



Pilot survey of the use of plant health products on agricultural holdings in Spain 2000

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**Pilot survey of the use of plant health products
on agricultural holdings in Spain 2000**

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Ministry of Agriculture, Fisheries and Food

**TECHNICAL SECRETARIAT-GENERAL
STATISTICAL SUBDIRECTORATE-GENERAL**

**PILOT SURVEY OF THE USE OF PLANT HEALTH PRODUCTS
ON AGRICULTURAL HOLDINGS IN SPAIN 2000**

PRESENTATION

Pilot survey of the use of plant health products on agricultural holdings in Spain 2000

I. INTRODUCTION

The surveys of plant health products in Spain will be implemented in the following stages:

1. a preliminary study of the bases for establishing the future surveys of plant health products;
2. methodological design, selection of a sample of holdings and conduct of a pilot survey in one Spanish province with the aim of testing the effectiveness of the sample selection system and the model survey of farmers, calculation of estimators for the main variables;
3. implementation of a national survey of plant health products.

This report concerns the first stage, which investigated the possibilities of optimum collection of information on the technical aspects related to crop diseases and treatments.

To that end, the field work manual and questionnaire were drawn up in cooperation with the sectors concerned: farmers, enumerators and public bodies responsible for crop protection. These were then tested in action in four provinces with different production structures and different crops (and fruit and vegetables in particular).

Furthermore, in view of possible reluctance to provide this kind of information, an *advance publicity strategy* has been devised with a view to securing the most objective, reliable, verifiable and timely information possible.

Lastly, some indicators are given for ensuring that the selection of the sample of farmers is highly representative.

II. METHODOLOGICAL DEVELOPMENT

The following operations were carried out:

1. The information provided by the "Survey of Means of Production on Agricultural Holdings in Spain 1997" was analysed with a view to:
 - identifying the main pests treated in the various crops;
 - identifying the forms of treatment (direct or by service enterprises);
 - identifying the frequency of treatment.

Further information is available from:

- manufacturers and distributors of plant health products;
- enterprises providing pest control services;
- Community tables (Eurostat) of the main active ingredients and the commercial presentations of the most widely used plant health products.

As a result, a technical and agronomic record has been designed and completed which gives national averages for each of the crops (fruit and vegetables) and the most important specifications. This work provides a picture of activity in the sector and has laid the foundations for subsequent operations.

2. The crops to be investigated in the trial and the areas in which the trial was to be conducted were selected:
 - The crops selected were fruit and vegetables, as these require greater use of plant health products and account for a substantial part of agricultural production in Spain.
 - The provinces were selected on the basis of their production characteristics: Almería (vegetables grown under glass), La Rioja (vegetables grown in the open air), Zaragoza (stone and pome fruit) and Valencia (citrus fruit).
3. Specific questionnaires were designed with the characteristics to be investigated.
4. Ten questionnaires were completed in each of the four provinces chosen in the second stage to test the viability of the overall project.

Drawing on the experience acquired in conducting the Survey of Means of Production and the opinions expressed by the sectors concerned, a manual was designed with a questionnaire to be completed in the 40 trial holdings. The proposed final version incorporates the suggestions provided by the respondent-enumerators.

5. The study and conclusions for the conduct of the future national survey of plant health products were presented.

III. ANALYSIS OF THE INFORMATION PROVIDED BY THE “SURVEY OF MEANS OF PRODUCTION ON AGRICULTURAL HOLDINGS IN SPAIN 1997”

The analysis provides a summary of the use of plant health products in Spain, drawn from information gleaned from the “Survey of Means of Production on Agricultural Holdings 1997, which was conducted by the Ministry of Agriculture, Fisheries and Food.

The results analysed refer to fruit and vegetable crops: citrus fruit, non-citrus fruit, vegetables grown in the open air and vegetables grown under glass. The tables were compiled by Autonomous Communities and for the entire national territory.

The information contained in these tables covers:

- the pests or diseases treated;
- the product used, in terms of the *kind of product*: herbicides, insecticides, acaricides, nematicides, soil fumigants and disinfectants, fungicides, bactericides, growth regulators, bionutrients, deficiency correctors and leaf composts, warehouse and seed treatments, rodenticides, etc. and their *commercial names*, with the aim of making it possible subsequently to calculate formulations;
- the quantities of product used: unit of each product, number of treatments, average dose;

- the average price of products.

These tables provide a basis for analysis, and permit crops and crop systems to be identified by:

- the main pests or diseases treated;
- the forms of treatment and frequency of treatment, i.e. which plant health products are used to deal with the main pests and how many times these treatments are applied.

A table provided gives an example of this.

IV. FIELD WORK MANUAL AND QUESTIONNAIRE

The information analysed in the previous section was borne in mind when designing the manual and the questionnaire to be used by the enumerators to collect the information on the holdings. Every effort was made to adapt this information insofar as possible to the different kinds of holdings while breaking it down sufficiently to record all the data which were directly linked to the investigation undertaken.

