

## CADASTRE AND THE REFORM OF EUROPEAN UNION'S COMMON AGRICULTURAL POLICY. IMPLEMENTATION OF THE SIGPAC (1)

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### INTRODUCTION

The conditions for the distribution of European Union agricultural aid, in application of the E.U.'s Common Agricultural Policy (CAP), have changed significantly in recent years, in regard both to the structure of the aids themselves and to the requirements of the related Integrated Administration and Control System. From aids directly linked to production, the system evolved to area-based subsidies and later, from a simple alpha-numerical identification of the agricultural land parcel to a more accurate identification based on a geographic information system obligatory since 1 January 2005.

The new land parcel identification system (LPIS) is an inventory similar to the cadastral inventory, and is applied to the administration of agricultural aid. In the few countries where it has been possible, including Spain, the rural cadastre has been used as the basis for construction of the LPIS; in others –all of them new E.U. members– the LPIS and the cadastre have been built at the same time. The majority of countries have adopted alternative solutions that generally exclude cadastral information, which in these countries is used for other purposes.

The geographic information system for the management of CAP aid implemented in Spain (referred to throughout this document as SIGPAC, its Spanish acronym) has adopted the cadastral parcel, representing a point of departure at which the two inventories contain identical information at a similar stage of updating. At the same time, it also represents a significant challenge:

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(1) The principal sources of information used to prepare this article are European legislation on agricultural aid, available on the European Union website ([www.europa.eu.int](http://www.europa.eu.int)), and the abundance of information on SIGCAP available on the website of the Department of Agriculture of the Autonomous Government of Andalucía ([www.juntadeandalucia.es/agriculturaypesca](http://www.juntadeandalucia.es/agriculturaypesca)). Especially remarkable is the contribution from Olivier Léo (MARS Project, AGRIFISH Unit, DG. Joint Research Centre), who kindly performed a review of the article. Added to this is the research into this subject by both the author and other professionals of the Cadastre in Andalucía, conducted over the past several months in the performance of their work. Of the latter, special recognition must be given to Juan Moreno, Area Head at the Regional Office of Cadastre in Andalucía, and José Ramón López de Luis, Area Head in the Territorial Office of Cadastre in Jaén.

to maintain future coherence between two inventories containing identical objects, but used for different purposes and managed by different Administrations.

This article aims to provide a brief explanation of the origins and evolution of the CAP, with emphasis on how cadastral information has been used in the administration of agricultural aid. We will also touch briefly on certain aspects of the implementation of LPIS in Europe, and analyse how Spain's SIGPAC works. Lastly, we will discuss the procedure established for coordination between the Cadastre and the SIGPAC, and the future of the system.

### BACKGROUND

#### What is the CAP?

Agricultural policy was the first –and for decades, the only– genuinely common policy of the former European Common Market, founded in 1957, and dates back to the creation of the first European institutions. Born just as the six founder members were emerging from a decade or more of food shortages, the Common Agricultural Policy began by subsidising production of basic foodstuffs to guarantee self-sufficiency. The Treaty of Rome [2] defined the general objectives of a common agricultural policy: to increase agricultural productivity, to ensure a fair standard of living for farmers, and to guarantee the availability of supplies at reasonable prices.

In short, the CAP combined a system of subsidies linked to production volumes of certain agricultural products, considered the most important in what was called continental agriculture (meat, dairy products, cereals, sugar beet, etc.), with a system of import duties on agricultural products and export grants.

The policy was so successful that, by the late 1970s and early 1980s, it had generated a problem of surplus production (the famous milk lakes, and beef, sugar and butter mountains), not to mention the distortion in world trade caused by subsidised production and export, brought to light in the negotiating rounds of the GATT, predecessor of today's World Trade Organization (WTO). And if this were not enough, agriculture accounted for over two-thirds of the total Community budget. It was in this context that the first reforms of the CAP were proposed.

#### CAP Reform

Cost control measures adopted in 1984 established quotas for dairy products and market controls for cereals and wine. At the same time, the Commission proposed a

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(2) Article 39 of the Treaty.

Green Paper[3] that emphasised the need to adapt the CAP to economic constraints, and to seek a better market balance, underlining the economic and social role of agriculture. Despite these measures, the situation of agriculture in Europe did not substantially improve, and in 1988 the Commission presented new proposals, principally the improvement of budget discipline, an increase of structural funds at the cost of guarantee funds, and measures to reduce the volume of farm land.

These new measures again proved insufficient. For reasons of budget (production surplus), the environment (mainly a result of intensive farming) and international pressure (GATT agreements), in 1992 the Commission decided to propose a major reform of the CAP [4]. This reform brought about a substantial change in the existing system of subsidies to the agricultural sector. In order to limit supply, the system of sustained income through guaranteed prices was replaced by a system of direct aid, accompanied by a coherent structural policy. The measures adopted by this reform were finally successful in reducing surpluses, containing expenditure and maintaining farmer income.

### The Cadastre enters the scene

To support the new direction of the CAP, Regulation (EEC) 3508/92 of the Council established an integrated administration and control system for certain community aid schemes, affecting the most important agricultural products. The new system was based on the idea that identification of agricultural parcels is essential for the correct application of area-based schemes, and on the conviction that the methods used up to that time were inadequate.

The integrated system that each Member State was required to create was to feature, among others, the following elements [5]:

- A computerised data base
- An alpha-numerical system of identification of agricultural parcels.
- Applications for subsidies.
- An integrated control system.

Article 4 of this Regulation established literally that *“the alpha-numerical system of identification of agricultural land parcels will be prepared using cadastral maps and documents and other cartographic references, or aerial photographs or spatial images, or other equivalent probatory references, or a combination of these elements”*. As we will see further on, this was not the first reference to the Cadastre in European Community legislation.

In Spain, the opportunity to use the Cadastre as a means of identification of agricultural land parcels in the integrated system was welcomed with open arms by the Administration responsible for agriculture, consisting of the Ministry of Agriculture and the departments of agriculture in the regional governments. Unfortunately, a combination of factors made

it very difficult at the outset to use cadastral data for this purpose.

Firstly, the necessary coordination between the different administrations did not occur. In 1993, farmers applying for subsidies were directed, en masse and with urgent deadlines, to the offices of the Cadastre in order to obtain cadastral certificates confirming the identification of their agricultural parcels. This collapsed the Cadastre's branch offices, which lacked the resources to attend a demand of such a size.

Secondly, the Rural Cadastre in 1993 was largely out of date, meaning that in addition to the massive demand for information, the Cadastre was faced with the need to update this information. Further, the information technology available at the time was incapable of processing and supplying data as quickly as the situation required.

As a first measure, the General Directorate of the Centre for Cadastral Management and Tax Cooperation determined that their offices would issue paper certificates for the parcels of all farmers. These were sent to the local authorities for rapid distribution. In readiness for future campaigns, the regional bodies of the Cadastre established contact with the departments of agriculture in the regional governments in order to establish a mechanism for the direct supply of information, making it unnecessary for farmers to apply to cadastral branch offices.

