



guia de buenas practicas  
nuevas profesiones en el medio rural

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## 1. INTRODUCTION

### 1.1. Leonardo da Vinci Programme

Leonardo da Vinci is a Community Programme intended to create a common European area for collaboration in education and vocational training.

This Programme supports vocational training strategies by funding projects carried out by transnational associations with the aim to promote innovation and improve the quality of all types of vocational training within the EU.

Thus, it contributes to the creation of a "Europe of Knowledge", a model for a competitive and dynamic society based on knowledge. The idea of knowledge society was first presented in year 2000 in the European Council of Lisbon, and then in the Summit of Barcelona in 2002, where the aim to bring Europe at the forefront in terms of knowledge society was expressed.

The Leonardo da Vinci Programme was approved by the European Council in December 6<sup>th</sup> 1994. Its creation ensured the continuity of the Community Action in terms of vocational training, which had started in the 80's and grouped all the actions within previous Community Programmes: COMETT, EUROTECNET, FORCE, IRIS, PETRA and LINGUA PROGRAMMES.

The main objectives of the Leonardo da Vinci Programme are:

- a. Promoting the abilities and competences of individuals- especially of young people- in vocational training, regardless the level.
- b. Improving the quality of continuing vocational training and the acquisition of skills and competences throughout life, and facilitating the access to training, so as to enhance people's adaptation capacity, in particular as regards technological and organisational changes.
- c. Promoting and boosting the input of vocational training in the innovation process, with a view to improving entrepreneurial skills and creating new jobs. In this sense, particular attention is paid to the promotion of cooperation between vocational training institutions (Universities among others) and enterprises (SMES in particular).

The aforementioned goals have been achieved through different actions grouped in 3 different procedures:

- Procedure A for mobility projects;
- Procedure B for pilot projects, language skills and transnational networks;
- and Procedure C for thematic actions and reference documents projects.

#### MOBILITY PROJECTS

The Programme fosters transnational projects addressed to people that are attending vocational training courses, especially young people undergoing work-linked training and teachers. Two types of actions are covered: stays and exchanges.

#### PILOT PROJECTS

Community funding will focus on the design, adaptation to the different collectives, experimentation, assessment and dissemination of innovative practices concerning methods, contents, formats and training products, as well as vocational guidance and dissemination of results.

Pilot Projects must promote the innovation process and support vocational guidance as well as the improvement of the quality of training. In addition to this, it must devise specific products based, to the possible extent, on Information and Communication Technologies.

#### LANGUAGE SKILLS

The Community Programme supports projects that promote language skills and cultural skills in the scope of vocational training, especially as less widely used and taught languages are concerned.

These projects will be devoted to the design, experimentation, validation, assessment and dissemination of innovative training material and pedagogical methods adapted to the specific needs of each professional and economical context.

## TRANSNATIONAL NETWORKS

The Programme supports EU based competence and dissemination networks in the scope of vocational training. These networks have three different aims:

- Assembling, distilling and building on European expertise and innovatory approaches.
- Improving the analysis and anticipation of occupational skills requirements.
- Disseminating the network's outputs and project results throughout the Union in the appropriate circles.

## REFERENCE MATERIAL

This measure is intended to support the creation and updating of Community reference material, by funding research and analysis, gathering and updating of comparable data on vocational training. It is also intended to support the dissemination of quantitative and qualitative information as well as the analysis of good practices in order to support policies and practices in the scope of vocational training and lifelong learning.

## COMBINED ACTIONS

Leonardo da Vinci Programme provides funding for combined actions, that is, initiatives supported by different Community Actions and sharing the common aim of promoting a Europe of Knowledge, especially education and youth programmes.

## 1.2. FONTES Project: Thematic Network to Validate and Disseminate Good Practises and Quality Models of Vocational Training in Rural Areas

### DESCRIPTION

Fontes is a Thematic Network created in 2005 in order to validate good practice models and support quality in vocational training in connection with the new sources of employment in rural areas.

The project intends to validate training itineraries (both those that already exist and new ones), by devising a given set of tools.

These tools will allow to:

- Assess training itineraries.
- Devise a framework that allows for the official recognition of training at EU level,
- Design a high quality and efficient teletraining model that allows for the promotion of the training initiatives.
- And publicize the project, its aims and results among the target collectives: end users of the training initiatives (especially women and unskilled youth in rural areas looking for their first employment and other excluded collectives that have trouble to access the labour market); multi-agents involved in vocational training and continuing training; social partners and educational authorities.

The final products of the project are several types of tools such as: A European Observatory, an Information and Learning Resources Centre, a Teletraining Platform, the project's web page, the dissemination material and this Good Practices Guide.

In addition to the aforementioned products, several dissemination initiatives have been carried out in the scope of the project, such as talks, seminars, meetings etc, in order to promote the project among the target collectives and the end users of the training initiatives.

## AIMS AND RESULTS

The specific aims of the project where the following:

- a) To create the "Fontes" Thematic Network in order to produce and validate several tools in the EU scope (namely the European Observatory, the Good Practices Guide, the Information and Learning Resources Centre, the web page and the Teletraining Platform). These products were intended to promote transparency and to disseminate the new types of training and new competences by creating a framework for the VET system reform. It also aims to promote the transformation and adaptation of such VET

systems to the needs of the "Knowledge Society" so as to achieve a more flexible and individual-focused training system.

- b) To adopt an **integrated approach based on the consensus of the members of the project and the social partners** in the different participating countries, and to identify the trends and qualification needs and improve the results of initiatives connected with VET.
- c) To **strengthen and implement new collaborative work methods involving a closer institutional cooperation** among the participating countries liable to be made extensive to other countries. Thus, the exchange of expertise is promoted, and innovation in VET is supported by bringing experts, organisations and collectives into contact with each other, and by making the most of the prospects and characteristics of each region.
- d) To **create a European Observatory**; a lab for the promotion of transparency with a multisectoral approach to qualifications and intended for the strengthening of institutional relationships that open the way for **new approaches and solutions** liable to contribute to the general aims put forward in the Councils of Lisbon, Barcelona and Copenhagen.
- e) To **support the implementation of common measures that help assembling, distilling and developing practical knowledge on European approaches (Information and Learning Resources Centre and Telemarketing Platform)**, in order to promote the New Sources of Employment by using the new training technologies.
- f) To **reinforce Equal Opportunities** in all sectors of the labour market.
- g) To **disseminate the results** obtained to other collectives and institutions by using the European Observatory, the web page, the Good Practices Guide as well as the rest of the tools devised within the project, in order to promote the transference of results, innovation and transnational cooperation in VET, so as to make

the most of the synergies created in the scope of other projects already implemented.

The following Results have been achieved:

**a) Creation of the "Fontes" Thematic Network.**

This network includes not only the partnership of the project, but also other entities (associations, trade unions, enterprises, public and private training centres, enterprises involved in rural development...etc.) connected with the rural context and that have expressed their interest in taking an active role in the Thematic Network.

The Network addresses enterprises of the sector, the social partners and the target collectives of the participating countries. It is expected to be used by: experts in VET and rural development; social agents of the sector; the target collectives and the educational authorities.

The working language of the Network is English.

**b) Creation of the European Observatory for new qualifications.** This tool is a laboratory that contains a large collection of approaches and solutions to be implemented in the rural context.

The European Observatory addresses the users of the Network and the target collectives of the project (teachers, training centres and authorities competent in education and employment).

Its functions concern:

- 1) A multisectoral approach to the training made available to collectives with specific needs.
- 2) The promotion of transparency in training and the implication of enterprises of all sectors for the assessment of results.
- 3) The relationship with several institutions in order to promote the official recognition of training itineraries, bearing in mind the existing employment policies and the validation at EU level (European Qualification Certificate).
- 4) The dissemination and transference of results.

The analysis tool of the Observatory, the so-called **FONTES Analysis**, is available in English and in the languages of all the partners.

- c) **Creation of an Information and Learning Resources Centre.** Its main aim is to provide an effective educational and informational context that allows for an adequate communication between the end user of the training initiative and the trainer (whether a mediator, a self-directed learning motivator or a tutor). This information service intends to reach as many users as possible and make a large amount of information on existing and future training options within the different areas of the project available to them.

This service is initially available in the languages of the project partners for target collectives, social partners, teachers, associations and training centres.

- d) **Creation of a Model of Telework Platform** based on previous distance learning and open learning experiences in order to encourage communication between students and tutors and enhance collaborative learning and learning by project method, which lead to fruitful discussions among the different actors involved in training. It also encourages the acquisition of information and the building of new knowledge, which are the basis for informal training and information exchanges.

This product is meant for teachers and target collectives of the project. It is available in English and in the languages of the project partners.

- e) **Publication of a Good Practices Guide** which describes the process towards the transformation, modernisation and adaptation of European training systems based on high quality standards. The Guide intends to promote the recognition of new professions connected to the New Sources of Employment, which will allow for the transference of the results throughout the project.

This product is addressed mainly to teachers, training centres and educational institutions.

Nevertheless, the fact that it offers a general outlook of the different issues dealt with, makes it also interesting to other types of users.

The Guide is available in English and in the languages of the project partners.

- f) **Web page for information and dissemination purposes.** The web page collects and showcases the activities carried out within the Thematic Network. Its aim is to provide information on different aspects of the project; its features, functioning, activities carried out, achievements...etc. and disseminate the results to other potential users.

This product is addressed to the target collective, teachers, educational authorities and the general public. It is available in the languages of the partners of the Thematic Network and in English. It has been updated throughout the life of the project by all partners.

- g) **Publication of Material for the Dissemination of the project.** Three brochures have been edited as complementary dissemination and information material. These brochures have been produced throughout the life of the project. Each brochure covered a different area of the project, so as to reinforce the dissemination process: Start up and aims of the project; presentation of the transnational partnership; access to the project by end users through the web page, presentation of the final results of the project.

All brochures are available in English and the languages of the project partners. They are intended for the target collectives and the end users of the project.

### **1.3. European dimension of the project. The Transnational Partnership.**

#### **THE TRANSNATIONAL PARTNERSHIP**

The transnational cooperation has been the main pillar over which the project has been built. Otherwise it would lose all its meaning. **The Transnational**

Partnership of FONTES has been conceived as a Thematic Network involving several different agents (trade unions, Research Centres, VET centres, Human Resources Companies, entities connected to Universities etc.). It has 11 partners from 7 different countries (Germany, Slovakia, Spain, Greece, Italy, Portugal and Romania). The partnership was created to address the need for a wide cooperation framework that meets the expectations and the needs of the project and of the target collectives. Such framework collects the experience of the different partners, a valuable contribution to the project.

The cooperation is based on several common characteristics of the partners and also on the functioning of the network, which allows all partners to participate in decision taking and in the development of the network as well as to enrich it with their contributions.

Partners have also been involved in the management and assessment of the project. They have contributed to its validation and to the adaptation of contents and aims to the real needs of the regions where the project was implemented.

A Continuous Assessment and Quality Management work team was created within the

partnership. It included a representative of each of the partners. Their task was to carry out the follow up and assessment of project activities: objectives achieved, progress made, efficiency of the activities, quality of the products...etc.

Apart from regular cooperation throughout the project, the partners met in several transnational work sessions. In these meetings, they discussed different issues concerning the development of the project, schedule, initiatives, duties in each activity, general progress or continuous assessment, in order to achieve the objectives put forward.

Some actions required an especially intense cooperation among the partners, who contributed to it with their experience and expertise so as to reach target collectives.

Some other activities, on the contrary, due to their specific nature, required close collaboration among some specific partners who had the necessary experience in the field.

In all cases, a considerable informative effort has been made, in order to provide comprehensive information on activities and results to all partners at all times.



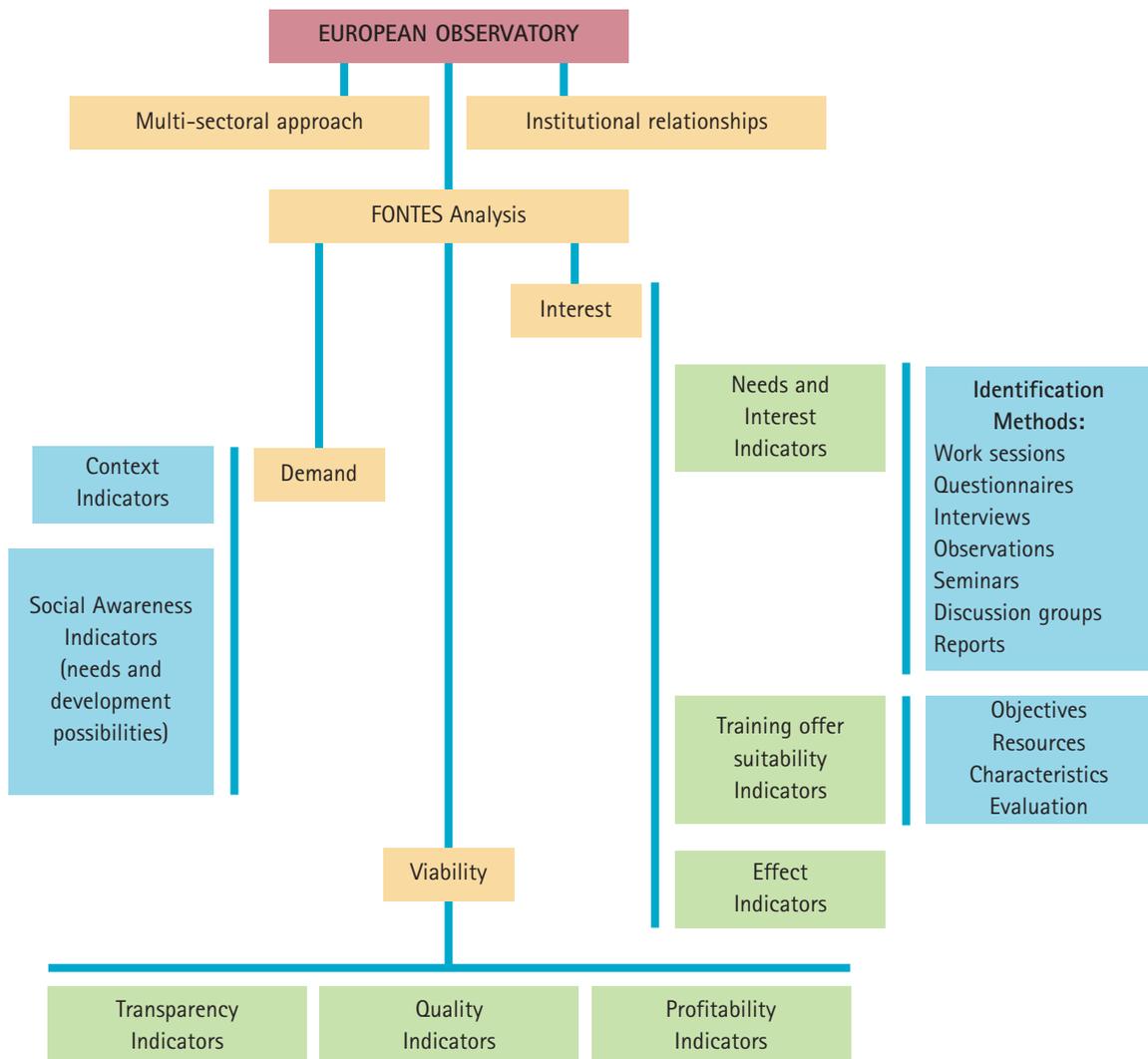
## 2. TOOLS DEvised BY THE PROJECT

### 2.1. The European Observatory.

The European Observatory is a tool aimed to assess training itineraries. This analysis tool assesses the interest, demand and viability of training itineraries in a given territory and addressed to a specific target collective by using the so-called "Fontes Analysis".

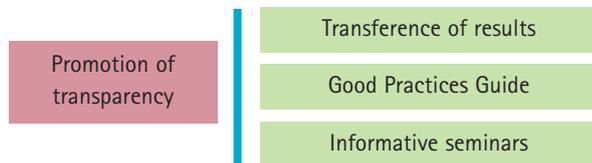
The basic elements that provide the foundations of the European Observatory are the following:

- 1) The promotion of the transparency of results, using different communication and information media.
- 2) A **multisectoral approach** that establishes links between the new employment opportunities and the new training opportunities. Such training opportunities will be expanded to meet the needs of different end users in order to provide them with the necessary knowledge in diverse fields.
- 3) To favour relationships with **different types of entities** that promote the official recognition of the training itineraries.



## THE PROMOTION OF TRANSPARENCY

The results achieved by any project must be released to the target collectives, social partners and educational entities by issuing a descriptive report.



This sort of report boost dissemination and clearly illustrates the point that different types of curricular design can have specific impacts and results.

Thus we make sure that a given training curriculum can successfully be implemented in similar social contexts with similar needs and demands and that it will cause the impact expected in a given target group.

Moreover, reports are also useful to raise awareness among social partners and, to some extent, among the stakeholders of the sector.

The European Observatory is the basis for the **Good Practices Guide**. The Guide will be useful in the assessment of a given curricular design and when devising a work plan which intends to achieve objectives that have been fixed beforehand.

The different informative seminars organised should address all the entities involved in transparency actions, in order to support:

- **The target collective:** for they will become aware of the benefits of participating in new training initiatives that test a given curricular design and its future impacts in terms of qualification and of employment creation.
- **Social partners:** for them to become aware of the importance of the qualification in the fields covered by the curricular design in order to improve the employment opportunities and the

economic and social situation of the target collectives.

- **Educational authorities and professionals of the sector:** for them to assess the adequacy of the curricular design for the professionalisation of a given sector where no other qualification options exist.

## MULTISECTORAL APPROACH



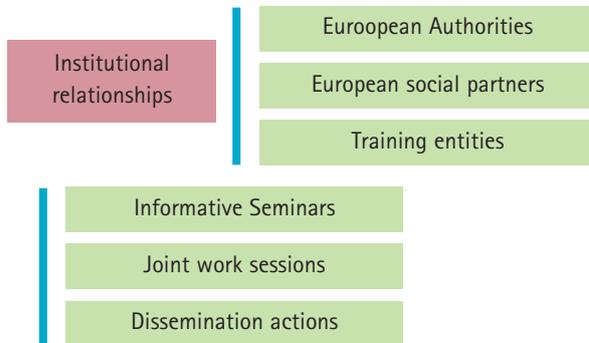
A multisectoral approach allows studying different curricula at a time. Such approach allows the access from different sectors, as the qualification obtained is very diverse, which increases the employment opportunities of all kinds of users.

The multisectoral approach fosters the New Professions connected to the so-called New Sources of Employment. These emerging professions do not have any specific qualification system so far. The curricular designs analysed in the European Observatory will focus on these new professions.

The interdisciplinary approach takes into consideration all the elements that are common to different curricular approaches. Thus, the training action cover a wide range of knowledge fields.

The laws regulating education are different in each country. Therefore, it is not easy to get the official recognition of a curricular design. Thus, we consider that it would be very interesting to have a **certification body** at EU level involving EU educational authorities. Such body would be responsible for the official recognition of training initiatives that are not contemplated by the educational regulations of member states so far and will presumably continue to be so.

## INSTITUTIONAL RELATIONSHIPS



Another important aspect of the European Observatory is its capacity to establish relationships with institutions at all levels. This is a difficult task, both because it is quite new and also due to the fact that no specific measures are being implemented to encourage such relationships.

It seems that these issues are not considered very relevant at EU level, but they are very important for the development of a high quality education in the scope of the EU:

- On the one hand, we lack the necessary mechanisms for the involvement of educational authorities at EU level. Such involvement would provide positive inputs that would result in a greater quality and transparency in the new professional qualifications.
- And on the other, it is very difficult to find resemblances between the different European social partners of the sector. Such symmetry would allow for the creation of collaboration mechanisms that would improve training and qualification at EU level.

This lack cannot be remedied by initiatives as FONTES; it has to be tackled by those that can implement measures in a wider context and improve the quality of VET at EU level contributing to the creation of the quality certifications that already exist in other professional fields.

FONTES' proposal is to carry out several awareness raising initiatives that encourage the commitment of the competent institutions. Thus, it would be possible to

outline a plan for the promotion of high quality VET, especially as the New Sources of Employment and the New Professions are concerned.

To the possible extent, FONTES Project has encouraged such institutional contacts at regional and national level. Arranging meetings and interviews in this sense is no easy task, as these issues are usually regarded as secondary and of little relevance for educational groups at regional and national levels.

## FONTES ANALYSIS

The so-called FONTES Analysis has been devised and developed within The European Observatory .

As previously mentioned, the "FONTES Analysis" is an assessment tool for the validation of new training itineraries. Such assessment must be based on a given set of parameters:

Interest.

Demand.

Feasibility.

Several reasons have motivated the election of these three parameters:

- 1) Firstly, the projects that we intend to validate and that laid the foundations for several training itineraries, have already finished. Thus, we must assess whether the circumstances that motivated the creation of these new itineraries still exist or are no longer applicable.

Therefore, the existing interest (quite usually connected with training and employment needs) and the demand for new training opportunities are two essential parameters.

- 2) In addition to this, we must analyse whether these circumstances can be found in other territories and if they affect other target groups, and to what extent could new itineraries (only if the first two parameters are met) be implemented successfully (feasibility is a useful variable in this sense).

- 3) Finally, in the event that there are major divergences between needs detected, the demand and the implementation methods

initially devised to ensure the feasibility, the itineraries would need to be adapted to the new circumstances, the new context and the new target group for them to be useful.

In order to ensure that the aforementioned variables provide useful and valid conclusions, the FONTES Analysis includes several indicators:

## 1. Interest

### 1.1. Needs and interests detected

- Types of needs and interests
- Methods used to detect them

#### Indicators of needs and interests

- Indicators of Prescriptive Needs
- Indicators of Prospective Needs
- Indicators of personal Needs and Interests.

### 1.2. Adaptation of the itineraries to these needs and interests

- Aims.
- Resources.
- Features.
- Assessment.

#### Indicators of the adequacy of the training offer for needs and interests.

- Analysis of the compatibility of the training (suitability of the subject matter)
- Analysis of the compatibility of the length of the itinerary with the time that users can allocate to it.
- Analysis of the location compatibility (accessibility limits)

### 1.3. Expected Impact

#### Impact indicators

- Relationship between the position of the worker and his or her qualifications.

- Potential increase of employment possibilities. Assessment of the adequacy of the professional profile in the territory.

## 2. Demand.

#### Demand Indicators

- Context-related indicators: Employment creation potential.
- Indicators of the social awareness of the development needs and possibilities.

## 3. Feasibility.

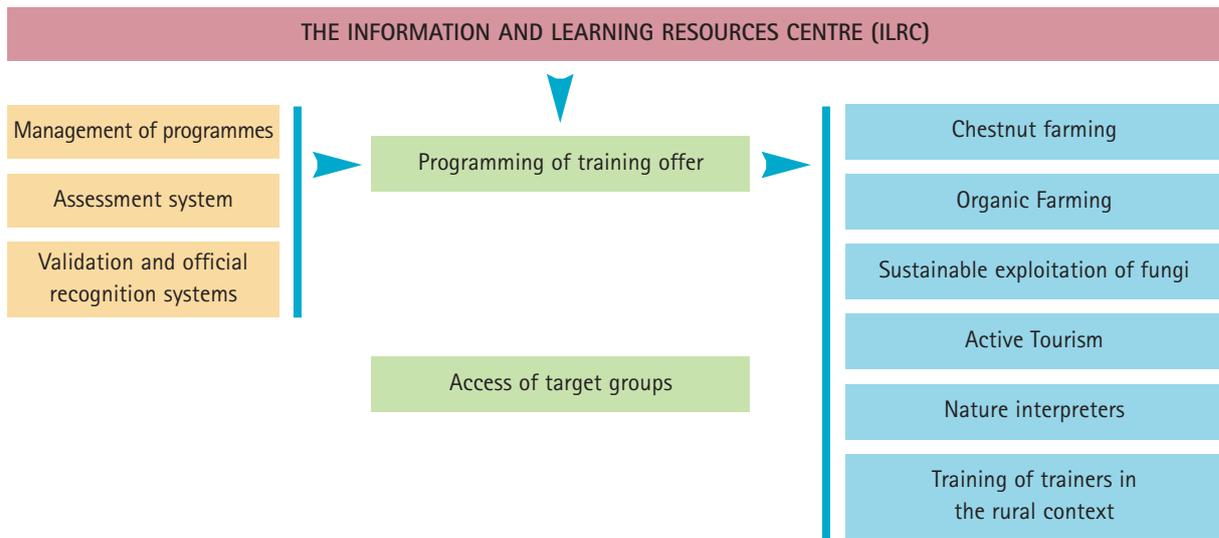
#### Feasibility indicators

- Indicators of the profitability of the implementation of the training itinerary.
- Indicators of the quality of the pedagogical material.
- Indicators of the transparency of the curricular design.

The complete version of the FONTES Analysis is available for downloading at [www.fontesproject.eu](http://www.fontesproject.eu) in the section of the European Observatory, within Tools.

## 2.2. The Information and Learning Resources Centre (ILRC).

The ILRC (Information and Learning Resources Centre) is the information area of FONTES Thematic Network. Therefore, in the design stage it was agreed that ILRC should be built within the web page of the project, namely in the section devoted to documentation. The information of this Virtual Centre can be found in [www.fontesproject.eu](http://www.fontesproject.eu) and is available to all users. The tool has been designed with the aim to provide as much information as possible on the existing training offer in the different areas covered by the Thematic Network.



In order to do so, the following sections were created within the Resources Centre:

- The Educational System in the different countries involved in the project.
- The Vocational Training offer provided in the territories involved in the project.
- Notice Board.
- New jobs and training offers.
- Requirements and Processes involved in the official recognition of training in the areas covered by the project.

These sections of ILRC are available in the eight working languages of the project: the seven languages spoken in the seven countries involved in the Transnational Network and the common working language, that is, English.

#### The Educational System in the different countries

This section provides a general outlook to the structure of **formal education** in the countries involved in FONTES Thematic Network.

This section is organised by country. Each area includes descriptive documents that provide information on the general structure of the educational system, especially as formal education is concerned, in each country. The information on the formal training offer in each country is available in its original language and in English.

#### The Vocational Training offer provided in the territories involved in project

The section on **non-formal training** includes several documents describing continuous learning and job training for each area covered by the project.

The partners selected the following areas to be used in Fontes Project:

- The rural areas in the County of León, Spain.
- Southern Black Forest Natural Park, Germany.
- Region of Harghita, Romania.
- Region of Tesalia, Greece.
- Region of Tras-os-Montes, Portugal.
- Region of Valdorba, Spain.
- Region of Alto Tâmega, Portugal.
- Central, Western and Eastern regions, Slovakia.

Each partner was in charge of finding information, comparing data and producing documents about their areas of influence, in their native language and in English.

#### Notice board

In addition to providing information on formal and non-formal training, the Notice Board was created in order to offer a broader view on education.

This section is intended to provide complementary information on other training courses that are being

offered in the relevant fields, as well as detailed information on the different territories covered by Fontes Project.

Therefore, the ILRC provides a general outlook of the existing training offer in the three sections described above.

### **New Jobs and training offers**

The section "New Jobs and Training Offers" aims to encourage the professionalisation of the new emerging professions in specific sectors in rural areas.

This section includes information on new itineraries which are founded on Equal Opportunities and make use of the New Information and Communication Technologies in order to:

- Use local endogenous resources,
- raise awareness among the beneficiary groups on the new vocational training offer and its importance for employment creation,
- increase the possibilities of transforming products in the rural areas that produce them,
- and encourage entrepreneurship.

This section will also publicises previous Leonardo projects that carried out training initiatives in rural areas in the scope of the following New Sources of Employment:

1. Jobs connected with Leisure and Sports.
2. Jobs connected with Farming in rural areas.
3. Jobs connected with the environment and the conservation of natural areas.
4. Jobs connected with personal services.

The Leonardo Pilot Projects that were chosen and described are the following:

- **Trade on Line:** This project aimed to create the profile of career adviser in the context of farming and rural areas.
- **Active tourism:** A new professional profile
- **Ecoagro:** International project on organic farming.

- **Forest – Chestnut in Europe:** Comprehensive training for chestnut growers (training for specialists on the handling, cultivation, maintenance, plague treatments and use of chestnuts).
- **Iris:** Organic farming as an innovative labour market.
- **Mykos:** Fungi as a source of employment, sustainable development and economic diversification in rural areas.
- **In-Nature:** Nature and rural realm interpreter, an innovative training.

### **Requirements and Processes involved in the official recognition of training in the different territories.**

The section "Requirements and Processes involved in the official recognition of training in the different territories" was created within the Information and Learning Resources Centre in order to contribute to the recognition of the emerging new professions by means of an official certification that validates the training and the qualification at EU level.

This section includes the documents produced in each country describing the steps to take in order to obtain the official recognition of new training itineraries.

### **AIMS OF THE INFORMATION AND LEARNING RESOURCES CENTRE**

#### **Access to information for the target groups.**

The design of the Information and Learning Resources Centre was devised with the aim to make the access to information easier for the target groups.

The validation of the training offer collected in ILRC was done taking the following priorities into consideration:

- The promotion of the transparency of qualifications.
- A multifaceted approach to education.

- The support of a system that incorporates training, qualification, follow-up and lifelong training.

The Resources Centre was organised in different sections in order to meet the information needs of the target group and bearing in mind the aforementioned priorities.

These sections contain the documents produced by the partnership.

The ILRC together with the FONTES project were publicised to the target group by means of several dissemination and awareness raising activities in the different territories covered by the project.

**Encouragement of the social dialogue**

In order to produce the reference material, several sources of information were consulted in the process of searching data, exchanging expertise and comparing information: The process involved interviews with educational institutions, work sessions and discussion groups with social partners as well as several information, guidance and awareness raising seminars addressed to the beneficiary groups.

All these initiatives have improved social dialogue with the groups involved in the project.

They also made it possible to adapt ILRC information to real needs, as dissemination activities allowed the checking of data.

**Creation of assessment systems that involve educational authorities and social partners**

FONTES Project has an integrated approach to VET. It intends to contribute to the transparency of qualifications and to the recognition of the new competences connected to the new professions, in order to provide more flexible and tailored training systems.

This aim implies that educational authorities and social partners must become involved in the assessment of the training systems suggested.

The partnership held meetings with several educational institutions and some of the new training courses offered went through quality assessment processes, namely the ones aimed for the

professionalisation of organic farming and the sustainable exploitation of fungi as a new source of employment.

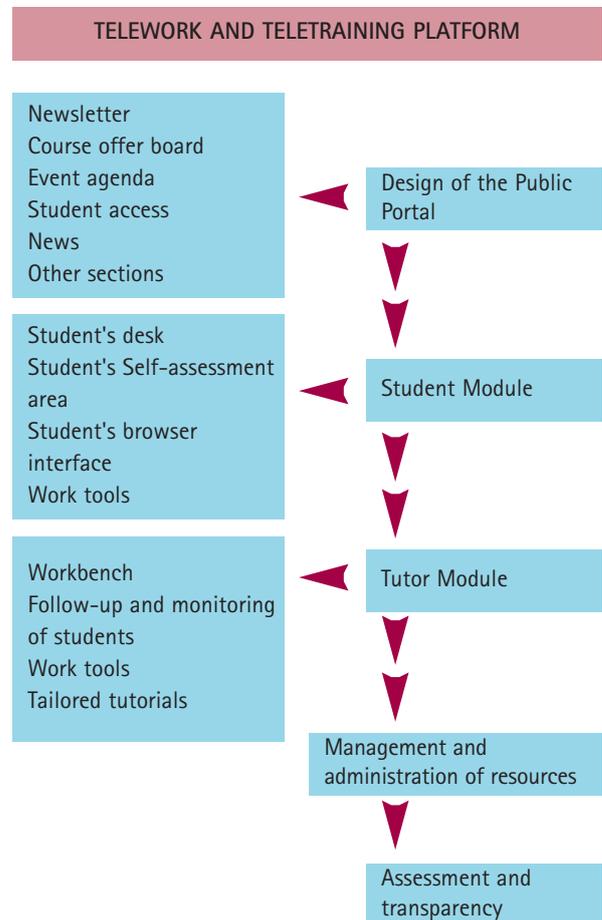
As a result, the project IRIS was awarded a Quality Award. This project is responsible for the design of the training itinerary for Organic Farming.

**2.3. The Teletraining Platform Model.**

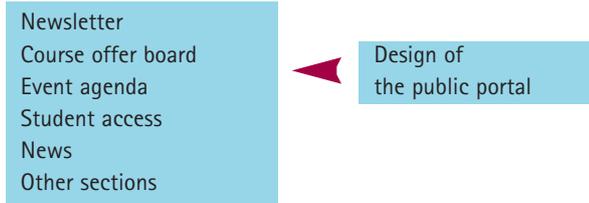
This telework and teletraining platform model intends to be a useful guide for those entities and organisations that wish to offer their training services by using the New Technologies of Information and Communication.

The model is available for downloading at [www.fontesproject.eu](http://www.fontesproject.eu), in the subsection devoted to the Teletraining Platform within the Tools Section.

The Teletraining Platform Model has the following structure:



## PUBLIC PORTAL

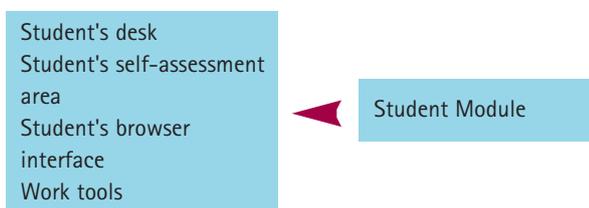


The Public Portal is the access point for all users.

According to this Teletraining Platform Model, a Public Portal should include the following sections:

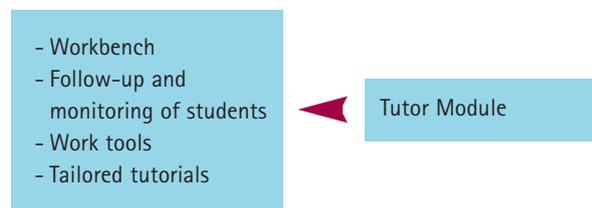
- **Newsletter.** Containing important information concerning the subject matters of the courses offered.
- **Course offer board.** Containing a list of the courses that are available at each point, and a detailed description of each of them.
- **Event agenda.** The section Event Agenda will gather information on all parallel activities related to the courses offered, whether organised by the entity that manages them or not.
- **Student access.** Where students can register and access other sections of the Platform.
- **News.** Fast access to the most interesting news included in the different sections of the platform.
- **Other sections** that the entity that manages the courses consider interesting (information of the entity, contact details... etc).

## STUDENT MODULE



This module is divided into four different areas according to their function:

- **Student's Desk:** Where the training contents are stored.
- **Student's self-assessment area:** This section allows students assess their personal progress in the training process.
- **Student's browser interface:** In this section students are able to track back their own steps when in the platform. It allows the student to become aware of the tasks already fulfilled and the ones to be tackled in order to acquire further knowledge and abilities.
- **Work tools:** Section where the student can go through the different techniques and possibilities available in the Platform in order to follow a specific itinerary.



The tutor of the course is an essential component in the training process of the student.

In order to accomplish this task adequately, tutors must have certain characteristics:

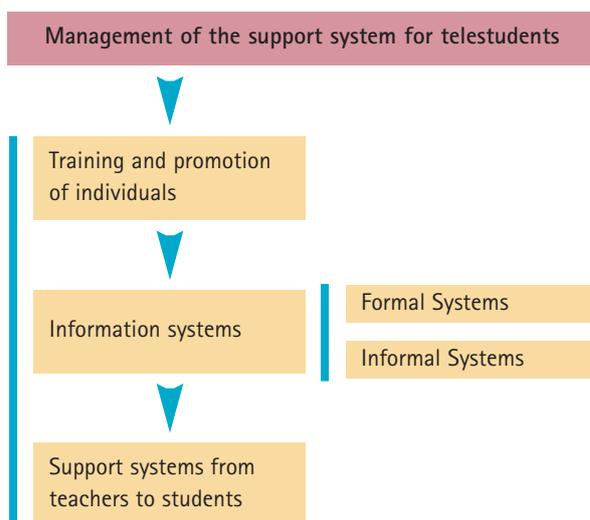
- Average/Highly cultured person.
- Expert in the relevant field.
- General knowledge of the sector.
- Acquainted with pedagogical principles.
- Good planning skills when organising tasks, activities and work tools.
- Experienced in the use of training techniques and resources, so as to obtain the best possible results.