IV.1 QUESTIONNAIRE

The questionnaire consists of a folder and a model record:

- The “Holding data” and “Proprietor data” are entered on the cover.
- Inside, general information is collected on the “General distribution of lands on the holding”, the “Crop characteristics” and the “General aspect of treatments using plant health products”.
- On the back cover, space is provided for observations on the holding and any explanatory notes required to convey the “General aspects of treatments using plant health products” .
- A “Treatment record” has to be completed for every crop grown on the holding, and is kept in the folder described above.

IV.2 FIELD WORK MANUAL

A manual was compiled by reference to the field work questionnaire. This contains the instructions necessary for completing the questionnaire and an annex with the corresponding tables which specifies all the codes to be used in the survey.

The Spanish proposal for the field work manual and the questionnaire are summarised in two separate documents.

V. SELECTION OF ENUMERATORS

Conducting a survey of this kind makes heavy demands on the farmers, in that they are required to provide very specific information on pests, inputs of plant health products, forms of treatment, application timetables, etc. An appropriate strategy which will stimulate farmers' interest in the survey while also providing help for collecting and recording the information can only be devised if technical experts are carefully chosen. This condition was partly met by using the RECAN network of offices.

Four of the accounting network's offices were chosen, one in each province. Each office completed questionnaires on ten holdings, giving preference to those which mainly cultivated fruit and vegetables.

The selection of holdings aimed for diversity, i.e. considerable differences in their size, the range of crops, their geographical situation and the "professionalism" of the farmer.

When they had completed the surveys of farmers, the enumerators responded to a questionnaire to establish their views on the field work manual and the questionnaire on plant health products for the purposes of drawing up a definitive version of these.

The field data on plant health products collected in the questionnaires were recorded and processed in the office by technical experts who maintained contact with the enumerators for the purposes of any clarifications required.

VI. CONCLUSIONS ON CONDUCTING THE FIELD WORK

VI.1 Operationality of the questionnaire and the field work manual

Bearing in mind the complexity of the survey in view of the information sought, the questionnaires were generally completed to a high standard, although some of the information proves harder to obtain, e.g. the full name of the commercial product, the price of the product and the land registry reference.

The greatest difficulty anticipated in completing the questionnaire was in obtaining reliable responses from the farmers surveyed, and fundamentally in identifying the pests treated and the products used. Technical experts from the RECAN accounting offices were ASKED to act as enumerators in an attempt to solve this problem as far as possible.

VI.2 Enumerators: technical personnel

The great density and complexity of the data sought discourages interviewees, who may end up not responding or providing inconsistent data. The enumerator therefore needs to be able to take the right approach to the farmer and put his questions in the right way if he is to obtain the requisite information.

In the light of experience of the "Survey of the means of production 1997" and the suggestions made by the enumerators for this project, it is indispensable that the personnel responsible for the survey should be graduate-level specialists in agricultural engineering or agronomy with experience of field work on agricultural holdings, if possible.

As stated above, the enumerators chosen were technical experts from the RECAN accounting network, and this was vital for effective work.

VI.3 Statistical confidence

It is crucial that the enumerators convince the farmers that all the information is protected pursuant to Law No. 12/1989 on the Public Statistical Function. The data provided are not binding on them, and are kept absolutely confidential throughout the entire process while the statistical data will have no individual references beyond a number.

VI.4 Difficulties encountered with the Survey

- *Plots with land registry references:* It is essential to have information on inputs of plant health products in crops and the land itself. The use of plant health products on agricultural holdings is therefore linked to the plots which have been treated. The *Catastro de Rústica* (land registry) provides the best means of identifying arable land at national level, and this is why the land registry reference of the plot containing the largest crop - in terms of the area or its economic profitability - is asked for.
- *The need for the farmer to keep the product labels, treatment dates, invoices etc.* The manual suggests that the farmer assemble and keep all available information attesting to the activity on the holding during the reference period to facilitate the enumerator's work in completing the questionnaire. There is a clear need for action on the following lines:
 - The farmer should be advised to this effect sufficiently in advance to permit him to comply with this request.
 - There should be institutional backing for this request.
 - A routine should be established so that the farmer has the information when it comes to completing the questionnaire, to which end the enumerator would provide him with a tally sheet, in calendar form on which he should record the most important information for the questionnaire.
 - The greatest returns, however, will be obtained from explaining the need to carry out this kind of operation to the farmer and convincing him of the benefits offered everyone by knowledge of the sector.

VI.5 Information collection strategy

The following methodology is proposed for contacting respondents and completing the questionnaire:

- The agricultural holdings in the chosen sample should be sent a letter from the Ministry of Agriculture, Fisheries and Food and the Autonomous Communities informing them of the technical work it is intended to carry out, stressing *the need for their cooperation* to that end and the benefits of greater knowledge of the sector while also emphasising that the administration is obliged to maintain statistical confidentiality
- The enumerator should establish telephone contact with the holdings to make an appointment with the party who is responsible for the holding.
- A visit should be made to the holding to present the documents and explain in detail to the farmer what his cooperation involves and what the aim is.
- Subsequent meetings and telephone conversations with the farmer should be organised to complete the survey.

VII. PROPOSAL FOR SELECTING A SAMPLE FOR FUTURE WORK

The following means of selecting the sample of holdings is proposed in view of the level of professional qualifications available in the RECAN offices in Spain:

The Census of Agriculture 1999 will provide the most up-to-date population.