Since then, in the case of Andalucía, for example, the offices of the Cadastre issue computerised reports every quarter, with data on all rural parcels, to enable the department of agriculture to perform the control of declarations for the receipt of subsidies as established by the Integrated System.

### The Olive GIS

Two agricultural sectors that have always been subject to specific regulation within the framework of the CAP are vineyards and olive groves. Vineyards are governed by regulations published as of 1986 which affect more than 1.5 million vine growers<sup>6</sup>. As of this date, European regulations require the existence of a viticultural register in each country, listing all vineyards with their characteristics, location and rights, in order to control subsidies and to verify that the plantations are legal. Information has been transferred sporadically between the Rural Cadastre and the Spanish viticultural register, every time in the same direction, being the Cadastre supplier for graphic and textual information.

With regard to olive groves, these were first regulated by Regulation (EEC) 154/75, requiring the creation of an olive-growing register. This Regulation makes reference to the Cadastre, probably the first mention of many by the Community [7]. However, like the Viticultural Register, the transfer of information between the Rural Cadastre and the Olive-Growing Register has been

(6) Regulations (EEC) 2392/86, 649/87 and 1549/95.

(7) Art. 2. *“Le casier oleicole doit recenser pour chaque exploitant: a) la superficie oleicole totale avec les references cadastrales des parcelles qui la composent; b) ... des noms des proprietaires de chaque parcelle.”*

(3) COM(85) 333

(4) Reflection documents COM(91) 100 and COM(91) 258

(5) Article 2 of Regulation (EEC) 3508/92.

sporadic. With the introduction of Regulation (EEC) 2366/98, Member States were required to create a Geographic Information System, based on ortho-photography, to enable the strict control of subsidies to the olive-growing sector. This new Regulation, however, does not mention cadastral identification of parcels.

Even before this Regulation was passed, the Autonomous Government of Andalucía, in view of the poor quality of information used for the payment of subsidies, and faced with a new, more restrictive European legislation, had published an Order [8] requiring olive growers to present new declarations. The Order demanded that the declarations be consistent with cadastral data (cadastral reference and title holder).

Due to the relevance of the olive sector in Andalucía, and particularly in Jaén (Andalucía contains almost 60% of Spain's olive groves and Jaén, over 40% of Andalucía's olive groves), the impact on Cadastral offices in the region was immediate, with an overwhelming influx of declarations of change of crop. This was caused mainly by the large number of olive-growing towns that in 1997 were pending cadastral renovation and which therefore did not have up to date information. The second reason, also important, was the strong increase in olive production due to the prospects this crop offered, both commercial and in terms of subsidies, together with a significant revitalisation of the rural real estate market which has continued up to the present day.

Since publication of the European Regulation of 1998, the Ministry of Agriculture, Fisheries and Foodstuffs has passed several regulations for development, designed the Spanish Geographic Information System for the Olive Sector, and has increasingly emphasised the requirement for coherence between declarations on olive production and the GIS [9]. As in 1997 and 1998, the new regulation on subsidies for the olive-growing sector severely impacted some offices of the Cadastre. Whereas on the first occasion the objective was coherence of declared crop and title holder, after mid-2001 the requirement was for an exact match in parcel boundaries and consequently, in the number of olive trees.

#### Figure 1. Construction of the Olive GIS (p. 33)

The Spanish Olive GIS was obtained by superimposing the cadastral parcel map supplied by Cadastral offices between 1998 and 2000 onto digital ortho-

photos performed by the Ministry of Agriculture between 1997 and 1998. Where digital cadastral cartography was available this superposition was performed directly, otherwise, the cadastral map was scanned onto paper (for towns in the process of renovation) before superposition. Lastly, the number of olive trees in each parcel was counted. The liquidation of subsidies for the production of olive oil in 2001 brought a large number of incidents to light, notified to farmers by the agricultural Administration. These incidents derived from discrepancies between farmers' declarations, cadastral data and the Olive GIS, mainly variations in the number of trees registered in the Olive GIS and the number of trees declared.

As in 1993, when implementation of the new integrated system for the control of subsidies, in support of CAP reform, which required exact identification of agricultural parcels, the Cadastre was once more under pressure. This time, the issue was cartography, due to the demand to match parcel geometry to the single tree level. The reader is reminded that when cadastral documentation was collected to construct the Olive GIS, numerous olive-growing towns were still awaiting renovation, and consequently, their conventional cartography was not sufficiently up to date. Obviously, the superposition of this scanned cartography onto the new ortho-photos gave rise to numerous errors. Additionally, the cadastre was not initially conceived for this use and level of detail, therefore discrepancies arose even in towns whose cadastre had already been updated. A final consideration was the gap between reality, photographs taken in 1997-98, and the Cadastre, which increases as time goes by.

Although the Cadastre received nearly 100,000 claims (more than 60,000 in Jaén alone) related to the Olive GIS, this figure is not particularly high in relative terms, considering the conditions explained above and the fact that in Andalucía alone there are 1.4 million hectares of olive groves and that the average parcel size is 1 hectare. In any case, better communication by the Agricultural administration and better coordination with the Cadastre would have significantly reduced the impact on both the Cadastre and on farmers.

#### CAP Reform in Agenda 2000

The future entry of Central and Eastern European countries (CEEC) and the revision of WTO multi-lateral trade agreements demanded a new direction for the CAP to make it consistent with the strategy adopted in 1992. In the context of an increasingly market-oriented policy, this goal involved the consolidation of Europe's agricultural model, based on simultaneous achievement of three fundamental functions [10]:

- **Economic**, in the traditional role of agriculture as the producer of food for consumers and raw materials for industry, and in its contribution to economic growth, employment and the balance of trade.

(8) Order of 5 November 1997 of the Department of Agriculture.

(9) Royal Decree 368/99 of the Ministry of Agriculture, Fisheries and Foodstuffs. It requires an exact match between the data declared by the farmer (number of olive trees, surface area, cadastral reference, etc.) and the data registered in the Olive Sector GIS.

Royal Decree 1972/99 of the Ministry of Agriculture, Fisheries and Foodstuffs, regulating the procedure for the correction of discrepancies in the Olive Sector GIS. It classifies as a discrepancy any difference of more than 3% in the number of olive trees declared versus the GIS count.

Order of 13 June 2001 of the Ministry of Agriculture, Fisheries and Foodstuffs. Establishing rules for the verification of the Olive Sector GIS: a period of three months to present applications for correction of discrepancies in the GIS, and the obligation of olive growers to present an application to the Cadastre if the discrepancy affects parcellation.

(10) European Parliament. Fact Sheets. [www.europa.eu.int](http://www.europa.eu.int)

- **Territorial regulation**, based on diversification: agriculture complemented by other industrial, commercial or tourism activities.
- **Environmental**, emphasising its role in the conservation of the countryside, the defence of bio-diversity and conservation of the landscape based on sustainable agriculture that promotes farming practices which respect the environment.