According to this Platform Model, the Tutor Module consists of several sections that will help tutors provide students with high technical skills in each particular training course:

- **Tutor's Workbench.** It includes all the materials that teachers may need in order to produce didactic units and prepare activities for each course.
- **Follow-up and monitoring of students.** In this section tutors will find different activities and exercises that may help them carry out the follow up of students' progress.
- **Work tools:** The Work Tools will be made available to students as complementary material to the activities included in the course and will be updated by the tutors:
- **Tailored Tutorials.** Tailored Tutorials allow students to contact their teachers and ask them questions at all times.

### MANAGEMENT AND ADMINISTRATION OF RESOURCES

Management and administration are crucial for an adequate use of teletraining platforms. The tutor will be in charge of the management of the platform. Management entails several elements:

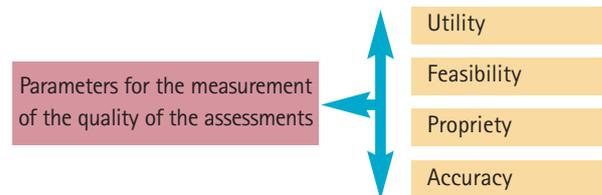


The administration of materials is essential in order to provide the necessary resources to students for them to deal with training without any avoidable obstacles connected with a defective work method.

### ASSESSMENT AND TRANSPARENCY

All training systems, teletraining platforms included, must provide an assessment method in order to be able to continuously update, improve and amend eventual mistakes

Generally speaking, the most usual standards for the assessment of the quality and transparency of evaluation processes are the "Program Evaluation Standards" issued by The Joint Committee on Standards for Educational Evaluation of the US and the "Guiding principles for evaluators" by the American Evaluation Association. These standards cover the principles for the evaluation of programmes and thus allow for significant improvements in the assessment.



## 2.4. Good Practices Guide.

This Good Practices Guide aims to be a tool for the transformation, modernisation and adaptation of the innovative and high quality European VET systems.

This guide contains a summary of the work carried out in the scope of FONTES Project, and also some useful information on the New Sources of Employment and the new emerging professions. These emerging professions imply new employment opportunities in rural areas.

The Guide is structured as follows:

#### 1. Introduction.

- Leonardo da Vinci Programme.
- FONTES Project: Thematic Network to Validate and Disseminate Good Practises and Quality Models of Vocational Training in Rural Areas. Description, Aims and Results.
- European dimension of the project. The Transnational Partnership.

#### 2. Tools devised by the project.

- The European Observatory.

- The Information and Learning Resources Centre (ILRC).
- The Teletraining Platform Model.
- The Good Practices Guide.
- The Web page of the project.
- Connections between the tools devised.

### 3. The New Sources of Employment (NSE).

- What are the New Sources of Employment?
- Origins and development of the New Sources of Employment.
- Training connected to the new emerging professional activities.
- Description of the New Sources of Employment and the new emerging professions:
  - Fungi.
  - Organic Farming.
  - Chestnut trees.
  - Active tourism.
  - Interpretation in rural areas.
  - Renewable energies.
  - Professional caregivers.
- Example of a Comprehensive Rural Development Project.

### 4. The transparency in the processes of validation of new professions.

- Good practices in the validation process.
- The importance of social partners.
- The impact in the target group (information and dissemination initiatives).
- Transference of results.

### 5. References.

Each of the New Sources of Employment described are structured as follows:

#### 1. General description of the subject matter.

- Description of the source of employment.
- Evolution in the use of the source of employment.

#### 2. Relevance and impact of the source of employment at present.

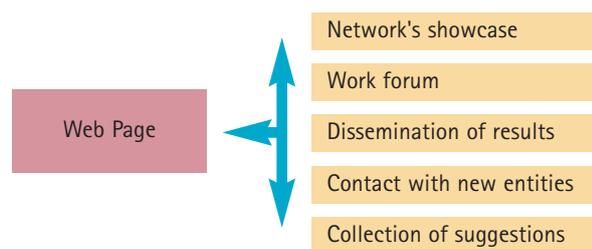
- Current relevance and circumstances concerning the source of employment.
- Results and impacts of the source of employment.

#### 3. The source of employment as an instrument for rural development.

- Prospects of development and requirements.
- Employment creation potential of the source.

This is one of the most important results, as the project is expected to cause a great interest among the target groups.

## 2.5. The Web page of the project.



The web page ([www.fontesproject.eu](http://www.fontesproject.eu)) was created taking into consideration the following important objectives:

#### • Publicising the project:

The web page showcases the Network and disseminates the results of Fontes project. In addition to this, it also gathers suggestions of training initiatives in rural areas.

#### • Making easier for the Project to reach the different target groups:

It allows for contacts with institutions involved in the sectors concerned by the training itineraries that are to be validated.

#### • Providing a workspace for the partners: Work forum.

The page is divided in three different sections:

- Fontes Project
- Fontes Tools
- Interesting links.

## FONTES PROJECT

The section devoted to Fontes Project was created in order to contribute to the transparency of the project. It also intends to provide information about the project, the entities involved in it and the activities, and to contribute to the dissemination in the different countries and the communication among the entities.

Some sections were created for the partners to carry out the evaluation of the process and the assessment of the actions carried out in each stage.

In order to do so, the following subsections were created:

1. **Fontes Documents:** Aims, beneficiary groups, results, schedule of the project and expected impact.
2. **The Partners:** A description of each partner is included, as well as a link to their respective web pages.
3. **Collaborating entities:** Some of the entities that collaborate with the project are described.
4. **Publicity and dissemination actions:** By means of brochures, the media...etc.
5. **Transnational Meetings:** Internal documents connected with the meetings (minutes, agendas...etc) and dissemination activities carried out during the meetings.
6. **Internal and quality evaluations:** Internal documents of the partners, used as a tool to assess the progress of the project.
7. **Interim results of the project:** Selection of the territories involved and studies carried out.

## FONTES TOOLS

The second section of the Web page is called Fontes Tools. It contains the final products devised within the project, and also hosts some of them.

This section was designed to make the different tools available to target groups for them to use them, test them and assess them. Some of the subsections in this section are restricted to the partners.

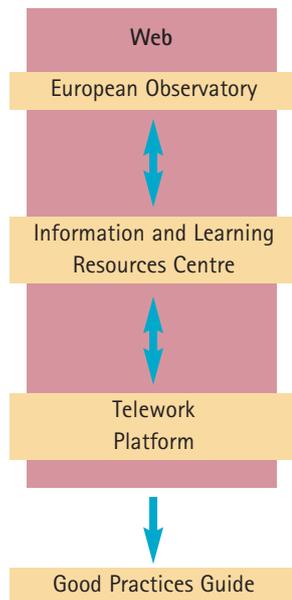
This section is divided in the following subsections:

1. **The European Observatory** The reference material that the partners used in the previous analysis and that are the base for their work are available in this subsection, as well as the Fontes Analysis which was devised by the project partners.
2. **The teletraining platform:** Here it is possible to consult the documents and proposals that are the basis of the work of the partners. The final version of the Teletraining platform model devised within the project is also available.
3. **The Information and Learning Resources Centre (ILRC):** In this subsection it is possible to consult the reference material included in the different informative sections, as already explained in the section describing this tool.
4. **The Good Practices Guide:** Here a general outlook of the Guide is available, although the unabridged version of this project tool is only available in paper format, and therefore will not be available in the web page.

## INTERESTING LINKS

The last section of the web page is called Links. This section intends to collect additional information about other entities that work in the sectors covered by the training itineraries that are to be validated within Fontes Project. The information is arranged by countries. Each partner has contributed with a list of links that they consider interesting. In addition to this, there is a subsection of European links.

## 2.6. Connections between the FONTES tools devised.



All the tools devised within Fontes Project are interrelated.

The web page of the project hosts the European Observatory, the Teletraining Platform Model and the Information and Learning Resources Centre. Moreover, these tools complement each other and provide a global

outlook of the situation of Vocational Training in the different countries and of the new training options:

The **Information and Learning Resources Centre** collects information concerning the educative systems, the existing training offer as well as the new training options and the processes for them to become officially recognised.

- The **European Observatory** can be used to analyse the possibilities of implementing such new training designs.
- The **Teletraining Platform** provides new teaching approaches for these new training designs, so that they can be available for a greater number of users.

The **Web page** provides general information on FONTES Project, its activities and progress. Thus, a relationship is established between the tools and the management and development of Fontes Project itself.

Finally, the **Good Practices Guide** collects the main activities carried out in the scope of the project and the tools devised. It gives especial emphasis to the **New Sources of Employment**, for them to become widely known among the general public and the target groups of the project.

### 3. THE NEW SOURCES OF EMPLOYMENT (NSE)

#### 3.1. What are the New Sources of Employment?

This term makes reference to new professional activities (either potential or emerging) that meet the new social needs and that are liable to become part of an ever-growing labour market.

These new professional activities must meet these four characteristics:

- Comply with social needs.
- Become part of incomplete or defective labour markets.
- Have a well-defined local context for the products or the services rendered.
- Have a high employment creation potential.

#### 3.2. Origins and development of the New Sources of Employment.

The deep changes that have taken place in Western countries in demographic, social and economic terms, have brought along new employment opportunities. The ageing of population, the transformation of family structures, the new industrial revolution and the globally interdependent markets have to a great extent contributed to create new needs that have in their turn generated new employments and services that had been either inexistent or scarcely developed.

One of the greatest challenges of modern societies is creating the employment society is demanding. This is no easy task; it requires a great effort consisting on searching, spotting and experimenting in the new areas liable to generate employment at local and regional level.

All in all, we need to develop new activities that satisfy the new social needs. These new activities should be assigned a wage group and should also be labelled and thoroughly described in order to become a new profession connected to a New Source of Employment.

Daily-use services, services improving our quality of life, cultural and leisure services and environmental protection are the four main pillars of the so-called New Sources of Employment, as classified by the former President of the European Commission Jacques Delors in the White Paper *"Growth, competitiveness and employment entitled: The challenges and ways forward into the 21st century"*

The aim of New Sources of Employment is to promote local strategies liable to create employment. The practical implementation of these New Sources of Employment will be adapted to local characteristics and real needs in order to be effective in each territory.

The European Employment Strategy, in structural and market terms, requires an investment effort to increase Human Resources, especially as VET is concerned. Employment creation requires more flexible organisations and more effective labour market policies; the promotion of local and regional initiatives and the reduction of staff costs which are not related to wages. Specific efforts should be made for the inclusion of young people in the labour market and to fight long-term unemployment as well as to achieve Equal Opportunities for men and women in the labour market.

An efficient implementation of the strategy requires the involvement of stakeholders at all levels, including Governments, regional and local authorities and social partners.

Employment creation associated to economic growth, as mentioned in the White Paper, and competitiveness are based in three main pillars:

- The promotion of local initiatives that comply with the needs of individuals and enterprises;
- A greater involvement of enterprises, traditionally only involved in economic issues, in the search for new employment creation methods. Such commitment would turn enterprises into actual local development agents;
- The reduction of the indirect costs of labour would reduce the costs of unqualified work, which would contribute to the inclusion of unskilled unemployed people.

The New Sources of Employment do not comprise all new professions as a whole, only those connected with the new needs in a given territory.

The main elements that cause such needs are the following:

- a) **The social and demographic changes** of the last decades and technological development as a whole, increase social needs.
- b) **The ageing of population and the transformation of family structures bring about needs of a social and demographical nature.**
- c) **The inclusion of women in the labour market.** The inclusion of women in the labour market brings about the need for new services derived from their absence from home.
- d) **Technological developments** imply very important changes in our daily lives and in our homes in connection with time use.
- e) **The ever-increasing urbanization of the territory.**
- f) **The increase of the educational level and social willingness to move forward.**

We must emphasise that the New Sources of Employment are more than a set of actions for employment creation; they also boost competitiveness, economy and the social welfare.

We aim to create the necessary conditions, thanks to the **New Sources of Employment** (new professions), for rural areas to achieve sustainable development in the next decade by increasing employment rates using endogenous resources and promoting the diversification of the local production structures.

### **3.3. Training connected with the new emerging professions.**

#### **Training needs**

A need is the gap between the way things are and the way things should be. The concept "need" has different meanings depending on one's point of view and activity. From the point of view of training, a "need" is the expression of the difference between the desirable qualifications and competences required in order to perform a given activity and the actual qualifications and competences.

#### **Training Plan – Method for the elaboration of a curricular design**

Training processes in rural areas are complex, due to the characteristics of rural areas and rural population.

Apart from the formal training offer available in each country, there are not many more options in order to get qualifications in a specific sector in rural areas.

The existing training needs are very varied, and in some cases it is difficult to find a homogeneous group of people with the same interest and liable to be trained. Therefore, attention should be paid to the needs of the population addressed, rather than training itself, and to the ability of such target group to solve the problems caused by their needs.

At this point, we must be aware of the fact that the approach of LEONARDO DA VINCI Programme allows for new methods to be used, in order to reach people and to achieve the results sought by the training process, while promoting the interest of the target population.

We suggest an open training plan as training model for the new emerging professions, and a curricular design devised by FONTES Thematic Network.

The Training Plan and the Curricular Design suggested are structured in several stages, as described below:

### A) THE TRAINING PLAN

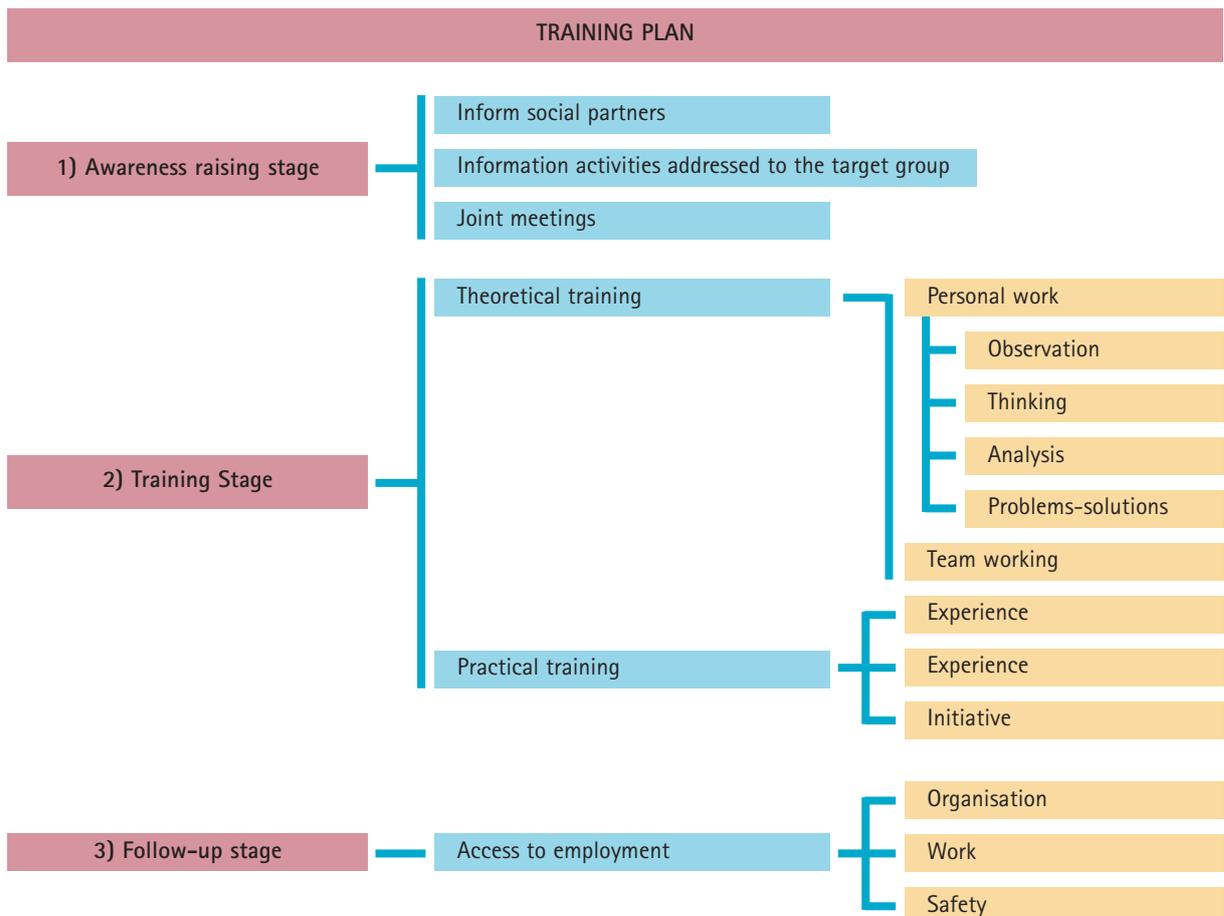
The aim of the Training Plan for the new professional profiles connected with emerging professions consists of training a versatile technical staff that meets the following requirements:

- They must be able to carry out the tasks assigned in a sensible way.

- They must have personality and professional maturity enabling them to become involved in a lifelong training process.
- They must be acquainted with the resources of the area in which they work.
- They must be committed with local development.
- They must be ready to face present and future challenges with initiative and creativity.

The Training Plan is structured in three phases:

- Awareness raising stage.
- Training Stage.
- Follow-up Stage.



## AWARENESS RAISING STAGE

The Awareness Raising Stage has two aims:

- To involve social partners in the training initiative in order to ensure permanent adaptation to actual needs.
- and to encourage and promote the employment of the target group, for them to be able to adapt to the working method used and to have initiative and be resourceful.

The activities suggested for this stage are:

1. Meetings between those in charge of the training initiative and the representatives of the social partners of the sector.
2. Talks, discussions and seminars addressed to the target group and to professionals of the sector.
3. Bringing the representatives of the social partners and the representatives of the target group together.

## TRAINING STAGE

### 1. Didactic guidelines and methodology

The work programme used in the training stage is structured in several training modules.

Each module presents students a new approach to the topic being addressed, and gives them the chance to compare that approach with the one actually used in the sector.

The Programme intends to teach a series of interesting techniques, but also to illustrate the problems of the sector, make students think about them and, above all, give them the necessary qualifications to provide solutions to those problems. It also encourages team working and a positive attitude towards joint work and associations, both in order to defend the product and to diversify the offer.

The programme suggested consists of theoretical and practical lessons, depending on the modules. This approach is very participative, and encourages thinking.

Theoretical lessons will include different types of activities aimed to encourage the intellectual development of students, and their team working skills, as team working is becoming more and more important in rural areas.

Thus, the role of the teacher will be complemented with some personal work and some group activities.

The theoretical lessons may be accompanied with slide shows and documentaries.

It is also possible to invite someone qualified who may provide new points of view and experience in the subject, so as to enrich training contents and contribute with new practical solutions to specific problems. These activities bring the training initiative closer to reality.

Practical activities will be carried out, whenever possible, in areas which are familiar for the participants. Thus, we work with real situations and also encourage the interest and dedication of students.

Depending on the subject matter being addressing in each case, the right season must be chosen in order to carry out practical exercises.

### Organisation of theoretical activities:

The general model of theoretical activities will be as follows:

Activities
1. Theoretical explanation of the teacher.
2. Handing out of work questionnaire.
3. Consultation of pedagogic material.
4. Filling in of the questionnaire (individually).
5. Work in small groups. Drawing up conclusions.
6. General conclusions of the whole group.
7. Solving of secondary problems and doubts.
8. Slide show or documentary, whenever necessary.

**General aims of theoretical activities:**

This work system is intended to achieve the following goals:

As an individual
Encouraging observation and thinking.
Creating links with the rest of students.
Analysing problems and its effects.
Detecting specific problems.
Understanding what is causing the problem.
Coming up with possible solutions.
Improving written expression.
As a group
Being able to give one's opinion in front of the class.
Improving oral expression.
Listening and considering other's opinions.
Understanding the point of view of other students.
Joint search of solutions.

**Team working routines:**

The work system suggested includes team working as an important part of the training process. Team working will always take place after individual work on the same issues that will afterwards be dealt with by the group, so that every student can provide their own ideas.

Team working will be tackled as follows:

Activities
1. Arranging students in small groups of 4-5 people.
2. Appointment of a secretary in each group, who will keep a record of all the issues agreed by the group.
3. Appointment of a coordinator that will organise speaking turns and will moderate the discussions that may arise.
4. Participation of all the members in each group.
5. Production of a final report or a draft.

After drawing general conclusions and explaining them to the students, the teacher will provide some further technical and scientific knowledge in order to complement the work done so far. The teacher will explain any aspects that are not clear or that have not been discussed upon by the groups.

**2. Didactic material and resources**

The didactic materials and resources to be used will depend on the context and on the characteristics of the students. In this flexible approach, teachers will choose the materials and resources they deem appropriate according to their own criteria. We must bear in mind that materials and resources are intended to help training, and they are expected to contribute to the training process.

It is advisable to develop the contents included in the design, so that they can be used as guidelines.

In addition to this, in order to develop the modular itinerary described, it is advisable to use **computers, audiovisual equipment etc.**

The classrooms used must be suitable for different group arrangements, in order to ensure the effectiveness of the training activities.

**Practical training** will be carried out in different premises (organic farms, rural tourism enterprises...etc.) depending on the subject matter being addressed. Collaboration agreements must be signed with these centres, for them to admit the students during these practice periods.

Apart from the material and the facilities above mentioned, the students may be asked to have a logbook in which they will:

- Write down their opinions, ideas and points of view in connection with the work performed.
- Write down their doubts
- On their own initiative, describe their suggestions in order to solve the problems that may arise.
- Write down their personal opinions on the practice period, and highlight those aspects that

have been especially useful during training, and the ones that may need improvement.

### 3. Assessment.

The assessment will determine the progress of students as regards the objectives of the training initiative. Thus, the process will be constantly adapted to the needs of the students.

Assessment will be a continuous process, with three relevant moments:

- **Initial assessment:** It will be used to measure the knowledge and skills of the students. The results will be used in the subsequent analyses. The initial assessment helps adapting the training to the characteristics and the level of the students. Initial assessment will be carried out before starting theoretical training, and at the beginning of each module.
- **Formative assessment:** Formative assessment will be a continuous process, it will be used in order to adjust the training activities to the information gathered. The progressive adjustment of the process requires systematic observation of each student, which helps detecting at what point of the learning process they find obstacles, what are the causes, and what adjustments must be made in the training process.
- **Summative assessment:** The summative assessment will take place at the end of each module. It will tell us if the students have achieved the objectives sought. The level of learning achieved will be the starting point for the next training period.

Students must feel they are the **protagonists** of the training process, and that they are the ones deciding how far are they going to get during the process. Thus, trainers will carry out awareness raising activities, in order to engage the student's interest in the subject matter. To a certain extent, the students themselves will determine the limits of their learning process.

**Information gathering procedures** for the assessments will be based on the systematic observation of the students, the evaluation of their personal work,

their logbooks, the group activities and the questionnaires.

The involvement of the students in the assessment process will be encouraged by means of "self-assessment" and "joint assessment" routines.

Apart from assessing the learning process of students, the training process itself will be assessed, as well as the teacher's performance, the resources used, the facilities, the scheduling of contents, assessment criteria and tools and the curricular design.

### FOLLOW-UP STAGE

The follow-up stage will be based on tailored tutorials.

Tailored tutorials will be used to create links between the student and the teacher-tutor, These links are very beneficial in the professional, technical, social and personal levels, and enable the teacher to follow-up the progress of the student.

Tutorials will consist on periodical conversations between the teacher and the student, in which personal goals can be established, for the student to benefit from a more professional and tailored training, adapted to his or her personal characteristics.

In tailored tutorials the following aspects will be dealt with:

- Personal assessment of the work carried out.
- Results obtained.
- Motivations:
  - Social.
  - Technical.
  - Professional.
- Problems of the student:
  - Concerning his or her background.
  - Concerning the student.
- Relationship with the teachers.
- Relationships with the rest of the students.
- Other issues:
  - Organisation of work: schedules.

- Written and oral expression.
- Initiative of the student.

These issues will be dealt with in a personal way, in order to establish close links with the student and the teacher, based on mutual trust, which will boost the academic progress and the process of maturity of the student.

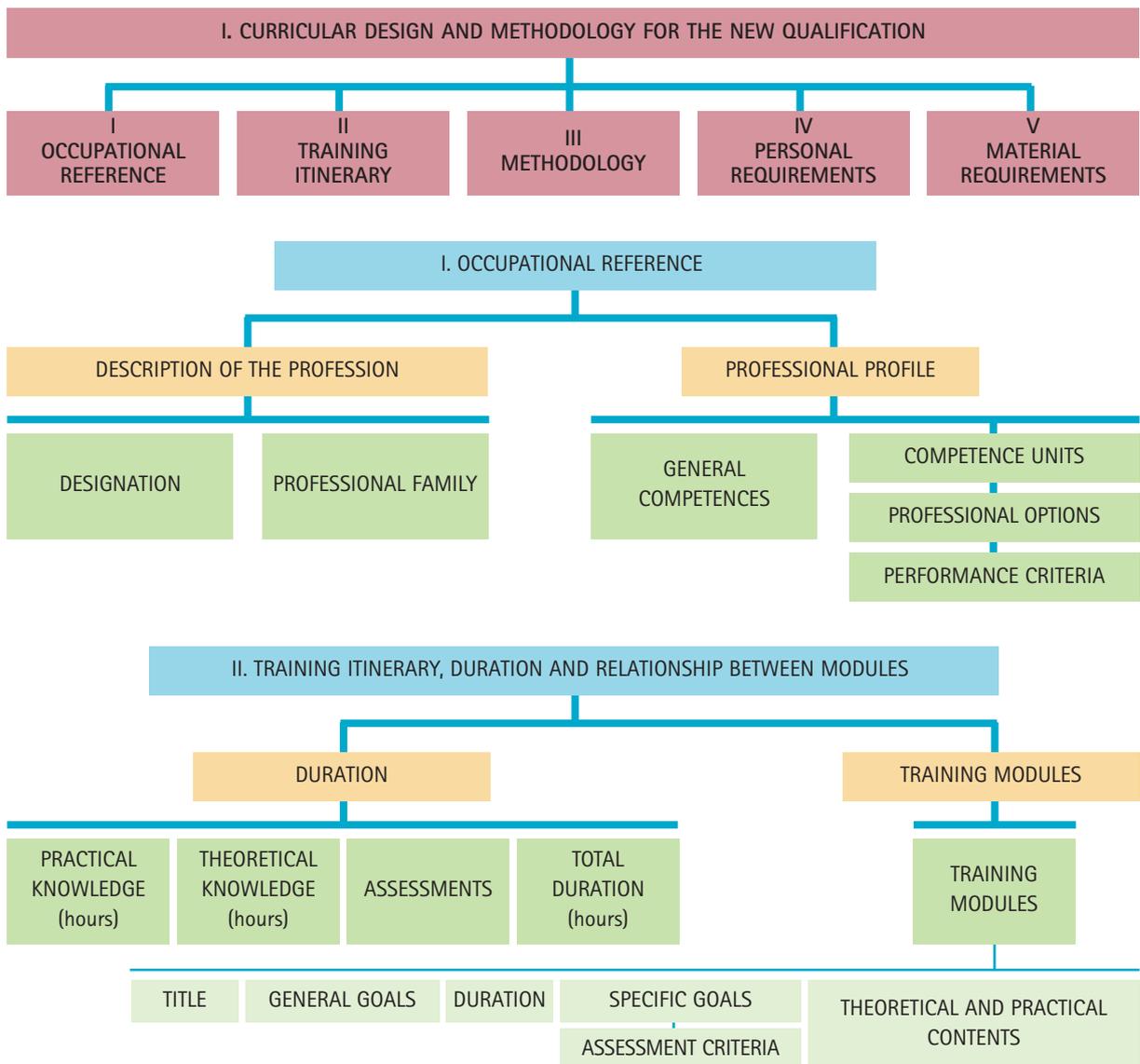
Follow-up will help students to become aware of their progress in a professional, social and human level, and of the importance of achieving the goals in order to complete their training.

On the other hand, the teacher-tutor will become aware of the circumstances of each student and aid their progress by establishing personal goals adapted to their needs.

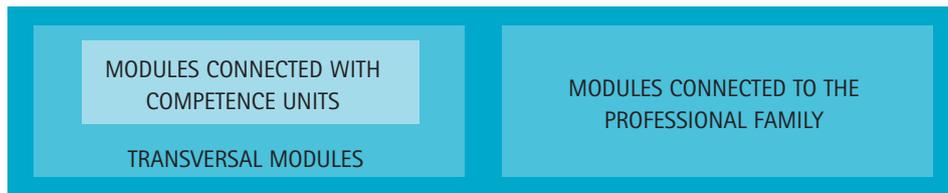
**B) THE CURRICULAR DESIGN MODEL.**

As mentioned before, training will be based on a work programme structured in several training modules. The structuring of training contents corresponds to a type of curricular design. In this curricular design model, itineraries and specific training goals are devised. The knowledge and processes required in order to achieve these training goals are identified and form a well-structured training programme.

We will now describe the curricular design model that may be used in order to devise training itineraries for the New Sources of Employment:

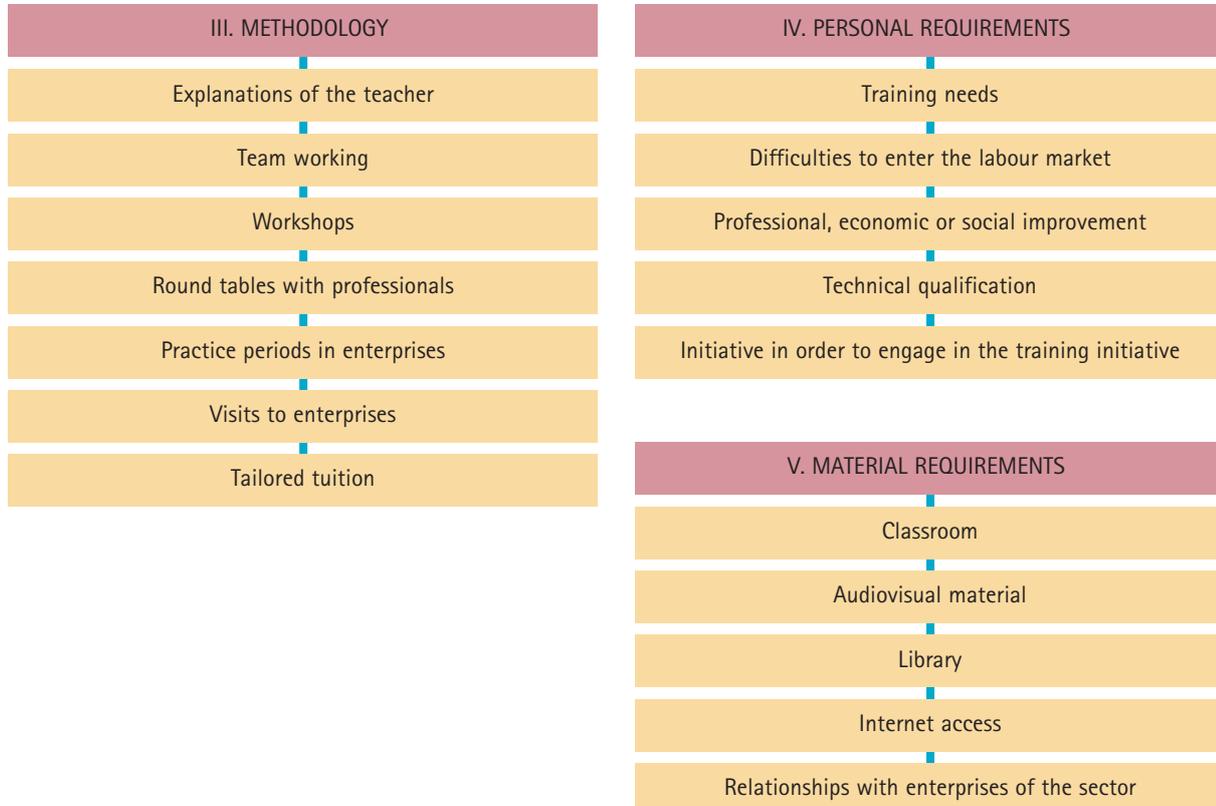


## CLASSIFICATION OF THE MODULES



### *General Diagram of a Training Module.*

1. Name of the module.
  - 1.1. Goals.
2. Curricular elements in the module.
  - 2.1. Target skills.
  - 2.2. Assessment criteria.
3. Programming.
  - 3.1. Training units.
  - 3.2. Curricular elements in each training unit
4. References.
5. Assessment questionnaires.



### 3.4. Descriptions of the New Sources of Employment and the newly emerging professions

At present there is an open list of New Sources of Employment classified into 19 areas by sociologists and European Commission experts.