- Census of Agriculture Population (i strata of TFs and ESUs): $M_1, M_2, \text{ etc.}, M_i$

A sample is drawn from this population: $m_1, m_2, \text{ etc.}, m_i$

- Population of holdings cooperating with RECAN: $R_1, R_2, \text{ etc.}, R_i$

The sample is determined on the following premises:

1. If $R_i \geq m_i$, sample: $m_1 = r_1, m_2 = r_2, \dots, m_i = r_i, \text{ etc.}$

If, for a stratum i, the number Of RECAN holdings is equal to or greater than that of the selected sample, all the selected holdings will belong to RECAN.

2. If $R_i < m_i$, sample: $m_1 = r_1 + e_1, m_2 = r_2 + e_2, \dots, m_i = r_i + e_i, \text{ etc.}$

Otherwise, the other holdings in the Census will be taken until it is complete.

Where : r_i number of RECAN holdings
 e_i number of additional holdings.



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FIELD WORK MANUAL

Instructions for completing the questionnaire

Pilot survey of the use of plant health products on agricultural holdings in Spain 2000

1. OBJECTIVE

This survey aims to evaluate inputs of plant protection products in fruit and vegetables, as the crops which require the greatest use of these products. These inputs are analysed by identifying the products, the quantities administered and the how they are applied. The prime aim, therefore, is to carry out a technical study, and thereafter to examine the costs of the different operations. Agricultural holdings provide the responses need to this end. As a pilot experiment, the survey will be conducted in four Spanish provinces in which the above-mentioned crop groups are amply represented: Almería, La Rioja, Valencia and Zaragoza.

2. GENERAL INSTRUCTIONS

2.1 Presentation of the questionnaire

The questionnaire is used to collect information on the use of plant protection products on a holding which may grow one or more crops at the same time. The holdings in the sample were selected from those on which the *type of farming is mainly growing vegetables and fruit*, according to the classification carried out by the INE on the basis of the Census of Agriculture.

The questionnaire takes the form of a folder containing the following standard tables:

- The front cover serves to collect the “**Holding data**” and the “**Holder data**”.
- Inside, general information is collected on the “General distribution of land on the holding”, the “Crop characteristics” and the “General aspects of plant protection product treatments”.
- On the back cover, “**explanatory notes**” summarise the concepts for completing the “general aspects of plant protection product treatments”, while a section for “**observations on the holding record**” is provided for any clarifications necessary for a better understanding of how the holding operates.
- A “**Treatment Record**” is to be completed for every crop grown on the holding, and then stored in the folder described.
- A “**Biological control record**” is also to be completed on holdings on which this is carried out on any crops, and stored in the folder in the same way.

The information on every holding in the sample is to be duly compiled and collected in the tables.

2.2 General pointers

■ Information compiled by the farmer:

In completing the questionnaire, before entering the data, it is indispensable that the farmer assemble all the labels from plant protection products, the invoices for any purchases or any contracts to have the products applied and the calculations made in view of the doses which will show how much of these products he used on his crops during the reference period. This will be a great help.

■ Reference period:

The information to be collected refers to plant protection product treatments applied to crops on the land over one agricultural marketing year, from 1 October 1998 to 30 September 1999. For farming under glass, the reference period runs from 1 July 1998 to 30 June 1999.

■ Economic data:

The value of plant protection products is determined at the purchase price at the farm gate, without VAT (or subtracting the VAT shown on the invoices, which comes to the same thing).

The quantities and prices of plant protection products refer to the product as marketed, i.e. the *commercial products*, and not their contents or active ingredients, adjuvants, etc.

■ Metric units to be used in the survey:

In the interests of standardising data to make for standard results, the following metric units should be used to complete the survey, according to the requirements of the survey:

- weight: kilograms, grams
- volume: litres, cubic centimetres
- area: hectares

The table of metric equivalences provided after the Annex of Codes may be helpful.

■ Observations:

Space is provided in each section of the questionnaire for observations to allow enumerators to clarify or expand on the information requested, to cater for variants which may arise.

■ Record of incidents:

This is designed to record incidents in the greatest possible detail, along with the name of the enumerator, the working area and the date.

3. IDENTIFICATION OF THE HOLDING

This part of the questionnaire is set out on the cover of the folder, and serves to collect information identifying the holding and the natural or legal person responsible for it. This information is contained on the “identification label” which is supplied to the enumerators.

The data on the holding is to be recorded using the following abbreviations: province (PROV), comarca (COM), municipality (MUN), holding number, utilised agricultural area (UAA), total area (ST), type of farming (TF) and size.

These concepts are defined below, along with some needed to understand them correctly:

- **The “Utilised Agricultural Area” (UAA)** is all the tilled land and permanent pasture.
- **The “Total Area” (TA)** is the area of all the plots which make up the holding.

The typology aims to assign relatively homogeneous agricultural holdings to classes based on two fundamental characteristics: the type of farming and the economic size. Both the type of farming and the size are determined from the gross margin.