Agenda 2000, presented in 1997/98, was a first step in this direction. The document was followed by proposals for regulations widely supported by the Berlin Council in March 1999, establishing the guidelines for the reforms of 2000-2006 to allow the E.U. to provide itself with a financial framework and more efficient policies. These proposals mainly involved a new reduction in institutional prices, offset (in part) by the increase in direct subsidies, the incorporation for rural development of measures traditionally used for other purposes, and the introduction of the faculty of Member States to modulate direct farm subsidies. This new regulatory framework also coincided with reforms passed for sectors typical of southern Europe, including the Olive Sector, mentioned previously. European agriculture must become multi-functional, sustainable and competitive, and at the same time guarantee a stable income for the farming population. Common Agricultural Policy must also contribute to the conservation of the countryside and to ensuring the vitality of the rural world. At the same time, it must address the concerns and demands of consumers regarding the quality and safety of foodstuffs, protection of the environment, and animal welfare. Lastly, it also aims at transparency and the simplification of procedures for application. The new political goals, which differ from market policy (the first pillar), refer to rural development, making this the second pillar of CAP.

In this way the Agenda acknowledges new concerns, such as fears that more intensive farming and animal husbandry were to blame for mad cow disease, dioxins in milk, artificial hormones in meat and other food-related health scares. High on the Agenda 2000 list of priorities were environmentally sound production methods, high standards of animal welfare, and food safety and quality.

The main reforms generated by the principles of Agenda 2000 were adopted half-way through 2003 [11], and represent the most radical reforms of CAP since its foundation in 1958. Subsidies for production are largely disappearing in favour of direct payments to farmers, which are in many cases linked to compliance with regulations regarding the environment, animal welfare, standards of hygiene and preservation of the rural environment.

Changing the way E.U. agriculture is funded also addresses the accusation that CAP distorts world trade (e.g. through subsidised export of surplus foodstuffs). The latest reforms have reduced agricultural aids that

distort trade, by as much as 70%. They have also prepared the E.U. for the next wave of deregulation of international trade, now under negotiation within the context of the Doha Development Agenda.

The principal elements of this reform are the following:

- **Promoting market-oriented agriculture.** Single farm payments are introduced, still coupled with production in some cases, to compensate for the reduction in price subsidies. The objective is to encourage farmers to tailor production to market demand, instead of growing whatever crops obtain the highest subsidies.
- **Guaranteeing farmers' income and promoting equitable distribution of income.** Farmers' income has increased thanks to the introduction of single farm payments, which cannot be abolished because the income generated by the market is inadequate. The right of Member States to modulate aid on the basis, in particular, of the situation of employment and the workforce introduced by Agenda 2000, should guarantee a more equitable distribution from the social viewpoint.
- **Environmental protection.** Environmental needs are being incorporated ever better into CAP, but rural development does not pay enough attention to the environment, and the aids granted to farmers are still excessively linked to production. The reform increases aid to farms using production methods that respect the environment.
- **Rural development.** The reform reinforces the second pillar of CAP with new measures and adjustments relative to food quality and to the development of regulations in the areas of environment, food safety, and animal health and welfare, designed to encourage farmers to obtain certification of their production.
- **Stabilisation of markets and the reform of common market organisations.** The reform insists on the need to decouple subsidies, in other words, to break the link between production and income, in order to replace production subsidies with single farm payments. These payments, consisting of an amount per hectare, are subject to compliance with a series of requirements relative to the environment, safety, and the obligatory setting-aside of farmland. The objective is to progress in the decoupling of aids, which should enable the entry of new Member States into the CAP and strengthen the European Union's position in the World Trade Organisation.

The financial prospects that served as a framework for the reform of the CAP introduced by Agenda 2000 are valid until the end of financial year 2006. Negotiation of the financial framework for 2007-2013 started several months ago, with a Union now formed of 25 or 27 members. Enlargement will make the CAP even more restrictive, with fewer direct aids to farmers and increasingly linked to rural development.

(11) Regulation 1782/2003 (EC) of the Council, of 29 September 2003, establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers.

The recent proposal of the European Commission, in its chapter on "Preservation and Management of Natural Resources", introduces a 3% reduction in the CAP budget, despite the fact that with enlargement, the number of farmers in the E.U. will grow by 7.5 million. This reduction in direct aid to farmers is compensated by funds for rural development and environmental protection. Although the CAP continues to take the biggest share of the community budget (300,000 million euros), its relative weight drops to 30% of the total, compared to today's 50%. In the 1980s, before the above-mentioned reforms, the CAP represented two-thirds of the budget.

Figure 2 shows the evolution of the CAP and of its principal control mechanisms, in relation with certain important milestones in the history of the E.U.

**Figure 2. CAP evolution.  
Reform of the Integrated Administration  
and Control System and implementation  
of the Land Parcel Identification System. (p. 15)**

While the CAP reform approved in 1992 and applied in subsequent years introduced stronger measures for the control of agricultural aid through implementation of the Integrated System, the reforms introduced by Agenda 2000 have modified the Integrated System to make it even more efficient. Regulation 3508/92, establishing the integrated system, was modified by Regulation (EC) 1593/2000 of the Council, which establishes the following terms in Article 4:

*"The identification system for agricultural parcels shall be established on the basis of maps or land registry documents or other cartographic references. Use shall be made of computerised geographical information system techniques including preferably aerial or spatial orthoimagery, with an homogenous standard guaranteeing accuracy at least equivalent to cartography at a scale of 1:10 000."*

The deadline established for implementation of the new system was 1 January 2005.

In this manner, graphic identification was added to the control system for agricultural aid, complementing the alpha-numerical identification established in 1992. Although it grants E.U. Member States a measure of independence to build the parcel identification system best suited to the situation in each country at the point of departure, the new Regulation recommends the use of the cadastral parcel supported by recent ortho-photography.

The above-mentioned new 2003 Regulation [12], which incorporates the CAP reform required by Agenda 2000 and replaces the 1992 Regulation, reproduces the text transcribed above relative to the land parcel identification system in its Article 20. Article 18 lists the elements of the Integrated System, modernising the 1992 list. These elements are:

- A computerised database.
- An identification system for agricultural parcels.
- A system for the identification and registration of payment entitlements.
- Aid applications.
- An integrated control system.
- A single system to record the identity of each farmer who submits and aid application.

In summary, since year 2000, all E.U. countries, including new members, are required to establish a land parcel identification system (LPIS), which forms part of the Integrated Administration and Control System of agricultural aids, and which must be implemented by 1 January 2005. Each country has been allowed to establish the LPIS in the manner it considers appropriate, within the terms imposed by community regulations [13].

The technical requisites of LPIS are the following:

- The information it contains must include the parcel identification number, its area and use, specifying the uses entitled to aid.
- It must cover the entire rural area in a consistent manner, under a single system.
- In terms of cartographic precision, it requires a scale of at least 1:10 000, indeterminate field between 0,5m and 1m, and a maximum pixel in ortho-photos of 1m [14].
- The system and its connection to the Integrated System database (IACS GIS) must allow connection between graphic and alpha-numerical databases, and the efficient use of graphical information in all the IACS procedures: the massive distribution of information to farmers, administrative cross checks with immediate cross-referencing of all information, the use by local offices or field inspectors or operators of control with remote sensing.
- The system must be regularly updated: at least once a year, following feed back of on the spot checks. Ortho-photos should be updated to ensure that the general quality of the information remains consistent. A five years cycle is generally indicated but real updating varies between three and seven or more according to the stability of the land use.