The list is also classified in four main axes:

Main axes	Area of activity	
Daily life services:	1. Home help.	<ul style="list-style-type: none"> <li>• Assistance in bureaucratic procedures</li> <li>• Meal preparation and home delivery</li> <li>• Home delivery of goods.</li> <li>• Escort services for elderly people</li> <li>• Domestic cleaning services</li> <li>• Elderly assistance</li> </ul>
	2. Childcare.	<ul style="list-style-type: none"> <li>• Nurseries</li> <li>• Preschool education</li> <li>• Out of school hours nursery services.</li> <li>• Medical assistance during sickness</li> <li>• Out of school hours sport programmes</li> <li>• Assistance for problem children</li> <li>• Holiday camps</li> <li>• Sport camps</li> <li>• Childcare services provided by enterprises or groups of enterprises</li> </ul>
	3. New information and communication technologies.	<p><b>3.1. Personal services:</b></p> <ul style="list-style-type: none"> <li>• Telematic applications</li> <li>• Telemedicine</li> <li>• Multimedia and leisure</li> <li>• Computer assisted training services</li> <li>• e-commerce</li> <li>• Telematic booking service</li> <li>• Access to information (Internet)</li> <li>• Home monitoring</li> <li>• Telematic information on local issues</li> <li>• Telework</li> </ul> <p><b>3.2. Services to enterprises:</b></p> <ul style="list-style-type: none"> <li>• Lifelong training</li> <li>• Access to specialised business information</li> <li>• Production techniques</li> <li>• Adaptation to market fluctuations</li> <li>• Enlargement of markets</li> <li>• Managerial services</li> <li>• Computer assisted design</li> <li>• Tailored software</li> <li>• Telematic service</li> <li>• Surveillance services for enterprises.</li> </ul>

		<p><b>3.3. Services to the local public sector:</b></p> <ul style="list-style-type: none"> <li>• e-government.</li> <li>• Telework support.</li> <li>• Telematic services support.</li> <li>• Territorial cohesion: Access to public information</li> <li>• Management of public transports</li> <li>• Traffic and circulation support</li> </ul>
	4. Assistance to young people facing difficulties with integration.	<ul style="list-style-type: none"> <li>• Out of school support services to students facing academic failure</li> <li>• Rehabilitation of young delinquents</li> <li>• Rehabilitation of drug addicts</li> <li>• Support services for the disabled</li> </ul>
Los servicios de mejora del marco de vida:	5. Better housing.	<ul style="list-style-type: none"> <li>• Restoration and repairs inside buildings</li> <li>• Restoration of the outside of buildings</li> <li>• Maintenance and surveillance in buildings</li> </ul>
	6. Security.	<ul style="list-style-type: none"> <li>• Surveillance in public spaces</li> <li>• Surveillance in collective transport services.</li> <li>• Home security systems</li> <li>• Security systems for enterprises</li> <li>• Security systems in public spaces</li> <li>• Tele-surveillance</li> </ul>
	7. Local public transport services.	<ul style="list-style-type: none"> <li>• Improvement of technical comfort in public transport</li> <li>• Improvement of the access to public transport for disabled people.</li> <li>• Creation of new collective transport organisation systems (multi-service enterprises, supply, vehicle maintenance, bus and taxi local associations)</li> <li>• Escort services for people with difficulties</li> <li>• Security</li> <li>• Information (reception, advice, tourism...etc.)</li> <li>• Surveillance of vehicles</li> <li>• Microtransport systems that specialise in a given area or a given service</li> </ul>
	8. Redevelopment of urban public areas.	<ul style="list-style-type: none"> <li>• Redefinition of functional spaces into multi-purposed areas for cohabitation</li> <li>• Remodelling and restoration</li> <li>• Maintenance of public spaces</li> <li>• Initiatives that require specialised workers and allow for the upkeep and reassessment of certain professions</li> </ul>
	9. Local trade.	<ul style="list-style-type: none"> <li>• In rural areas: Adaptation to the changes in the configuration of population (permanent or commuting)</li> <li>• In suburban areas: Development of local trade as a way to redevelop and adapt these areas to new lifestyles (working women, ageing population)</li> </ul>
	10. Energy management.	<ul style="list-style-type: none"> <li>• Energy saving in buildings and homes</li> <li>• Energy saving advice service for families</li> <li>• Use of new energy sources</li> </ul>
Los servicios culturales y de ocio:	11. Tourism.	<ul style="list-style-type: none"> <li>• Rural tourism</li> <li>• Cultural tourism</li> <li>• Adventure tourism</li> <li>• Specialised tourism (routes, circuits)</li> <li>• Organisation of activities and events</li> <li>• Tourism for the elderly</li> </ul>



	12. The audiovisual sector.	<ul style="list-style-type: none"> <li>• Film making</li> <li>• Film distribution</li> <li>• Production of TV programmes</li> <li>• TV broadcasting</li> <li>• Interactive television (remote access to museums, libraries etc.)</li> <li>• Production of multimedia advertisements (for instance presentations of enterprises, institutions or products)</li> </ul>
	13. Promotion of cultural heritage.	<ul style="list-style-type: none"> <li>• Restoration (qualified craftsmen needed)</li> <li>• Creation of cultural centres (artists, keepers etc.)</li> <li>• Promotion of culture reception, guides, scientists, technical staff, editors... etc.)</li> <li>• Ordinary services and maintenance (security guards, management of tourist flows... etc.)</li> </ul>
	14. Local cultural development.	<ul style="list-style-type: none"> <li>• Promotion of popular culture (endogenous potential)</li> <li>• Link between recovery, maintenance, transmission, dissemination and conservation (role at local level of cultural projects and links with cultural tourism and the implementation of multimedia systems)</li> </ul>
	15. Sports.	<ul style="list-style-type: none"> <li>• Management of sports clubs</li> <li>• Sports as an instrument for insertion</li> <li>• Sport education and sports as an instrument for a healthy lifestyle</li> <li>• Professional sports and show events</li> </ul>
Los servicios de medio ambiente:	16. Waste management.	<ul style="list-style-type: none"> <li>• Separate waste collection and treatment</li> <li>• Recovery and marketing of collected material</li> </ul>
	17. Water services.	<ul style="list-style-type: none"> <li>• Protection of water sources</li> <li>• Cleansing and maintenance of watercourses</li> <li>• Cleanup of river basins</li> <li>• Protection against water pollution</li> <li>• Management of infrastructures.</li> <li>• Promoting public awareness on the sustainable use of water: citizens and enterprises</li> <li>• Water as a leisure resource</li> </ul>
	18. The protection and maintenance of natural areas.	<ul style="list-style-type: none"> <li>• Control its deterioration</li> <li>• Programmes for natural parks, natural reservations, reforestation and recovery</li> <li>• Protection of wild natural areas</li> <li>• Protection of reception centres</li> </ul>
	19. Regulation, pollution control and required installations.	<ul style="list-style-type: none"> <li>• Goods and services connected with less polluting technologies.</li> <li>• Export of process technologies</li> <li>• Energy saving technologies</li> <li>• Awareness raising on pollution control and energy saving: among citizens and enterprises</li> </ul>

The herein Good Practices Guide collects the results of the work carried out in the scope of Fontes Project, in particular, of those activities and emerging professions in the rural areas connected with:

- 1. Home help.
- 10. Energy management.
- 11. Tourism.
- 13. Promotion of cultural heritage
- 14. Local cultural development.
- 15. Sports.
- 18. The protection and maintenance of natural areas.

In this section, the New Sources of Employment addressed in the FONTES Project are fully described:

- Fungi.
- Organic Farming.
- Chestnut trees.
- Active tourism.
- Interpretation in rural areas.
- Renewable energies.
- Professional caregivers.



## FUNGI

### 1. GENERAL DESCRIPTION.

#### 1.1. Description of the resource.

##### 1.1.1. Introduction.

Fungi are among the most important renewable natural resources in many rural areas. Collecting and marketing fungi is an important source of income.

The main aim of this sector is to achieve the valorisation of fungi in their forestry ecosystems, and manage the resource so as to increase fungal production and fructification without being detrimental to nature conservation and laying the foundations for the sustainable utilisation of fungi producing forests.

The connection between forests, pastures or coppices and fungi is caused by the existing symbiosis between plants and mushrooms.

During fungi seasons (autumn and spring), the sustainable picking of edible fungi, an abundant and valuable resource, can be very profitable if all the stages of the marketing process take place in producer areas.

Edible fungi from European forests, mountains and wastelands may be collected and marketed. Tree species such as beeches, holm oaks, oaks or pines can produce several tens of kilos per hectare each season.

##### 1.1.2. General characteristics of fungi.

###### a) Morphology.

All macromycetes or mushrooms have two distinct parts:

- **THE MYCELIUM**

It is the vegetative part of fungi. It is formed by *filaments or hyphae*, which normally are white. It lives underground, in humus, among the roots, over leaves or dead wood, even over other fungi, plants or animals.

These *filaments or hyphae* grow radially in all directions and indefinitely. In some cases, there are spontaneous and mysterious fructifications forming complete circles, which are called "*fairy rings*" or "*fairy circles*".

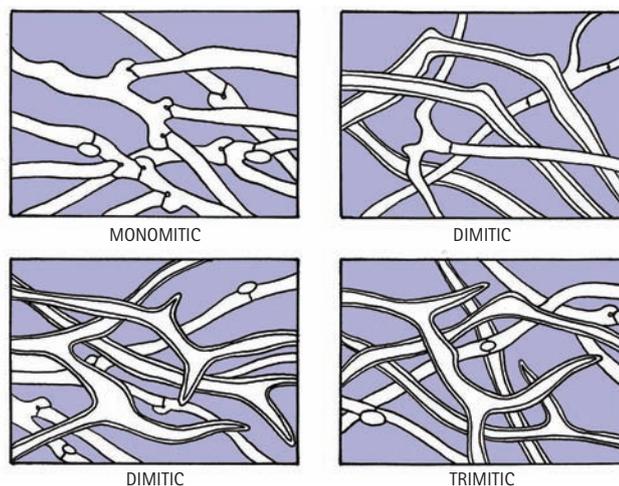


Figure 1. Different types of mycelia.

- **THE CARPOPHORE**

Commonly known as mushroom. The "**fruiting body, mushroom or carpophore**" sprouts from the mycelium, forming a tissue, which is sterile in

its most part. Only a small portion of the mushroom or carpophore is fertile. This area is called "*hymenium*", and is formed by gills, tubes or spines. In other cases, it is a smooth or slightly creased surface.

The **hymenium** produces the spores in charge of disseminating the species. Spores disperse when they reach maturation and fall over substrate, which may be or may not be adequate. In most cases, spores do not find the necessary conditions and are not viable.

In adequate conditions, spores germinate and produce a very thin filament (called **primary filament**) that comes into contact with another filament produced

at the same time by a spore of the opposite sex. These filaments fuse together forming a new filament (**secondary filament**). The group of filaments or hyphae is called **mycelium**.

The **fruiting body** or mushroom develops from the mycelium or **vegetative body** of the fungus. A single carpophore or fruiting body (mushroom) can produce tens of thousands of spores.



Figure 2. Development of the carpophore.

**b) Macroscopic examination.**

*Carpophores* or *mushrooms* present many characteristics that may seem very insignificant but are of great importance for their identification.

- **CAP**

The most common shape is similar to an umbrella, with a stipe and cap, although there are many variants, depending on the type of hymenium. There is a very wide range of shapes and colours: round, flat, umbilicate, convex,

umbonate, funnel-shaped, hemispherical, bellshaped,...

**The cuticle:** The cuticle is the outer membrane that covers the cap. It is very important in order to classify fungi according to their structure and colour.

**The surface of the cap may be:** slimy or dry, with or without patches, easily separated from the flesh, smooth or scaly, fibrous, warty, cracked or rimose, zonate... etc.

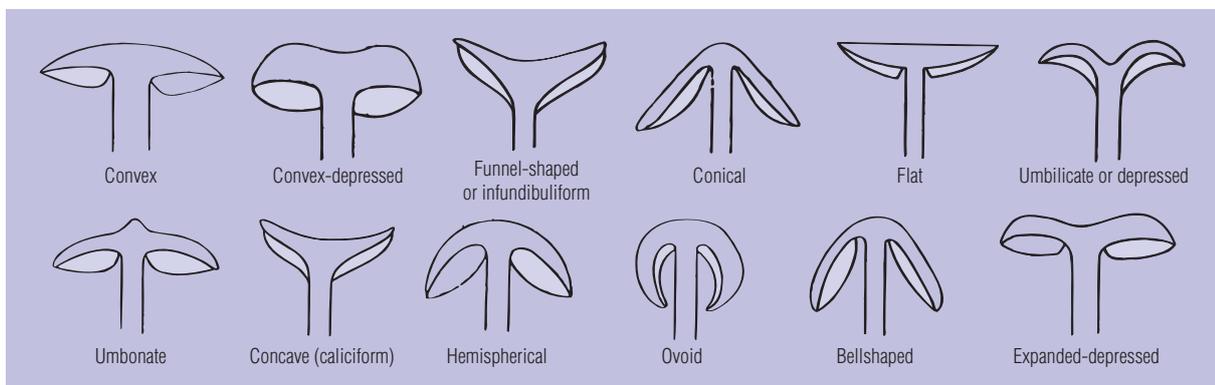


Figure 3. Different cap configurations.

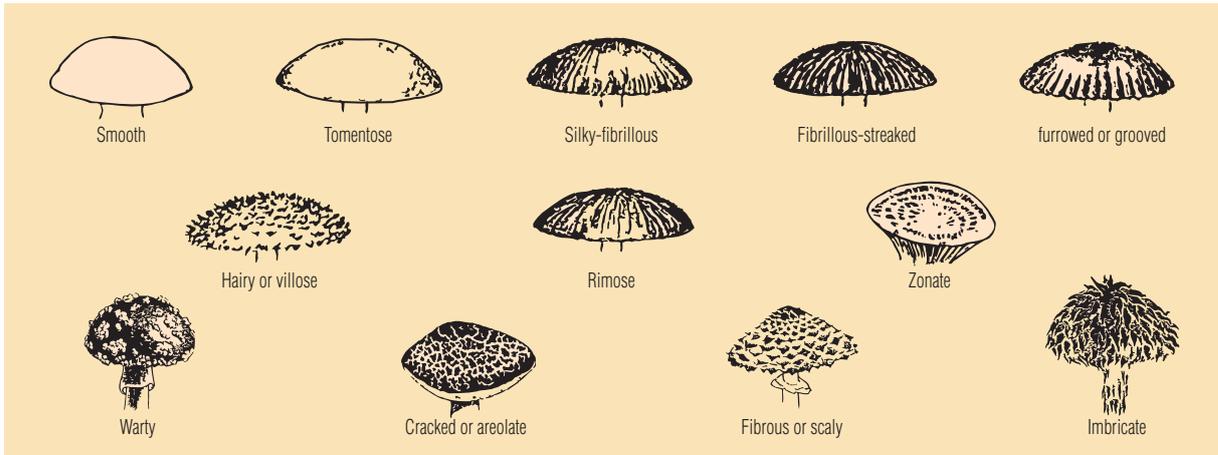


Figure 4. Characteristics of cap surface.

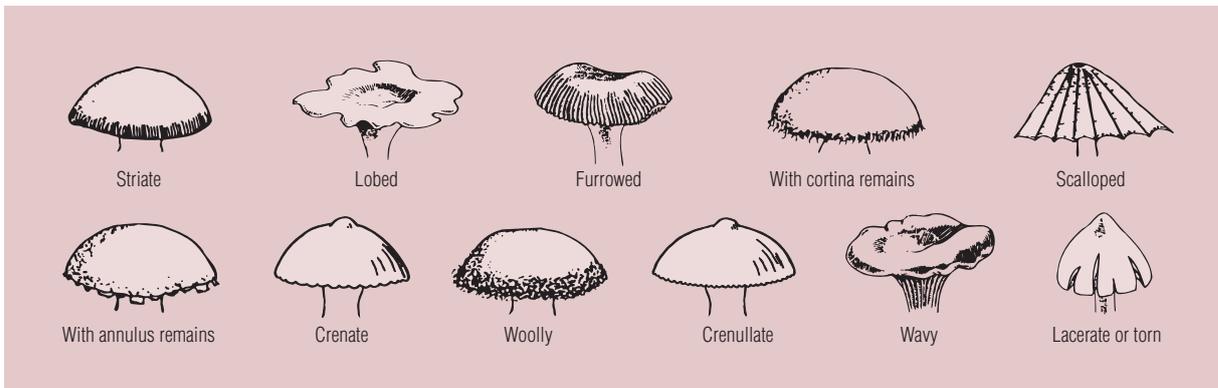


Figure 5. Types of cap margins.

**The margin:** The margin of the cap may be smooth, wavy, striate, furrowed, scalloped, thin or thick, etc.

• **HYMENIUM**

This is the area where spores are, and consequently, it is the fertile portion of the carpophore.

**Gills:** gills are thin vertical ridges on the bottom of the cap.

They go from the cap to the stipe, and can have different configurations:

- Distant (when they are distant from the stipe).
- Free (when they come close to the stipe but without touching it).
- Emarginate (when they are notched near the stipe).

- Adnate (when a small part of the gills is in contact with the stipe).
- Decurrent (when they descend down the stipe and cover a part of it).

**Pores:** Pores are small orifices at the edge of tubes, in the bottom of the caps of fungi belonging to the order *Boletales* and in the family *Polyporaceae*. Tubes can have different colour and length, and more or less easily separated from the flesh. Pores can be round, elongated, single, double, angular...etc. Their position with regard to the stipe can be, as in the case of gills, decurrent, adnate, free, emarginate and distant.

**Spines:** Spines are small projections in the bottom part (hymenium) of some mushrooms, as those in the family *Hydnaceae*. They can be short or elongated, thick or thin, firm or gelatinous.



Figure 6. Types of hymenophores.



Figure 7. Gill edges.

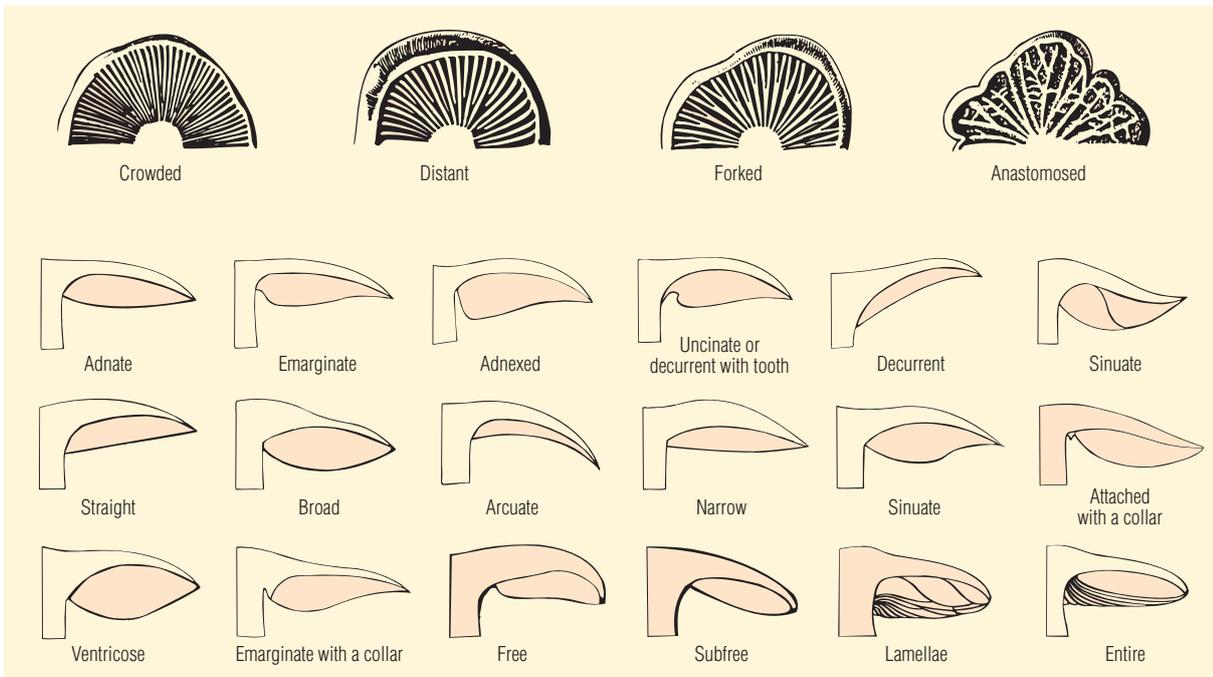


Figure 8. Characteristics of hymenophores and types of gills.

• **STIPE**

The stipe is the part of the mushroom that holds up the cap. Its colour, size, shape, as well as its fibrous or granular structure, hollow or solid condition, are important aspects in its taxonomy.

**The shape of the stipe:** Stipes can be solid or hollow, central, lateral or eccentric, thin or thick, curved, sinuous, radicant, tapering upwards, tapering downwards, bulbous, fibrous, cartilaginous or granular.

The surface of the stipe can be: reticulate, smooth, fibrillous, scaly, granular or velvety. The insertion point of the stipe in the cap is one of the most relevant characteristics of the mushrooms in the family *Agaricaceae*. In some specimens, the cap is hard to separate from the stipe, as it is the case with homogeneous fungi, whose cap is the continuation of the flesh of the stipe. In other cases, the two parts can be separated easily. This is the case of the so-called heterogeneous fungi, the flesh of whose cap is completely different of that of the stipe.

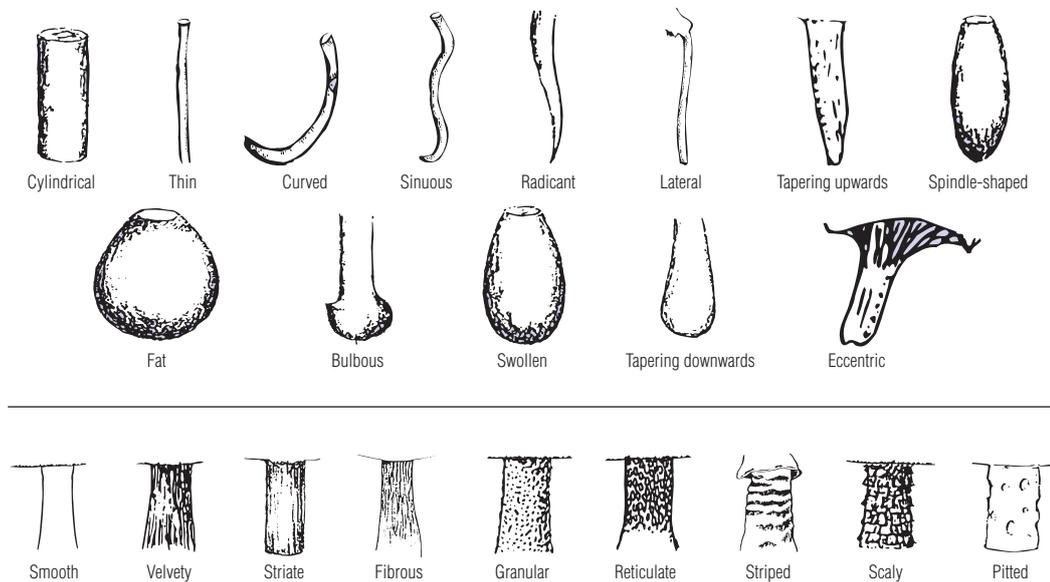


Figure 9.a. Different stipe shapes.  
Figure 9.b. Stipe surface.

• **ANNULUS**

The annulus is the remains of the partial veil. Some mushroom species are covered with a membrane or partial veil when they are developing. This membrane protects the hymenium and covers both the stipe and the cap. When the cap grows, it breaks the membrane, and in some cases, parts of it stay in the stipe,

forming a ring or annulus around it. The existence or non-existence of an annulus in the stipe is very useful in fungi classification.

**The annulus can be:** single or double, attached or movable, funnel-shaped, scaly, farinaceous, granular, skirtlike or with a cartwheel structure. An annulus can be persistent or evanescent, which makes taxonomy more complicated.



Figure 10. Types of annulus.

- **CORTINA**

The cortina is formed by very thin, cobwebby fibrils that join the margin of the cap with the stipe. It is very frequent in the genera *Cortinarius*, *Inocybe*, *Hebeloma* and *Psathyrella*. Cortinas are evanescent, and can only be seen in very young specimens. It disappears in mature mushrooms, leaving just a few filamentous remains in the upper part of the stipe.

- **VOLVA**

The origin of the volva is in the universal veil, which is a membrane that covers the carpophore

in young specimens and breaks when the mushroom grows. If this membrane is broken only in its upper part, the lower part remains within a sheath or volva. The lower part of the stipe needs to be examined carefully in order to see the volva or its remains, especially in the cases where it is buried. In the classification of the genera *Amanita* and *Volvaria*, the shape of the volva is essential.

**Volvas can be:** farinaceous, membranous, scaly, conical or spherical, bulbous, cylindrical, evanescent or persistent.

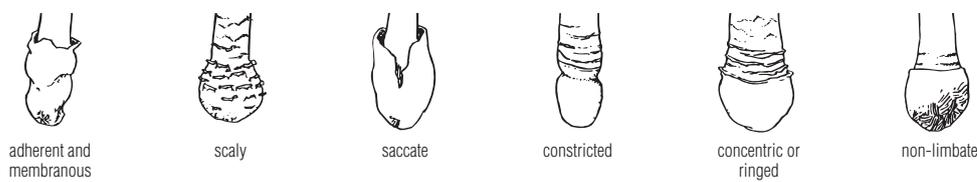


Figure 11. Types of volvas.

- **FLESH**

**Consistency:** The flesh can be fibrous, granular, cartilaginous, hard or soft, firm or spongy, coriaceous, slimy, hydrophanous...etc.

**Colour:** In some genera (*Lactarius*, *Leccinum*, *Boletus*, *Cortinarius*...etc) the colour of the flesh can be altered due to an oxidation process. Moreover, the colour of the flesh can also change with the weather.

**Smell:** It is advisable to smell mushrooms when we are collecting them and after they have been conveniently preserved. Some mushrooms smell like fresh flour (*Calocybe gambosa*, *Entoloma lividum*, *Tricholoma tigrinum* or *pardium*) others smell like anise

(*Agaricus sylvicola*, *Clitocybe odora*) phenol (*Agaricus xanthoderma*) or garlic (*Lepiota cristata*, *Marasmius alliaceus*). Others have a fetid smell (*russula foetida*) or smell like bitter almonds (*Hygrophorus agathosmus*) chlorine (*Mycena alcalina*) radishes (*Hebeloma*) or raw potatoes (*Amanita citrina*)...etc.

**Taste:** The taste of mushrooms can be sweet, bitter or spicy, and it can be pleasant or unpleasant.

**c) Main components of fungi.**

Fungi have a very large water content (90%) and low energy yield (fat content 1-2%). Many fungi have medicinal properties.

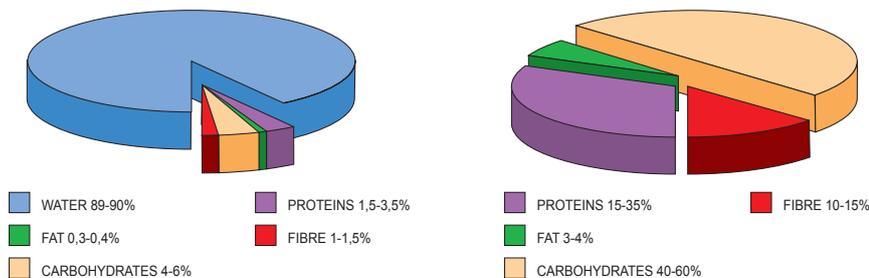


Figure 12. Main components of fungi.

**d) Main life forms.**

Due to the lack of chlorophyll and photosynthetic and chemosynthetic pigments, fungi have to either establish relationships with other organisms in order to subsist and get the necessary organic nutrients, or obtain nutrients from organic matter, dead or living.

Fungi have adapted to virtually all elements and all life forms, both aquatic and terrestrial. They can live under the snow, in fresh water and seawater. They can live in earthy soils, in the torrid sands of deserts or the dunes of sandy beaches, in wood or excrements, over bryophyte plants etc.

Classification of fungi according to their nutritional status

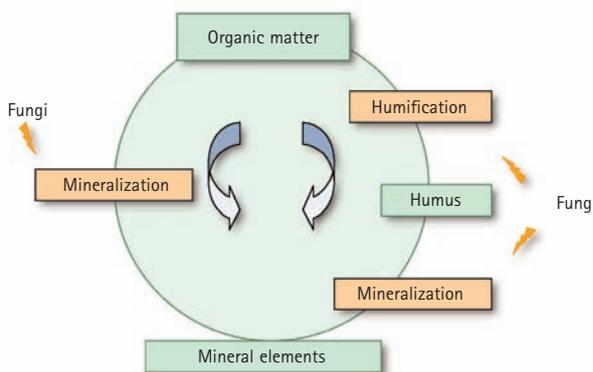


**• SAPROPHYTES**

A saprophyte fungus (*sapros*=putrid and *fyton*=plant) feeds from dead or decaying matter. These are the most common fungi. They take part in the fermentation and mineralization of vegetables so that they can become humus.

Fungi can decompose all types of organic natural matter. Thanks to them, the life cycle of organic matter can be completed, and matter transforms into the mineral elements that plants feed on. This cycle is essential for life.

Phases of organic matter degradation



In some cases the difference between parasite fungi and saprophyte fungi is not very clear. Some species behave as semisaprophytes or semi-parasites, which means that they can be saprophytes or parasites depending on their circumstances and needs. *Kuehneromyces mutabilis* is an example; it is a very efficient saprophyte fungus that becomes a parasite when it finds a weak organism (as the trunk of a tree).

**• PARASITES**

Parasite fungi colonise other animals, vegetables and fungi and live at their expense. They may cause diseases or even death to the host. Fungi represent the 90% of the existing vegetable parasites. Moreover, some argue that they destroy more than 15% of the vegetable production worldwide yearly. They are capable of overcome the cellular defences of the host organism due to the large number of enzymes, toxins and antibiotics that they produce.



Figure 13. Chestnut infected with chestnut blight.

**• SYMBIOTIC OR MYCORRHIZAL FUNGI**

The mycelium on the soil may feed on decaying organic matter or may establish a mutual relationship with green plants, that is, with trees, weeds, ferns, seaweeds etc. Such mutual

relationship is usually based on feeding and protection. The relationship between fungi and green plant roots is a specific type of symbiosis called mycorrhizal symbiosis.

These mycorrhizal fungi obtain reserve sugar, starch in particular, from the roots of the plant. The plant on its turn improves its capacity to absorb water and mineral elements (phosphorus) thanks to the union between mycelium and its roots.



Figure 14. Mycorrhizal fungus associated to chestnut trees.

### 1.1.3. Mycorrhizae in nature.

#### a) Rhizosphere.

The rhizosphere is the region of soil where plant roots are.

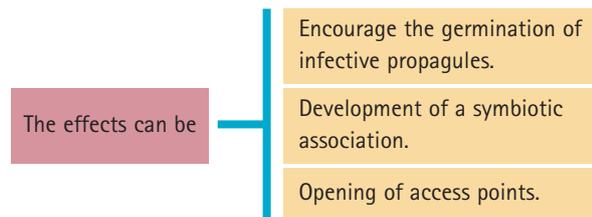
It is the soil that is adhered to a root when we pluck it. The chemical and biological activity of the rhizosphere takes place in a 1mm thick portion of the soil.

Broadly speaking, the rhizosphere is the portion of the soil that is colonised by plant roots.

The rhizosphere has two outstanding characteristics:

- The density of organisms is larger than that of other portions of soil.
- The stability of the soil is greater, due to the physical action of roots and due to the exudates of all the existing organisms.

Among rhizospheric micro-organisms, mycorrhizal fungi are essential. Nevertheless, these symbiotic relationships are governed by other groups of rhizospheric microbes that deal with the recycling of nutrients and with plant nutrition.



Mycorrhizal symbiosis in its turn changes the quality and quantity of plant exudates and creates new nodes around the roots. All these physical and chemical changes affect the rhizospheric microbes and leads to a new balance.

#### b) Mycorrhizal associations.

Mycorrhizal associations are very evolved mutualist associations (symbiosis) between plant roots and the fungi in the soil. The relationship between the fungus and the plant is beneficial for both. It enables the plant to better absorb the nutrients around it, and it improves its protection against pathogens. Most frequently the mycorrhizal fungus would not be able to subsist without this symbiotic relationship. The members of these associations are fungi (Basidiomycetes, Ascomycetes and Zygomycetes) and most vascular plants.

#### • TYPES OF MYCORRHIZAL ASSOCIATIONS

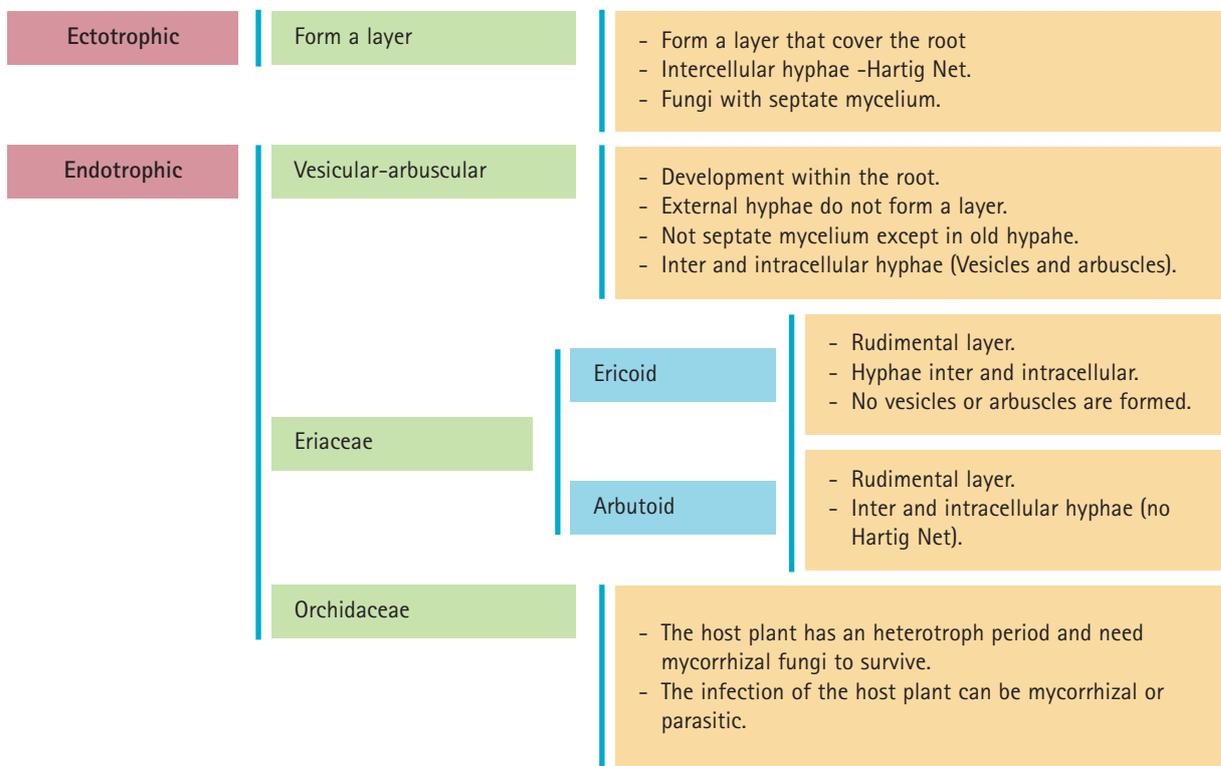
Mycorrhizal associations are classified in two big groups, according to their structure and morphology: ectotrophic and endotrophic.

*Ectotrophic Mycorrhizae*

Ectotrophic mycorrhizae are those mycorrhizal associations in which the fungus, normally having septate mycelium, forms a layer of hyphae around the root. The development of the fungus takes place intercellularly within the root bark, and it is called "Hartig Net".

*Endotrophic Mycorrhizae*

In endotrophic associations, the fungus does not form a layer around the root and hyphae enter the cells in the bark. Nowadays we know that the fungi taking part in endomycorrhizae are very different in a taxonomic and physiological sense, and therefore the classification has changed and former endotrophic mycorrhizae were split in different groups.



The most usual mycorrhizae are vesicular-arbuscular ones. This type of symbiosis is present in all climates that allow for plant growth and most plants with farming and industrial interest have this sort of symbiotic relationship.

Ectomycorrhizal associations are much easier to manipulate in silvicultural plantations than vesicular-arbuscular associations are in other farming systems.

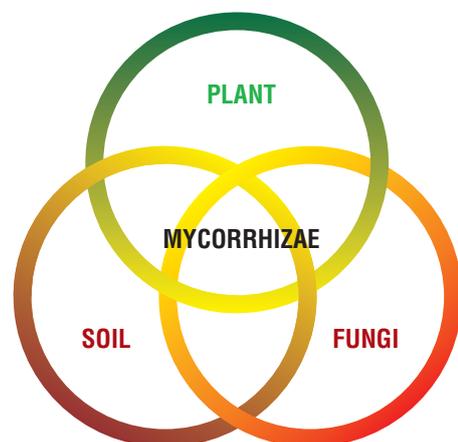


Figure 15. Elements involved in mycorrhizal associations.

This is a consequence of

Ubiquity of vesicular-arbuscular fungi in all types of soils.

Capacity of many ECM fungi, but not of vesicular-arbuscular ones, to colonise sterile crops.

Compatibility of conventional practices with fungal inoculation in tree nurseries.

Specificity between mother trees and many ECM fungi.

- **HOST PLANTS**

Researchers have discovered that the plants involved in mycorrhizal associations are predominant in most natural ecosystems worldwide. The trees and plants involved in ectomycorrhizal association have an important role in most habitat; non-mycorrhizal species are also common. There is a lot left to learn about fungal-plant associations, including species of economic interest.

- **MYCORRHIZAL FUNGI**

The species in the kingdom fungi obtain nutrients in several different ways, including decomposing organic substrate, predation, parasitism and mutual relationships.

Many soil fungi are saprobic and have the enzymatic ability to digest organic substrates of different complexity; however, some live in soils with very little organic and inorganic substrate.

Mycorrhizal fungi are an important component of the soil mycoflora but normally have a rather limited saprophytic capacity.