- **The “Gross margin” (GM)** is the difference between the monetary value of gross production from an activity and the value of certain indirect costs inherent in this.
- **The “Type of farming” (TF)** is defined by the relative composition by activity (vegetables grown in the open air or under glass, citrus fruit, non-citrus fruit, etc.) of the gross margin.
- **The “European Size Unit” (ESU)** is a Community unit of measurement corresponding to 1 200 European units of account (ECU) of gross margin.

The label identifying the holding must be stuck on the cover of the folder.

When the survey of each vegetable and fruit crop which has been treated with plant protection products has been completed, the total number of records should be noted.

When any biological control is carried out on the crops on a holding, the corresponding section on the questionnaire cover should be marked "Yes", and the biological control record should be inserted in the folder.

4. HOLDING RECORD

The information included in this large section records the general distribution of the land on the holding, the main crops grown in the reference year and the general aspects of the application of plant protection products. It is contained inside the folder, and comprises the following tables.

4.1 General distribution of the land on the holding

This table is in section 1.1. of the questionnaire, and covers the areas of the large blocks of land which make up the holding: “dry farming, arable crops”, “dry farming, tree crops”, “wet farming, arable crops”, “wet farming, tree crops” and

“farming under glass”. It includes the sub-total “total area under crops” and the grand total “total area of holding”, which also includes “grassland, pasture and other land”.

The quantities must be expressed in hectares to two decimal places.

4.2 Crop record

This table, at 1.2. in the questionnaire, records the major crops on the holding and their main characteristics, provided that they account for approximately 90% of the total area under crops. The characteristics are described below:

■ Name of crop, group code and crop code:

The name of each crop and the codes for each group of crops to which it belongs, according to Sheets No. 1a and No. 1b in the Crop Codes Annex to the Manual, should be entered.

■ System (S/R/I):

This refers to the kind of crop, whether dry farmed (S), wet (R) farmed or grown under glass (I). When a crop is grown by two methods on a single holding, a separate entry is made for each form on different lines.

■ Variety:

The crop variety is important additional information, because some varieties of a species are resistant to certain agents. If several coexist, the predominant one should be entered.

■ Age:

In the case of tree crops and multi-annual arable crops, the age of the plantation can influence the inputs of plant protection products in terms of the quantity and the type of products. The approximate age should be given in years. If several stands of different ages coexist, the predominant one should be recorded.

■ Area under crops (ha):

This section serves to record the area under each crop, expressed in hectares to two decimal places. If several varieties of a crop and/or plantations of different ages coexist, the total area should be noted.

■ Record (Serial number/NO):

Whenever the crops recorded are vegetables or fruit which have undergone some plant care treatment, the serial number corresponding to the statement of crops is entered in the corresponding cell, and a treatment record has to be completed for that crop. If it is not surveyed, the cell is marked ‘NO’. The number of records included in the folder should be noted on the cover of the questionnaire, and a distinction is to be made between arable crops and fruit crops.

4.3 General aspects of the plant protection treatments on the holding

This section, number 1.3. in the questionnaire, looks at a number of general aspects of all the crops on the holding in terms of plant protection treatment: advice received on the treatments to be applied, the purchase of these products, the machinery used for application and whether biological control methods are used.

Like the manual, the questionnaire also contains explanatory notes on all these concepts.

If there are substantial differences in these aspects of the treatment of the main crops on the holding, the most representative should be explained and a reference to this included in the observations.

The survey tables covering “advice and technical assistance” and the “purchase of plant protection products” should contain the name of the respondent and of the vendor for reference purposes with a view to technical enquiries. Respondents should be made to understand that this information is not binding on either party. It is solely for statistical purposes, and is covered by **Statistical Confidentiality** pursuant to law No. 12/1989 on the Public Statistical Function, as is the entire survey. Under no circumstances will the identity of a farmer who provided any data be disclosed.

Each section has a space for observations to provide any clarifications which may prove useful. These observations should also specify what any "other" codes refer to.

■ Advice and technical assistance.

The enumerator must indicate the farmer's principal source of information on the specific plant protection products with which he treats his crops (diagnoses, products, methods, etc.):

- Whether he relies on his own experience, on other farmers', calls on specialists who are known to him or contracts such services out.
- Whether he receives advice from private bodies such as warehouses selling plant protection products, commercial ventures, cooperatives and their specialists, or under pre-established treatment programmes from private establishments, etc.
- Whether he receives assistance via general government, the local offices of the Autonomous Communities, under pre-established treatment programmes organised by the Autonomous Communities, or from publications produced by his Autonomous Community.
- etc.

In any case, the source of information must be recorded by the code laid down to this end, and identified by name.

It should also be recorded whether these sources of information are sought out for preventative or remedial treatment, or for both.

The codes for the sources of advice and technical assistance are set out on Sheet No. 2 of the Annex of Codes at the end of the manual.

■ **Purchase of products**

The origin of the plant protection products should be recorded, indicating:

- If purchased alone or in association with other farmers to reduce the costs.
- The place of purchase: in warehouses which sell plant protection products, from commercial companies or if the purchase was pre-arranged with warehouses, commercial companies or cooperatives, and whether any kind of discount was agreed on pre-arranged purchases.
- The timing of the purchase, i.e. whether bought in advance or just before applying the product.
- Whether the purchase was influenced by the advice received by the farmer, as mentioned above.
- etc.