(13) The last CAP reform maintains the key role of the IACS GIS and LPIS as horizontal reference layer of information to control and manage the subsidies. The Single Payment scheme may, to some extent, reduce the requirements of identification and control of individual parcels, but the general trend is to extend the role of IACS GIS to most of the sectors (present reform of olive sector, cotton and tobacco, second pillar etc).

Moreover, extra requirement of information are introduced for the control of cross-compliance with environmental Directives (Bird, Habitat, Sludge, Nitrate) and GAECs (Good Agricultural and Environmental Conditions). According to regional/national definition of GAECs, the IACS GIS may have to manage also point or linear features (for instance maintenance of terraces, hedges...).

(14) The use of orthoimagery is not compulsory but strongly recommended in the EU Regulation. However, all the EU member States and Candidate countries indeed decided to use orthoimagery in a way or another in their LPIS.

(12) Regulation (EC) 1782/2003 of the Council, later complemented by 796/04 of the Commission.

The next section briefly reviews the different points of departure in various Member States, certain problems in the interpretation of concepts, and the options finally selected.

### IMPLEMENTATION OF THE LPIS IN E.U. MEMBER STATES [15]

From the Spanish viewpoint, the required system is similar to the Rural Cadastre, which covers the entire territory, identifies each parcel, and provides information on land use. However, the concept of cadastre varies widely in Europe and the common denominator when addressing LPIS across the different Member States is the wide variety of cadastral models and the information they contain.

The principal elements that European cadastres have in common are their aim to cover the entire territory, the accurate identification of parcels, and the existence of cartographic and alpha-numerical information. The scales used are higher than those required for the LPIS and, in theory, they are continuously updated. It is also common for the Cadastre to include the identity of the title holder, as a consequence of the close relationship between the Cadastre and the Land Registry in most E.U. Member States.

However, until only recently the use of ortho-photos by European cadastres was uncommon, since cartography was prepared using topographic surveys. Ortho-photos have been used mainly by the new Member States, faced with the requirement to establish their cadastres in a short space of time and with limited economic resources. It is much less common for Cadastres to contain detailed information on the use of the land, with the sole exception of Spain.

This being the situation at the point of departure, E.U. countries have chosen different solutions to build their respective LPIS, using to a greater or lesser degree the information available from their cartographic or cadastral institutions, or building a completely new system. In any case, the final product must be substantially homogenous.

#### The point of departure in 2000

As explained above, the requirement to build an LPIS to support the IACS for agricultural aid was established by Regulation (EC) 1593/2000. The situation existing at that time is analysed on Maps 1 and 2.

**Map 1.** The use of cadastral information in the Integrated System in 2000. (p. 35)

(15) To prepare this section, a large amount of information has been obtained from the presentation made by OLIVIER LEO (MARS Project, AGRIFISH Unit, DG. Joint Research Centre) at the 1st Congress on Cadastre in the European Union, Granada, May 2002. This document can be viewed on [www.eurocadastre.org/pdf/olivierleo.pdf](http://www.eurocadastre.org/pdf/olivierleo.pdf). This is a large file which may take several minutes to open or download.

Of the 15 E.U. Member States, 13 had a cadastre, in widely different situations of updating. Ireland and the U.K. did not have a cadastre *strictu-sensu*, but they did have cartography in their respective Ordnance Surveys allowing accurate identification of any piece of land. For this reason, for the purposes of this article, we will consider that all E.U. countries had a cadastre or "equivalent system", although we might make an exception with Portugal (where the cadastre exist only on the Northern part) and Greece (where cadastre is presently being established, and only very fragmentary Cadastre exists- for instance on Rhodes Island).

In addition to cadastral information, seven countries (Belgium, Denmark, Finland, Greece, Ireland, Italy, Portugal and Spain) also had ortho-photographic coverage, allowing superposition of the cadastral parcel map. In some cases, such as Italy, ortho-photography had not been performed by the Cadastre, but rather by the administration responsible of IACS and olive GIS. In Spain, ortho-photography did not cover the entire country, only its olive growing areas. France had ortho-photography for a small part of the country, corresponding to olive-growing areas in its Mediterranean regions.

As for the use of cadastral information in the Integrated System, this was already a reality in Austria, France, Germany, Italy, Spain and the U.K. In all cases it was used merely as back-up information for the location of agricultural parcels eligible for subsidies. Spain was the only country in which cadastral information included data on the use of the land, in enough detail to determine whether or not a given portion of the parcel was entitled to subsidy. In Spain also, the Integrated System accurately identified the agricultural parcel with the cadastral parcel.

**Map 2.** Identification of agricultural land parcels in the Integrated System. (p. 36)

As illustrated on map 2, in 2000 all Integrated Systems already had some form of LPIS, in more or less precarious conditions, with digital or paper cartography, in some cases supported by ortho-photography and in others not. In the case of Spain, we can summarise the situation by saying that the Integrated System used alpha-numerical cadastral information to identify parcels and their use (without prejudice to on-site checks), used paper maps to delimitate agricultural use in certain cases and was beginning to feature ortho-photography performed for the Olive GIS.

In short, up until year 2000 each country used the best information available to it, cadastral or not, to manage its integrated system, within the wide variety of models allowed by the regulations in force since 1992.

#### Objective: LPIS 2005

As we have already seen, the technical requirements of the LPIS for the Integrated System are much stricter since 1 January 2005, and fully incorporate digital cartography. It would seem to make sense to use the cadastre directly as the LPIS or as a basis for the construction of the LPIS, particularly in countries with an up-to-date cadastre and digital cartography. When the

cadastre does not offer these conditions, the options are either not to use the cadastre at all, or to improve it; in the case of precarious cadastres (in some of the new E.U. Member States), the most efficient option would be to establish a new multi-purpose cadastre, among them to serve as the basis for the LPIS.

Before going on to describe the options adopted by the different E.U. countries, we will focus briefly on certain technical questions related to the conditions of a cadastre and LPIS for the Integrated System.

Firstly, the sole mission of the LPIS for the Integrated System is the administration and control of E.U. agricultural aid, while the cadastre originally has very different purposes. Traditionally, the majority of European cadastres were mainly used to support the registration of a property or as a tax database. Although in modern times they have evolved to become multi-purpose cadastres, this variety of purposes does not necessarily mean that the cadastres are specialised in each and every one of these purposes.

The administrations that manage the two inventories are also very different. While CAP aids are managed by very specific bodies of the agricultural Administration, the Cadastre is usually the competency of Ministries responsible for territorial policy or finances, seldom of the Ministry of Agriculture. Even when the latter is the case, cadastre is the responsibility of a different entity from the one that administers aid.