It is thought that mycorrhizal fungi have lived in the same type of soil habitat for million years, and have slowly adapted to the changing conditions in such habitat. It seems that some fungal species have a worldwide distribution

pattern, and have adapted to a wide range of habitat types.

- **STRUCTURE AND DEVELOPMENT OF MYCORRHIZAL ROOTS**

We must become acquainted with the structure of non-mycorrhizal roots before studying the changes that mycorrhizal associations cause in them. Some roots have mycorrhizal potential among its anatomic characteristics.

We must be aware of the differences between primary and secondary roots, and the different types of roots, as they have different functions. Root types vary in growth speed, life span and structure as well as in water and nutrient intake capacity or mycorrhizal capacity.

Root tissues are produced by cell division in the root apex, and by cell expansion in subapical regions.

These tissues develop at large distances from the root apex, and may be identified under a microscope thanks to their specific features, as cell walls and cytoplasm.

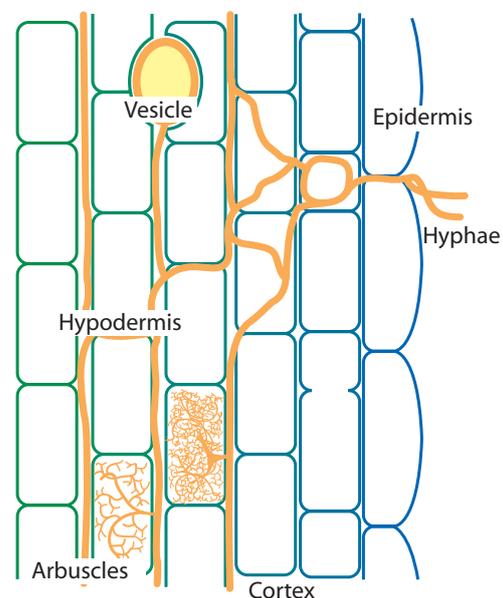
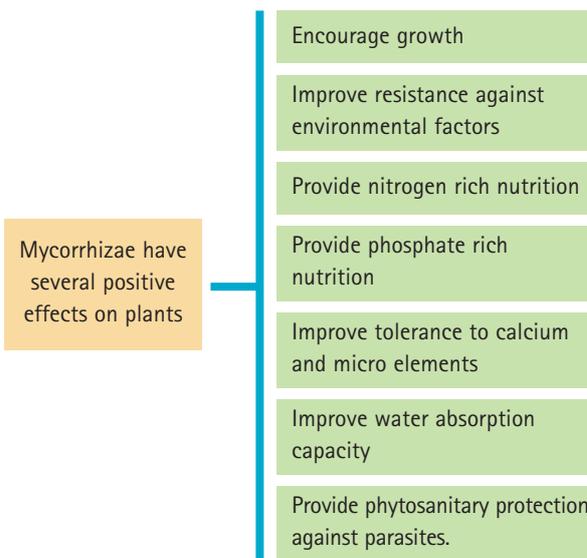


Figure 16. Root tissues.

In mycorrhizal roots, cell components are very important for metabolic and transportation processes, and provide information on the functioning of mycorrhizal associations.

**c) Effects of Arbuscular Mycorrhizae on plants.**



**• EFFECTS ON GROWTH**

The most outstanding effect of arbuscular mycorrhizae (AM) on plants is an increase in their capacity to absorb mineral nutrients, which has a positive effect on their growth. The spreading of fungal mycelium in the rhizospheric soil is the main factor causing such effect, as it allows for the intake of nutrients beyond the depletion area around the roots, caused by the absorption of the plant itself.

**• RESISTANCE TO CLIMATIC FACTORS**

Another outstanding effect of arbuscular mycorrhizae is the increased resistance of plants against water stress, salinity, and soil pathogens, as well as higher transplant survival rates. A mycorrhized plant can grow in sandy soils, and is able to add more soil particles to their roots per mass unit than a non-mycorrhized plants. The production of soil aggregates is essential to reduce erosion.

**• PHOSPHATE-RICH NUTRITION**

Phosphorus is a stable element and does not move in the soil; therefore, the lack of phosphorus is not uncommon. Phosphorus ions are entrapped within the colloids or fixed as iron or aluminium phosphates. Most of the phosphorus in the soil is insoluble.

Studies show that ectomycorrhizal roots absorb more label phosphorus than non-mycorrhized roots of the same age. The same effect has been noticed in endomycorrhizae.

Mycorrhized plants grow more due to the active mechanisms that transport phosphorus from the fungus to the plant.



Figure 17. Mycorrhizae are beneficial for plants.

**• NITROGEN-RICH NUTRITION**

Mycorrhizal fungi absorb ammonium ions; some of them can also absorb nitrates. Label nitrogen accumulates in ectomycorrhizae and endomycorrhizae in the form of amino acids: glutamate-glutamine, aspartate-asparagine and alanine. Roots and fungi assimilate ammonium in different ways.

Roots assimilate it via glutamine synthase and glutamate synthase.

Fungi assimilation involves glutamate dehydrogenase NADP. Glutamate synthase seems to be involved too. Nitric and ammoniacal

activity of fungi allows for the plant to adapt to very varied pedoclimatic conditions.

- **TOLERANCE TO CALCIUM AND MICRO ELEMENTS**

In calcium-rich soils, acidophilous<sup>1</sup> species present chlorosis<sup>2</sup>. This is caused by disorders in the metabolisation of nitrogen and micro elements. Mycorrhizae develop a tolerance to limy soils.

The presence of manganese in acid soils may cause phytotoxicity and therefore low yields, and the typical foliar symptoms. Mycorrhization prevents toxicity as it modifies the distribution of manganese in the plant (stalk 45% and roots 20%, non-toxic concentrations lower than those in non-mycorrhizae).

- **WATER INTAKE**

The mycelium layer may absorb and provide the plant with water that is a few centimetres further off than the roots can reach. The mycorrhized plants resist transplants much better and have a more positive response to water stress. An improved intake of minerals and the hormonal processes that control the opening of stomata explains all these physiological effects<sup>3</sup>.

- **PHYTOSANITARY PROTECTION**

Mycorrhization influences the functioning of plants to a great extent; in particular, it makes them less sensitive to diseases. The influence of the mycorrhizae depends on the nature of the infectious agent and of the disease it causes.

Mycorrhizal symbiotic associations are undeniable biological control methods against telluric pathogens. This prophylactic activity is

caused by the joint action of several mechanisms (nature of the exudates, ability of the mycorrhizal fungi, mechanical barrier, inhibitory substances, metabolic by-products, etc).

#### d) Applications of mycorrhizae

The study of mycorrhizal associations comprise several scientific fields, which include:

- mycology (fungal taxonomy, physiology, development, etc.);
- botany (physiology, mineral nutrition and morphology of mycorrhizal plants);
- soil science (soil nutrients, structure, biology etc.);
- ecology (nutrition cycle, environmental quality, reconstruction of ecosystems, biotic interactions, etc.);
- humanities (economical, nutritional, medicinal value of fungi and associated plants);
- and other applied studies (silviculture, farming, plant pathology etc.).

Nowadays research on this field focuses on the utilisation of the potentials of mycorrhizal associations in silviculture, farming, horticulture and production of new edible fungi species.

Important research initiatives intend to manipulate micorrhizal associations in order to increase the productivity of the plants in silvicultural plantations as well as in new plants used in the recovery of damaged ecosystems. The functional diversity of mycorrhizal fungi increases the resistance of ecosystems and provides new opportunities to select fungi that have adapted to specific combinations of mother plant/environment/soil, in order to encourage tree growth in plantations.

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<sup>1</sup> Organism that grows in acid soils with low PH.

<sup>2</sup> BOT. yellowing of leaf tissue due to a lack of chlorophyll.

<sup>3</sup> BOT: stomata are small pores found in the surface of a plant leaf.

Some of the mycorrhized trees with commercial value belong to the following families:	
Pinaceae	Pines, fir trees, cedars, pseudotsugae, larch trees, spruces.
Fagaceae	Holm oaks, chestnut trees, oaks, beeches.
Tiliaceae	Lime trees.
Betulaceae	Alder trees, birches, hazel nut trees.
Salicaceae	Willows, black poplars.
Rosaceae	Apple trees, pear trees, plum trees.
Jugladaceae	Walnut trees.
Mimosaceae	Acacias.
Ulmaceae	Elms.
Ericaceae	Heathers, strawberry trees.

All these families form ectomycorrhizae and some of them form endomycorrhizae too. Endomycorrhizae prevail only during the first months or years of the life

of trees, after which ectomycorrhizae are predominant. Mycorrhizal communities vary with the passing of time.

Examples of some of the main mycorrhizal fungi			
Ectomycorrhizal	<i>Amanita</i>	<i>Boletus</i>	<i>Cortinarius</i>
	<i>Paxillus</i>	<i>Russula</i>	<i>Rhizopogon</i>
	<i>Phallus</i>	<i>Pisolitus</i>	<i>Laccaria</i>
	<i>Scleroderma</i>	<i>Tuber</i>	<i>Suillus</i>
	<i>Lactarius</i>		
Endomycorrhizal	<i>Glomus</i>	<i>Gigaspora</i>	<i>Acaulospora</i>
	<i>Sclerocystis</i>	<i>Marasmius</i>	<i>Fomes</i>
	<i>Coriolus</i>	<i>Fomes</i>	<i>Armillaria</i>
	<i>Rhizoctonia</i>	<i>Pezicella</i>	<i>Sebacina</i>
	<i>Corticium</i>		

The main forests of interest depend on ectomycorrhizae. When fungi colonise poor soils, they help plant nutrition and adaptation.

Controlled mycorrhization in nurseries allows reforestation with plants that are mycorrhized already. The main objective of controlled mycorrhization is to improve forest productivity and sometimes also to produce fungi.

Mycorrhizae reduce mortality and transplant stress. They fasten the growth and production of forests.

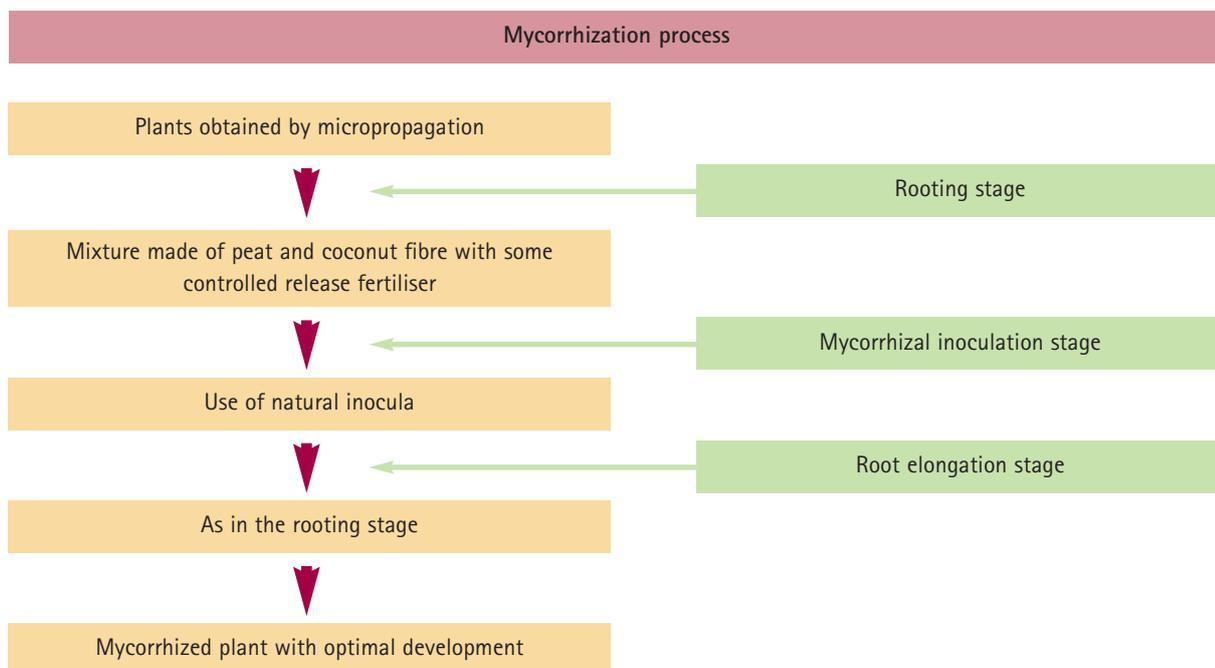
At present it is impossible to modify significantly and permanently the balance of the mycorrhizal flora and

the root in adult specimens. Therefore, all initiatives must focus in the early stages of the life of the plant. This is an essential step in controlled mycorrhization.



In the mycorrhization process, it is possible to use natural inocula as meiotic spores, sclerotia, rhizomorph fragments, mycelium or old mycorrhizae.

Advantages and disadvantages of natural inocula:	
Advantages:	Disadvantages:
This type of inoculum does not require any devices or techniques to be used.	It is difficult to purify the inoculum.
Costs are very low.	They are genetically unstable.
	There are risks of pathogenic infection.



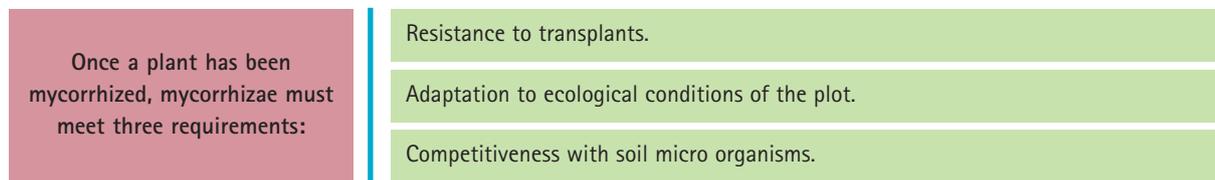
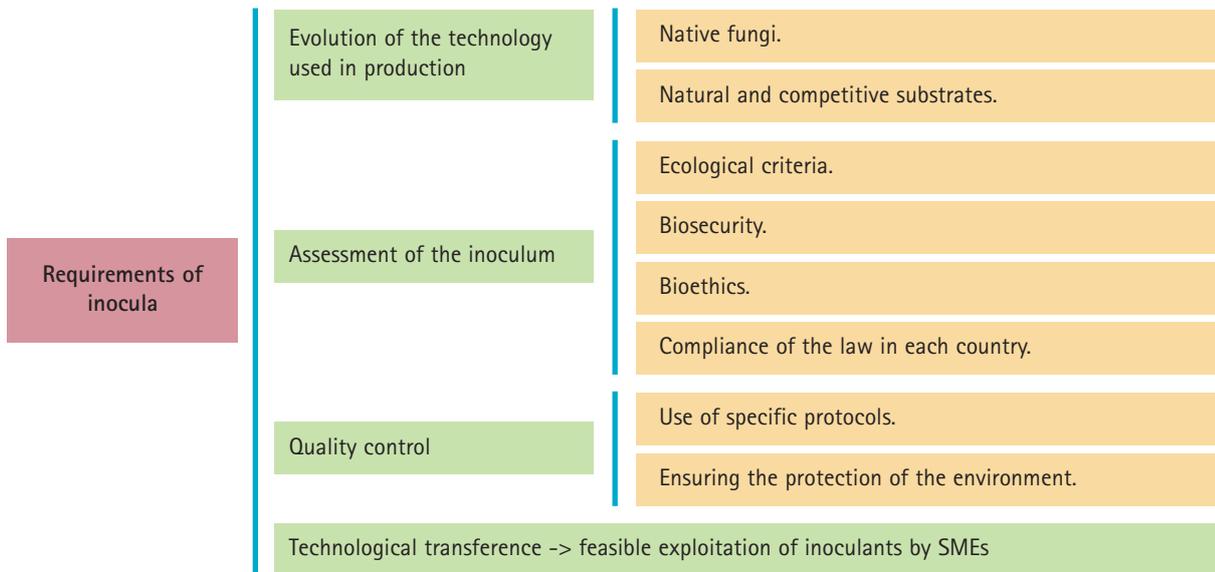


Once we have the necessary amount of inoculum, we can use in the mycorrhization process.

Nursery inoculation techniques:	
Soil disinfection	Disinfection can be carried out with heat or fumigation.
Adding up of the inoculum.	The inoculum is mixed with the soil before sowing.
Cultivation tasks	They normally involve moderate fertilising and phytosanitary treatments.

Factors affecting the development and activity of mycorrhizae:	
<b>Light.</b> The light affects the mycorrhizal infection. The infection is drastically reduced if it takes place in shadowy places. 80% drop of spore production.	
Low temperatures have the same effects.	
The use of nitrogen and phosphorus rich fertilisers.	
Soil fertility is connected with root growth: A fast growth does not allow for the mycorrhizal infection to take place. A slow growth allows for the mycorrhizal infection to take place.	
The presence of plant hormones (auxines and ethylenes) favours the creation of mycorrhizae.	
The interaction with other micro-organisms of the rhizosphere may have different effects: Azotobacter have positive effects. Pseudomonas have positive effects.	
Pesticides have negative effects.	

The production of inocula has certain limitations	Mass production of high quality inoculum, easy to apply and transport is needed	Hydroponic crops are not useful in practical terms.
	Roots are processed and broken in bits of 1 - 2 mm, which make good quality inoculants	Aeroponic crops are more useful.
	Problems:	Require technology.
		Require specialised staff.
		High prices.



**e) Ecology of mycorrhizae.**

Some recent studies show how trees start producing fungi when they reach a certain age. As the ecosystem grows older, the complexity of the mycorrhizal fungal population increases.

Therefore, young plantations or plantations having suffered some sort of damage (fire, long periods of drought, grazing) have very limited mycorrhizal fungal populations, both as regards its diversity and number of propagules.

Both factors increase as the vegetation itself increases with the passing of time, as there are more propagules that find a favourable niche and there are more organic matter and nutrients, as well as a greater diversity of species .

Moreover, the surrounding vegetation, which is not directly connected with the fungus but provide favourable conditions for its development, can influence the process if is not too abundant.

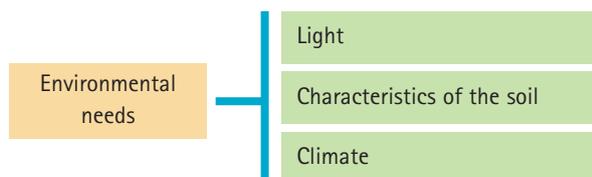
In some areas, the greater concentrations of *Boletus edulis* are associated with species as *Vaccinum myrtillus*,

*Erica vagans* and *Myrica gale*, the later being responsible for nitrogen fixation.

Carpophores present high levels of proteins, and therefore N-fixing plants are very useful, as ectomycorrhitic fungi are able to mineralise organic nitrogen from the soil thanks to mycorrhizae and give it to the symbiotic plant they are associated with.

The ecology of fungi implies certain pedoclimatic preferences and determines in what periods they can successfully compete with other living organs for the existing resources.

Thus, it has been verified that apart from associating with another organ able to provide them with carbohydrates, mycorrhizal fungi have other environmental requirements.



- **LIGHT**

As for light needs, even if fungi do not have any photosynthetic activity, some species require considerably dense vegetation layers while others (*Boletus edulis*, *Lactarius deliciosus* or *Amanita caesarea*) may need a more direct exposure to light.

The abandonment of rural areas causes coppice to grow too dense, which makes it difficult for some fungal species as *Amanita caesarea*, truffles or *Terfezia* to proliferate.

Other species seem to adapt to both shadowy and sunny environments. This is the case of the chanterelle. Other edible fungi as *Boletus pinicola* grow preferably in dense and shadowy forests.

- **SOIL CHARACTERISTICS**

Some species are intolerant to certain features; for instance, the valued truffles (*Tuber sp*) prefer limy soils.

Moreover, the type of soil conditions the type of mycoflora that is liable to live in it, which is subject to pedoclimatic evolution:

- *Suillus bellini* grows in dry, eroded and limy soils.
- *Pisolithus tinctorius* and *Rizhopogon roseolus* are very efficient and competitive in acid and damaged soils. These species are being used in order to regenerate soils where other plants cannot survive easily.

On the other hand, many species of the genera *Cortinarius*, *Russula* or *Boletus* grow in mature soils. *Lactarius* is more common in loose, well-drained and sandy soils resulting from the degeneration of sandstone, granite, quartzite, slate and schist. On the other hand, truffles grow in limy soils and grow near holm oaks, Portuguese oaks and other broadleaf species.

- **CLIMATE**

The climatic preferences of fungal species are normally linked to the preferences of the trees or bushes they are associated with. However, the amount of fruiting bodies produced depends on yearly climatic conditions.

Thus, a given species may be latent and never get to grow, or do it only to a certain extent, due to climate conditions of the ecosystem.

A connection has been found between production and the last rains of the summer, after a sequence of dry days, when this particular moment coincides with the time when trees accumulate the maximum amount of nutrients.

Therefore, it is possible to predict production to a certain extent by considering climatic variables, and thus plan the management of fungal resources taking into account the alternation of high and low yield years which is characteristic of fungal production<sup>4</sup>.

In general terms, acid soils in areas with more than 600 ml of yearly rainfall are considered to have good conditions for fungal proliferation.

Edible fungi normally grow in forests located in rainy areas. However, they may also grow in dryer areas.

Fungal production is not only connected with tree species, but also with pastures (where *Terfezia arenaria* usually grows) or scrublands and thorn forests, where the valued St. George's mushroom (*Tricholoma georgii*) grows, among other species.

Frosts condition or even hinder the production of some species.

With respect to the spatial distribution of mycorrhizal fungi, it is important to observe the distribution of mycelia and how it changes with

<sup>4</sup> High and low yield years affect the amount of fruit or flowers produced by a plant. One year there is abundant fructification or flowering and the next the production is much lower. This is very common in olive trees.

the passing of time. This aspect is essential in order to understand the role of fungi in natural ecosystems.

Nowadays we know that young fungal populations tend to group in numerous but small thalli, while adult populations tend to be less numerous but larger, and have a more heterogeneous distribution.

The size the mycelium of fungi can go from a few centimetres to some tens of meters, and age can range from some tens to some hundreds.

The surface and depth covered by mycelia is not even; they can be at different depths regardless the species they belong to.

All in all, each fungal species, and some times each specimen, require different types of forest, associated plant, tree coverage, soil, water conditions... etc.

In addition to this, each species have its own growth rate and reproductive characteristics. The managers of these resources can improve these characteristics and keep or even increase production.

In order to make the most of fungal resources and favour both forest ecosystems and their sustainable exploitation, the utilisation and recovery of fungal resources must be planned carefully.

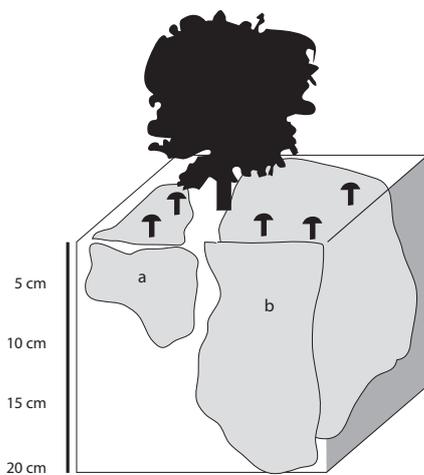


Figure 18. Distribution of fungi.

## 1.2. Evolution in the use of the resource.

**Silviculture** is the act of applying a group of treatments to forests in order to preserve them in time and in accordance with the principles of sustainability and multiple use. These treatments vary depending on the target species and on the objectives sought.

Silviculture intends to apply the knowledge on the characteristics, structure, growth and reproduction of forest plants in order to obtain a continuous production of goods that are necessary for society.

Until recent times, management (treatments, distribution in space and time) focused mainly on timber.

However, there are many other products in forests, which are more and more valued nowadays. This is especially true of Mediterranean areas, where the diversity of forest production and services (hunting, pastures, fungi, berries) is much more profitable than timber itself.

Edible fungi are among the products that are starting to be appreciated by managers, researchers, owners and users.

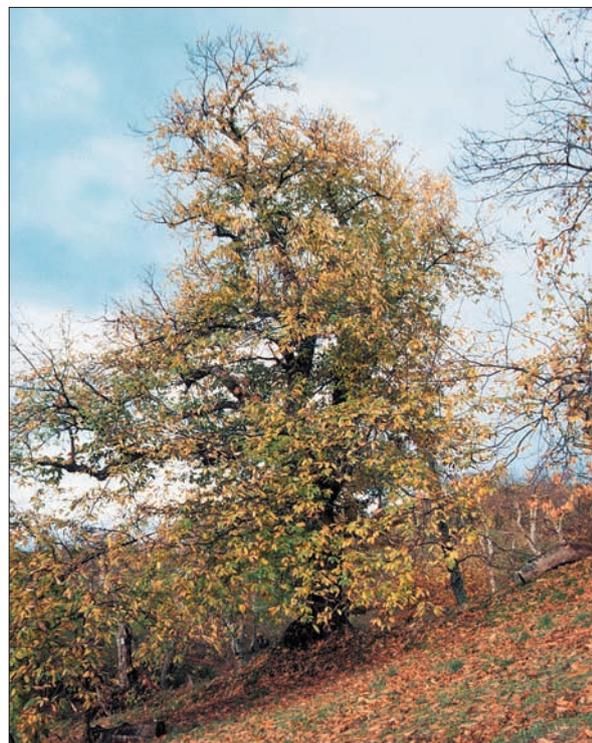
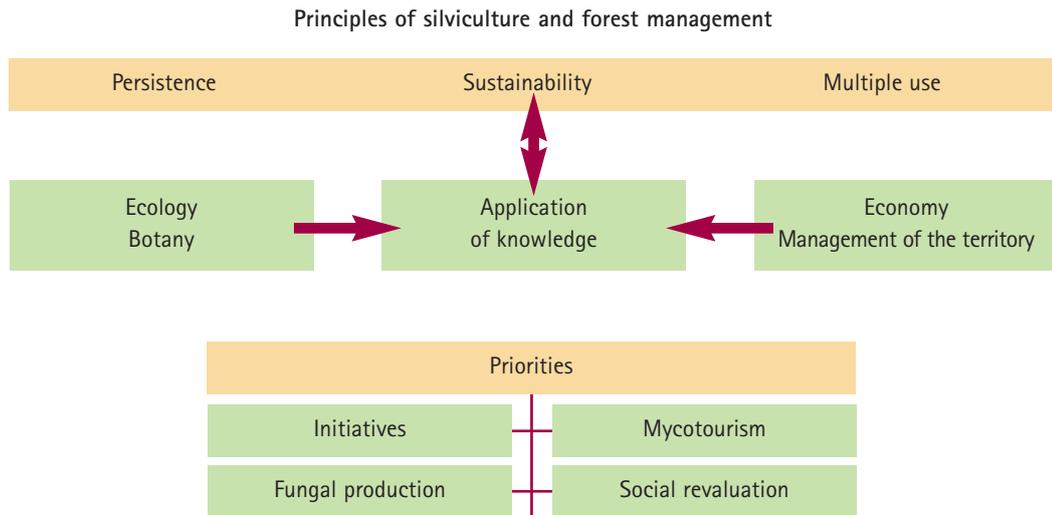


Figure 19. Forests have many different resources that can be utilised.

Many of the edible fungi that grow in forests and bushes are largely ignored and undervalued. On the other hand, in some areas they are subject to excessive

collection, due to the increasing demand of this kind of products and due to the growing popularity of mushroom picking.



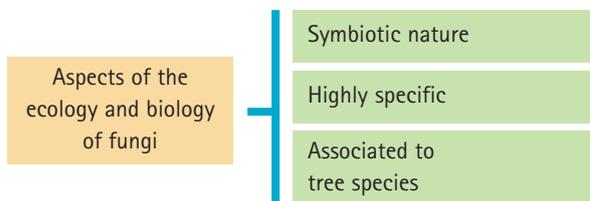
Silvicultural practices are necessary in these ecosystems in order to preserve the balance of forests and fungal populations. Fungi play an important ecologic role in areas with extreme pedoclimatic conditions, as they encourage the development of superior plants.

In general terms, the popularity of mushroom picking has grown dramatically in the last few years due to the growing interest in mycology and in the utilisation of forest resources.

Therefore, regulations are being set up in order to control collection and sustainably manage the resource, so as to preserve it for future generations.

On the other hand, a new concept is starting to be used: the so-called "mushroom reserves", that is, specific areas of interest where the inhabitants of nearby villages can collect fungi.

In producer areas, this resource is being used as a source of income and therefore occasional mushroom pickers must become aware and respect the new regulations.



The effects of some silvicultural practices on the variety and richness of fungal production remain largely unknown.

## 2. IMPORTANCE AND IMPACT OF THE RESOURCE

### 2.1. Current situation and impact of the resource.

#### a) Current situation of the resource.

The production of fungi has become one of the most profitable activities in rural European areas. The most common activity is the collection of wild fungi in the ecosystems where they usually grow. Most of the production is sold fresh.

At present there are some enterprises that process, can and market mushrooms.

In Spain and other European countries, many people are involved in mushroom picking in forests and pastures. Nevertheless, mushroom farms are very scarce, especially those that produce less widely known fungi.

#### b) Principles of mycological resources management.

The management of the mycological potential of certain areas must be based on clear principles defining the activities that are going to be planned:



Figure 20. *Amanita rubescens*.

1. Mycorrhizal edible fungi are obligate symbionts of vascular plants such as pines, chestnut trees, beeches, cork trees, holm oaks, rockroses etc. If the plant disappears, the symbiosis disappears too.
2. Mycorrhizal edible fungi associate with very specific partner plants: *Lactarius deliciosus*,

*Tricholoma terreum* and *Boletus pinophilus* normally grow near pines; *Tuber melanosporum*, *Boletus aereus* and *Amanita caesarea* grow near broadleaf species as those belonging to the genus *Quercus*, *Castanea*; and *Terfezia arenaria* is associated with cistaceae as *Tuberaria guttata*.

3. When the partner tree is young the mycological flora is different (to some extent) from the one found by older trees.
4. Some fungi are able to form mycorrhizae with some species but produce fruiting bodies if they associate with only with a few of these species. This is the case of *Tuber melanosporum*: this fungus can associate with pines but does not produce any carpophores. Therefore, even in the presence of mycorrhizae, it does not produce any truffles. On the other hand, if holm oaks or Portuguese oaks were planted in the same pine forests, truffles would proliferate.
5. Each tree species can associate with hundreds or thousands of species but only some of these are of economic interest.
6. In mixed forests, where different tree species live, there are more fungal species, and thus more diverse productions.
7. Ectomycorrhizal fungi are able to use organic nitrogen thanks to their pectolytic and cellulolytic activity, and therefore it is advisable to use organic fertilised containing manure and urea.
8. The removal of bushy vegetation in forests can seriously damage fungal production.
9. Tilling is not advised, as many superficial roots, usually mycorrhizae, may break.
10. In chestnut groves, coppice is preferable to high forest systems because of chestnut ink disease. High forests are more productive, and would be preferable if this serious disease did not exist.
11. The phytocides used to control undergrowth in forests are very harmful, as they attack woody vegetation on the one hand, and mycelium and mycorrhizae on the other. As a consequence, the symbiosis breaks down.



Figure 21. Some fungi are very similar to truffles.

12. Draining swampy areas can improve the quality and quantity of fungal production, provided drainage is not excessive and makes soils too dry.
13. The genetic improvement of mycorrhizae and mycorrhizal fungi in order to make them even more beneficial for trees would increase the commercial value of the latter.
14. Some very profitable fungi species may be introduced.
15. A balanced combination between the utilisation of fungi, timber, cork bark and pastures should be achieved. Forest thinning is intended to remove weak and dominated trees. In pine groves, dominant trees seem to produce more mycorrhizal fungi than dominated trees.



Figure 22. We must know beforehand the species that we collect.

16. In order to manage forests the following actions are necessary:

- a) To make a comprehensive inventory of mycoflora, including both poisonous and commercial ones, as well as those liable to be used in the future. Information on the productions of the last few years and the amounts of product that were marketed in the area is also important,
- b) To divide the relevant area in several parts, according to the quality and quantity of mycological production.
- c) Reserves should be created and production should be auctioned, always bearing in mind legal restrictions.
- d) As for possible improvements, new trees should be planted in the most suitable areas, irrigation of truffle plants, low thinning in dense forests, modification of felling etc.

#### c) Techniques used in fungi processing.

Fungi are fragile delicacies. Most fungi decompose fast, due to fermentation and rotting caused by microorganisms, and become unsuitable for consumption.

This fast decomposition can be prevented by stopping the agents causing decay.

Fungi are highly perishable and have a post-harvest life of 2-5 days at room temperature. This makes their stocking and conservation more difficult.

The appearance and quality of fungi are largely determined by a sound post-harvest handling, which conditions the conservation period.

Post harvest practices and techniques used in food conservation shows the importance of temperature, relative humidity and storage period in dehydration, rotting and oxidation of perishable products.

Among these post harvest techniques are:

- **REFRIGERATION**

Nowadays refrigeration is very common in the storage and preservation of fruits and vegetables.

It can be defined as the controlled removal of the natural heat of the products stored in a warehouse, by using several liquid, gas or solid cooling substances.

The removal of the heat of a given product, it changes phase (for instance, from liquid to gas), allowing the cooling of the product. Each species and variety requires a different critical storage temperature, below which the cold would damage the product.

Cold-storage rooms are normally between -1 and 2°C degrees, have an air speed of about 2-4 m/s and a relative humidity of 89-90%.

In general terms, bad preservation conditions cause the appearance of stains and make membranes more permeable, which make the product more sensitive to the attack of micro-organisms.

Raw, fresh mushrooms can be preserved for a few days at low temperatures, but there is a high risk of dehydration, and therefore they should be covered with foil. Nevertheless, boiled mushrooms can be preserved for more than 30 days.

#### Plastic films

The main aim of plastic films is to create a protective barrier against organisms, and to create a microclimate for the products being handled, stored and transported.

Thus, the product generates its own atmosphere and modifies it until it is a suitable atmosphere that slows down the ripeness and senescence of the fresh goods.

Low-density polyethylene has a relatively low permeability to steam.

This chemically inert, odourless and flavourless material has heat-sealing properties, and is tear

and impact resistant. It is suitable for temperatures ranging from 50 to 70°C degrees approximately.

#### • DEHYDRATION

Dehydration consists of using drying ovens in order to remove water from the tissues of fungi. Fungi can also be air-dried at room temperature.

Food can be preserved indefinitely, as humidity is necessary for microbial activity.

With this technique, the 90% of the water in fungi is evaporated, without altering their structure.

Technique (to be used for cut or entire mushrooms):

- Spread the mushrooms out in a tray.
- Let them dry under the sun or use a mushroom light dryer.
- Put them in jars or bags.

#### • RADIATION PRESERVATION

Ultraviolet radiation is used to reduce superficial contamination in some products. Some cold storage rooms are often equipped with germicidal lamps.



Figure 23. Dehydrated mushrooms.

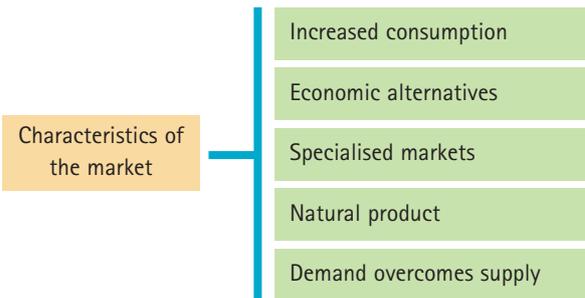
Canned and packed foodstuffs are sometimes sterilised by gamma radiation. This method is known as cold sterilisation, as it only rises the temperature of the products a few degrees.

**d) Current situation of fungi marketing.**

Most of the products derived from fungi are foodstuffs.

Nowadays the supply of this kind of products is not very large, as most of them are sold in foreign markets.