In any case, the vendor should be recorded using the corresponding codes and must be identified by name.

Any discount offered on purchase should be recorded.

The codes for purchases of products are set out on Sheet No. 2 of the Annex of Codes at the end of the manual.

■ **Machinery for treatment**

In this section, the enumerator should record all machinery used by the farmer to apply plant protection products, and indicate their provenance. The codes for machinery are set out on Sheet No. 3 of the Annex of Codes at the end of the manual.

- These codes provide various groups of machinery for plant protection treatments according to how these are used and within each group according to how complex they are: machinery for spraying, dusting, applying granules, by treatment networks or by drip irrigation, etc.
- The origin of each type of machinery should be indicated: whether owned, lent by other farmers, rented, jointly owned with other farmers or if the machinery belongs to a cooperative.
- etc.

■ **Protection**

This section serves to record whether the farmer takes any preventative and/or safety measures in handling and using plant protection products.

■ **Biological control**

Any biological control carried out by a farmer on any of the crops on his holding is to be recorded in this section. The cover of the survey should be marked to indicate that it includes a “biological control record”, which should be completed and kept in the survey brochure. It should describe:

- the reasons for using this kind of control;
- details of advice on carrying out biological control (on the same lines as section 1.3.1., Advice and technical assistance);
- details of the purchase of biological control products (on the same lines as section 1.3.2., Purchase of products);
- the technique, i.e. which biological agents or methods are used;
- whether biological control is used in conjunction with other traditional plant protection products, whether integrated pest control or ecological farming;
- an assessment of the effectiveness of biological control: good, moderate or poor;
- etc.

As stated above, the “Biological control” record should be completed by marking the corresponding sections with an x, and the completed record should then be inserted in the survey folder. Furthermore, this record should be provided separately, but the model is shown on Sheet No. 4 of the Annex of Codes.

4.4 Observations on the holding record

Any comments which may make for a better understanding of the data compiled in the survey and concerning the operation of the holding should be recorded in section 1.4, on the back cover.

5. TREATMENT RECORD

A “Treatment record” is to be completed for every crop the serial number of which is shown in the corresponding cell in the “Crop record”. The treatment record is designed as follows:

A header serves to record the following information:

* Information from the “Crop record”:

Serial number

Form of cultivation

Age

Crop code

Variety

Area under crop

* New information:

■ **Total production**

The main production of the crop on the above-mentioned area; any secondary production which may exist in addition to this is not recorded. The preferred unit of measurement is the kilogram.

■ **Sowing and harvesting dates**

The sowing and harvesting dates should always be recorded for annual arable crops. Certain crops are harvested over an extended period, in which case this interval is to be recorded.

■ **Land registry reference**

In view of the benefits of having more specific geographical references than simply knowing the municipality in which most of a plot is located, the land registry reference should be obtained for the plot where the crop is growing, or the largest plot if the crop is being grown on several. This reference consists of several codes which give the plot a unique identity at national level. It comprises 13 digits in all: 2 for the province code, 3 for the municipality, 3 for the polygon and 5 for the plot.

* Information taken from the cover:

■ **Holding number**

The “treatment record” as such is described below. Before listing the concepts, however, the following considerations have to be borne in mind:

- a) Pests and diseases may be combated by treatments entailing the use of different products and applications over the year. These should therefore be described on successive lines. To facilitate the enumerator's work when noting a farmer's responses, these should be recorded in chronological order, given that the respondent probably remembers them like this.
- b) One line should be completed for each application, i.e. for each pest, the time of application, the product (active ingredients, method and doses) applied to each crop, even if the application is a mixture. If, for example, a mix of insecticide and fungicide is applied, each should be recorded on a single line. If the application is repeated, this should be recorded on one or more lines.

The headings on the treatment record are as follows:

■ **Pest, disease treated or reason for use:**

This refers to the reason for applying a plant health treatment, whether preventative or remedial. The causative agent should be highlighted in this section; it may be a specific species or a group of these: weeds, pests or diseases. In the case of growth regulators, desiccants, defoliant, etc., the reason for using these should be given. The codes for the commonest pests, diseases and reasons for use are given on Sheet No. 5 in the Annex of Codes.

* N.B.: In this section, the name of the pest or disease and the reason for use should be given as well as the corresponding code number for the purposes of subsequent checks.

■ **Application timetable:**

The month in which the product was applied should be given, including the approximate date if possible. If more than one identical applications were made in the same month, as required by the treatment, each application should be entered on a separate line in chronological order over the month. This is a great help when subsequently compiling the technical records.

■ **Crop stage:**

In certain situations, it is important to know at which point in the development of the crop the treatment was carried out. The codes for the most important stages of development for arable and tree crops are given in Sheet No. 6 “Crop stages” of the Annex of Codes.

■ **Product used:**

A plant care product is understood as “formulations or preparations containing one or more substances or active ingredients to combat agents causing crop damage, to protect crops and to destroy undesirable plant growth”.