**Figure 3.** Comparison between Cadastre and Integrated System for CAP administration. (p. 18)

The subject with whom the agricultural Administration relates is the farmer, the recipient of aid, therefore the database for the Integrated System is an inventory of agricultural production units entitled to certain subsidies. The subject registered in the cadastre is somebody with certain legal rights on rural estates, usually property rights. The title holder and farmer of a given piece of land are not necessarily one and the same person.

Lastly, the territorial object is also different. As discussed below, the Integrated System uses a different concept, the agricultural parcel, which does not coincide with the concept of cadastral parcel.

European law [16] defines the agricultural parcel as a continuous portion of land, with a single type of crop and cultivated by a single farmer. Farmers have to declare these agricultural parcels, however their identification and control is operated by "reference parcels" which can be slightly different [17]. Community terminology also uses spatial concepts such as the *block* (any continuous portion of land) or the *ilot* (single portion of land with a unique farmer but several crops). Language differences have made these terms even more confusing.

**Figure 4.** The concept of the agricultural parcel in community regulations. (p. 19)

The latest regulation to address this subject establishes that "The identification system for agricultural parcels referred to in Article 20 of Regulation (EC) No 1782/2003 shall operate at reference parcel level such as

*cadastral parcel, or production block which shall ensure unique identification of each reference parcel.*" This ruling may represent a significant reduction in the relevance of the cadastral parcel as the basis for delimitating agricultural parcels, mentioning it as an example at the same level as the *ilot*, and leaving the door open to other possibilities.

In this situation, there are three basic options available to E.U. member states when deciding which type of parcel of reference they will use as the system of identification in their respective LPIS:

- **Blocks;** simply, continuous portions of land delimited by geographic irregularities, roads, or other elements of discontinuity. Blocks can accommodate different agricultural uses and be exploited by several different farmers.
- **Ilots;** continuous portions of land which is farmed by only one farmer with several crops of the same or different land use type. In both *ilots* and *blocks*, Integrated System must verify that the sum of the areas declared does not exceed the total area of the parcel of reference.
- **Cadastral parcels;** in this case, two farmers can not apply for aid on the same parcel of reference, and moreover, the cadastral parcel can be subdivided to single out agricultural usage [18].

The use of the cadastral parcel would appear to offer important advantages over the other two options. The main advantage is that it directly provides an exact identification of each portion of land, together with its area, at a scale that is more than sufficient for the requirements of the Integrated System. Further, the cadastre is an inventory that is permanently available and already familiar to farmers, which also contains more information than strictly necessary for the control of agricultural aid (property) and which is often able to link up to other territorial inventories. Lastly, the savings inherent in using an existing system instead of creating a new one speak for themselves.

In the case of Spain, the cadastre offers a significant added advantage: it provides highly detailed information on agricultural use of the land which, although usage categories do not coincide exactly with the uses classified for community aid, can be linked with these relatively easily. These different uses are represented graphically inside the parcel of each farmer, such that the internal subdivisions of the cadastral parcel (sub-parcels) are comparable to the definition of the agricultural parcel in CAP terminology.

**Figure 5.** Advantages and disadvantages of the cadastral parcel as a land parcel identification system. (p. 20)

However, in most European cadastres information on the agricultural use is non-existent (only in alphanumeric form- no subdivision) or poorly updated. Very

(18) However, two farmers can share the same parcel paying rent to the same parcel's owner and they can both apply for subsidies. The problem is solved in different ways depending on the country.

(16) Article 1.4 of Regulation (EEC) 3508/1992.

(17) Article 2 point (26) of Regulation (EEC) 796/2004.

few provide data on type of usage, at best with a low degree of detail. This fact, together with the strong link between the cadastral parcel and land ownership, means that the territorial object of the cadastral parcel and the agricultural parcel are not easily comparable.

Other general obstacles to the use of the cadastre as the identifier of agricultural parcels are related to the different administrations that manage the two inventories, and their different missions, giving rise to different updating schedules and the subsequent discrepancies between the data contained in each. On top of all this are the typical problems of coordination that arise between different institutions.

One last difficulty is related to the stability of the different territorial objects that might be adopted as parcels of reference. Of these, the most stable is the block, with highly generic boundaries only altered by the appearance of new discontinuous elements on the land. At the other extreme, the agricultural parcel is the most volatile, subject to modification as a result of a simple change in agricultural use or farmer. The *ilot* is situated mid-way between these two extremes, since its boundaries are not affected by a change in ownership of the land.

**Figure 6.** Stability of territorial objects. (p. 21)

The degree of complexity of LPIS maintenance will directly depend on the object chosen: a highly detailed territorial object is subject to a higher rate of variability. On the other hand, administration of the Integrated System is made easier by more detailed identification of the territorial objects eligible for aid.

For the reasons explained above, the choice of territorial object to be used in the LPIS is far from simple, and involves achieving a balance that basically depends on the background and circumstances in each country. These decisions are illustrated in Map 3.

**Map 3.** LPIS parcels of reference. (p. 37)

The majority of countries (mainly the Nordic countries, plus Greece and Portugal) have adopted the block system, which is the easiest in terms of LPIS maintenance. For this system, it is sufficient to have a good basic cartography, ortho-photography and scale maps performed by the corresponding national geographic institutions, to reflect “continuous portions of land” in the required level of detail. The case of Scotland, within the UK, is exceptional, using a sort of “block” system with individual identification of each parcel, making it next to the “agricultural parcel” system.

The system of *ilot*s has been chosen by France, Finland, the Czech Republic and Malta. In addition to the work necessary to define the blocks, it requires at least one photo-interpretation on ortho-photos in order to delimitate the agricultural uses of the land. Belgium has gone a step further, outlining real agricultural parcels by including data on the farmer, with a result similar to the use of cadastral parcels. Slovakia and Hungary have opted for a combined *ilot*-block system.

Germany in itself contains all the possible European choices, either blocks, *ilot*s or agricultural parcels have been adopted, depending on the *lander*. Digital cadastre when available is always part of the IACS GIS but is generally used as ancillary information. Only two *lander* keep in 2005 the Cadastre as main reference parcel.

Lastly, seven countries (Spain, Italy, Austria, Poland, Slovenia [19], Cyprus and Luxembourg), some relevant in terms of economic and territorial size, have used the cadastre as parcel of reference for the LPIS. In this case, it has been necessary to superimpose the cadastral parcel onto the new ortho-photography and photo-interpret agricultural usage, except when, as in the case of Spain, the cadastre already provides this information.

Images 1, 2 and 3 show examples of the LPIS established in different E.U. countries.