These products should be sold to consumers in the local, regional (mainly) and national (secondarily) markets, where they are scarce or too expensive.



• **GENERAL CHARACTERISTICS OF THE MARKET**

The number of fungi consumers increases every year.

The collection of wild and cultivated fungi is not enough as compared with other products. This means that production sells out fast.

Since fungi are preserved and canned, as they are highly perishable products, target markets are broader and fungi-based products are within the reach of all consumers.

The restaurant industry is a very important market, as many restaurants include fungi in their menus. However, fungi consumers are normally young people, with average purchasing power and higher education.



Figure 24. Dehydrated mushrooms.

Consumers like this product because of its qualities and organoleptic characteristics. Fungi can be both the central ingredient of a dish or part of the garnishing of many different dishes.

Mycotourism is another important element. Tourists become interested in fungi after trying them in the traditional dishes of some areas.

• **NATIONAL AND INTERNATIONAL MARKET VOLUME**

There are no reliable data on the volume of national and international markets, as the mushroom market is quite opaque and it is very difficult to assess production volume.

We must bear in mind that this market is subject to fluctuation, as it depends on fungal production, which in its turn depends on climatic conditions that change from one year to the next.

Mushroom market is known to be growing due to the strong demand of products related to fungi, but there are no specific data on growth rates or global volume of sales.

In some cases, mushrooms are sold in local markets although there is no record of it. Therefore, it is very hard to gather reliable data.

On the other hand, people involved in this market are convinced that it will continue growing, both at national and European level.

## 2.2. Results and impact of the resource.

### • PILOT EXPERIENCES

The Leonardo da Vinci project "MYKOS" addressed the sustainable development of mycological resources. This project had a great impact in the world of mycology both due to the innovative curricular design and the final products, as the book "Fungi: manual and didactic guide", which is being very successful.

Some of these impacts are described below:

- a) Collaboration among entities from the participating countries, aimed to establish closer and durable links that enable them to carry out joint activities; exchange technology and technical advice, promote their products etc.
- b) Involvement of social partners, SMEs, social action groups, local institutions, associations, beneficiaries and trade unions that took part in the project and activities connected to it, as awareness raising campaigns and dissemination of results in all the territories covered by the project.
- c) The entities involved have continued their collaboration after the end of the projects. They have shared experiences and worked together in experimental pilot centres (experimental pilot enterprises, cultivation and processing of products, nurseries, processing facilities).

The dissemination of the results of these activities has had a great impact in professionals and authorities connected to forestry and fungi resources. The publication of "Fungi: manual and didactic guide" has encouraged some specific actions to improve the sustainable management of mycological resources in forest ecosystems. We expect it to influence future sustainable forest management plans.

In addition to this, several courses on fungi cultivation, fungal silviculture and sustainable fungi collection were organised. These courses were very successful among people involved in the sector of fungi.

The informative seminars organised addressed people connected with forestry and mycology. The main target groups have been forest rangers, employees of forestry enterprises, mushroom pickers, processing and marketing enterprises, ecologist associations etc.

These activities have provided more detailed information on fungi and the economical benefits derived from them, which can be used as an instrument for rural development.

**Among the initiatives carried out in the scope of the project are:**

- The setting up of a tree nursery that produces mycorrhized forest plants. These nurseries are experimental and demonstration centres where training activities (talks, seminars, workshops) and dissemination activities are carried out. The most important impact of these nurseries is connected with mushroom pickers and growers and employees in forestry enterprises that have visited them and attended some of the information and demonstration activities carried out.
- The creation of several mycological associations that give advice on fungi and protect endangered species.
- The setting up of several small processing enterprises that have started working with fungi alone and then have included other natural products.

These initiatives have generated new jobs, although in some cases this is difficult to measure.

### 3. USE OF THE RESOURCE AS AN INSTRUMENT FOR RURAL DEVELOPMENT.

#### 3.1. Possibilities and conditions needed for development.

a) Requirements for the development of fungal silviculture.



Inventories of the mycoflora, including all species, both edible and with no gastronomic possibilities. Special attention must be paid to rare species or species having special economic or ecological importance.

Description of the ecosystems having important productions of fungi.

Development of mycological training programmes and environmental awareness raising.

Forestry professionals, rural area managers, local population and visitors of rural areas with mycological interest must become involved in these activities.

Production estimates and quantification is another important issue. This task requires specific inventories covering enough surface and period of time to be representative of the study area.

On the other hand many environmental training actions are needed in order to support the sustainable use of forestry resources such as fungi collection.

There is a need for regulations in order to protect the resource from excessive collection in the medium and long terms.

Apart from the above-mentioned considerations, we must take into account the lack of a general management plan and of specific regulations governing the use of mycological resources, although there are some exceptions.

The lack of control over production and exploitation of the resource and over industrial and tourist activities connected with fungi is another issue that needs to be tackled before planning and carrying out sound silvicultural initiatives.



Figure 25. Holm oak ecosystem.

b) Basic principles for the development of fungal silviculture.

PRINCIPLES FOR THE DEVELOPMENT OF FUNGAL SILVICULTURE	
Inventory and research	Planning
Training in mycology intended for the forestry sector Mycoflora inventories Definition of the production Description of the most suitable habitat for each species Fungi collection yields Definition of the ecological succession over time Reforestation with fungi	Forestry policies Management and exploitation plans Planning of harvests and collection season
	Rural development
	Development of an adequate legal frame Support of rural tourism Inclusion of the canning industries in the forestry sector Marketing and trade channels

It is always necessary to study the importance and diversity of fungal resources and their relationship with the existing natural environment. However, in general terms, all initiatives intended to increase the diversity of fungal species and their productions are positive.

Although there are not many studies on the results of the initiatives carried out in the forestry ecosystems, promising improvements have been made, especially as regards the basic silvicultural principles.

Some of these principles, already widespread, are:

Clear fellings (i.e. removal of all arboreal vegetation) are not advisable in pine groves or in the period of regeneration fellings.

Tilling and stump removal in felling areas are not advised, as they may damage the roots that are liable to come into contact with mycorrhizal fungi.

The removal of bushy vegetation should only be carried out in case it is too dense and prevents collection. If we have to remove the undergrowth in order to prevent forest fires, we should use mechanical methods rather than chemical products, which may have negative effects on fungi.

Both thinning and regeneration fellings generate waste wood and slash that need to be dealt with appropriately.

Tree felling, roadside stacking of logs of a diameter of more than 8 cm, and shredding of wooden waste is very beneficial as it prevents forest fires and pests, and makes collection easier.

Pruning improves the quality of wood and also the access to the forest. It prevents forest fires and also creates a microclimate favourable for fungi that need sunlight (better sun exposure of the soil, humidity and ventilation).

As for the distribution of the trees of different ages and sizes, an irregular configuration in clumps is advised. Thus, we will obtain a representative sample of all ages and species, and of the distribution of production over the year.

Thus, milk caps will grow by pine trees, and porcini will grow by older trees. There must always be large trees in the most productive areas.

The spacing of the actions in the relevant areas must depend on the time of recovery of the mycelium.



Any action intended to obtain mixed forests will increase fungal diversity. Thus, production will be larger and more stable over the years. The mycoflora of mixed forests of conifers and broadleaf trees is more diverse than that of monospecific forests. The soils of mixed forests are richer than those of conifer forests and production is also larger.

As for forest regeneration, mycorrhization is more and more usual in the periodic reforestations of potentially productive areas.

By using this technique, we encourage the proliferation of the most interesting fungi both in economic and ecological terms.

Choosing high quality plants is all-important. Plants should be mycorrhized and should be suitable for the specific reforestation area.

We should also choose an inoculation method that meets the needs of the relevant species and area.



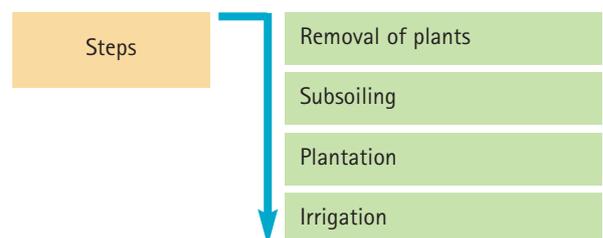
Figure 26. In chestnut ecosystems fungal associations are very common.

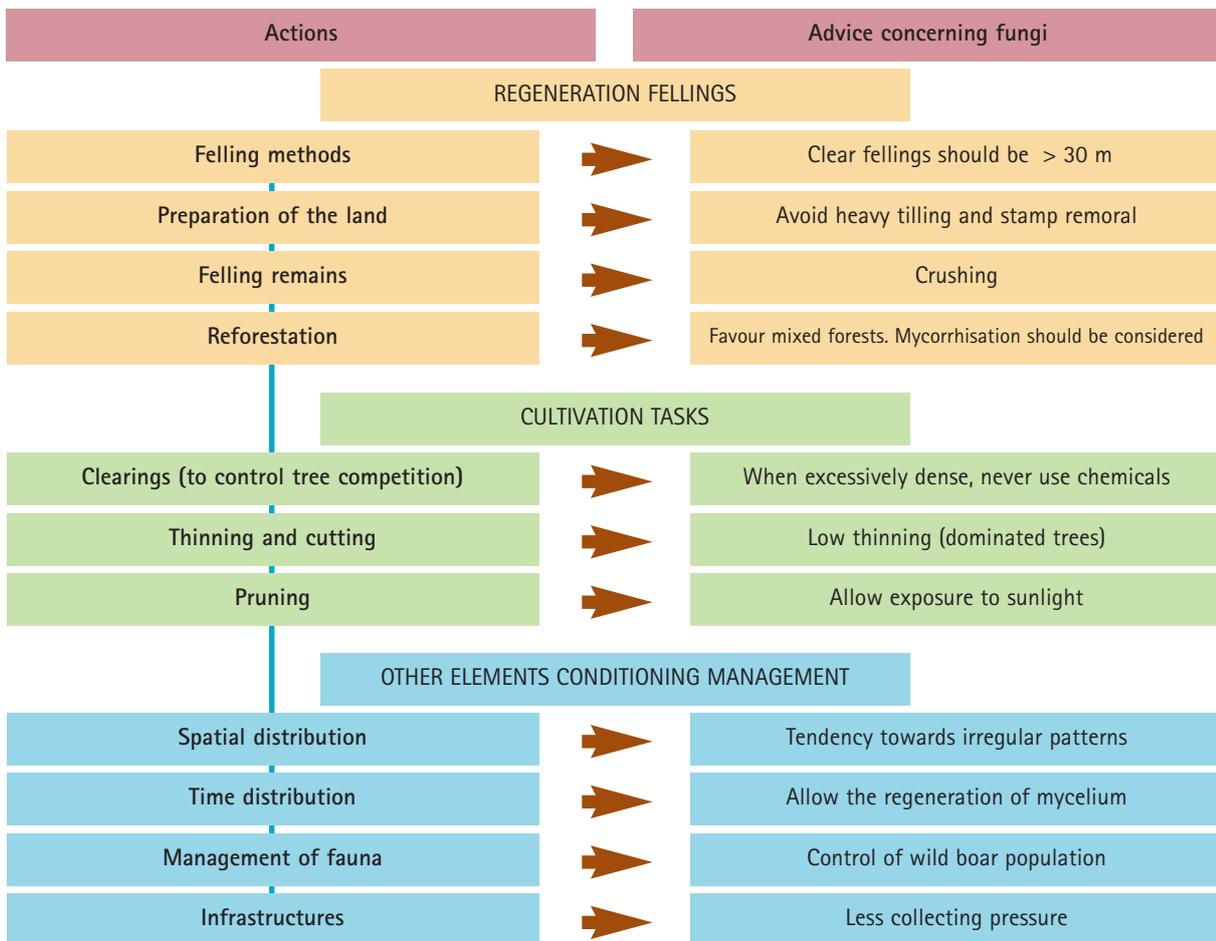
Using spore solution is advisable. This system is more effective than inoculated soil, and eliminates the risk of pathogenic fungi.

These methods are not only suitable for forests. They can also be used in the reforestation of abandoned farms; this type of soil is normally quite deep and free of unwanted ectomycorrhizal propagules, and therefore is suitable for the colonisation of the chosen mycorrhizal fungus. The introduction of these fungi will provide an added value to the soil and encourage the growth of the seeding.

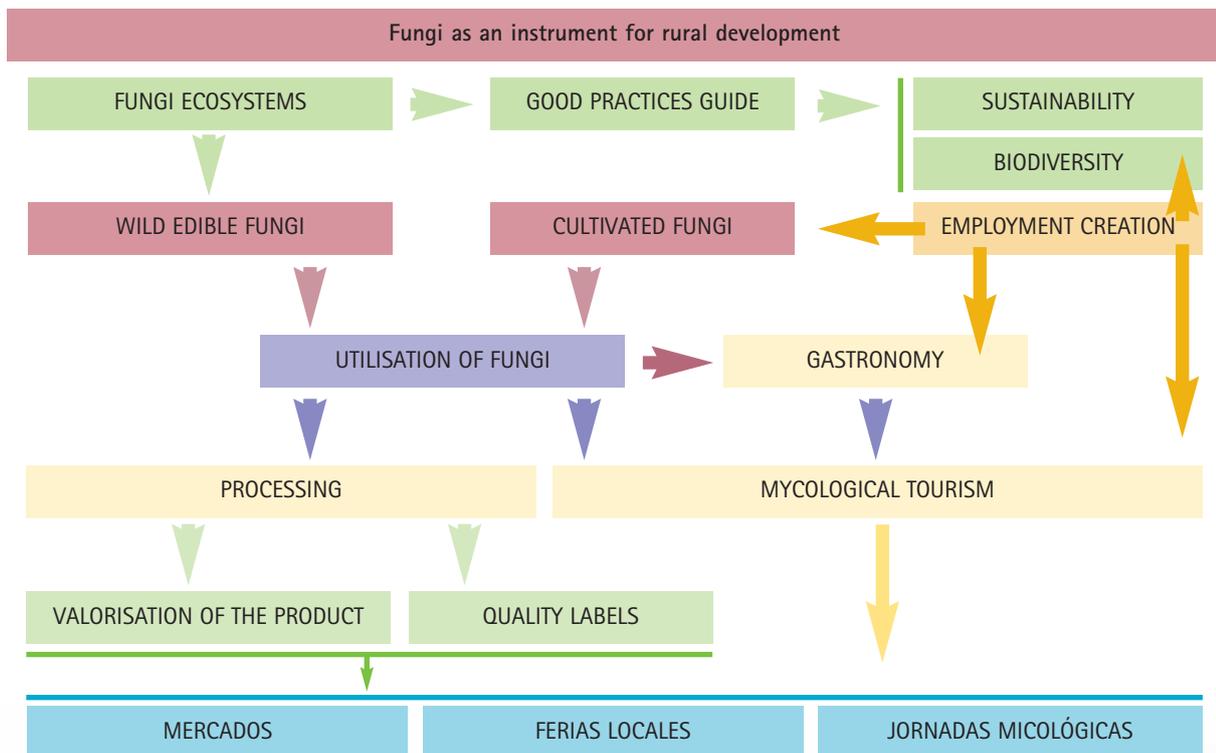
This kind of reforestations improves the development and durability of forests. Therefore, these practices contribute to the conservation of the environment and improve the economic profits of forests.

The most usual species are *Quercus ilex* inoculated with *Tuber melanosporum*; *Pinus nigra* inoculated with *Lactarius deliciosus*, *Lactarius sanguifluus* or *Lactarius semesanglifluus*.





c) Mycology and rural development.



In view of the growing interest on fungi and mycology itself, managers, researchers and owners are starting to pay attention to the collection of edible fungi in forests and scrublands in addition to the rest of recreational activities connected to forests.

Due to its importance for the landscape and the social and economical structure of many rural areas, mycology is being more and more associated to rural development.

Society is gradually changing its attitude towards nature and feels more inclined to discover the rural world and start to consider it as a space for leisure and amusement.

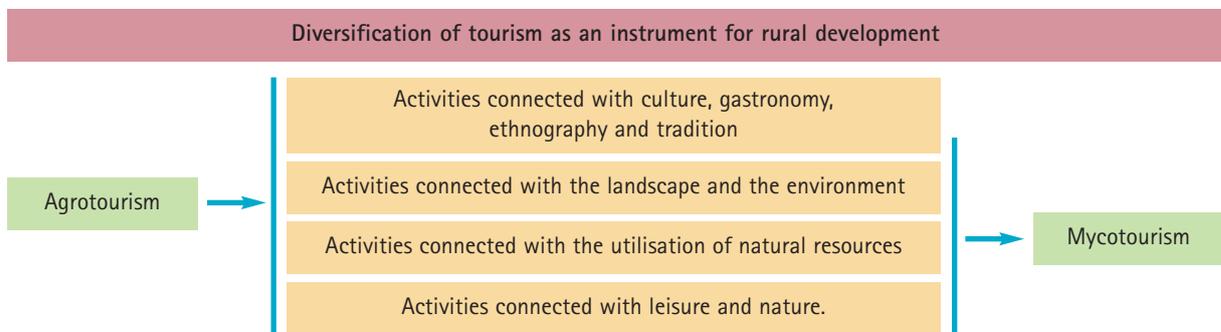
Tourism as a social activity is constantly growing, and it is focusing more and more in activities connected with natural and local resources, that is, the so-called rural tourism. Landscapes, natural values, animal and

vegetable species and new hobbies are the main elements sought by rural tourists.

Mushroom picking is becoming very popular. There are more and more people that pick mushrooms for fun, for gastronomic purposes or for economic reasons. This emerging hobby is called **Mycotourism**. Mycotourism entails other activities that are boosting the economy and the entrepreneurial activity in many villages: country lodges, lodging houses, restaurants, shops that sell traditional local products, guides, complementary recreational activities...etc.

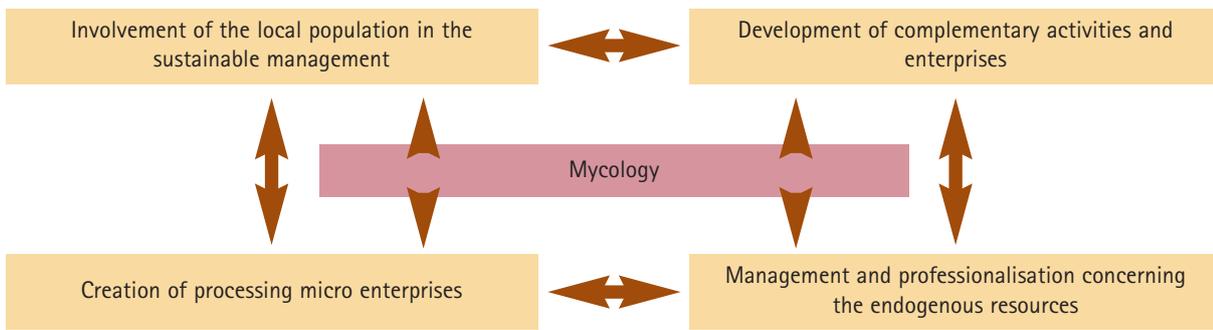
Mycotourism is seasonal, and depends on mushroom seasons. However, many tourists get to know new places that they may want to visit again at other times of the year, and therefore the tourist activity can last longer.

The use of fungi resources must be managed so as to make the most of the synergies created.



There is an EU-level network of activities connected with mycotourism and silviculture which is becoming quite important and that gathers a varied range of people and institutions: producers, mushroom pickers, mycology associations, industries involved in preservation, processing and marketing... etc.

In order to manage this resource in a sustainable way, there is a need for experts with specific training who are liable to transmit their knowledge in an educative way, and carry out dissemination and information campaigns together with the authorities involved in forestry.



**d) Mycotourism, sustainability and development.**

All activities connected to mycology boost rural development provided that they *promote the sustainable*

*exploitation of resources*, a better land distribution, as well as other activities related to fungi, while preserving local identity and culture.

**This approach to fungi exploitation permits:**

- A better quality of life in rural communities.
- The conservation and sustainable management of fungi resources.
- The revaluation of local products in producer areas.
- Addressing the demand for more sustainable tourist offers on the part of consumers.
- The improvement of the local business sector.
- Attracting the attention of a growing number of people.

**Sustainable management**

Sustainability	Needs
Reasonable utilisation of the resource	Good Practices guide on fungi collection
Conservation of the habitat	Prevention of agents causing pollution
Conservation of biodiversity	European Red Data List of threatened fungi (ECCF)
Planning	Creation of sound management plans
Support of local economy	Inclusion in economic development strategies
Involvement of local population	Creation of processing industries and service provider enterprises
Professionalisation of the sector	Specific training
Tourist promotion	Adequate promotion
Encouragement of research	Silvicultural applications

Initiatives connected with sustainability and mycotourism:

- **REASONABLE UTILISATION OF THE RESOURCE**

The ecological impact of the exploitation of forest products other than timber must be assessed.

It is not recommended to use products or harvesting methods that:

Cause alterations or imbalance in the source (in this case, the mycelium of fungi).

Affect the productivity or growth of the species being used.

Damage the nutrient cycle.

Damage wildlife.

The utilisation of mycological resources must be reasonable. Thus, it is important to observe good practices when picking mushrooms.

- **CONSERVATION OF THE HABITAT**

Good practices must be observed in order to have stable fungi productions while preserving the characteristics of the habitat.

For instance, the removal of undergrowth in forests has negative effects on fungal production. We must bear in mind that there is a close relationship between fungal species and plants.

If vegetation disappears, the fungi that are associated to it disappear too. Therefore, tilling is not advisable, as superficial roots, many of them mycorrhizae, can be damaged.

In addition to this, the phytocides used to control undergrowth in forests are very harmful, as they attack woody vegetation and destroy mycelia and mycorrhizae. Therefore the symbiosis breaks down. These effects have been verified in Finland.

- **CONSERVATION OF BIODIVERSITY**

Biodiversity conservation includes all the species that live in a given territory. Endangered species must be detected in order to protect them against excessive pressure.

Therefore, the European Council for the Conservation of Fungi (ECCF) has created a *European Red Data List of threatened fungi*.

- **PLANNING**

There must be a Plan that ensures the sustainability of the collection system.

#### Objectives of a Sustainable Plan of Fungi Exploitation:

Use fungal resources without damaging the balance of their natural habitat or any other species in the territory.

Justify the exploitation activity by proving that collection contributes to the maintenance and conservation of natural areas.

Establish a set of criteria to be followed in mushroom collection. Such criteria should take into consideration the conservation of the species being collected and should ensure the sustainable use of the resource.

To delimit the collection areas by drawing up maps describing such areas.

To define the responsibilities of those that take part in mushroom collection and determine the requirements that must be met in order to carry out the activity.

- **SUPPORT LOCAL ECONOMY**

Mushroom growers, pickers and small fungi processing enterprises would form a small network that would improve the economy at local level. This impact should also encourage the creation of more lodgings, restaurants, cultural and ecological tourism offer, etc.

These impacts are liable to create employment, and therefore rural areas may become more dynamic and allow younger people to stay in them.

- **INVOLVEMENT OF LOCAL POPULATION**

One of the main objectives of development plans is the involvement of the local population that is going to benefit from the results of the initiative. Local population must be a pillar of mycotourist activities.

They must become involved in the development of the infrastructures of sustainable development and in the professional, cultural, gastronomic and social opportunities that may arise.

- **PROFESSIONALISATION OF THE SECTOR**

This sector needs specific training programmes that provide professional qualifications in order to solve the existing problems and improve work conditions.

All the activities carried out by the specialists in the field must be taken into consideration; they may provide guidance to users and help them identify the mushrooms they have collected, as part of a group of services intended to make their stay more pleasant.

- **TOURIST PROMOTION**

Tourist promotion is another important aspect. There is a need for a promotion strategy that

allows users to discover the values of the area, the services available and the different aspects that make it worth visiting (tourist, ecologic, cultural, gastronomic, social etc.).

It is not a matter of promoting the place alone, but also the products that are produced and processed locally, as another key element that visitors can find in the territory.

Tourist guides, web pages, tour operators and brochures are useful mechanisms for the promotion of the area and its local products.

- **ENCOURAGEMENT OF RESEARCH**

The techniques used in mycological activities are evolving very fast, which requires an extra effort for those that want to know the state of the art and take advantage of new possibilities.

For instance, the mycorrhization techniques allow for faster plant growth and better plant adaptability.

Specific mycorrhizae are being used in order to obtain certain selected fungi.

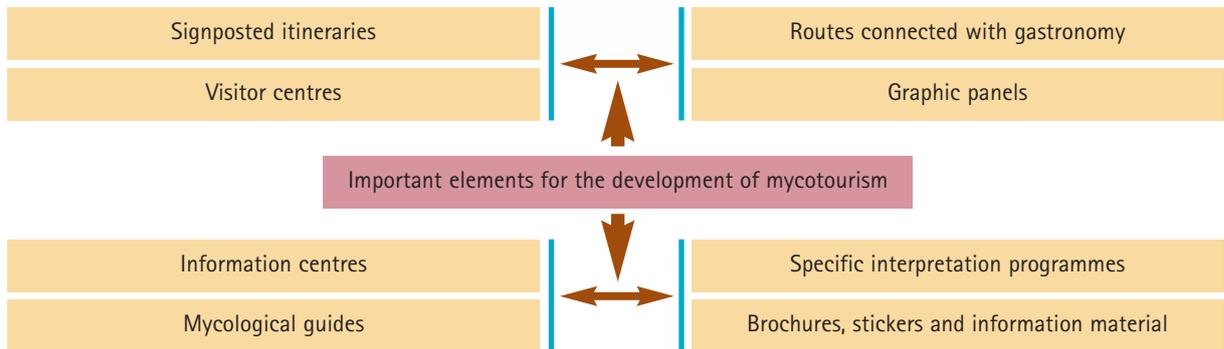
Different approaches are used in order to obtain edible fungi with commercial value.

Another promising field of research deals with the development of new species that can be used to obtain pharmacological substances.

### e) Mycological tourism as an instrument for rural development.

Mycological tourism requires specific planning and structures enabling visitors to become aware of the things they can see and do, what they can eat and buy... etc. As regards fungi, the following structures are needed:

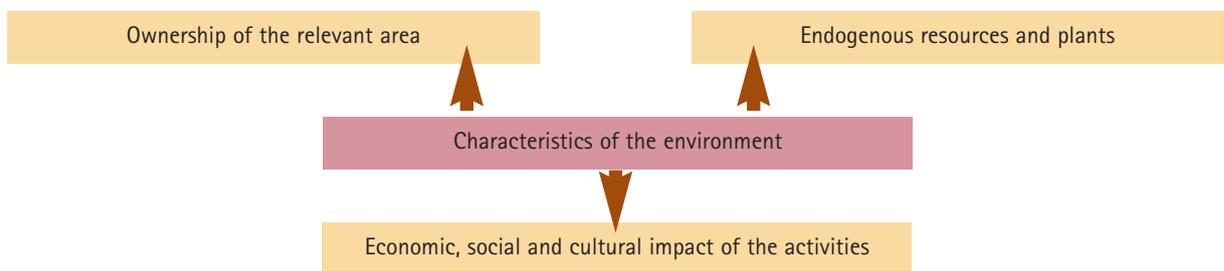
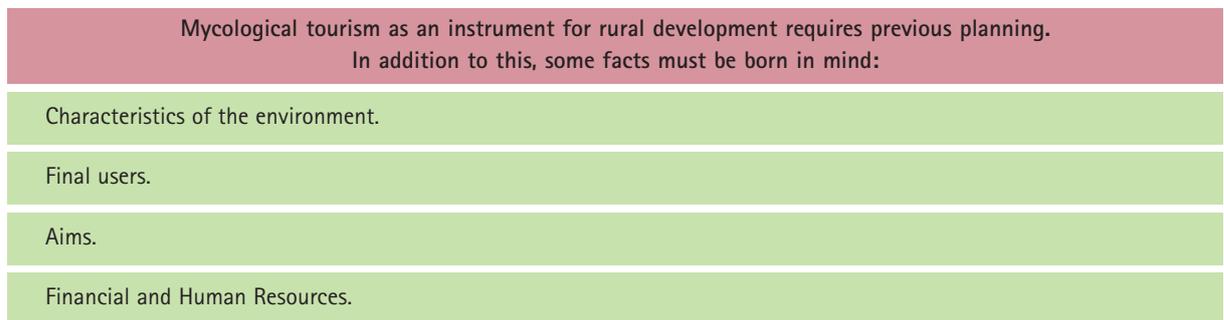




These instruments will enable visitors to become aware of the advantages of staying in that given place and suggest different ways to spend their time there. Visitors will have all the necessary information on the habitat and fungi species available, and how to find them. They will also become aware of the rules that they

have to observe in order to protect ecosystems and fungal species. A good field guide would be an excellent tool to provide all this information.

Thus, an excessive exploitation and mismanagement of the resource can be avoided. A sound planning and control of activities can prevent negative impacts.



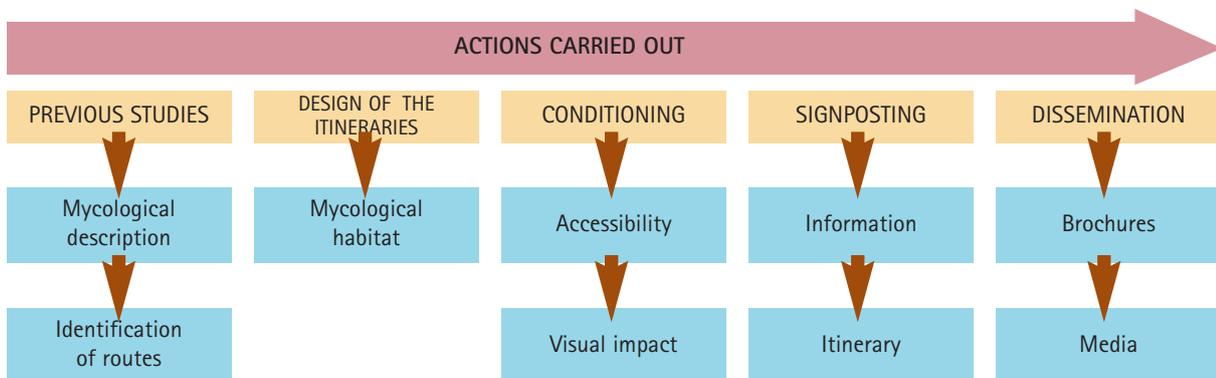


Some advantages and disadvantages of the elements that need to be implemented:

	SIGNPOSTED ITINERARIES	INFORMATION CENTRES
↑	<ul style="list-style-type: none"> <li>They help orientation</li> <li>They are available to many users</li> <li>They require maintenance</li> <li>They mark interesting spots</li> <li>They prevent people from getting lost</li> </ul>	<ul style="list-style-type: none"> <li>They provide technical information. Brochures and good practices guides can be made available.</li> <li>They help people with the classification of fungal species</li> <li>They provide multilingual information.</li> <li>They provide information on the different amenities in the area.</li> </ul>
↓	<ul style="list-style-type: none"> <li>They provide little information</li> <li>They may be subject to vandalism</li> </ul>	<ul style="list-style-type: none"> <li>They may be difficult to access.</li> <li>They are subject to seasons.</li> </ul>
	VISITOR CENTRES	MYCOLOGICAL GUIDES
↑	<ul style="list-style-type: none"> <li>They are attractive and encourage participation</li> <li>They allow for the use of combined formats (images, text and sound)</li> <li>Can organise courses and exhibitions</li> </ul>	<ul style="list-style-type: none"> <li>They provide direct and effective customer services.</li> <li>They provide information and advice.</li> <li>They promote mycology.</li> <li>They promote environmental education.</li> </ul>
↓	<ul style="list-style-type: none"> <li>They are expensive (building, management, maintenance).</li> <li>They provide seasonal employment.</li> </ul>	<ul style="list-style-type: none"> <li>They are suitable for small groups.</li> <li>They require specialised staff.</li> <li>They provide seasonal employment.</li> </ul>
	GRAPHIC PANELS	SPECIFIC INTERPRETATION PROGRAMMES
↑	<ul style="list-style-type: none"> <li>They require little maintenance</li> <li>They allow for the combination of text and pictures</li> <li>They are available to all visitors</li> <li>They provide information constantly</li> </ul>	<ul style="list-style-type: none"> <li>They encourage direct contact with the resource.</li> <li>They allow for the combination of several instruments.</li> <li>It is possible to organise thematic weeks.</li> </ul>
↓	<ul style="list-style-type: none"> <li>Sometimes they are not noticed</li> <li>Negative visual impact</li> <li>They are subject to vandalism</li> </ul>	<ul style="list-style-type: none"> <li>Complex development.</li> <li>Specialised staff is required.</li> </ul>

#### f) Stages in the design of mycological routes

Itinerary for the design of mycological routes.



### PREVIOUS STUDIES

Analysis of the ecological features and the access to the area, measurement of the safety status.

Quantitative and qualitative analysis of the existing mycological resources, the endangered species, and the most common species.

Design of the route, location, key spots, orientation, etc.

### DESIGN OF THE ITINERARIES

Drawing of the route:

Layout (it could be circular, to avoid passing by the same places twice).

The length of the route should take the different types of visitors into account.

Smooth slopes at the beginning of the route encourage visitors to go on.

Estimates of the grade of difficulty of the route and of the time it takes to complete it.

Identification of the mycological species of interest and habitat associated to them.

Other elements that may be interesting to users.

### CONDITIONING OF THE ROUTES

Improving the access by removing all existing barriers.

Cleaning.

Infrastructures and maintenance plan.

Adaptation of the route to the environment in order to minimise its impact.

### SIGNPOSTING

Erecting signposts.

Signalling of the route in order to help users find their way.

The contents of the panels must be easy to read and must contain the necessary information on routes, interesting sites and environmental care.

### DISSEMINATION

Edition of brochures, stickers, posters, videos, etc. that illustrate the mycological and environmental values of the area.

Organisation of thematic weeks, conferences, seminars, workshops and local fairs.

Guided visits for the identification and collection of mushrooms.

Use of the media: press, radio, television and Internet.

### g) Mycological gastronomy.

Rural tourism is closely related to traditional gastronomy. Many visitors are interested in the quality of local products and gastronomy. We must take into consideration the gastronomic possibilities of fungi. There are many easy ways to cook fungi; they can become easy and delicious dishes. It is important to establish a connection between a given product and the area it comes from. Thus, that particular place will not only be known for its specific location or name but also due to its gastronomic traditions.

Mycological gastronomy has positive cultural and economic impacts. The organisation of local gastronomic journeys, recipe contests or tastings of typical products may attract people, especially in mushroom seasons.

The preservation, processing and marketing of fungi in producer areas creates new jobs and favours endogenous development. The marketing of mushroom processed products is also a dissemination tool liable to increase the interest on a given place and its local products.

This type of initiatives will put new energy into the mycological tourist sector. Products must be advertised in order to increase their value in the market, for instance, by using quality labels, designation of origin, organic certification or specific labels indicating the producer areas.

Thus, a network for the distribution of mushroom products and the promotion of the landscape, culture, art and environmental values of a given area may be created.

#### Activities liable to promote mycological gastronomy:

Local gastronomic journeys.

Recipe contests.

Gastronomic routes.

Distinctive labelling: quality labels, organic certification, etc.

Tastings of traditional dishes.

Special offers in local restaurants and lodgings.

Sale of home crafted processed products.

Organisation of district fairs.

### 3.2. Employment creation potential of the resource.

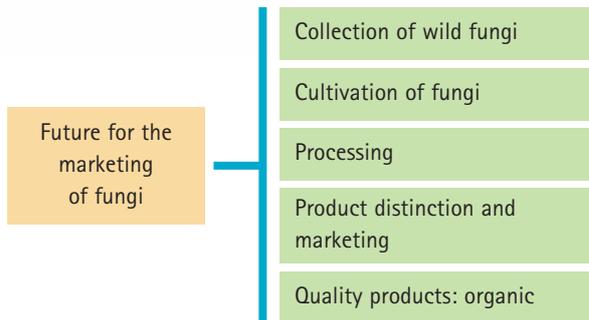
The New Sources of Employment connected with mushroom growing and picking are related to:

Sustainable collection of marketable fungal resources. Cultivation of fungal species valued in the

market. These activities will improve the economic situation of many people involved in the mushroom sector.