The survey specifies the following concepts : “class”, “commercial product” and “method of application”:

“Class”: This section serves to identify the broad groups of plant protection products. The code for the class of product used to treat crops should be one of those specified in Sheet No. 7 “Class of plant protection products” at the end of the manual.

The main groups of plant protection products are:

- ◆ **HERBICIDES:** chemicals which destroy grassy plants or prevent them from growing. The defoliant and desiccants which feature in the growth regulator group are not included.
- ◆ **INSECTICIDES:** Products intended to kill insects or prevent them from developing. Insecticide treatment of seeds is included, but this group does not include acaricides, nematocides and molluscicides, which form separate groups.
- ◆ **MOLUSCICIDES:** These include all the chemicals used against molluscs, including those used to treat seeds.
- ◆ **FUNGICIDES:** Generally, this includes all agents for destroying fungi. It includes all chemicals used as fungicides, including those for treating seeds. This group, does not, however, include the sulphur group, which is coded separately in view of its widespread use.
- ◆ **GROWTH REGULATORS:** Chemicals which affect the physiological and biological processes of the crop to which they are applied. These include defoliant, desiccants, growth inhibitors, etc.

- ◆ SULPHUR: This is treated as a separate class because, given the large quantities in which it is applied to some crops, it may distort the evaluation of the fungicide group.
- ◆ In addition to the main classes described above, the following are also included: ACARICIDES, NEMATOCIDES, SOIL DISINFECTANTS and STERILISERS, POST-HARVEST TREATMENTS, RODENTICIDES, SULPHUR and OTHER CLASSES, including parasitoids, predators, pheromones, bactericides, etc.

“Commercial product”: This is one of the most delicate data in the questionnaire, since the identification of the active ingredients and formulations depend on it. The full commercial name of the product should be given in order to make it possible subsequently to calculate the formulations used. Particular attention should be paid to the prefixes and suffixes of these names, because minor changes of nomenclature often indicate vastly different components. It is therefore very important to record the full name in as much detail as possible.

Sheet No. 8, “Commercial products”, in the Annex lists the most frequent commercial products according to the most representative classes of plant protection product.

“Method of application”: The way in which a plant care product is applied is hugely important for the main active agents to give good results. Sheet No. 9, “Methods of application”, in the Annex details the various ways of applying plant protection products.

Among the various forms of application, biological control is particularly important in view of its increasing use. Biological control methods include fungal, viral, bacterial and other agents as well as the use of natural predators and parasitoids.

■ **Quantity of product used:**

The data required must always be recorded whenever a farmer applies a product directly. Whenever the product is applied by a service company, these data should also be recorded if the farmer is aware of them. The document compiled should specify the products applied, the doses and other conditions.

“Area treated (ha)”: This is very important, because the entire area of the plot under a crop may not have been treated. This case arises when a localised area is partially treated, for example when a product is applied to stands of a crop infected by a pest or disease. Otherwise, environmental or other concerns may prevent plant protection products being applied to an entire crop, as is the case with certain products in the vicinity of streams.

“Product concentration per treatment (ud/l)”: These are the units (litres, kilograms, etc.) of commercial product per litre of diluent, usually water.

“Mix per treatment (l/ha)”: is the quantity in litres of diluted product applied per hectare.

“Dose applied per treatment (ud/ha)”: is the dose of commercial product (without taking dilution into account) expressed in units (litres, kilograms etc.)

applied to one hectare of crop in a single application. The farmer himself may provide this figure, or it may be calculated by multiplying the concentration of product by the mixture (units/litre * litres/hectare = units/hectare).

“Unit”: The unit is normally expressed in kilograms or litres of the commercial product used.

“Total”: The total quantity of product used is obtained by multiplying the ‘area treated’ by the ‘dose applied’.

■ **Product cost (cost to the farmer):**

The farmer usually has this information when he carried out the application himself. The prices should not include VAT. This heading covers:

“Price”: the unit price of the commercial product used, expressed in pesetas/unit.

“Total”: the total cost of that product expressed in pesetas, calculated by multiplying the ‘total quantity of product used’ by the ‘unit price’.

■ **Cost of application by a company:**

This is the cost of the application according to the variant concerned; the prices exclude VAT:

“Application only”: If the company undertakes to apply products purchased by the farmer, only the cost of such application counts. All data concerning the product used are recorded in the corresponding cells, because the farmer provided the product and should have this information.

“Full treatment”: If a company undertakes to purchase the products and apply them, i.e. to carry out the full treatment, the overall cost should be given in pesetas. In such cases, the commonest technical data in the area should be given, or the name of the company or body, and the corresponding information on the pest, crop, product used, doses per hectare subsequently obtained and entered in the cells for this treatment, the name of the company and any necessary clarifications should be entered in the observations section.

■ **Observations on the treatment record:**

Any explanatory notes considered necessary for a better understanding of the treatments should be entered at this point. Any “other” codes entered under the various headings should also be clarified here.