**Image 1.** Examples of LPIS. Scotland uses a system between block and agricultural parcel (without ortho-photos, on British Ordnance Survey maps). Denmark adopts the **block** system, on colour ortho-photo to a scale of 1:2,500. (p. 38)

**Image 2.** France uses the *ilot* system. In a first phase on ortho-photos to a scale of 1:10,000; a second phase, scheduled for 2005, on ortho-photos to a scale of 1:5,000. The system can be accessed through Internet, but access is restricted to each farmer by means of a user name and password. (p. 38)

**Image 3.** Superposition of the conventional cadastre scanned onto a colour ortho-photo in Poland. (p. 38)

## THE SPANISH LPIS: SIGPAC

When Regulation 1593/2000 established the requirement for Member States to define a system of parcel identification for the control of agricultural aid, it was clear to the Spanish agricultural Administration that the cadastre was the ideal base for construction of this system. As a result, a global agreement was signed in 2002 between the Ministry of Finance and the Ministry of Agriculture, to establish the basis for the supply of information, and updating the cooperation mechanisms designed to establish the olive-growing Geographical Information System (Olive GIS).

Because implementation and operation of the Integrated Administration and Control System are the responsibility of the departments of agriculture in the respective Regional governments, under the supervision of the Ministry of Agriculture, the Ministry also signed various agreements with the Regional governments defining their participation in the construction of the SIGPAC, the acronym for the Spanish LPIS. Under these agreements, as early as 2001 some Communities began the task of aerial photography for the preparation of ortho-photo, which had to be completed in time to superimpose the cadastral parcel information and finish clean-up tasks before 1 January 2005.

The system is regulated by Royal Decree 2128/2004, which assigns responsibility for coordinating SIGPAC implementation to the FEGA (Spanish Agricultural Guarantee Fund). This authority is also responsible for

(19) Slovenia benefits from an important “Real Estate Modernisation project” to build a multipurpose cadastre system. IACS Administration decided to build on these bases a specific system GERK, with concepts somehow similar to *Recintos*, but which will in 2006 replace the Cadastre as a main reference.

coordinating the controls established within the context of the Integrated System. [20] The requirement to designate an authority responsible for the Integrated System at the national level is established by Regulation (EC) 1782/2003.

SIGPAC is defined as:

1. A public administrative register dependent on the FEAGA and the departments of agriculture in the Regional governments, which contains information on the parcels eligible for area-based community aids.
2. A database containing digital cartographic information on the entire national territory, made up of aerial orthoimagery and a geographic delimitation of each land parcel, including its individual identification reference, geometry and agricultural use. The Olive GIS is incorporated into SIGPAC.
3. The individual identification reference is the self-same cadastral reference, since the cadastral parcel was used as the basis for SIGPAC.

Figure 7. The SIGPAC database. (p. 23)

The database can be centralised in the Ministry of Agriculture, Fisheries and Foodstuffs (MAPA), or decentralised to servers in the regional governments. In practice, a mixed system has been established, in which some regional governments have opted to maintain their own computer systems while others have chosen to load their data into the centralised database housed in MAPA. In any event, the information contained in SIGPAC is unique, allowing permanent consultation of updated data on the entire national territory.

System coordination has been reinforced by the creation of a collegiate body, the SIGPAC Coordination Board, assigned to the FEAGA, with representatives from other general directorates of the MAPA, the regional governments, and the General Directorate of Cadastre.

It is important to mention the definition of SIGPAC's two principal geographical objects:

- **Parcel:** continuous area of land with a unique alpha-numerical reference, graphically represented in SIGPAC. We have already mentioned that this unique reference is the cadastral reference, and that the parcel is the cadastral parcel.
- **Recinto (plot):** continuous area of land within a parcel for a single agricultural use. [21]

"Recinto" is equivalent to the previously discussed "agricultural parcel", the term used in Community Regulation: a continuous portion of land with a single type of crop, farmed by a single farmer. Conceptually, it is also analogous to the cadastral definition of "subparcel", created within the cadastral parcel as a consequence of different crops and uses of the land. However, this anal-

ogy between plot and subparcel is lost in the face of the differences between usage categories employed by the Cadastre and the SIGPAC. Although these categories can be linked fairly easily in most cases, they are much more detailed in the Cadastre.

Figure 8. SIGPAC uses and cadastral descriptions. (p. 25)

The difference in the definition of use has not been an obstacle to using cadastral data as the basis for usage data in SIGPAC, however it may affect system coordination in the future, as discussed later in this paper.

In summary, and in highly simplified terms, we can say that the SIGPAC has been constructed following the steps described below:

1. Ortho-photos taken, with a resolution at least equivalent to a scale of 1: 5 000, by the regional governments or the MAPA. Completed between 2001 and 2002.
2. Incorporation of the cadastral parcel and its superposition and adjustment on the continuous ortho-photo map. Completed in 2003 and 2004.
3. Incorporation of aid information from the Integrated System.
4. Delimitation of plots within each parcel, using photo-interpretation and information from cadastral descriptions. Completed in 2003 and 2004.
5. Loading of the system on Internet. Completed during the second half of 2004.

Figure 9. Construction of the SIGPAC. (p. 34)

Figure 9 shows a given area of Andalucía in two SIGPAC screens: on the website of the regional Department of Agriculture, and on the FEAGA (MAPA) website. FEAGA offers integrated SIGPAC information on any portion of the national territory, although some regional governments have chosen to offer information on their respective territories through their own systems. The following sample of Internet addresses are given for reference:

All of Spain (FEAGA)  
<http://sigpac.mapa.es/feaga/visor>  
 Andalucía  
<http://www.juntadeandalucia.es/agriculturaypesca/>  
 Aragón  
<http://sigpac1.aragob.es/visor/>  
 Castilla – La Mancha  
<http://sigpac.jccm.es/visorsigpac/>  
 Castilla y León  
<http://www.sigpac.jcyl.es/>  
 Extremadura  
<http://62.175.245.26/visor/>  
 Galicia  
<http://www.xunta.es/conselle/ag/fogga/sixpac/visor/>  
 Murcia  
<http://147.84.210.4/visor14/>  
 Navarra  
<http://sigpac.tracasa.es/>  
 Basque Country  
<http://arc.ikt.es/sigpac/>  
 La Rioja  
<http://sigpac.larioja.org/visor/>

(20) Per article 3.6 of Royal Decree 1441/2001, approving its statute.

(21) These agricultural uses are defined in Annex II of Royal Decree 2128/2004, of 29 October, regulating the geographic information system for land agricultural parcels.

Image 4 shows examples of screens used by different regional governments. Some, such as Andalucía, Navarra and the Basque Country, which house the SIGPAC database on their own servers, use personalised screens; Castilla y León, or Galicia, use the FEGA screen, with some degree of personalisation in the presentation. Other communities such as Murcia link directly to the FEGA screen.

Differences also exist in the ortho-photos used. The most widely used is the colour ortho-photo to a scale of 1:5,000, or 1:2,000 in the case of Galicia and the Basque Country. Andalucía has used black and white ortho-photography to a scale of 1:5 000. In all cases digital imagery has been used, and therefore the references to scale are orientative to a certain extent. We can be more exact regarding pixel size, which in some cases is 0.5m and in others, 0.25m.