Sustainable collection will allow for mushroom producing areas to continue to be productive for a long time, while sustainably using their endogenous resources.





The creation of small processing, canning and marketing enterprises are liable to form a small network of enterprises that improve local economy and create employment. Thus, rural areas may become more dynamic and allow younger people to stay in them.

The creation of Mycological Learning Centres will contribute to the promotion of the activities connected with fungi: ecosystem, flora and fauna, cultivation, cultural and gastronomic activities (traditions, tools used locally, ethnography...etc).

Summing up, fungi are to be considered an important resource for rural emerging professions with employment creation potential:

#### Forestry sector:

- Collection of wild fungi (Wild fungi sustainable exploitation Specialist).
- Enterprises that deal with environmental conservation and protection of endangered species (Forestry, natural conservation and mycological resources Specialist).
- Enterprises connected with the mycorrhization and production of mycorrhizae (Fungal silviculture Specialist).

#### Business sector:

- Preparation of substrates and inocula for the cultivation of fungi.
- Mushroom growing (Edible and Medicinal mushroom growing Specialist).
- Processing and marketing of fungi (Post-harvest Specialist).
- Plant mycorrhization (Plant mycorrhization Specialist).

#### Agri-food sector:

- Use of fungi in recipes (Mushroom-based gastronomy Expert).

#### Environmental and rural tourism sector:

- Activities connected with the environment and with mycological tourism (Mycological guides).
- Nature Learning Centres (Specialist on fungi and their habitat).



Figure 27. *Cantharellus cibarius*.

# ORGANIC FARMING

## 1. GENERAL DESCRIPTION.

### 1.1. Description of the resource.

#### 1.1.1. What does organic farming (OF) mean?

Organic farming is an agrarian system management model whose main aim is to obtain high quality food while preserving the fertility of the soil and respecting the environment. Organic farming is also known as biological, ecological or biodynamic agriculture.

The *Codex Alimentarius* Commission defines organic farming as a "holistic production management system- for crops and livestock- emphasising the use of management practices in preference to the use of off-farm inputs".

The *Codex Alimentarius* (Latin for "food code") is an internationally accepted collection of standards, practices, guidelines and recommendations concerning food, food production and food safety that aims to protect consumers. Officially, this code is updated by the *Codex Alimentarius* Commission which depends of the Food and Agriculture Organization (FAO), an entity that belongs to the United Nations and the World Health Organisation (WHO). Since its creation in 1963, its aim has been to protect the health of consumers and to ensure good practices in the international transportation of food.

The agrarian management model of organic farming is different from the one of industrial farming, which exhausts the soil. It also differs from the model used by traditional agriculture.



Figure 1. Organic agriculture respect plant cycles.

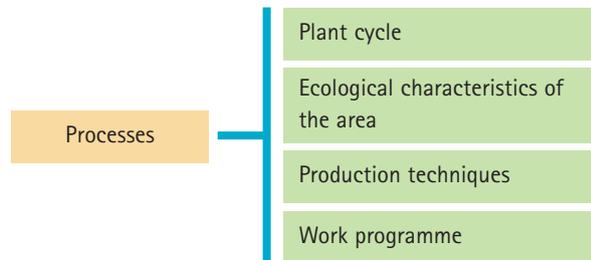
Organic farming is a creative and modern approach that solves many serious health, social and environmental problems caused by the unbalance brought about by the disappearance of genuine agriculture and farmers.

This production model uses alternative and durable farming methods based on traditional knowledge and agroecology. No synthetic chemical products or genetically modified organisms (GMO) are used. This model intends to make an optimal use of natural resources.

Biological agriculture deals with the design of production models based on an environmentally and socially friendly approach. It seeks a balance between needs, production media, environmental concerns and the quality of life of farmers. All in all, it is a way of thinking that requires *open mindedness, as it covers all the aspects and procees* involved in agricultural production.



Thus, it requires a holistic thought which conveys all the farming processes.



#### 1.1.2. Agroecology.

Organic farming is based on the so-called agroecology: science that incorporates the scientific concepts of Ecology with those of Agronomy.

This new science studies the functioning of agricultural systems, agricultural production and the dynamics of endogenous rural development. The theoretical and methodological approach of Agroecology is based on three elements: environment, economy and society.

According to Agroecology, each farm is a unit, a farming ecosystem. Thus the farm is the unit used for management and analysis, and has physical boundaries within which an agrosystem is established. An agrosystem is the result of the action of men in a given ecosystem for production purposes. Several management models can be used, which correspond to different cultural, technical and environmental approaches.

In the past few years agroecology has become an essential tool in the design of rural development plans that are compatible with nature conservation.

- **Agronomy:** Knowledge compendium belonging to the fields of exact sciences, physical science and economics, which are applicable to land cultivation.
- **Ecology:** Science studying the relationships among living organisms and between them and their environment.

### 1.1.3. Characteristics of Organic Farming.

There is not just one definition of organic farming, but there is a set of international principles governing organic farming. These rules have been included in the IFOAM Organic Principles (International Federation of Organic Agriculture Movements):

- To produce food of high nutritional quality taking care over the production process and the ingredients used.

- To interact with ecosystems rather than trying to rule over them.
- To respect and encourage the biological cycles within the farming system involving plants, animals, micro-organisms, flora, fauna and soil.
- To maintain and increase long-term fertility of soils by managing organic matter correctly.
- To use, as far as possible, local renewable sources.
- To give all livestock conditions of life which allow them to perform basic aspects of their innate behaviour.
- To avoid all forms of pollution that may result from agricultural practice ( by avoiding fertilisers and synthetic pesticides and reducing the use of fossil energy and in production and transportation of food and by making a sustainable use of water).
- To maintain the genetic diversity of the agricultural system and its surroundings, including the protection of plant and wildlife habitats.
- To provide workers an adequate return and satisfaction from their work in a safe working environment.
- To consider the wider social and ecological impact of the farming system.
- To promote the creation of links between producers and consumers.



Figure 2. Organic fruit trees.



Figure 3. Choosing the right crops is important.

Organic production methods encourage crop variety. The wide range of cultivated plants improves the soil and protects crops. This implies using organic fertilizers and mineral amendments instead of fertilisers and pesticides that damage the environment.

Moreover, wild animal and plant species that grow near the farmed land must be respected. Thus, we will avoid pollution and improve the health of producers and consumers and obtain high quality food. We will spare the costs of fertilisers and phytosanitary products, and also of machinery and fuel.

Organic production greatly contributes to boosting European agriculture, as it provides healthy and high quality food and considerably reduces environmental pollution. It contributes to the conservation of biodiversity and farmed land, and to maintain and improve employment.

#### 1.1.4. Conversion to organic farming: the process of conversion from conventional agriculture to organic farming.

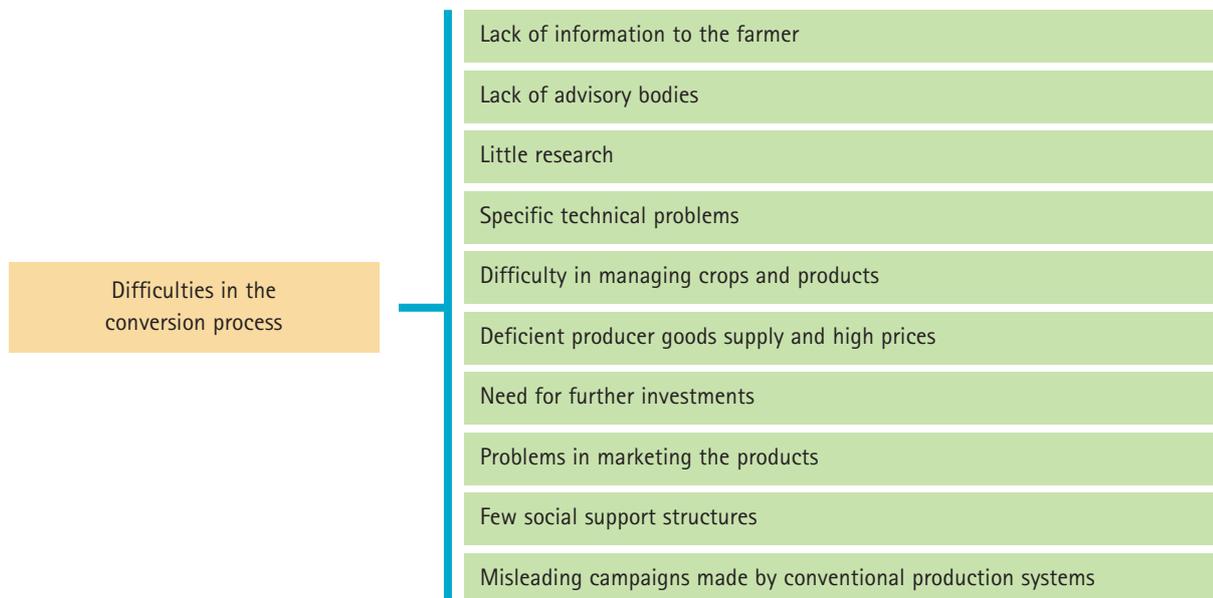
The transition to organic farming or conversion implies changing highly pollutant and capital-dependant farming techniques and adopting other techniques that have less impact and are more accessible at local level.

These techniques allow for biological readjustments to take place and for more functional agrosystems.

The conversion to organic farming can be defined as the transitory adaptation period in which conventional farming turns into organic farming.

In this period, the practices of organic farming are progressively implemented according to a plan, and the mistakes caused by bad previous practices are amended.

This transition process implies a change in the farmer's views and attitude. It implies rather radical changes in farms and in the way they are managed, which greatly differs from previous practices. These changes require some technical knowledge that will allow farmers to be aware of the implications of their actions and whether these actions contribute to their objectives or not.





In addition to this, the conversion to organic farming requires a thorough study of the situation of the farm in order to predict what major problems will have to be faced in the process and in order to design a fully biological production system.

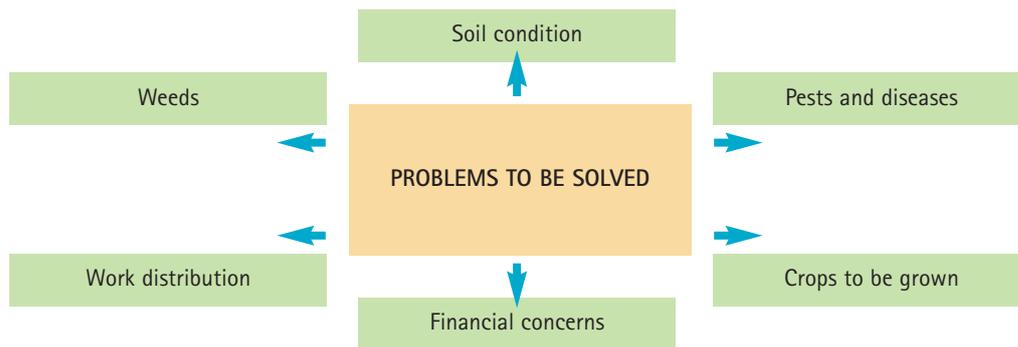
The analysis of the previous situation must provide information on several aspects connected with the farm and its characteristics. This information will help us decide how to deal with such aspects with a new approach. The analysis will show what will be the pace of the conversion and will give a previous idea of the changes that will be necessary and their extent.

Some of the aspects that must be taken into consideration when analysing the previous situation are:

- **Characteristics of the farm:** Size, distribution of plots and of crops, whether it is an agricultural farm only or there are animals and of what kind etc.
- **Analysis of the soil:** Situation of soil in terms of structure, nutrients, organic matter content, erosion, pollution etc.
- **Climate:** Pluviometry and average yearly rainfall distribution, average temperatures, minimum

and maximum temperatures, periods in which frosts are to be expected etc.

- **Management of organic matter** in general, and of manure in particular.
- **Premises for livestock and machinery:** Workshops, cowsheds, pens and other livestock premises.
- **Potentially restricting factors as:** Labour availability in activity peaks in the farm, capital to be invested in the farm in order to make the necessary changes, buy machinery etc.
- **Which marketing channels are going to be used,** that is, how is the product going to be advertised, what markets are being addressed and how?. This is an important aspect, as the farm's solvency depends on it. Nowadays there is a demand of organic food in certain market sectors. We have to decide whether it is worth entering those markets, usually located far away from the production areas, or it is better to progressively enter local markets, where distribution is easier, and advertise the product among local consumers. The market determine the transportation costs and the final price the consumer pays for the product.



One of the main problems is to get to know the actual soil conditions and how have previous practices and chemical manure affected them. It may be the case that the soil is exhausted and in very bad conditions.

On the other hand, the land may have been used as pasture or it may not have been cultivated for years. In all cases, we must establish a working schedule in order to restore the soil as much as possible and turn it into a stable soil by adding the required elements. Once the soil is balanced, it will cause fewer problems in the sense of production and also of pest and diseases control. We must bear in mind that soil fertility depends on the micro-organisms that feed from it and therefore all actions taken must try to improve their conditions and ensure their continuity.

Another major issue is the definition of a **weed control strategy**. Weeds can invade the farm right after abandoning herbicides in the conversion process due to the initial unbalance of the soil caused by the absence of synthetic manure.

Organic farming uses mechanical weed control methods complemented with adequate farming methods, rotations and companion planting.

In order to use mechanical weed control methods we must have the necessary machinery and farm equipment.

There are other methods but they are more expensive. In any case, we must decide what is going to be our action plan to solve this problem.

This new approach to pest and disease control implies an important change. This problem has to be taken into consideration, and preventive measures must be devised and implemented if need be. The first step is improving soil conditions. In spite of this, it is advisable to establish a preventive pest and disease control system in order to fight the most common diseases that may affect the crops. This is a medium or long-term measure. We must bear in mind that the more balanced the farming system is, the easier to solve the problems caused by parasites. In some cases the starting point may not be that far from the conditions sought, in which case it is much easier to solve eventual problems.

Another important aspect that has to be born in mind is **work distribution**. The work systems used in organic farming imply a different approach to tasks as manuring and to parasite control methods etc.



Figure 4. Plant and animal cycles are respected.

This means that at some point of the season there will be more work than in other moments. The schedule should determine at what point will extra labour be needed, in order to cope with it.

Finally, we must bear in mind from the very beginning that there may be financial difficulties and management problems when creating a new organic system. Initially, production may decrease without the corresponding surcharges, which may cause important financial problems.

### 1.1.5. Organic farming work methods.

In agronomy there is never just one way to solve a problem. Different approaches may lead to the same result. Organic farming advocates for the diversity of the farming system by means of enriching and stabilising the system.

Organic farming implies knowing some techniques that allow us to control the environment and boost natural processes.

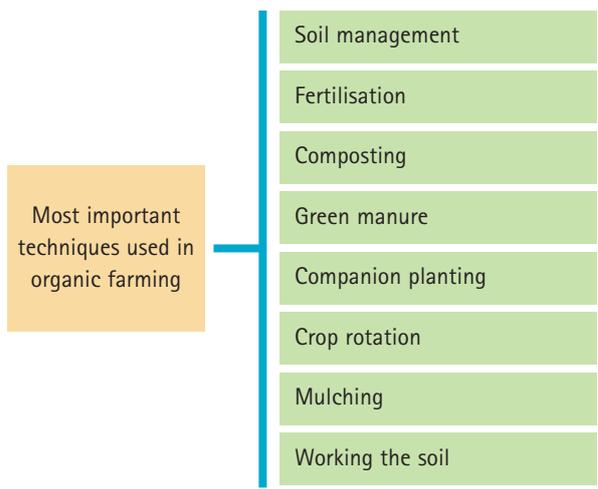


Figure 5. There is no need to use pesticides in order to have healthy plants.

Again, there are very different ways to solve problems. It could be argued that each farmer can devise his or her own work system according to particular circumstances. Such variety improves both the person and the method.

Scientists and technicians worldwide have been studying and working to improve agronomic techniques and organic farming for more than 40 years. The different existing cultivation techniques and trends share features as not using synthetic chemical products and understanding the soil as a living organ, or promoting the fertility of soil and the balance of the ecosystem.

#### a) Soil management.

The soil is one of the main elements in production. The soil remains largely unknown.

Knowing how the soil works and being aware of the different processes that take place within it is no easy task, but this is the key to achieve a balanced agrarian system.

The soil can be defined as the outermost layer of the earth's crust, where life takes place.

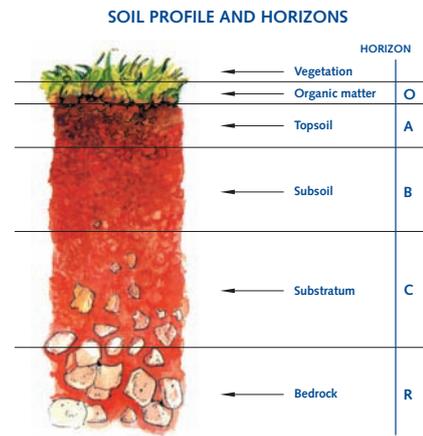
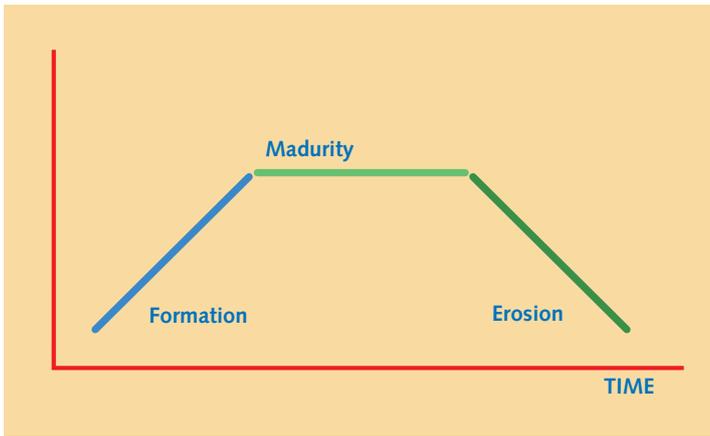
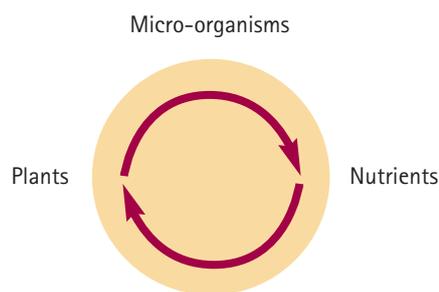
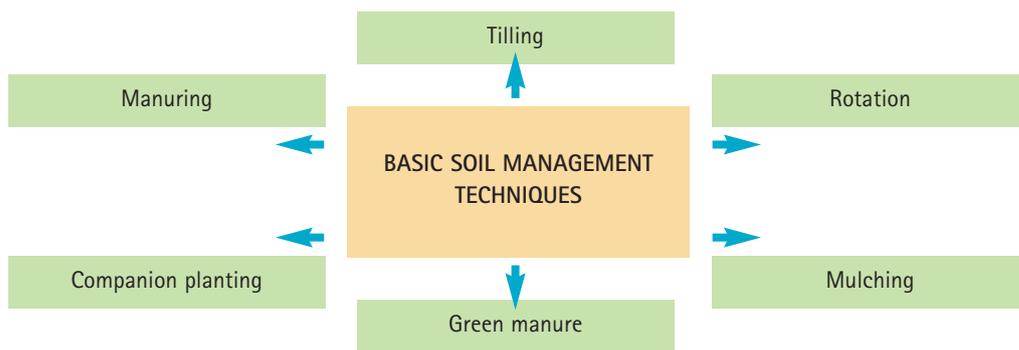


Figure 6. The evolution of the soil.

**b) Soil fertilisation.**

Fertility depends on the capacity to preserve life in time (ecological niche) and on soil balance (the greater

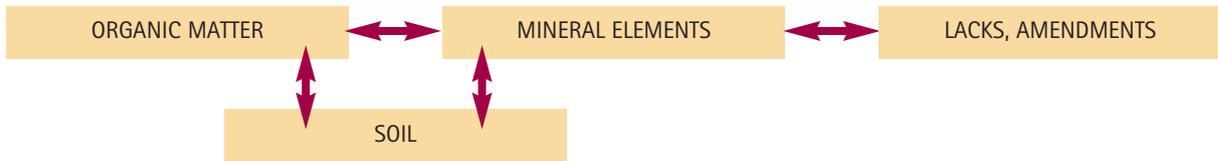
the diversity of living organs, the greater the quality and stability of the soil). It favours the proliferation of micro-organisms, the real protagonists of the soil.



Fertilisation is a powerful method to maintain the fertility of the soil. It consists of providing the nutrients that have been exhausted and at the same time maintaining the holding capacity so that plants can

absorb the nutrients whenever they need them. Moreover, it also helps maintaining soil structure.

Manuring consists of using organic matter (animal manure) and natural mineral elements.



**c) Composting.**

Compost is highly advisable for manuring. It is a stable substance that improves soil conditions and favours biodiversity. It may be used immediately by plants and has no polluting effects on aquifers.

**d) Green manure.**

Green manure is sown and reaped in order to add it to the same soil where it has been grown.

Green manure has several advantages:

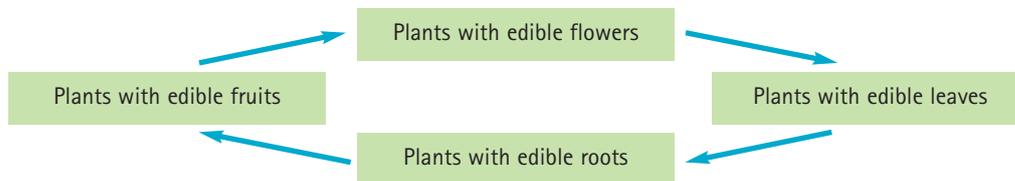
- It limits the proliferation of weeds as it occupies the soil.
- It increases the fertility of agrosystems as it provides organic matter and contributes to the proliferation of micro-organisms in the soil.
- It prevents the washing out of the nutrients fixed by plants.
- Its roots improve soil structure.
- They prevent soil erosion.
- If they are leguminous plants, they provide nitrogen to the soil.
- They stimulate the soil mineralising microflora, which will in its turn decompose organic matter.
- It provides nutrients for the next plants that will be grown.
- It improves the circulation of air and water in the soil.

Green manure is intended to have the following effects in the soil:

- Increase the nutrients in the soil.
- Improve the properties of the soil.
- Increase microbial activity.
- Cover the soil in seasons when no other crop can be grown.

### e) Rotations.

Crop rotation can be defined as the practices of growing a sequence of different types of crops in the same space for a given period of time.



#### Some advantages of crop rotation:

It improves humus reserves and the intake of nutrients.

It stimulates the activity of the micro-organisms of the soil.

It limits the growth of adventitious weeds, parasites and diseases.

It contributes to the diversity and balance of the system.

It allows for demanding crops and for non-demanding crops.

### f) Companion planting.

Companion planting in organic farming increases diversity, which is very important for crops. Diversity provides a balanced system: the more diverse, the more

balanced. Many studies show that companion planting provides better returns than monoculture farming, due to the joint action of a series of factors.

#### Advantages:

A better use of the soil and of water.

A greater soil protection, with less erosion.

The benefits of the microclimate that it creates.

A reduction in the risk of bad harvests.

Nutrient synergies.

An increase of the quality of production.

Less weed problems.

Less parasite problems.

An increase in the yield per hectare.

It may result in the better quality, aroma and taste of some crops.

#### Disadvantages:

There may be bad companion plants.

Negative influence of allelopathic secretions.

**g) Mulching.**

As we have previously mentioned, the soil is unstable and needs being protected. In order to do so, we should never leave the soil uncovered. Mulching allows us to protect it, and also serves other purposes.

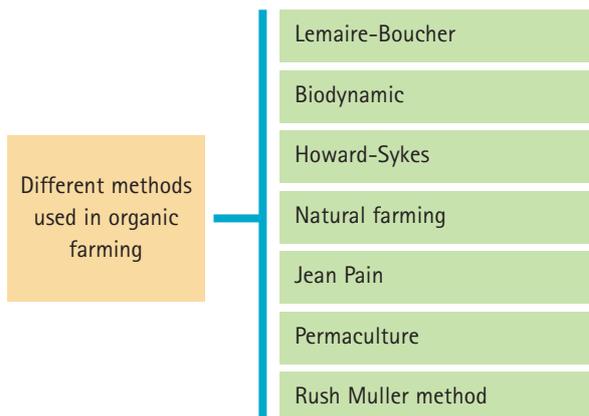


Figure 7. We mulch after watering the plants.

Mulching consists of covering the soil with organic material in order to:
Protect the land and the micro-organism from the rigours of the climate: sunburns, rain, sharp temperature changes... etc.
Feed micro-organisms living in the soil, as with the passing of time, the organic matter used ends up decomposing and working itself into the soil.
Prevent excessive evaporation and improve soil moisture conditions.
Weed control: Many weeds drown or never get to grow. Others may grow but weakened, and therefore are easily pulled up.
Improve the amount of humus and fertilizers. It depends on the type of material we use for mulching.
Increase biological activity due to the increase of the microbial population and of its activity.

**h) Working the soil.**

We will now describe several organic farming work methods:



• **LEMAIRE-BOUCHER METHOD**

Principles of the Lemaire - Boucher method
Removal of all toxic substances in the crops.
Conservation of microbial flora in the soil using humus.
Use of certain fertilising substances.
Covering of the soil, mainly with vegetable remains.
Use of companion planting and crop rotation.
Avoiding practices involving soil turning.

This method aims to achieve the self-sufficiency of the farmer, who produces the products he needs and no longer has to rely on external products.

This method seeks the balance between cultivated areas, and dedicates about the 45% of the farm to crops, the 35% to pastures and the 20% to forests.

The manuring systems used normally include two types of products with special properties:

- **Lithothamnium calcareum**, seaweed that is included in manure due to its high contents of magnesium and other fertilising microelements. It is also used as cattle feed and has anti-infective properties that protect it from Foot-and-mouth-disease, TB etc.
- **Aromatherapy**, that is, the use of essences and aromatic plants as disinfectant, healing and invigorating agents.

• **BIODYNAMIC METHOD**

Biodynamic agriculture focuses on processes rather than on substances.

This organic farming method was first used in Germany, Rudolf Steiner being its main promoter. It is based on the understanding the processes involving the life forces, life-creating forces, the origin of the materialisation of substances and the influence of stars on biological processes. It uses specific preparations with specific preparation processes and taking yearly cycles into account.

There are eight biodynamic preparations, numbered from 501 to 508, based mainly on vegetable matter but also on animal and mineral elements. The analysis indicates that these preparations are extremely rich in aerobic bacteria and microelements.

The method used by biodynamic agriculture consists of elaborating these preparations by linking agricultural cycles with those of nature and with the Star signs.

Farm tasks are connected with the astronomical calendar, which shows the influence of the moon as it moves into the different the star signs and transmit its energies, both positive and negative ones, to the soil and the plants.

These strengths allow crops to grow normally and help weed, diseases and pest control, which result on better products.

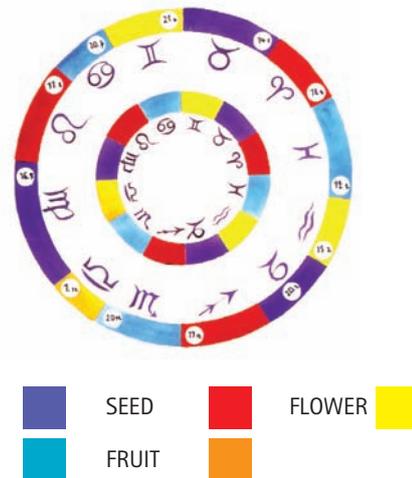


Figure 8. Biodynamic farming technique.

• **HOWARD-SYKES METHOD**

This method is the result of tens of years' work of Howard in the East Indies. It's also known as the Indore process due to the fact that it was tested in a region of East Indies.

It consists of maintaining the soil's fertility by producing humus from plant and animal waste.

**Biodynamic agriculture aims to:**

Exalt energies and natural life forces, such as soil fertility.

The quality of the product.

Human health is connected to the above.

The biodynamic preparations are obtained from certain medicinal or aromatic plants, often rich in volatile oils, and having an invigorating effect.

The techniques used may be summarised as follows:

- Companion planting, which stimulates crops, especially by including leguminous plants in the rotation.
- Maintaining soil layers by using tillage but not turning the soil.
- Manuring with manure from the farm.
- Incorporating organic matter into the soil in a continuous and balanced way.

The resulting humus has the following characteristics:

- It is composed of 55% carbon and 3 to 6% nitrogen (more than plants and animals themselves).
- It undergoes a constant transformation process, due to the micro-organisms that live in it.
- It contributes to the conservation of soil structure and to its water holding capacity, and it allows for the circulation of air.
- It prevents infections in plants and animals.

#### • NATURAL FARMING

This method was first used in the 1940's by the Japanese researcher Masanobu Fukuoka.

It works on the following principle: "Work with the land, not against it". This is why it is also called "do-nothing method".



Figure 9. Weeds protect the soil against erosion.

It is based on four different assumptions:

- No tilling.
- No weed control.
- No action against pests and diseases.
- No composting.

#### • JEAN PAIN METHOD

Jean Pain devised this method in the dry lands of Southern France.

It is based on making compost with undergrowth recently cut in order to keep the soil fertile. The resulting humus is very balanced and provides the nutrients that plants need.

This kind of humus is also suitable to improve the physical and chemical conditions of the soil.

The matter used in this composting process is natural and comes from the farm. For this type of compost to provide nutrients to plants and contribute to the improvement of the land, it must have a balanced proportion of carbonated and nitrogenated matter; the C:N ratio must evolve from initial values of about 33:1 to final values that may reach, when appropriate, 12:1.

When the mixture looks brownish, has been properly fragmented and smells like humus should, the compost is ready to use.

Apart from having an adequate C:N ratio, it is rich in bacteria and beneficial micro-organisms without any pathogens.

This technique yields very good results in the Mediterranean Basin, where there is a high desertification risk due to climate conditions and forest fires. Fertile soils allow plants to grow faster and with less health problems, as it has all the necessary nutrients and in a friendly environment.

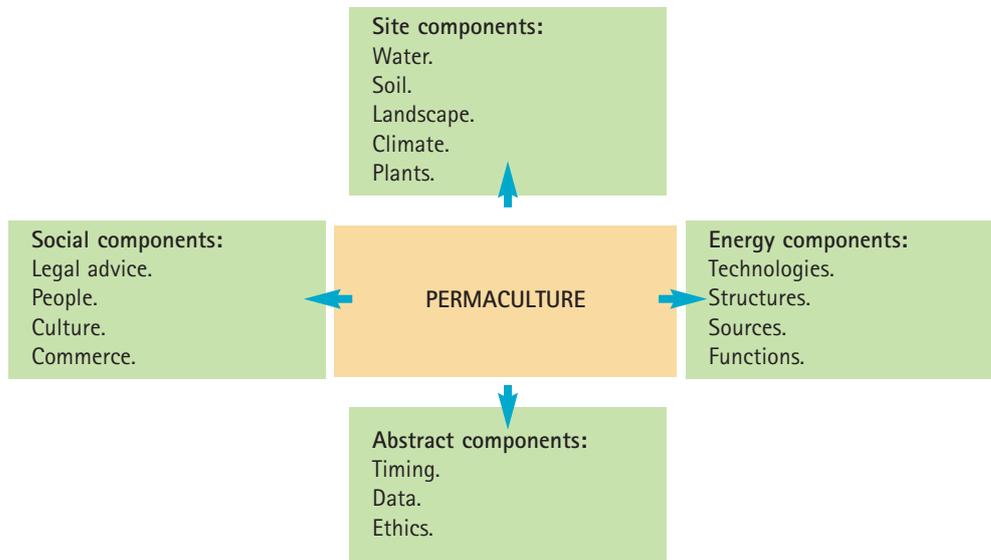
#### • PERMACULTURE METHOD

This method is also known as permanent agriculture. It was devised by Bill Mollison and David Holmgren in Australia.

It is a design for the creation of sustainable environments. Spaces are planned as if they were natural ecosystems. They work with plants,

animals, buildings and infrastructures. The method is based on the relationships that may be created among all these elements according to

their relative position in the landscape. This technique is based mainly in observing natural landscapes.



Source: Introduction to permaculture, 1998.

#### Principles of permaculture:

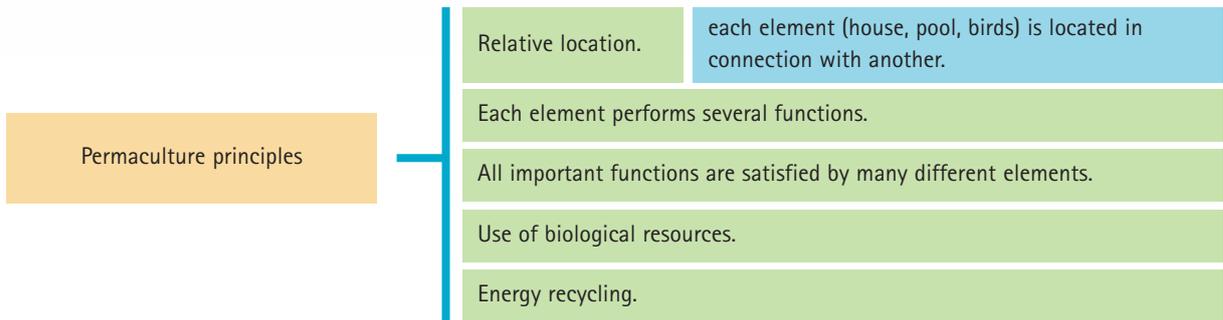
**Relative location:** One of the main key points in permaculture is the design, understood as a connection among things. When creating an element for the design (a house, a forest, a bush...etc) we must place in the right location if we want it to be efficient (for instance: the vegetable garden must be between the house and the pen, in this way, wastes from the garden can go to the pen and manure from the pen can go to the garden). Thus, we must remember that the needs of one element can be covered by other element of the system. The wastes generated by one element can be used by another element.

**Each element performs many functions:** Each element has to be chosen and located in a way that it fulfils as many functions as possible. A pond, for instance, can serve different purposes: watering, water supply for animals, aquaculture, fire control, water birds... etc.

**Each important function is supported by many elements:** Basic needs as water supply, food and energy must be satisfied in two or more different ways.

**Sustainable use of biological resources:** In permaculture, whenever it is possible, biological resources are used in order to save energy and to carry out farm tasks. There is a tendency to substitute non-biological resources with biological ones. Efficient energy planning. The work premises (greenhouse, pen, vegetable garden) used daily will be placed close together; the premises used only sporadically (orchard, pastures, forests) will be located further away. The golden rule in permaculture is first developing the nearby areas in the centre and once they are under control, expanding the borders.

**Energy recycling:** Communities managed with permaculture methods are independent from markets and distribution channels and guarantee a varied diet with all the required nutrients without diminishing quality or destroying the Earth.



• **RUSCH-MÜLLER METHOD OR SURFACE COMPOSTING**

This method consists of maintaining and stimulating the life of the soil. It is based on surface composting. In order to do this, the soil must be constantly covered by organic matter. Most often it is plant and animal waste that cover the surface instead of being buried. Thus, there is a continuous humus creating process which improves the nutrient reserves in the soil.

The soil is protected from heat in the summer, from cold in the winter, from wind and erosion and from the compression caused by torrential rain. It is like a coat for the soil, which is very sensitive to the rigours of the climate. Moreover, given that this protective layer is organic, it also provides nutrients to the symbiotic organisms in the soil and that take part in the process of transformation, destruction and reconstruction that should not be altered.