Ministry of Agriculture, Fisheries and Food

**TECHNICAL SECRETARIAT-GENERAL
STATISTICAL SUBDIRECTORATE-GENERAL**

**PILOT SURVEY OF THE USE OF PLANT HEALTH PRODUCTS
ON AGRICULTURAL HOLDINGS IN SPAIN 2000**

QUESTIONNAIRE

1. HOLDING RECORD									
1.1. GENERAL DISTRIBUTION OF LAND ON THE HOLDING									
		TYPES OF LAND			AREA (ha)				
		1. Dry farming, arable crops							
		2. Dry farming, tree crops							
		3. Wet farming, arable crops							
		4. Wet farming, tree crops							
		5. Crops grown under glass							
		6. Total area under crops (1+2+3+4+5)							
		7.- Grassland, pasture and other land							
		8.- Total area of holding							
1.2. CROP RECORD									
Serial number	CROP (Name)	CODES		Dry (S), wet (R), glass (I)	VARIETY	AGE (yrs): Trees & multi-annual arable	AREA UNDER CROPS (ha)	RECORD (serial No./no)	
		GROUP	CROP						
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
TOTAL AREA UNDER CROP									

Page 1

2. **TREATMENT RECORD**

Disturbance FILE NO. _____

CRIP CODE _____ SITE: _____ NSA UNDER CRIP? _____ DATE OF CRIPING _____

WREST: _____ TOTAL PRODUCTION _____ UNIT _____ DATE OF PERIOD OF APPLICATION _____ LAND-ROBERTY REFERENCE (aerial or cadastral plan) _____

AGE (years) _____ (Time and date of record with crop) _____

PEST/DISEASE TREATED (SPHERULOSPORANGIUM)	APPLICATION ON (DATE/TIME)	CROP STAGE (CIRCUIT OF APPLICATION)	PRODUCT USED					QUANTITY OF PRODUCT USED					COST OF PRODUCT (RUBLES/HA)		ESTIMATED AGROZON BUDGET		
			COMMERCIAL PRODUCT (FARMS)	METHOD OF APPLICATION (IN)	AREA TREATED (HA)	CONCENTRATION % OF PRODUCT PER TREATED LITRE	WET/DRY MATERIAL (G/L)	USED/NOT USED (LITRE)	UNIT	TOTAL (HA)	PRICE (RUB/HA)	TOTAL RUB	APPLICATION ONLY (TOTAL GSP)	FULL TREATMENTS (TOTAL GSP)			

PEST/DISEASE TREATED (SPHERULOSPORANGIUM)	APPLICATION ON (DATE/TIME)	CROP STAGE (CIRCUIT OF APPLICATION)	PRODUCT USED					QUANTITY OF PRODUCT USED					COST OF PRODUCT (RUBLES/HA)		ESTIMATED AGROZON BUDGET		
			COMMERCIAL PRODUCT (FARMS)	METHOD OF APPLICATION (IN)	AREA TREATED (HA)	CONCENTRATION % OF PRODUCT PER TREATED LITRE	WET/DRY MATERIAL (G/L)	USED/NOT USED (LITRE)	UNIT	TOTAL (HA)	PRICE (RUB/HA)	TOTAL RUB	APPLICATION ONLY (TOTAL GSP)	FULL TREATMENTS (TOTAL GSP)			

REMARKS ON THE TREATMENT RECORD

(*) If the applications were applied by a company, and the farmer has no information on the products used
or the doses applied, the most common data for each case should be given,
or the name of the company should be given to enable the information to be obtained subsequently.

1.3. GENERAL ASPECTS OF THE PLANT HEALTH PRODUCTS USED IN TREATMENTS ON THE HOLDING

1.3.1. ADVICE AND TECHNICAL ASSISTANCE

RESPONDENT	IDENTITY OF RESPONDENT	P/R(*)	OBSERVATIONS

(*) If the source of information distinguishes whether it is P: preventative, R: Remedial

1.3.2. PURCHASE OF PRODUCTS

VENDOR	IDENTITY OF VENDOR	Discount (yes/no)	OBSERVATIONS

1.3.3. MACHINERY FOR TREATMENT

MACHINE TYPE	ORIGIN	OBSERVATIONS

1.3.4. PROTECTION

Prevention and/or safety measures used in handling and using health care products:

yes__ no____ Why? _____

BIOLOGICAL CONTROL RECORD

1.3.5. BIOLOGICAL CONTROL

Reason used

- | | | |
|------|--------------------------|---|
| 5001 | <input type="checkbox"/> | ECONOMIC SAVING BY COMPARISON WITH OTHER HEALTH CARE PRODUCTS |
| 5002 | <input type="checkbox"/> | PRODUCTS MORE EXPENSIVE |
| 5003 | <input type="checkbox"/> | REDUCING APPLICATION OF TRADITIONAL PLANT HEALTH PRODUCTS |
| 5004 | <input type="checkbox"/> | TECHNICAL EASE OF HANDLING BY COMPARISON WITH TRADITIONAL PLANT CARE PRODUCTS |
| 5005 | <input type="checkbox"/> | TO AVOID TOXIC WASTE PROBLEMS |
| 5006 | <input type="checkbox"/> | TO AVOID EXPOSURE TO PLANT CARE PRODUCTS |
| 5007 | <input type="checkbox"/> | TO AVOID DETERIORATION OF QUALITY OF THE PRODUCT TO BE CONSUMED |
| 5008 | <input type="checkbox"/> | TO AVOID RECURRENCES OF PESTS |
| 5009 | <input type="checkbox"/> | TO AVOID EMERGENCE OF RESISTANCE |
| 5010 | <input type="checkbox"/> | TO CARRY OUT INTEGRATED CONTROL |
| 5011 | <input type="checkbox"/> | PRACTISING ECOLOGICAL FARMING |
| 5012 | <input type="checkbox"/> | DUE TO DEMANDS OF TARGET MARKET |
| 5099 | <input type="checkbox"/> | OTHER (specify in observations) |