However, we would again place emphasis on the fact that the SIGPAC is a unified national system and that FEGA screens offer complete information on any given point in the territory, with the exception of Ceuta and Melilla (Spanish towns in Northern Africa). The system also features unified formats for information templates (Image 5). We would also underline that this is a public free of charge service, providing open access to physical information on parcels.

**Image 4.** Examples of SIGPAC screens. (p. 39)

**Image 5.** SIGPAC information template, that can be downloaded from Internet and printed. (p. 40)

## SIGPAC MAINTENANCE AND COOPERATION WITH THE CADASTRE

The SIGPAC, which became operational on 1 January 2005, is in fact a still photograph of Spanish agriculture which, depending on the autonomous community, dates back to the second semester of 2003 or the first semester of 2004, based on the date of incorporation into the cadastral parcel system. Orthoimagery is a little older, dating from 2001 or 2002. The issue of time lag is inherent in the way the system is built.

Added to this is the gap between current reality and cadastral information at the time of delivery, plus any mistakes made in photo-interpretation when the SIGPAC “recintos” were created. It is therefore evident that the SIGPAC dated 1 January 2005 is an unfinished product which needs to be submitted for verification by the farmers themselves.

For this purpose, the regional governments – responsible for administration and maintenance of the system in their respective territories – have declared allegation periods to allow farmers to communicate any discrepancies with the data contained in the SIGPAC. Andalucía, taken as an example, declared an allegation period at the end of 2004, prior to the official implementation of the system, another post-implementation period in the first quarter of 2005, and a third, specifically for olive-growing parcels, in May 2005. Allegations are prepared using the SIGPAC graphic template, for presentation in the branch offices of the Department of Agriculture. Andalucía offers assistance to farmers to complete their allegations, downloading the SIGPAC graphic template for them from Internet and using a computerised allegation model.

The categories of allegation that may arise are the following:

1. Change of use of an entire plot.
2. Change in production method (non-irrigated/irrigated) in an entire plot.
3. Division of a plot in order to modify use in part of the plot.
4. Division of a plot in order to modify production method (non-irrigated/irrigated) in part of the plot.
5. Existence of a parcel located on urban land and used for farming purposes.
6. Changes in the morphology of the parcel.
7. Other allegations and applications for modification not covered in the previous categories.

The designated authorities in the regional governments must verify the documentation provided with the allegations and decide on each case, rectifying the SIGPAC as necessary. All rectifications are incorporated into the national system through the associated computer processes.

Type 6 allegations give rise to special requirements. Whereas the other categories affect the distribution of plots within the parcel, type 6 affects the geometry of the parcel itself, which can only be modified by affecting the neighbouring parcels. Because the SIGPAC parcels are cadastral parcels, the Cadastre must necessarily intervene in their modification. Therefore, in addition to its contribution to the creation of the SIGPAC, the Cadastre is also committed to its maintenance.

The procedure for resolution of Type 6 allegations is specific, and was agreed by the SIGPAC Coordination Board in February 2005. The process flow is shown in Figure 10.

**Figur 10.** Process flow for Type 6 allegations. (p. 27)

Some regional governments are critical of this process, especially with regard to the time it takes for the cadastral resolution to reach them. They are therefore in favour of a direct connection between the Cadastre’s branch offices and the departments of agriculture, incorporating modifications first into the database resident on the decentralised server and only afterwards into the general system managed by the FEGA.

Furthermore, the procedure generates a double resolution: from the Cadastre, who notifies the applicant of the cadastral modification, and from the SIGPAC, who notifies him/her of the modification to the system. A formula to prevent this duplication is advisable, for example for the cadastral notification to include information on the immediate incorporation of the modification into the SIGPAC.

In any event, the essential coordination between different administrations has the primary objective of serving the citizen, in this case the farmer, who should have the perception of a single system and not be forced to communicate with different administrations for a single purpose. In particular, citizens must be freed of the burden of searching for information and red tape formalities that the Administration can perform itself. A fundamental tool is the Virtual Office of Cadastre, or the e-Cadastre.

The e-Cadastre allows public access to information on physical data updated daily, for 80% of the area contained in the Rustic Cadastre. This means that

any farmer, regardless of whether he/she is the cadastral title holder, and any employee of any public administration or any entity involved in the system of agricultural aids, has immediate access to information on the geometry, area and crops in any given parcel. We must remark the accessibility to this information: as well as SIGPAC, the e-Cadastre allows free of charge access to all information, excepting to protected personal data. This can be freely inspected only by every person (on his/her own data, with an user's certificate) or by the Public Administration (as a registered user for its competencies). This free access philosophy is a distinctive feature of the Spanish Administration, being the common practice in Europe the restricted dissemination charging a fee.

Nextly, the e-Cadastre will provide new facilities. Through a web map server (WMS), it will be possible to retrieve layers of graphic information to be used (without manipulation) for particular purposes.

**Image 6.** Information available to the public offered by the e-Cadastre. Parcel map and information template containing the physical data relative to a specific parcel: cadastral reference, location, area and crops. (p. 40)

With regard to the SIGPAC, as discussed previously this is a still photograph that is updated by farmers during the allegation periods. This updating mechanism is completely different from the cadastral method, which is based on continuous modernisation fed by the declarations that are mandatory whenever an estate is modified. For this reason, cadastral data will always be more up-to-date, since the SIGPAC data generates from cadastral data pertaining to a prior date, and which is already over a year old.

Consequently, cadastral information is a permanent reference in any SIGPAC allegation exercise, in such a way that farmers can base their applications for modification of the SIGPAC on the current situation of the cadastre. An immediate consequence of this situation has been the strong increase in the demand for cadastral information, which the e-Cadastre can satisfy much more efficiently than the traditional visit to the Cadastre's branch office. The fundamental advantage of e-Cadastre is that it allows the agricultural Administration to consult cadastral data for its own purposes, or to provide these data to farmers so that they don't have to obtain it themselves. The benefits for all three parties is evident: the Cadastre's branch offices are not overloaded with requests for information, the agricultural Administration can obtain this information easily, for comparison with the allegations presented by farmers, and most importantly, citizens are saved from unnecessary inconvenience and are provided better service.

This fruitful cooperation between the agricultural Administration and the Cadastre can be improved with the information that the agricultural Administration receives in the allegations relative to land use. In practice, SIGPAC allegations can refer to crops or uses not incorporated in the SIGPAC database and that may also not be included in the cadastral database, either because they had never been declared or due to errors in cadastral information current at the time the SIGPAC was built. The Cadastre is naturally interested in receiving this information available to the SIGPAC administration bodies.

## THE FUTURE OF THE SYSTEM

From the viewpoint of the Cadastre, we are at the centre of a triangle formed by the agricultural Administration (SIGPAC), the Land Registry and the Tax Administration (Figure 11).

The key to the system is the cadastral reference, which allows the exact identification of any holding, physically delimited in the Cadastre. This reference is called the "SIGPAC reference" in the LPIS for agricultural aids, while the Land Registry refers to it as the cadastral reference and associates it with the estate number. In the context of the tax system, its most obvious uses are the identification of holdings subject to real estate tax, and the access to real estate data by the National Agency for Tax Administration (AEAT).