The main organisms involved in the process are:

**Macro-organisms**, that transport and mix different elements: insects, arachnids, myriapoda etc. feed from vegetables and after digesting them, they restore them to the natural cycle.

**Micro-organisms** of all sorts that take part in the transformation process, as:

**Nematodes**, these small worms are in millions in each square metre of soil.

**Surface algae**.

**Fungi** as actinomycetes, which degrade organic matter.

**Bacteria**, which can be found in millions per gram of soil. Among these bacteria, the most beneficial ones are the ones that can fix atmospheric nitrogen.

**Earthworms** are widely known and easy to see organisms that contribute to soil fertility. They play an important role in the ventilation of soil. They dig the land making galleries and contribute to the creation of the lumpy structure that characterises fertile soils.

**1.1.6. Biological control techniques.**

In organic farming parasite control does not rest on the use of products but on the use of techniques that aid the balance of the system and makes it more stable and improve the strength of plants. This requires an

adequate approach including aspects as balanced crop rotation, companion planting and organic manuring, as well as the use of resistant plants. It also implies cultivation, sowing, covering the soil, favouring the existence of natural predators of pests in general, etc.

Biological control techniques are based on prevention, so as to minimise problems, both in terms of quantity and intensity. The aim is to achieve a balanced biosystem:

Balance in physical terms, through the crop systems used.

Balanced in biological terms, through diversification and through biological control methods.

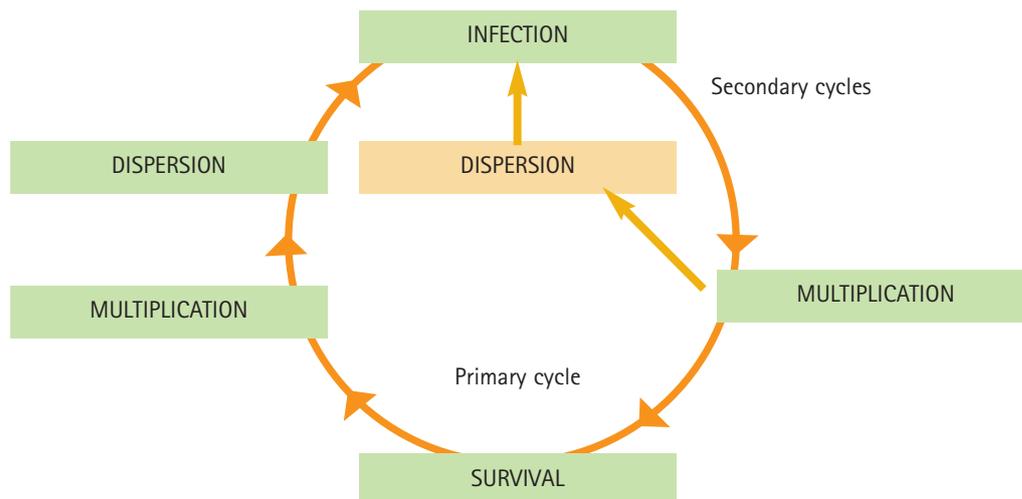
Balanced through the selection of resistant varieties of plants and invigorating substances.

#### a) Methods for fighting fungi.

Most plant diseases are caused by parasite fungi that feed from them. There are two stages in the life of parasite fungi: a vegetative stage in which they assimilate nutrients and a reproductive stage. However, both stages take place at the same time in some species.

As fungi and plants are concerned, there are two different stages:

- a stage in which there is no association between the plant and the fungus and they are independent from each other,
- and an associative stage in which they come into contact and the fungus invades the plant's tissue, causing the infection.



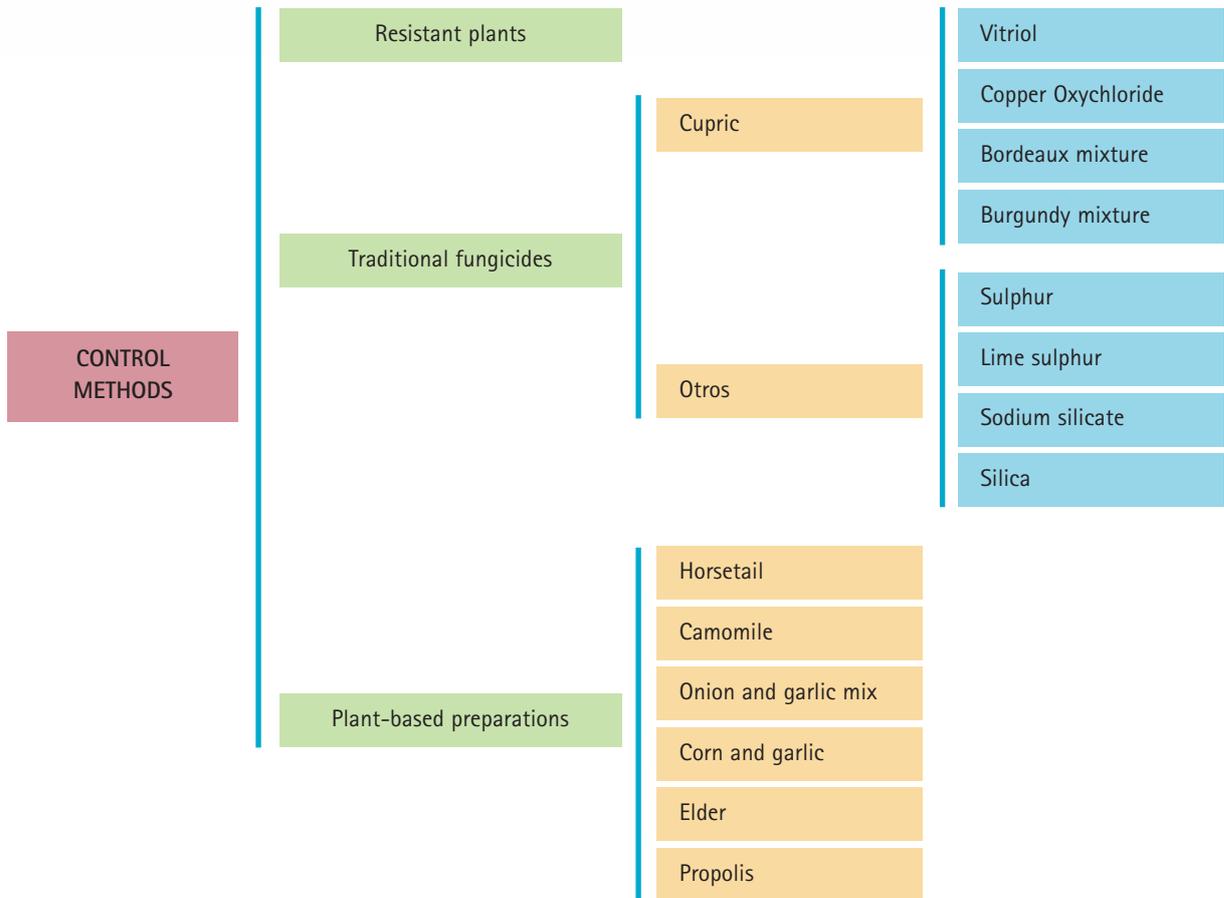
Pathogenic fungi cause infections due to four different mechanisms that may act jointly or separately:

Production and release of enzymes that damage the cell wall.

Production of substances that interfere with the metabolism or affect the normal structure of the protoplasm of vegetable cells.

Release of substances that interfere with the growth and evolution of the plant.

Interferences with the normal circulation of water, nutrients and metabolites.



**b) Pest control methods.**

For an animal species to be considered a pest, there needs to be an invasion from a large number of specimens from that species. A given species cannot be considered a pest if there are small groups with a few specimens that do not cause remarkable damages to crops. The animals that cause crop pests are mainly: insects, mites and nematodes, and to a lesser extent, certain molluscs (snails and slugs) birds (crows) and rodents (mice and moles).

The damages that a pest can cause depend on two main factors: the biotic potential of the parasite and resistance of the environment. The biotic potential is the capacity that a parasite has to multiply without any element blocking or diminishing their multiplication power.

The biotic potential depends on the parasite's multiplication speed and the existing gender proportion in each generation. The resistance of an environment in

a given ecosystem depends on several factors that diminish the multiplication rate of the parasite and hinder the growth of the parasitic population.



Figure 10. Some plants have beneficial properties.

To a greater or lesser extent, pests are connected to:

The environmental conditions that may favour or hinder the development of their biological cycle.

The degree of plant development, which makes it more or less attractive to pests.

The resistance of the plant, which normally depends on the release of repellent substances.

Crop frequency can cause the pest to settle in the farm or it may cause it to leave when the crop changes.

Pest control is based on methods that help reducing the damages caused by the insects.

There are several methods that may be implemented in order to fight plagues:

**Preventive method:** Intended to prevent the pest from invading the farm.

**Control method:** It is based on the reduction of parasitic populations, so as to prevent major damage.

**No action method:** Especially used with pests that do not provoke serious damages and live in balance with plants, causing very little harm to them.

Natural control or natural balance concerning pests is achieved when natural factors maintain the number of parasites in acceptable levels and they do not cause

any economic harm. When the natural factors are not enough to control a pest, direct action is needed once the situation has been assessed.

Direct action methods:

Physical methods:

Mechanical methods.  
Caloric method.  
Ultrasound.

Chemical stimuli:

Pheromones.  
With arousing effects.  
With repelling effects.

Biological methods:

Microbiological control.  
Bringing in predators or parasites affecting the plague.  
Use of biopreparations.  
Biofumigation.

Cultivation methods:

Choosing resistant strains.  
Manuring and tilling.  
Companion planting and crop rotation.

### c) Weed control.

The most common weeds are those that have best adapted to the crop cycles and farming tasks. In addition to this, they have some advantages over crops:

- They live in communities rather than in monocultures, which allows them to use efficiently all the resources available.
- They adapt to many different kinds of soils and climates, even to extreme conditions.
- Competition causes changes in the community and among specimens of the same species, which means that if we try to control a particular weed we may be helping other species to become dominant.
- They have very high genetic variation, which allows them to adapt to hostile conditions easily.
- Many weeds grow very fast and generate large amounts of seeds or perennial parts, which gives them a great capacity to regenerate.



Figure 11. Adventitious weeds play a role within the agrosystem.

- Often the seeds have organs that help their spreading and many remain fertile for long periods, even after being buried.
- Germination takes place in different stages, which makes it hard to destroy them at once.
- Generally speaking, they are more resistant to diseases, and therefore more fit to compete with highly selected crops.

Weed control methods are based on the control of several factors that help their spreading:

#### 1. Control of the spreading of seeds from weeds:

- An adequate use of organic fertilizers and slurry allows for the deactivation of the seed in the soil by raising the temperature.
- Mowing around plots prevents the contamination of the crops and the seedbed. Boundaries and borders around the plot must be cleaned.
- Irrigation water must be monitored as it may carry large amounts of seeds with it. Irrigation channels and ditches must be free from weeds.
- By performing all these tasks it is possible to stabilise and diminish the soil seed bank.

#### 2. Physical weed control methods:

The periods of time in which the existence of weeds cause a reduction in returns is critical. This is the right period for hoeing.

Weeds interfere with crops mainly due to the competition for light, space, water, air and nutrients, that is, the elements involved in the growth process.

The following chart describes the different physical methods that may be used in weed control, once they are already in the plot:

PHYSICAL METHODS	Manual & mechanical	Most common methods for all types of crop.
	Use of fire	Used in extensive cultivations and fodder crops.
	Mulching	Organic and vegetable remains can be used, as well as plastic.
	Heat methods	Localised burning, infrared radiation, microwave-based systems, o steam.
	Flooding	Especially used with rice.
	Cultivation methods	Several techniques are used both in intensive and extensive cultivation.

### 3. Crop diversification: rotations and companion planting.

The types of weeds we may get depend on the weather and the relationship between the characteristics of the soil and its use. The weed's adaptability to the environment is also important.

Periodic changes of plants, companion planting and mixed farming create positive synergies between the different types of plants. Thus, we can avoid competition for nutrients and favour mutual protection as one plant may release substances that keep off the parasites of the

other. Thus, one plant has a direct effect on the other thanks to the chemical compounds it produces and releases, to the washing off of leaves with rain, root exudation, the volatilisation of leaves, etc.

#### 1.2. Evolution in the use of the resource.

##### 1.2.1. Origins and development of Organic Farming.

Organic farming is a production technique that has been practiced since the beginning of the 20<sup>th</sup> century. Nevertheless, the techniques currently used in organic



Figure 12. Preserving genetic diversity is very important.

farming are based on an ideological model that reacts against problems and excesses caused by the intensification and industrialisation of agriculture and fishing, which threaten public health, the environment and society.

In the fifties, the main aim of European agriculture was to cope with the need for food and to improve self-sufficiency by increasing productivity.

By the end of the sixties, especially in the seventies, there is a general realization of the need to protect the environment.

Finally, in the eighties, once self-sufficient production had been achieved, and agricultural surplus started to cause problems, Europe became interested on organic production.

In the early nineties the process of official recognition of organic farming in several countries resulted in the approval of the Regulation (EEC) no. 2092/91 by the European Council.

This meant the creation of a Community framework for the regulation and setting up of standards that all organic foodstuff and products had to comply with in order to be considered and labelled as organic.

Thus, organic farming became officially recognised, and all products that were made in accordance with a given set of rules started to be defined as "organic". Regulation (CEE) no. 2092/91 is based on the promotion of production and on marketing control standards that had already been put forward by the relevant associations of organic farmers.

From 1992 onwards, with the CAP reform, the European Union started to foster organic farming through the agricultural and environmental policy framework.

### 1.2.2. Creation and implementation of Rules for Organic Production.

Organic rules do not define the quality standards affecting the final product but the production process.

At an international level, the most important organic rules are the basic rules set by the International

Federation of Organic Agriculture Movements. (I.F.O.A.M.) These rules are revised regularly so as to reflect the actual situation of organic farming worldwide. Apart from the minimum requirements, these rules describe the principles of organic agriculture and give advice on how to meet the requirements.

There are other organic criteria at private, national and international level.

The basic rules set by IFOAM are the framework for certification processes and for the control bodies around the world to be able to establish control and certification processes that may be used worldwide.

Local certification control can meet or even go beyond the basic principles of IFOAM and also observe the local specific conditions and include specific requirements.



Figure 13. Biological products must comply with the regulations.

At EU level, all foodstuff of vegetable or animal origin, whether processed or not, that comply with the premises of Regulation (CEE) no.2092/91, will be considered to be ecological, organic, biological, biodynamic or biological-dynamic.

The following products are liable to be defined as produced with organic production methods according to the European regulations on organic farming:

- Unprocessed agricultural crop products, animals and unprocessed animal products to the extent that organic farming requirements are met.
- Processed agricultural and animal products intended for human consumption composed essentially of one or more ingredients of plant or animal origin.
- Products intended for animal consumption, prepared feed and animal feeding composed according to the principles of organic farming.

Therefore a product makes reference to the organic production method when the labels, advertisements or marketing information indicates that the product, its ingredients or the raw materials used for animal feeding have been obtained according to the principles of organic farming.

The products authorised for the organic production system shall meet the following requirements:

They must be essential for the control of an organism or a particular disease when there are no other biological, physical alternatives or selection and cultivation alternatives available.

The conditions for its use must exclude any direct contact with seeds, vegetables, products of vegetable or animal origin or the products derived from them. Nevertheless, concerning perennial vegetables, direct contact is allowed except during the growth of edible parts, that is, fruits; provided that the application of the product does not imply direct or indirect presence of remains of the product in the edible parts of plants.

The use shall not have any unacceptable effect in the environment and shall not pollute it.

As for the minerals and micro elements used in animal feeding, other elements may be used as a complement to these products, provided they are natural or synthetic in imitation of the natural products.

As animal production is concerned, Member States may apply more restrictive regulations to livestock and

animal production within their territories, provided these regulations comply with Community regulations and do not ban or restrict the marketing of other animals and products of animal origin that meet the requirements.

The importation and marketing of organic products from third countries is subject to the evaluation on the part of the Commission in order to ensure that they meet equivalent standards.

If a third country has regulations that can be considered equivalent to European ones, it enters a list of authorised countries and its products can be imported and circulated within the EU conveniently accompanied by a control certificate by the competent institutions in that third country. Currently authorised third countries are Argentina, Australia, Israel and Switzerland.

Since December 2005, the legal framework that entered into force in 1991 is being substituted by new regulations. With these new regulations that are being devised, the European Commission intends to improve quality, both for consumers and farmers, by issuing more simple rules that allow for some more flexibility and that



Figure 14. The products of certain crops are exported.

take into consideration climate differences among the regions and market conditions. They also intend to provide solutions for problems that have been detected when using Regulation 2092/91.

### 1.2.3. Evolution in the processing and marketing of organic products: Certification and organic labelling.

Organic agriculture is the response to the actual need to regenerate the environment and to obtain high quality, healthy and non-polluted food.

At that point, small producers start to realise how important organic agriculture will be in the future, and a new market is thus created.

The processing industry connected with organic farming is getting more and more important in the production of healthy and nutritious products.



Figure 15. Certification guarantees the quality of the product.

The organic processing industry does not use any synthetic additives in any moment of the process. The organic processing industry is at the service of consumers and it cooperates with farmers. Not too big, not too far away from producers or consumers, not too sophisticated. Designed to recycle and not to pollute.

At first, there were no specific regulations and producers and consumers met through different means:

producers' associations, cooperatives, consumers' associations etc.

Then the organic certification system was created to ensure consumers that food has been produced according to organic standards. The certification of organic products was initially carried out by private entities that took into consideration a series of specifications that they had established.

When the organic production and marketing sectors grew bigger, some problems concerning frauds and different ways of understanding the meaning of organic arose.

In order to avoid frauds and to protect the consumers' interests, a set of general regulations had to be established.

Nowadays the organic certification is issued both by public entities and private certified entities registered to EN-45011.

In both cases, organic certification is understood as a quality control system based on the fulfilment of rules, inspections, certification and accreditation of products.

- Organic certification is intended to restore the confidence of consumers and organic farmers.
- Organic rules are minimum requirements for organic production.
- The inspections of organic farms comprise all farming procedures, and lab tests are conducted, among other measures.



Figure 16. Soil management is one of the basic aspects of organic farming.

- Endogenous certification programmes are important for the development of home organic markets, and they also reduce inspection expenses.

In order to demonstrate that a given product has been certified as organic, certification labels and marks are used. These labels are registered and kept so that only certified producers and processors can use them. Registered producers and processors gain the right to use the labels by signing a contract. Such permission is a confirmation that the product has actually been produced according to specific organic rules.

Certification labels and marks enable consumers to easily recognise reliable organic products. Thus, these labels are important marketing elements that allow for higher prices than those of ordinary products.

## 2. IMPORTANCE AND IMPACT OF THE RESOURCE

### 2.1. Current situation and importance of the resource.

#### 2.1.1. Current situation of conventional farming. Analysis of farming areas.

The so-called conventional agriculture is less and less popular and the number of farmers that practice it is constantly decreasing.

Nowadays farming areas are facing the following social and economic circumstances, according to the SWOT analysis: Strengths, Weaknesses, Opportunities and Threats.

#### Weaknesses:

Population loss, scattering and ageing, which results in the progressive abandonment of rural areas.

Little economic diversification and low innovation capacity.

Failure to adapt to the changes that are taking place in the rural areas.

Little entrepreneurial spirit.

Difficulties in the professionalisation of rural economic activities in farming and agri-food sectors.

Insufficient use of natural resources as traditional agriculture, landscape, traditions...etc, and lack of the necessary resources for the processing of their own products.

#### Threats:

The backwardness in alternative development instruments such as the industrial or traditional processing of farming products.

Insufficient development of networks of associations and of a support scheme that encourages the production and managerial capacity and that fosters new development and entrepreneurial initiatives at local level.

The training offer does not answer the needs of rural areas and does not make an extensive use of NICT.

Loose application of quality criteria of activities concerning agri-food, the environment and tourism.

**Strengths:**

- There are high quality agri-food products providing an added value (agricultural products, cattle, chestnuts, fungi, crafts etc.)
- There is an outstanding historical, cultural and natural heritage with a great potential for tourism.
- The increasing diversification of agricultural activities thanks to endogenous resources (fungi).
- The organisation of social partners thanks to the Local Action Groups intended to promote local entrepreneurial initiatives.

**Opportunities:**

- Agriculture understood as the keystone of the agri-food sector. Increasing the added value of agricultural products by processing and canning them locally.
- Greater capacity to attract tourist interested in rural tourism, sports, culture and nature, thanks to a more organised and integrated offer that cover the increase in leisure time and the demand of quality tourism.

Many farmers worldwide are changing the way they manage their farms and shifting to organic farming and livestock production.

Organic farming is a hope for the future for many rural areas. The organic market is growing at a rate of 25% per year. Thus it can be considered an instrument to:

- Improve employment creation and vocational integration.
- Improve the social and economic conditions in rural areas.
- Fix population in those areas where it is decreasing.

This agricultural method improves the returns of farms significantly.

It also diminishes the environmental impact and improves the quality of the production.

**2.1.2. Current situation of organic farming.**

In the last few years, organic farming has developed greatly. Nowadays it is being taken up and regulated in more than 120 countries. There are more than 31 million hectares of organic crops scattered among the five continents and distributed in more than 600,000 farms.

As for the geographical distribution of certified organic production, according to BIOFACH, the largest amount of certified crops (39%) corresponds to Oceania (mainly to Australian pastures); followed by Europe (23%), Latin America (19%), Asia (9%), North America (7%) and finally Africa (3%).

*"The World of Organic Agriculture. Statistics & Emerging Trends 2006"* is the yearly study by IFOAM (International Federation of Organic Agriculture Movements) and FiBL (Research Institute of Organic



Figure 17. Organic farming encourages the study and research of agrosystems.

Agriculture). This report gathers information on the surface and number of organic farms etc. that currently exist in the world.

This study estimates that the worldwide returns of organic products amount to 27.5 billion euro.

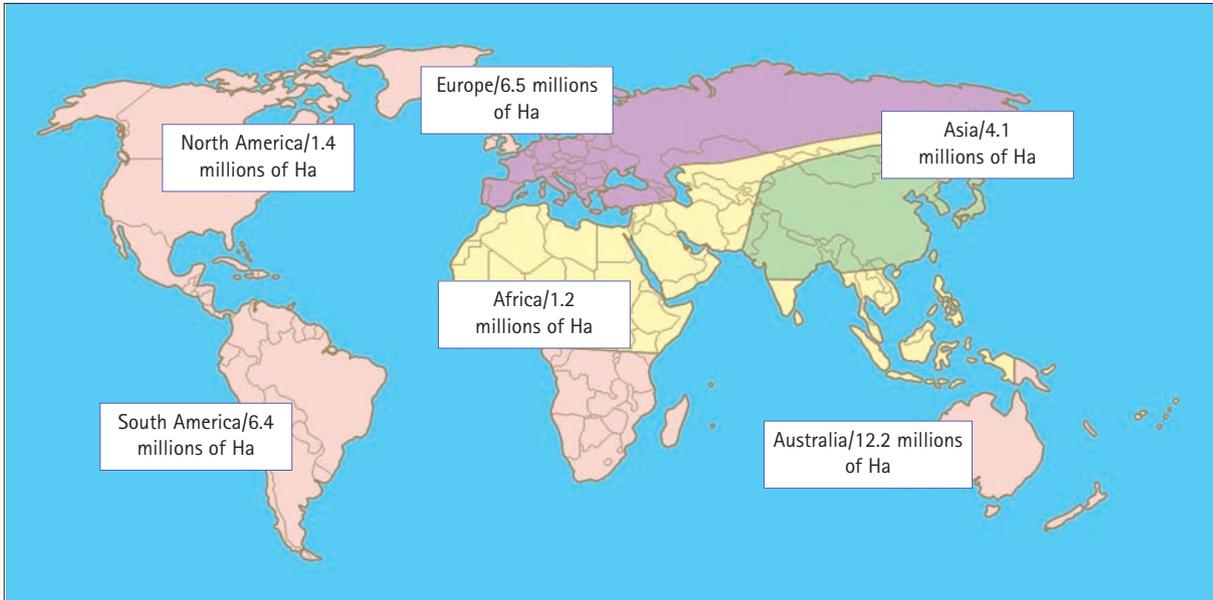


Figure 18. Worldwide surface.  
Source: SOEL-Survey, February 2005.

Apart from the surface and number of farms known, the survey assumes that there is an equivalent amount of

organic production that is not certified and that would increase the total figures, especially in Africa and Asia.

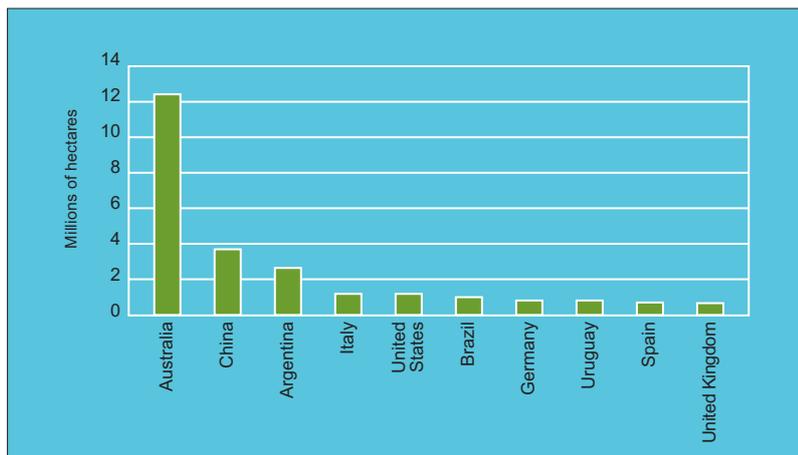


Figure 19. Production in some countries.  
Source: IFOAM-FiBL Survey, 2006.

### 2.1.3. Current situation of Organic Farming in the European context.

From the beginning of the 90's, organic production has evolved fast in most European countries, as a result of the common legal framework and the aid schemes that have encouraged the conversion of many farms.

In 1985, the amount of land devoted to organic farming in Europe amounted to 100,000 hectares distributed in some 6,000 farms.

In 2004, there were 6,500.000 hectares of organic crops in Europe, distributed in 167,000 farms, which represents the 3.5% of the total agricultural area (UAA: Usable Agricultural Area).

Nowadays there are big differences in the way Member States support organic farming. Therefore the situation varies a lot between countries: Austria, Denmark and Italy are in the lead in terms of surface cultivated according to organic farming principles. France, Ireland and Greece on the contrary are well behind. In Germany, for instance, 80% of baby food is organic. In the region of Alto Adige, in the North of Italy, organic fruit growing (apples and vines) represent the 60% of the land and 50% of producers practice it.

#### a) EU support to organic production.

In 1992 the agricultural policy of the European Union underwent a reform that brought about the

inclusion of environmental issues and funding measures. Thus new aid schemes for organic farming were provided for and included in the new environmental programmes.

These environmental programmes consisted on 5-year contracts between farmers and the administration, according to which farmers would commit to implement a series of agri-environmental practices in their farms, in return for a bonus that would compensate the decrease of returns resulting from the changes implemented. Aids for organic production were included within this scheme.

Agri-environmental schemes have boosted the development of the organic sector, especially in those countries that adopted these schemes already in 1992, in a yearly basis and using the maximum amounts made provision for in the European regulations. These measures have also been very effective when combined with an efficient marketing of organic products.

#### b) European Action Plan and new proposal of European organic farming framework.

In order to promote organic markets and products a working paper, which includes a context analysis and a description of the proposal, has been created and a European Action Plan has been adopted.

The Action Plan lays down 21 measures intended to improve the quality, efficiency, transparency and



Figure 20. The number of organic farmers increases every year.



Figure 21. Young farmers are interested in this type of production.

confidence of consumers. This Action Plan is the basis for the evolution expected in the organic markets in the next few years.

The 21 measures are included in the following three main axes:

- Information-led development of the organic food market by increasing consumer awareness.
- Making public support for organic farming more effective.

- Improving and reinforcing of the Community's organic farming standards, import and inspection requirements (trade in organic products is hampered by widely differing standards).

Then, in February 2005, the plan was reviewed and the European Parliament issued a report questioning some aspects:

**Conclusions: Making organic farming the spearhead of sustainable agriculture, instead of a sectoral niche with limited aims.**

"This European Action Plan has been long awaited, and the least one can say about it is that the disappointment is commensurate with the wait. The plan is notable for a distinct absence of practical measures, and still more of binding ones, and, above all, a total lack of ambition"

"It illustrates quite well the European Commission's mixed message on the subject of organic farming. On the one hand, it never stops praising the virtues of this type of farming, but on the other it takes no concrete steps to promote its development, while the organisation of the first pillar of the CAP also continues to be somewhat at odds with the organic approach."

So, in spite of some interesting ideas such as promoting the use of organic food in public canteens and the need to harmonise specifications, in absence of adequate financial and human resources and of any kind of timetable, what will be the real impact of most of these 21 actions?

The texts in the chart above correspond to paragraphs from: *Report "on the European Action Plan for organic food and farming"*; intended to review the Action Plan.

Organic production still has to overcome many obstacles to prevail, especially in connection with the marketing and distribution channels, which are the weakest points in the organic agri-food system. There is a need for political commitment in order to meet the expectations of consumers and producers.

## 2.2. Results and impact of the resource.

### • PILOT EXPERIENCES

Pilot experiences carried out in the scope of the transnational cooperation of several European LEONARDO DA VINCI projects: The projects "IRIS" and "ECO-AGRO" have achieved a great impact in the fields

of the organic production sector where they have been working. Some of these impacts are:

- a) Cooperation among entities from the countries that have taken part in the projects, with the aim



Figure 22. In organic farming waste products are recycled.

to establish more stable and durable links between them. This has resulted in joint activities, technological exchanges, technical advising, joint promotion of products, etc.

- b) **Involvement of different social partners, SMEs, local action groups, local entities, associations, trade unions, the project's beneficiary groups, etc.** throughout the activities carried out in the scope of the project.

They have also been involved in other initiatives as information activities, awareness raising and dissemination of results in all the territories covered by the partnership.

- c) **After the end of the projects, new work tools have been devised, and there have been new common experiences and "pilot centres"** (pilot experimental enterprises, cultivation and processing of products).

The dissemination of results has resulted in a great impact among the professionals and institutions of the organic production sector. The book "Agricultura Ecológica: Manual y Guía Didáctica" ("Organic Farming: Manual and didactic Guide") has led to the implementation specific actions to improve the phytosanitary conditions of crops in some regions.

The partners have conducted several courses on organic farming techniques, which have been very well received by the local population in the rural areas where they were taught.

In addition to this, the project included seminars intended to provide information to the general public.

The main target groups were young people, unemployed people, women and the general public.

These activities have been useful for the dissemination of the organic approach as a New Source of Employment that makes a sustainable use of the natural resources available.

Awareness raising activities have been very successful and led to some self-employment initiatives.

Several organic farms have been set up in the areas where the training initiatives had taken place.

Self-employment initiatives were also encouraged by training actions (talks, seminars and workshops).

- c) **Creation of several organic farms and organic farmers' associations.** Thus, intermediaries can be avoided and product prices can be improved.

These initiatives are also influencing production directly, and as a result they are having an impact in the economy of many people, as they are getting an extra income thanks to organic farming.

- d) **Creation of small processing enterprises.**

New jobs have been created as a result of these experiences in many of the spheres of activity covered, although, in some cases, employment creation is a difficult thing to measure.

### 3. USE OF THE RESOURCE AS AN INSTRUMENT FOR RURAL DEVELOPMENT.

#### 3.1. Prospects and conditions needed for development.

Organic farming provides for economically feasible production models that combine economic growth and human development, with no environmental damage.

Organic farming production models are environmentally friendly and socially sensitive. This approach does not only focus on production, but also on the biological sustainability of the production system. It seeks a balance between needs, factors of production, environmental concerns and the quality of life of those that live on agriculture.

Thus, organic farming can be considered as an instrument for rural development.

The agri-environmental management seeks the balance between production and conservation through measures based on the following principles:

Reducing the use of energy and of the resource and regulate the use of producer goods in general.

Reducing the loss of nutrients, by reducing the washing out, leaching and erosion. This approach also aids the recycling of nutrients by using leguminous plants, organic fertilizers, companion planting and crop rotation.

Promoting local production of foodstuff, which adapt to the natural, social and economic context.

Producing only the amounts needed, and preserving natural resources.

Reducing costs and increasing returns and economical feasibility of medium to small agrosystems.

High quality production obtained using organic methods implies having specific knowledge of the local ecosystem. Organic production implies the diversification of rural economy. In addition to this, it

encourages self-sufficiency at local level, as it is connected to the local context and favours the stability of the rural population that lives on agriculture.

#### Organic farming as an instrument for Rural Development:

It improves the standard of living of rural communities.

It allows nature conservation thanks to sustainable management of natural resources.

It increases the value of the products in the production areas and in nearby areas.

It develops a market with a large number of potential users.

It improves the local business networks and the economic situation.

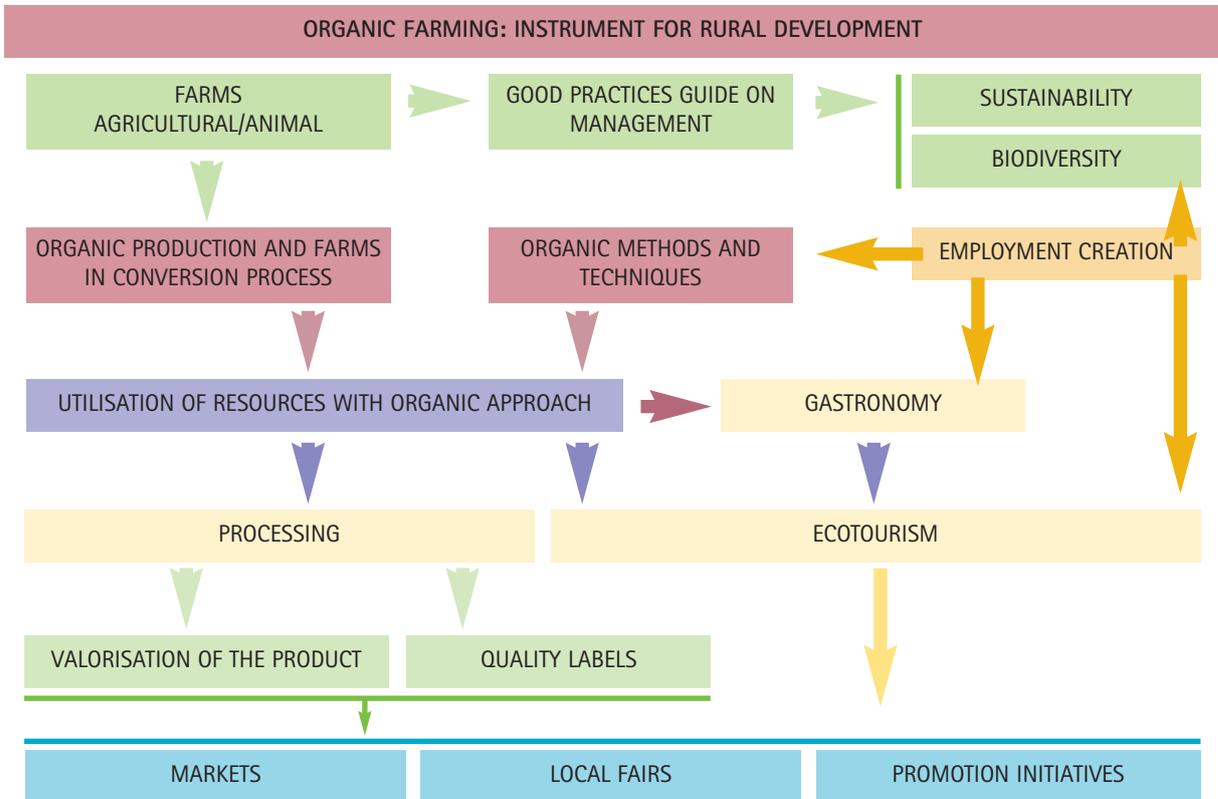
The need to find new agricultural management options, more in tune with sustainability and move away from the paradigm of the "Green Revolution" that praised intensive farming, is nowadays an issue for debate. Agroecology brought about the shift to the new paradigm. Agroecology is the science that provides the theoretical basis and the techniques used by Organic Farming.

