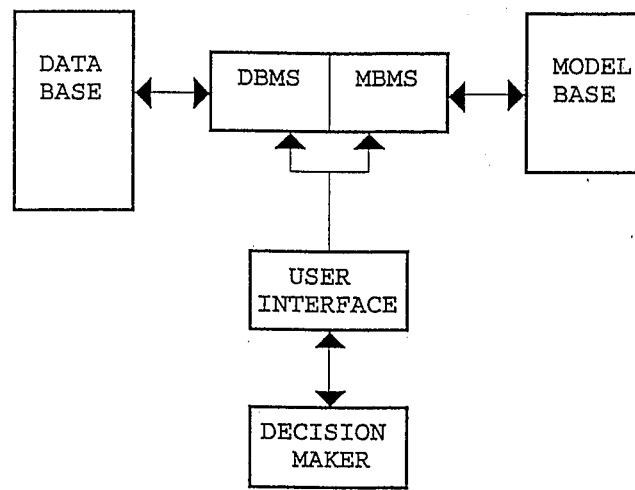


A relatively new area is the linking between modelbase and database. The discussion focused on similarities and distinctions between the Dutch and the American situation. In both countries there is a tendency towards integrated DSS and a competition between commercial software developers and researchers. But the Dutch efforts are more directed towards operational problems whereas the Americans concentrate on tactical and strategic problems, OK?



Agro Informatics in Spain

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Agro Informatics in Spain, is slowly taking its first steps forward. A great deal of effort is required if it is to be fully introduced, because it should not be forgotten that Agriculture is a traditionally conservative sector, in which the farmer, especially the landowner who has small and medium-sized extensions of land, is reluctant to use new technologies in agricultural management.

If one were to carry out a survey of the software in use in the Agricultural Departments of the different Regional Autonomies in Spain, one would find that most of it is reserved for internal use: means for managing different aids for the farmer (Compensation in Hill-Farming and Farming in Mountainous Areas, Improvement in the Efficiency of Agricultural Management as set out in Royal Decree 808/87, etc), for the monitoring of the vaccination

programmes being carried out in livestock management, etc).

Some Regional Autonomies have promoted the setting up of companies devoted to software development; this is the case with the Basque Government, with the company I.K.T., S.A., and La Rioja, with S.A.I.C.A.R. (Software Company for the Autonomous Region of La Rioja, S.A.).

Some Autonomous Communities such as I.K.T., S.A. have developed programmes of a technical nature - not only for the production of vegetables, but also for livestock - and technical-economic activity, the latter designed primarily for the livestock sector. Some of these are concerned with technical-economic management of the following species: rabbits, dairy sheep, dairy cows, livestock for beef and pork, etc., and they issue monthly and annual reports

concerning management as a whole, and classifying it.

In Navarre, the following institutions are worth mentioning:

- The 'Instituto Técnico y de Gestión de Vacuno' (Technical Institute for Cattle Management), with sanitation programmes for sheep and cattle, and for genetic improvement and technical-economic management for dairy cows, beef cattle and sheep. All these provide reports, both individual and/or general, to the member-farmers.
- The 'Instituto Técnico y de Gestión del Porcino' (Technical Institute for Pig Management), with programmes for the technical-economic management of pigs and rabbits, providing management rates to the farmer.

- The 'Instituto Técnico y de Gestión del Cereal' (Technical Institute for Cereal Management) has a software designed to deal with the technical-economic management of fields, and this is used to carry out the monitoring of such enclosures, with the aid of data which are provided by the farmers, on a three-monthly basis. It carries out comparisons, allowing the farmer to analyze the different technical-economic parameters for alternative crops. These institutions provide some of these software to their members, free of charge.