**Figure 11.** The relationship of the Cadastre with the SIGPAC, the Land Registry and the Tax System. (p. 29)

The SIGPAC is an inventory that includes the entire area of the country, but that only houses and updates detailed information on the agricultural parcels that are entitled to CAP aids. In other words, forest land and agricultural lands not entitled to CAP aids are excluded from maintenance by this system. The basic product that the Cadastre "exports" to the SIGPAC is the cadastral reference, which is equivalent to saying the delimitation and area of the parcels. Additionally, during preparation of the SIGPAC the cadastre has also provided the initial information on the use of land.

The main product that the Cadastre hopes to receive from the SIGPAC in future is information on land uses, that is, on changes in crops and use, available to the Administration responsible for the SIGPAC (MAPA and the departments of agriculture of the regional governments). It is important to remember that these constitute the country's agricultural Administration, integrated in the rural world and in contact with the farmers and as such, they may be aware of modifications that might not have been declared to the Cadastre.

It is easy to establish an analogy with the relationship between the Cadastre and the Land Registry. The coordination between these two inventories has been mandatory since 1996, with the requirement to reflect the cadastral reference in documents certifying real estate rights, although implementation of this obligation did not come into force for rural real estate until 1 January 2003 [22]. In this manner, by means of the cadastral reference the Cadastre provides the Land Registry with the identification and boundaries of estates, and receives information on the related ownership rights.

The Land Registry is a continuously updated inventory that only includes information on the holdings presented for registration. Remember that in

(22) This requirement first appeared in law 13/1996, of 30 December, on Measures for Taxation, Administration and the Social Order. It is currently contained in Article 38 of Legislative Royal Decree 1/2004, of 5 March, of the merged text of the Law of Real Estate Cadastre. Articles 14 a) and 36.3 of this law refer to obligatory notification of the Cadastre by public notaries and registrars.

Spain, inscription in the Land Registry is voluntary, while cadastral inscription is obligatory, meaning that the Cadastre is the only inventory that contains information on all holdings. Subsequently, in terms of property the Cadastre performs what we could call a *supplementary activity*: it directly incorporates information on the title holders of the properties inscribed in the Land Registry and identified by means of the cadastral reference, and uses its own information for the rest.

Returning to the SIGPAC, the establishment of a similar rule relative to land uses is worth considering. Given that the agricultural Administration is aware of the modifications in the use of farmland and uses the cadastral reference for parcel identification, it could communicate these changes to the Cadastre, and thus free farmers from this obligation. Furthermore, a reform of the system of cadastral descriptions to fully align these with SIGPAC usage categories would allow the Cadastre to incorporate the "recintos" delimited within the parcel, replacing the cadastral subparcel. In this manner, the Rural Cadastre would also take on a supplementary role, directly assuming the maintenance of data on crops and uses not controlled by the SIGPAC.

These ideas are attractive, and also feasible. However, any action in this direction must be approached with caution, since they would require certain legal reforms as well as the definition of some technical details. On one hand, the SIGPAC's annual maintenance schedule does not fit well into the continuous maintenance required by the Cadastre. And on the other, both systems would have to work with the same graphic database, which is not a simple undertaking.

In all, probably the biggest uncertainty regarding the system resides in the stability of the SIGPAC itself. The Land Registry has been operating in a known fashion for many years, allowing the establishment of legal regulations that are intended to be permanent. But the SIGPAC has been operating for only a few months, and is directly linked to the E.U.'s CAP for agricultural aid which, as discussed throughout this paper, is subject to a permanent process of reform. The community Regulation confirming the requirements for the European LPIS (which had already been established by previous Regulations) introduces the biggest reform of the CAP ever made: the decoupling of community aid and the single payment scheme [23].

"Decoupling" cuts the link between subsidies and production, and is designed to encourage the farmer to tailor his/her production to market demand instead of to the products entitled to higher subsidies. The Single Payment scheme establishes a direct subsidy per holding, whose amount is based on the amounts received by the farmer in a given reference period, unconnected to the production of a specific crop. In other words, the subsidy for each farm is a type of "historical right" that the farmer will receive in the future regardless of the area and use of his/her holding, subject to compliance with a series of conditions. In Spain, the scheme will be applied as of 1 January 2006.

(23) The single payment scheme is referred to in articles 66 to 69 of Regulation (EC) 1782/2003. For Spain, this scheme is developed by Order APA/1171/2005 of 15 April, on data updating and identification of farmers for application of the single payment system.

It is too early to predict the impact of the single payment scheme on the SIGPAC, although it is certain to substantially reduce the need for comprehensive information on land use and accurate data on the location of the agricultural parcel. However, although it will lose relevance in the new system of subsidies, it will continue to be a powerful instrument for the implementation of structural policies, in a new Community scenario which appears to be tending towards the "re-nationalisation" of agricultural policy.

In any event, the challenge remains to maintain cooperation with the SIGPAC and to perform parallel updating of both databases. With regard to the Rural Cadastre, we should point out that the SIGPAC has contributed orthoimagery that is both more recent and more accurate (0.5m or 0.25m pixel) than the cartography normally used by the Cadastre, and which has brought to light defects and outdated data in the cadastral parcel system that require prompt action. The cadastral parcel system is in need of a clean-up plan to help achieve the strategic objective of maintaining the Rural Cadastre as the single nationwide geographical information system, following a single technical standard, updated permanently and subject to stringent cartographical quality standards.

At the beginning of this section we mentioned the key role of the cadastral reference. Another product, exclusive to the Cadastre, that is of particular relevance to the Spanish tax system, is the cadastral value. It is a well-known fact that, unfortunately, the rural cadastral value is today largely unreliable due to the fact that it is very out of date, and unaligned by crops, with regard to the market value. As a result, the rural cadastral value is useless outside of the limited context of the economically unimportant rural real estate tax. For this reason, the reform of the Rural Cadastre Appraisal is another strategic objective, requiring the support of market research, modern statistical and artificial intelligence tools, and updated, reliable data. Recent initiatives by the General Directorate of Cadastre suggest that this objective will be addressed in the near future.

## ANNEX

### Regulation Governing Agricultural Aids, the olive GIS and SIGPAC

- Regulation (EEC) 3508/92 of the Council, establishing an integrated administration and control system for certain communitarian aid schemes.
- Regulation (EEC) 2366/98, establishing the Olive GIS.
- Royal Decree 368/99. Spanish Olive GIS.
- Royal Decree 1972/99. Correction of discrepancies in the Olive GIS.
- Regulation (EC) 1593/2000 of the Council. Reform of the integrated administration and control system. Land parcel identification system.
- Order of 13 June 2001. Verification of the Olive GIS.
- Regulation (EC) 1782/2003 of the Council. CAP reform. Single payment scheme.
- Regulation (EC) 796/2004 of the Commission. Provisions for application of Regulation 1782/2003.
- Royal Decree 2128/2004. Regulation of the SIGPAC.
- Order APA/1171/2005. Application of the single payment scheme. ■