Advice

- | | | |
|------|--------------------------|---|
| 5101 | <input type="checkbox"/> | OWN EXPERIENCE |
| 5102 | <input type="checkbox"/> | OTHER FARMERS' |
| 5103 | <input type="checkbox"/> | SPECIFIC TECHNICAL SPECIALISTS' |
| 5104 | <input type="checkbox"/> | WAREHOUSES SELLING PLANT CARE PRODUCTS |
| 5105 | <input type="checkbox"/> | COMMERCIAL COMPANIES |
| 5106 | <input type="checkbox"/> | TECHNICAL SPECIALISTS FROM COOPERATIVES,... |
| 5107 | <input type="checkbox"/> | TREATMENT PROGRAMMES BY COMMERCIAL COMPANIES |
| 5108 | <input type="checkbox"/> | AUTONOMOUS COMMUNITIES LOCAL AGRICULTURE OFFICES IN THE COMARCA |
| 5109 | <input type="checkbox"/> | AUTONOMOUS COMMUNITY TREATMENT PROGRAMMES |
| 5110 | <input type="checkbox"/> | AUTONOMOUS COMMUNITY PUBLICATIONS |
| 5199 | <input type="checkbox"/> | OTHER (specify in observations) |

Purchase

- | | | |
|------|--------------------------|--|
| 5201 | <input type="checkbox"/> | ALONE |
| 5202 | <input type="checkbox"/> | WITH OTHER FARMERS |
| 5203 | <input type="checkbox"/> | DIRECTLY FROM WAREHOUSES SELLING PLANT CARE PRODUCTS |
| 5204 | <input type="checkbox"/> | DIRECTLY FROM COMMERCIAL COMPANY |
| 5205 | <input type="checkbox"/> | PRE-ARRANGED WITH WAREHOUSE |
| 5206 | <input type="checkbox"/> | PRE-ARRANGED WITH COMMERCIAL COMPANY |
| 5207 | <input type="checkbox"/> | PRE-ARRANGED WITH COOPERATIVE |
| 5208 | <input type="checkbox"/> | BOUGHT IN ADVANCE |
| 5209 | <input type="checkbox"/> | AT TIME OF APPLICATION |
| 5210 | <input type="checkbox"/> | INFLUENCED BY ADVICE |
| 5299 | <input type="checkbox"/> | OTHER (specify in observations) |

Technique

- | | | |
|------|--------------------------|--|
| 5301 | <input type="checkbox"/> | INSECTS |
| 5302 | <input type="checkbox"/> | MITES |
| 5303 | <input type="checkbox"/> | NEMATODES |
| 5304 | <input type="checkbox"/> | BACTERIA (<i>Bacillus Thuringiensis</i> ,...) |
| 5305 | <input type="checkbox"/> | FUNGUS (<i>Beauveria Bassiana</i> , ...) |
| 5306 | <input type="checkbox"/> | VIRUS |
| 5307 | <input type="checkbox"/> | PHEROMONES |
| 5308 | <input type="checkbox"/> | CHROMOTROPIC SHEETS |
| 5399 | <input type="checkbox"/> | OTHER (specify in observations) |

Kind of method

- | | | |
|------|--------------------------|---|
| 5401 | <input type="checkbox"/> | APPLICATION IN CONJUNCTION WITH OTHER PLANT CARE PRODUCTS |
| 5402 | <input type="checkbox"/> | INTEGRATED PEST CONTROL |
| 5403 | <input type="checkbox"/> | ECOLOGICAL FARMING |
| 5499 | <input type="checkbox"/> | OTHER (specify in observations) |

Effectiveness of biological control

- | | | |
|------|--------------------------|----------|
| 5501 | <input type="checkbox"/> | GOOD |
| 5502 | <input type="checkbox"/> | MODERATE |
| 5503 | <input type="checkbox"/> | POOR |

OBSERVATIONS

ANNEX OF CODES

Sheet No. 1: CROP CODES

Sheet No. 2: ADVICE AND TECHNICAL ASSISTANCE, PURCHASE OF PRODUCTS

Sheet No. 3: TREATMENT MACHINERY

Sheet No. 4: BIOLOGICAL CONTROL

Sheet No. 5: PESTS, DISEASES AND REASONS FOR USE

Sheet No. 6: CROP STAGES

Sheet No. 7: CLASS OF PLANT PROTECTION PRODUCTS

Sheet No. 8: COMMERCIAL PRODUCTS MOST FREQUENTLY USED

Sheet No. 9: APPLICATION METHODS