As far as Catalonia is concerned, there is the 'Sistema de Gestión Técnico de Explotaciones Porcinas' (Technical Management System for Pig Rearing), developed by the I.R.T.A., (Agriculture and Food Research and Technology Institute). This system is normally referred to as GTEP-IRTA, and it consists of a data-base and a set of software, whose aims, in addition to technical-economic management, are to compare the management results of one field with reference groups established in accordance with a wide range of criteria (geographical, breed, kind of management, etc.), and the setting up of a data bank, so that statistics can be obtained. The system is fairly flexible and adjusts to the needs of the sector. Three kind of software make it possible to do this;

- The GTEP-IRTA 1, is aimed at companies which do not possess their own means for data processing. The information is periodically transmitted to the Centro de Cálculo (Statistics Centre) belonging to the I.R.T.A. Once it has been processed, information is sent to the farmers, individual information about the pigs and general information about the fields. The transfer of information is carried out by the Servicio de Extensión Agraria (Agricultural Extension Service).
- The GTEP-IRTA 2, is aimed at large companies and cooperatives which have their own computer. It is a multi-user, multi-work and multi-farm program. It provides results for individual animals, group of animals, individual farms or group of farms. It can be connected to the data bank of the GTEP-IRTA system in order to obtain information from the reference group.

- Finally, there is the GTEP-IRTA 3, aimed at companies which use PC compatible computers. This can also be connected to the GTEP-IRTA data bank.

About 1050 fields are using this system, and roughly 110000 pigs. It is the most important data bank for pigs in the whole of Spain.

The I.R.T.A.-Cabrils (Agriculture and Food Research and Technology Institute of Cabrils), there is a computerized formulation service for problems concerning nutrition, fertility/irrigation and hydroponia, referred to as 'Prosfert'. The farmer must send the results of a recent water analysis, including the following data: pH, conductivity, bicarbonates, carbonates, nitrates, sulphates, chlorides, sodium, calcium and magnesium. This information is used for the calculation of the need for acid, and formulates the requirements for nutrients in the water, for a return to the original pH, and nutrition solutions for fertility/irrigation and hydroponia in accordance with the Steiner method and the formulation of nutrition solutions for fixed parameters (Cole-Lesaint, Houglund, Resh, etc). The formulation obtained is presented in tables and/or graphs. The fertilizers recommended are in everyday use and the dosages are given in meq/l and in gr/100 litres of nutritive solution.

The software that predominate in the market, are those for accountancy and the management of cooperatives, there being certain specific ones among the latter; (wine-making industry, horticulture, etc), and then there are those aimed at the livestock sector, the software for the manufacture of feeds being included in the latter group.

This same phenomenon can be observed in other countries, because the software designed for the livestock sector, for the management of cooperatives and for accountancy, can be more easily generalized than the software aimed at the agricultural and forestry sectors, where there are many more factors to be taken into consideration.

At present, there are only a few companies specializing in the development of agricultural software in Spain. This is partly due to the fact that there is a limited computerization of the companies in this sector; this is often detrimental to the sector itself. The large

amount of factors which combine in agriculture, make it necessary to develop software suited to the special conditions of each area, the crops and the farmer's specific needs. These factors, together with the lack of computerization in the agricultural sector in our country, are responsible for the rise in the price of software.

The lack of orientation towards farmers, that exists in the Agricultural Colleges in the Universities and the Research Institutes, as regards the development of software, is a result of the channelling of efforts towards the solving of problems which are inherent to basic research.

As is only to be expected, the above-mentioned software is not the only software which exists in Spain. The 'Catalogo de Software de Interés en Agricultura' (Catalogue of Software for Use in Agriculture), published in 1990 by the S.E.A. (Agricultural Extension Service) and FUNDESCO, shows that there are 414 software programmes. This catalogue is being updated, and in the near future, the second edition is due to be published.

Spain, together with France, Italy, Germany, Belgium and Israel, to mention but a few, are taking part in a project for the preparation of an 'International Catalogue for Agricultural Software', which is to contain the data processing programs developed in those countries that have been selected on the basis of a series of parameters (number of users, documentation, etc.).

We have to refer to some of the activities that are being developed by the Autonomous Regions, such as the Autonomous region of Castilla-La Mancha, which gave courses aimed at technicians, or the Autonomous Region of Valencia, which is giving courses to farmers and farm managers, as a user. On the other hand, the S.E.A. of the Autonomous Region of Catalonia, has carried out demonstrations of agricultural software over the last two years, in which the programs developed in Spain and France were presented.

If the possibilities of computerization in agriculture are to be fully exploited, it would be useful to set up a Centre for the Spreading of Informatics in Agriculture. This should be aimed at backing up the initiatives that have been mentioned, together with all those initiatives which will help to spread the existing software,