The main goal is to find new approaches that foster sustainable agriculture, nature conservation and Rural Development.

Organic farming is committed to provide economically feasible product models liable to increase

economic growth without causing environmental damage. In addition to this, these new models are more socially fair, as they imply a more balanced distribution of assets, skills and opportunities. These models are also fairer in terms of generational equity; as a sustainable use of natural resources enables future generations to use them.

In addition to this, organic farming is the driving force for rural development, as it promotes the survival of agriculture as a profitable economic activity in deprived rural areas, and articulates diverse local development models, being the main instrument for the sustainable development of rural areas.



In order to support economic and rural development organic farming activities must make a sensible utilisation of natural resources, and a sound distribution of land. They must also encourage other complementary activities, so as to support local cultural identity too.

### 3.2. Employment creation potential of the resource.

#### 3.2.1. The New Sources of Employment in the organic sector.

The New Sources of Employment connected with sustainable processing of ORGANIC PRODUCTS are to be found in the following sectors:



### a) Farming sector.

Organic farming is an opportunity for family-run farms to continue to exist in spite of factory farming.

#### Difficulties in the production stage:

- Producers lack the adequate training.
- Lack of internal demand (home market).
- Agri-environmental schemes: insufficient funding.
- An increase in costs due to the lower yields and to the need to master the most difficult techniques, as well as the greater sensitivity to climate changes, more extensive breeding etc.

#### Employment creation potential:

- Agricultural activity based on organic farming techniques.
- Agricultural activity based on disease, pest and weed control.
- Advice on organic food production.

#### ADVICE AREAS CONCERNING ORGANIC PRODUCTION

##### Plant production

- Conversion.
- Rotations.
- Nutrient balance of the soil.
- Green manure.
- Composting methods.
- Weed control strategies.
- Control and management of diseases.
- Medicinal plants.
- Multiannual crops.

##### Animal production

- Appropriate feed so as to obtain good carcass quality.
- Animal disease control and prevention.
- Fodder: Advice will lead to better quality and lower costs.
- Autochthonous breeds. Production.
- Authorized food additives.
- Preparation of diets that suit local resources, especially growing and fattening diets.

### b) Corporate and agri-food sectors.

#### • PROCESSING INDUSTRY AND MARKETING OF ORGANIC PRODUCTS

#### Difficulties in the processing stage:

- Few food-processing enterprises use organic products. There are not enough meat freezing and meat processing industries, and especially not enough slaughterhouses (in particular, poultry slaughterhouses) using organic methods, as they have to meet very strict requirements and therefore it is not profitable to use organic processing methods, especially for small consignments.
- Processing SMES must comply with environmental regulations.
- Organic production processes involve some extra costs. The main factors causing the increase of costs are:
  - Raw material is more expensive, as production costs increase too, and also due to the small size of consignments processed and marketed.
  - The use of technologies that choose quality over profitability.
  - Mixed industries (those that have two production processes: the conventional one and the organic one) need to invest in specific production lines or else to switch between organic and ordinary methods. In both cases, there are additional costs implied.
  - It implies paying the fees of the control and certification bodies (according to turnover). Many people concerned criticise this aspect and consider that it contradicts the environmental benefits of organic farming.

#### Employment creation potential:

The organic processing industry is very diverse and has very different features and problems. There are some enterprises that simply can and label foodstuff made with one or more animal or vegetable components, intended for human

consumption. Others produce feed intended for animal consumption.

Agri-food enterprises may produce organic products exclusively, that is, only process certified products.

They may also be mixed, if they produce conventional products too, provided they meet the requirements established by the regulations on the separation in time and/or space of the two processes.

Small local processing, canning and marketing industries that provide an added value to the product and use different market channels are liable to create employment.

These small enterprises are liable to create a small network of enterprises that improve local economy and create employment. Thus, rural

areas may become more dynamic and allow younger people to stay in them.

The following chart shows the different types of processing industries, according to the EU classification:



Figure 23. Agriculture and cattle breeding are complementary activities.

#### 1. Industries that produce products composed of a single ingredient of plant origin.

- Handling, canning and processing of crops.
- Handling, processing and canning of dried fruits.
- Production and bottling of wines, cavas and sparkling wines.
- Handling and canning of fruits and vegetables.
- Production and bottling of oils and fats.
- Production of cider and other alcoholic drinks,.... etc.

#### 2. Products composed of more than one ingredient of plant origin and/or of secondary processing.

- Production of food preparations.
- Production of homogenised food preparations and dietetic food preparations.
- Manufacturers of Cocoa and chocolate products.
- Manufacturers of bread and pastry.

#### 3. Products of animal origin.

- Milk, cheese and dairy products.
- Bee products.
- Eggs.
- Meat (chicken, cow, lamb, etc.)

#### 4. Animal feed.

- feeding stuffs.
- compound feeding stuffs.

Classification of processing industries according to UE regulations.

Source: "Libro Blanco de la Producción Agroalimentaria Ecológica en Cataluña"

**Products composed of a single ingredient of plant origin:** olives, cereals and vine growing products. Most processing industries are included in this category: farming co-ops, wine cellars and mills.

**Products composed of more than one ingredient of plant origin and/or of secondary processing:** this category includes all products used in vegetarian diets, as soy or wheat-derived products, as tofu, seitan, etc.

The industries in this category sell a wide range of products to supermarkets and small fair trade and health food shops, as well as vegetarian shops.

**Products of animal origin:** Organic meat production requires slaughterhouses and quartering plants to be certified as ecological.

It makes it easier to carry out the specific control of organic production and it also helps small slaughterhouses separate organic and non-organic production in time.

Nowadays it is still not profitable for big slaughterhouses to have specific production lines for organic products.

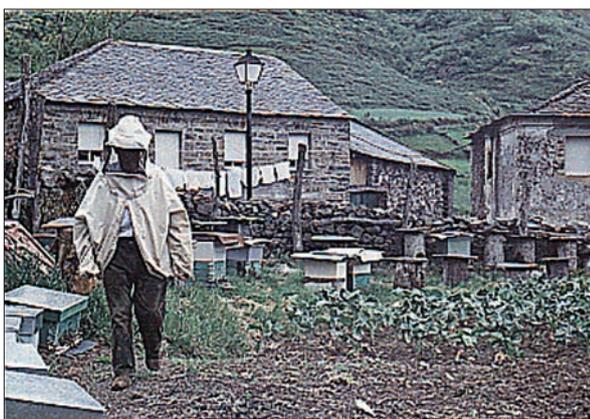


Figure 24. The diversification of production is important.

**Animal feed:** enterprises that produce feeding stuffs.

Eastern European Countries that have entered the EU in the last enlargement can produce animal feed at lower prices than the rest of member states.

#### • SHOPS AND MARKETS FOR ORGANIC PRODUCTS

The restaurant industry is a new challenge for organic food. A wide range of different possibilities exist: Local markets, restaurants, hotels, rural tourism centres, shops and small stores, distribution companies, gourmet food stores, large superstores, fairs, etc.

**Difficulties in the distribution stage:**

- Consumers have difficulties to find organic products (there are only few small shops that sell them, most of the products can only be found in large superstores).
- It is a vicious circle: the lack of supply hinders consumption, and no consumption prevents supply from growing.

**Employment creation potential:**

There is more and more acceptance and demand of organic products. Consumers are becoming aware of the benefits of organic food:

- Restaurants with organic food menus.
- Organic catering addressed to the general public, canteens, school cafeterias and public centres as hospitals.
- Small shops and small superstores specialised in health food and gourmet food.
- Supermarkets.
- Small-scale, local marketing: fairs, local markets, etc.

The greatest challenge of organic products marketing is the need to harmonise ideological components and competition, as these products have to compete with the rest.

There are several stages involved in the process of adaptation and creation of new marketing channels:

Identifying specific market supply and demand needs.

Becoming acquainted with market characteristics.

Providing the conditions required for the marketing of the product.

Implementing of actions devised.

Following up of the process.

The following aspects must also be taken into account during the marketing process:

- The type of market that we want to enter according to production capability and product diversity throughout the year. An adequate strategy is important. It must take into account that normally the greater the effort, the higher the price. It is advisable to focus on nearby markets. Local markets allow for lower transport costs. In addition to this, it is easier to get to know it thoroughly and to have a positive influence on consumers, as

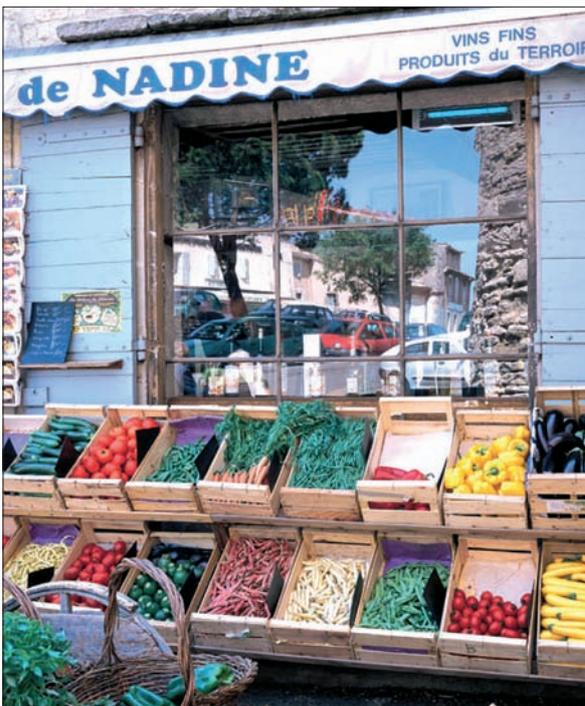


Figure 25. Organic market.

products can be easily advertised. Once local markets become saturated, it is the moment to spread to more distant markets, providing we still can control the situation. Nearby markets are always more convenient for producers, even if initially there is no demand at all.

- Consumers must be informed of the advantages of organic food, both as regards quality, health and environmental protection:
  - Organic food does not contain toxic products.
  - It protects the health of producers.
  - It prevents soil erosion and makes a sustainable use of water.
  - It helps small producers.
  - Food looks and tastes better.
- Organic products must meet several requirements in order to appeal consumers: quality, design, price, canning, labelling, service, image. They must compete with conventional products at all levels.
- The price of organic products is always slightly higher (between 10 and 15%) due to the higher quality and production expenses. This should not be an obstacle for the general consumers to buy them. It is difficult to tell organic products from conventional ones; consumers need information in order to be able to compare them.

- **Supply diversity.** In general, consumers look for offers when they buy regular products (vegetables, fruit, rice, potatoes, eggs, dairy products). In order to provide enough variety of products, organic farmers should join together.
- **Another option is having a group of consumers that "adopt" a given farmer,** which allows for a constant and diverse production that the group commits to buy.
- **Work with other organic farmers.** Often producers have to face some problems when they start selling their products to supermarkets, and sell specific products instead of providing a group of them. In such situations, it is advisable to collaborate with other organic food producers.



Figure 26. Workflow is planned beforehand.

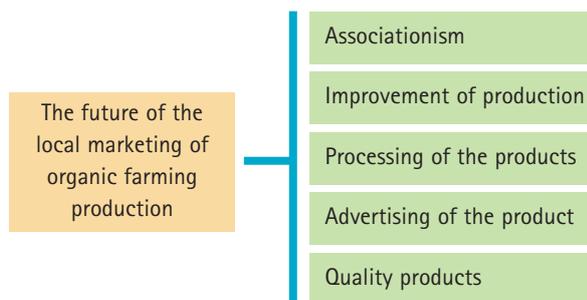
- **Distribution** is important in order to allow consumers to access products that maintain all the characteristics that make them more attractive than the rest, which gives them a chance to compete with conventional products.

Accessibility may be a major problem; if consumers cannot find a product regularly, they stop buying them.

- **Advertising** has an important role. Products must be advertised in such a way that their special characteristics are explained in a clear and understandable way.

This important information must include the benefits of consuming these products instead of any others.

- Use of organic food in organic food menus.
- Encourage the creation of small processing industries, which allow for the diversification of the production.
- Compete with producers from other areas. In order to do this, the strategy must be based mainly on quality. Quality is the distinguishing element. Quality must be present both in the production and the processing stages.



### c) Ecotourism and environmental sectors.

#### Employment creation potential:

- Activities connected with the environment and the so-called green tourism.
- Organic farming workshops.
- Ecological excursions that promote craftsman food. Courses, workshops and visits to the organic food artisans.
- Promotion of organic food in country lodges and rural hotels.

Organic production can become part of the tourist sector. Thus, typical products and organic products can be promoted as high quality, exceptional products that are an expression of the area and its culture.

- Promotion of craftsman food.
- Create a link between *quality/territory* and *regional products*. Thus, gastronomy, food education and respect for the environment are promoted.
- Upholding and restoring traditional farming activities including workshops as the following in tourist amenities:
  - Jams and tinned fruits;
  - Spirits and liquors;
  - Pickles, pickled meat and salted meat and fish;
  - Cheese and cottage cheese;
  - Honey sweets and herbs sweets;
  - Salt pork and delicatessen meats;
  - Pastries and fritters;
  - Ice creams, sorbets and iced drinks;
  - Products made with medicinal and aromatic herbs;

### 3.2.2. Emerging professions.

Organic production is a production system that implies adopting methods that are different from the ones used in conventional agriculture.

Organic farmers do not need recipes, but the training required to adapt the principles of organic production to their own specific circumstances.

In rural areas there are several groups that need qualification and training in order to improve their professional activity in the organic sector and thus encourage self-employment.

There is a strong need for trained specialists that cope with the demand of agroecological technologies

and techniques; there is a need for people that inform farmers on this production model. There is an increase in the number of young PAE member farmers (Producción Agroalimentaria Ecológica; Organic Agri-food production), which presumably implies that there will be a growing interest on this type of training.



Figure 27. Terrace configuration.

- **TRAINING OFFER IN ORGANIC PRODUCTION:  
SPECIALIST IN ORGANIC FARMING**

There are several options:

- Organic horticultural production.
- Fruit growing, and extensive production of cereal and other crops.
- Organic cattle breeding.
- Organic beekeeping.

- Large-scale organic production.
- Organic vegetables planting under plastic.
- Organic ornamental flowers.
- Organic gardening.
- Specialist in disease, pest and weed control in organic production.

#### SPECIALIST IN ORGANIC PRODUCT PROCESSING

Addressed to organic processing and marketing enterprises.

#### ORGANIC CATERING SPECIALIST

Intended for the training of specialised kitchen staff that can prepare organic menus.

#### ENVIRONMENTAL SPECIALIST

Intended to train specific staff for environmental activities in the scope of green tourism, that can include the promotion of organic farming among their activities.

## CHESTNUT TREES

### 1. GENERAL DESCRIPTION.

#### 1.1. Description of the resource.

##### 1.1.1. Origins.

Chestnut trees have existed for more than forty million years. Since men stopped being hunters and became farmers, chestnut trees have been highly valued for their fruits.

Some archaeological remains found in ancient settlements in Southern Europe dating from Roman times give evidence of the importance that Chestnut trees (*Castanea sativa Miller*) had in the life and primitive economy of the inhabitants of these areas already 20 centuries ago. Before that time it was already an important element in the landscape, but it was in the times of the Romans when it started being grown as a fruit tree.



Figure 1. Chestnut trees have always been connected with the life of man.

Chestnut trees have always played an important role in the survival of wild fauna.

Many animals feed on chestnuts during the long winter periods. Many bird species find shelter under its leafy branches, and its dead leaves allow for many small animals to survive.

#### 1.1.2. Description of the resource *Castanea sativa* Mill.

Chestnuts are both fruit trees and forest trees, of about 20-30 m. high. They have hemispherical crowns and grow fast, especially when they are young.

Leaves are deciduous, simple, alternate and with a short petiole of 3-5 cm wide and 10-15 cm to 25 cm long. They are lanceolate and slightly coriaceous (hard), deep-dented and serrated, with a regular pinnate nerve. Leaf fall takes place at the end of November or earlier if there are frosts. The flowering period takes place in May-June. It is a monoecious species, that is, there are male flowers and female flowers in the same plant. Male flowers are called catkins and have cyme inflorescences of 5-6 flowers. Female flowers sprout in little clusters under male ones. The fruit is a brown-coloured ovoid achene, with hilum and a hard and shiny pericarp.



Figure 2. Distribution of chestnut trees in the world.

- **Growth rate**

Fast, especially in young trees. It lives very long and can become very big.

- **Soil**

Ideally, light, fresh but also well-drained, deep soils, free of calcium.

Chestnut trees are calcifugous and have leaf chlorosis, and die in calcium-rich soils.

The ideal pH is between 6 and 7.

- **Climate**

Chestnut trees live in different climates. They need some 700 mm<sup>3</sup> of water a year.

They need to be moist, especially by the end of the summer - August and September-, as this is the period in which the fruit grow.

It tolerates wind but it does not grow strong in windy areas. Shoots are affected by droughts and frosts, especially in the late spring or early autumn.



Figure 3. Female flowers turn into cupules.



Figure 4. The fruits are within the cupules.

- **Orientation**

It is a heliophilic species, and requires plenty of sunlight, although it needs less light in lower latitudes.

- **Variability of the species**

Chestnuts have always had a great genetic diversification. The different climates have led to many different varietal types. In selection processes the following features are taken into consideration: size of the fruit, resistance to diseases, adaptation to the soil, climate, taste, and easy peeling and opening, etc.

This species is an essential part of the landscape and culture of some European regions. During medieval famines, chestnut trees provided food and were used as building material (beams, shutters). They were also used as fuel (wood) and for crafts (wickerwork, barrels, casks, walking sticks and furniture). In some places people still carry out all these activities connected with chestnut trees, which provide an added value to

the production of the area. Thus, this endogenous resource has become an instrument for the development of rural areas.

### 1.1.3. Good practices connected with chestnut tree growing.

For good practices programmes to be really useful, those local inhabitants that are directly connected with the resource must become involved in the initiatives.

This is a difficult issue, as they use ancestral work methods and may not be willing to change them, especially when positive results are only to be seen in the long term.

The good practices programme herein suggests investing more time in chestnut trees in order to improve production and have trees in optimal phytosanitary conditions.

The good practices programme must include a set of measures concerning the different aspects that affect chestnut tree growing, which can be described as follows:



### a) Plantations.

This section addresses only new plantations, and explains why it is important to use plants of our own or to keep a strict control of tree nursery plants.

#### When planting the tree:

It is advisable to use plants of our own, derived from our own wild chestnuts that can later on be grafted on the chosen variety.

Using our own plants allows us to know all their characteristics beforehand. It is difficult to know where tree nursery plants come from.

We can put the plants in a seed box or in a container directly (pot), depending on the number of chestnut trees we want to grow.

The best time to plant the trees is November. If we delay sowing, chestnuts must be kept so that they do not lose their germination capacity.

When choosing the seeds, it is advisable to pick big ones, as they have more nutrients.

When we transplant the plants to their final growing place, root and stem reinforcement are advisable, so as to favour rooting. Reinforcement is also necessary with nursery plants.

If we intend to plant many times in the following years, we should not use the same peat or earth that we have used previously, especially for container plants. Containers should be disinfected in order to prevent contamination. We can use bleach.

When we transplant the plant to the final growing place, we should establish an adequate planting framework, in order to allow the plant to grow and improve production.

If we are using our own plants, whether they have grown spontaneously or they are shoots from other plants, we must make sure that there have not been infected with chestnut ink disease.

If there is ink in the area, we must take the necessary measures described in the section devoted to diseases, in order to prevent the new plants from being infected.

If the plant comes from a tree nursery, we must check whether it is infected with ink disease. In order to do so, we must disinfect the roots with copper sulphate or with a synthetic fungicide like "Aliette".

Tree nursery plants can be contaminated if the soil or peat is recycled over the years. There can be latent fungi in the new plant that may appear during the growth process. If the disease does not develop in the nursery it may go unnoticed to tree nursery workers.

We should always buy our plants in tree nurseries that comply with all health regulations.

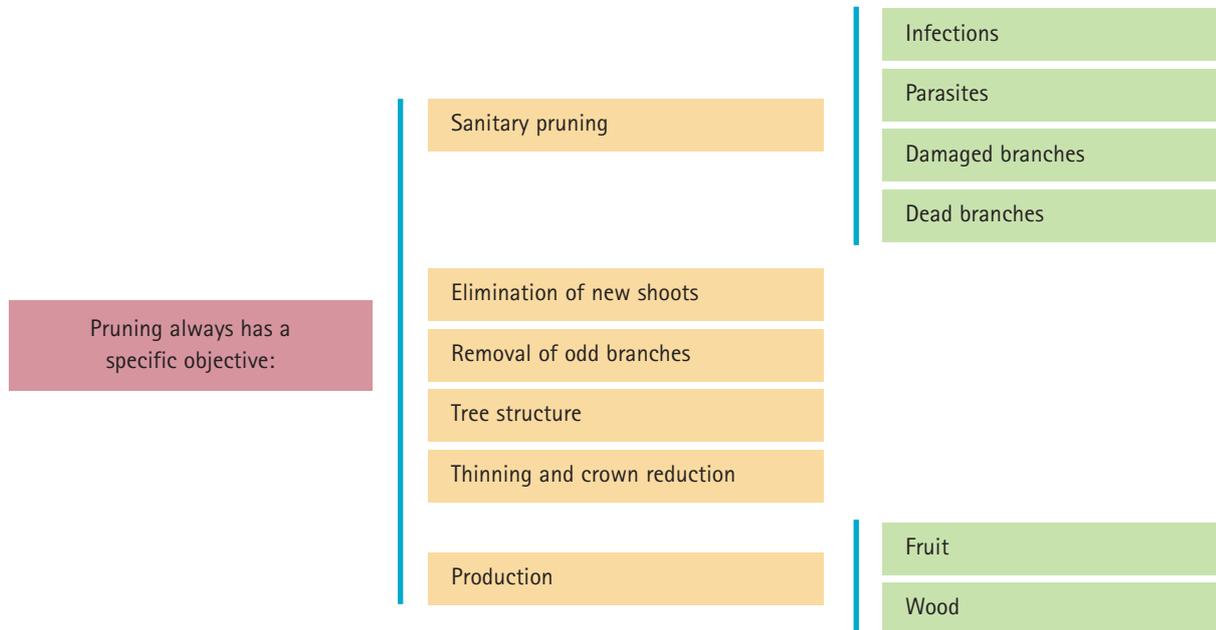
It is important to buy plants that have good root development.

Once we have chosen the new plants, we must make sure they do not have too much water.

Transplants to the final growing place must be done in November–December, rather than in spring.

## b) Pruning.

Pruning is one of the most important tasks and has to be included as a good practice. We have to establish a general set of criteria that explain its importance both for chestnut trees and fruits.



### Pruning

This practice has a great influence in the phytosanitary conditions of the chestnut tree and in its productivity.

Pruning also affects the total weight of the plant and the balance between the aerial portion (crown) and the underground portion (roots). An unbalanced crown causes plants to grow weak and be little productive.

Young specimens require a shape pruning, as it will to a great extent determine their future structure. Whenever possible, we should prune plants that have already been grafted. Thus, we will prune only above the graft area.

As for bigger plants, we may do a corrective pruning, especially when the crown is very leafy or is affected by age or by parasites.

Shape pruning must be done in plants that have not grown too large so that we can easily control them. This makes future works easier.

Pruning also helps providing a given structure (shape) to the plant and favours plant feeding, as it improves ventilation and sun exposure. These two aspects are important, as well as root absorption of minerals, for the plant to generate the nutrients it needs.

The so-called natural pruning is not recommended, as it favours the presence of fungi, insects and parasites. Natural pruning cause crowns to grow too dense and plants to grow too high, and as a result, branches that are not exposed to the light rot and dry out. This kind of pruning is more suitable for timber trees.

If we decide not to prune, we should at least remove dead branches periodically.

Pruning can be done all year round, but it is advisable to do it by late winter or early spring (February–April), as at that time plant structure can be seen easily and wounds heal faster.

Modern pruning methods choose the right positions for the cuts so as to help the healing of wounds. The principles of this technique are simple and easy. The right places for the cuts depend on the shape of the plant. This method prevents certain areas to rot in the future and weaken the tree.

In order to prevent diseases and parasites, it is advisable to disinfect the tools we are going to use and the pruning cuts. This is very important to prevent chestnut blight.

Copper sulphate or a bleach solution 50/50 can be used in order to disinfect them.

It is advisable to use sharp and clean pruning tools. These precautions will condition the future phytosanitary conditions of the plants.

When the wind tears off branches and when there are wounds in the trunk (caused during tilling, for instance) the torn tissue around the wound has to be removed quickly so as to help healing.

Wound dressing is quite commonly used in order to seal the wounds of fruit trees and prevent fungi to infect them. Wound dressings are plastic sealants that isolate the wounds and prevent the appearance of parasites that may damage the tree in the short or long term.

In areas infected with chestnut blight wound dressings are necessary to prevent the plant from getting infected.



Figure 5. Pruning improves tree nutrition.



Figure 6. Badly pruned chestnut tree.

### c) Soil management.

Soil management is a very important technique when dealing with plants. It is not an easy task as there are no qualified experts able to adapt practices to the

real needs of the soil. A thorough explanation on soil management would need a chapter of its own. However, we consider it necessary to explain at least some of the most important elements involved:

## Soil management

The soil is one of the most important elements when you work with plants, as it has a great influence in their development, nutrition and phytosanitary conditions.  
The soil is not a lifeless substrate, it is a living and fragile element.

Therefore, it is very important for chestnut tree growers to know the soil and its properties. Not all soils are the same, need the same or behave the same way.

When working the soil we must bear in mind its characteristics in order to keep it in good conditions. We must not act prompted by habit or whim.

Working the soil is important in order to improve its structure. In most of the plantations we have studied, the result is a better intake of organic matter.

Most soils studied were sandy, and prone to some extent of erosion and washing out of nutrients.  
This causes a progressive impoverishment of the soil.  
Therefore, we must stimulate it by keeping the plants in good conditions and by providing nutrients.

Work practices must take these characteristics into account for the soil to improve its nutrient holding capacity and slow down erosion.  
Both objectives can be achieved by adding organic matter to the soil.

Hoeing may not be necessary in every type of soil; it could even be a harmful practice in many cases. Nevertheless, it is possible to hoe every two or three years. In some cases, when the soil is too damaged, the do-nothing method may be suitable. It consists of taking no action at all.

Working the soil is an important factor in the spreading of chestnut ink disease, as the farm equipment used contributes to soil turning. Thus, the disease spreads from one place to another, and from one plot to another, without obvious connections.

If we decide to hoe the soil, we should do it immediately before gathering the chestnuts, in order to have a clean soil during harvesting. Covering the plants, leaves and spiny cupules (from the previous harvest) protects the soil from erosion (caused by air and water) and helps maintaining it fresher, especially as sandy soils are concerned.

Chestnut trees should not be watered during the summer, as it would favour chestnut ink disease. In general, chestnut trees do not need great amounts of water, but they can adapt to it to a certain extent.



Figure 7. Tilled soil.



Figure 8. Grass-covered soil.



- In all cases, we must control soil moisture to prevent it from being too high or too low. The plots studied tended to be too moist for chestnut trees.
- Watering chestnuts is a very old and deep-rooted technique that chestnut growers have used for years, but nowadays, chestnut ink disease makes it inadvisable.
- Small plants (herbaceous plants) are beneficial in chestnut groves, as they protect the soil and keep it moist. They also provide nutrients and stimulate the biological activity that helps nutrition and improve the defensive mechanisms of trees.
- There may be an excessive growth of herbaceous plants hindering harvesting. In this case, it is advisable to control them but not make them disappear completely. In order to do so, we may reap them and let them rot in the surface. If we hoe the soil, as we should right before harvesting, another option is to bury them partially. Thus, the plants take nutrients from the soil but also provide nutrients to it.
- A regular use of herbicides for weed control is not advisable. However, herbicides may be used at the beginning if there are too many woody plants or harmful plants, provided we start using other control methods soon.
- We must bear in mind that most herbicides are residual even if they say the contrary. These products wash out in sandy soils and may affect the roots of chestnut trees even if the product has not been applied there. They may also concentrate in aquifers and pollute them.
- Herbicides impoverish the soil and destroy the biological activity needed in plant feeding.
- Using fire as weed control method is not advisable. It has negative effects in the environment, the soil and the nearby chestnut trees. In addition to this, it increases the levels of greenhouse gases as carbon dioxide.
- Covering the soil with grass is very beneficial for the management of soils devoted to chestnut tree growing. It protects the soil, favours nutrient holding capacity and contributes to ventilation, among other positive effects.
- Using a communal approach to weed control is highly advisable.

d) The use of fertilisers.

are more beneficial for sandy soils prone to erosion.

When we talk of manure we are thinking basically of organic fertilizers, which have more durable effects and

Using chemical fertilisers, on the contrary, speeds up soil erosion.

Fertilising
Chestnut trees require soils, which are rich in organic matter. Most of the areas visited lack organic matter.
Organic matter consists of more than manure. There are other sources of organic matter that we can use (remains of previous harvests, grass, green waste from the area...etc).
The remains of previous harvests can be useful organic matter (as leaves and cupules). Therefore, we should use them instead of throwing them away or burning them.
Covering the soil with organic matter (plants) provides organic matter to the soil and prevents erosion.
Organic matter improves the physical and chemical characteristics of the soil and stimulates the biological activity of micro-organisms.

Micro-organisms act as a physical and chemical barrier to pathogenic agents as the fungus causing the ink disease.

Depending on the characteristics of the soil, we may have to add organic fertiliser every year, but it depends on the case.

The addition of organic matter must be done in autumn, for nutrients to be available to the plant by springtime.

Depending on the characteristics of the soil, it may be necessary to use calcium amendments periodically in the spring.

Mineral fertilisers do not improve soil conditions.

If we use this type of fertiliser, we must do it in spring, as it is a period of vegetative activity and the plant will use it.



Figure 9. Organic matter is a good fertiliser for chestnut trees.

If we use mineral fertilisers, we have to spread out doses (instead of adding it all at once) during the vegetative period, in order to prevent leaching in soils with filtering qualities and avoid the loss of the fertiliser, with the consequent economic and productive losses.

We may choose a mixed method consisting of adding organic matter one year and mineral fertilisers the next.

Nutrient scarcity hinders growth and chestnut production. The plant is more sensitive to external aggressions caused by the climate or by parasites.

#### e) Grafts.

##### Grafting

This technique is necessary in order to preserve geographical varieties and genetic reserves for the future.

Grafting requires being aware of the chestnut varieties of each area and their features.

In order to preserve varieties, it is advisable to use local specimens rather than alien varieties. This practice preserves genetic diversity, which is very important in order to classify the different varieties and tell them apart.

We may use different types of grafts. Normally we use varieties that we know well or are more experienced with, but this does not mean we are picking the best.

The secret of good grafting practices consists of bringing the cambium layer of the stock and of the scion bud into contact. The bigger the contact surface, the more chances of getting a successful graft union.

When we graft young tissue into young stocks, the chances of success are even bigger. If we graft young tissue into old tissue, we are more liable to fail.

It is advisable to disinfect tools and material in order to prevent diseases.

If we are not using home grown material we should make sure they are not infected with blight, as it may be a source of infection and the disease may spread fast.

Grafting tools must be sharp, clean and disinfected. At this point, we are never too careful.

Grafting is possible in many points of the plant's biological cycle, but the best moment is April-May for wood grafts and bark grafts (ideally late May), and the second half of June for bud grafts.

No precautions are normally taken, as normally grafts are successful. However, it is an interesting work method and it may prove useful as prophylactic agent against diseases.

When we are not using our own plants, or when we are using plants that are resistant to ink disease, we may have incompatibility problems if we graft them into local varieties, and grafts may be unsuccessful or else result in weak, low-yield plants.

There should be different varieties in plantations, so as to favour tree pollination, as they are self-infertile and require cross-pollination.

Cross-pollination takes place naturally, as different varieties coexist in nature. However, when making a large new planting, we must take this into account in order to plant different varieties.



Figure 10. Annular graft.



Figure 11. Whip grafting.

## f) Tree management.

The following aspects have to be taken into consideration in tree managing:

The soil or substrate that we are going to use in seedbeds and containers must be prepared.

Seeds must be planted at the right depth; never deeper than 6–8 cm. beneath the soil.

Maintenance of seedbed plants (watering, weed control) or container plants (watering).

Transplant to a tree nursery or growing place before reinforcing the plant.

Grafting can be done in the seedbed or once trees have been transplanted to the final growing place. In all cases, the sooner the better, as grafting can bring fructification forward.

Before transplants, it is advisable to prepare the soil. Using good quality earth to cover the roots is preferable.

This should be done by November–December.

A fertilising scheme can benefit the growth of the plant both in early stages and afterwards.

Young plants require shape pruning, then thinning and finally periodic maintenance pruning.

Concerning medium size plants, we may want to do a crown reduction, depending on the location of the chestnut tree. If the plant is very large and cannot be easily accessed, we may skip this step.

Both bare soils and grass-covered soils are suitable. If we do not cover the soil, it is preferable not to use chemical elements for weed control (herbicides).

During hot periods, we should cover the soil in order to protect it and keep it moist.

Works should be planned according to the characteristics of the soil.

Irrigation is not advisable during the summer.

We must bear in mind all these suggestions in order to keep plants in good phytosanitary conditions, and in order to protect them from chestnut ink disease in particular.

All plants affected by ink disease to some extent that have not been included in any protection plan, must be pulled up and burned, at least in the roots.

Thus, the number of infectious inoculum will be diminished.

## g) Diseases.

### 1. CHESTNUT INK DISEASE

Many Mediterranean chestnuts are affected by the ink disease, in spite of the efforts of many European researchers in order to fight it.

- Characteristics of the fungus causing the ink disease

This condition is caused by two fungi species belonging to the *Peronosporaceae* family: *Phytophthora cinnamomi* Rands and *Phytophthora Cambivora* (Petri) Buissman. The former is more widespread than the latter.



Figure 12. Tree infected with ink disease (dark parts in its base).

Even though it is older, it was not until 1917 that Petri managed to isolate and identify the agent causing this disease.

It is a telluric semisaprophyte fungus that lives some 20–30 cm below the earth. Semisaprophyte organisms can feed from dead organic matter by decomposing it, or else feed from a living plant as a parasite, depending on the circumstances. This feature makes fungi much more resistant and difficult to fight.

- **Characteristics of the infection**

It is a contact infection that takes place when the infectious structures of the fungus are in contact with the roots of the chestnut tree.

The spores (chlamydospores) are produced in the sporangium which gradually appear in the edge of arborescent sporangiophore stalks and spread from there.

In addition to this, it has motile zoospores able to move in the soil, specially if it is too moist or swamped.

Sclerotia and rhizomorphs are rootlike structures like pieces of wood, in the lower parts of chestnuts and other soil structures, in which saprophyte fungi can live.

In many cases this soil inoculum is inactive; it requires certain external stimuli in order to reactivate.



Figure 13. One of the signs of a chestnut tree killed by ink disease is the fast debarking.

Roots release certain exudates that can stimulate the germination of the spores in the soil.

Mycelial filaments produce zoospores. Due to chemotactism, motile zoospores can move in liquids, thanks to two flagella, and go into the radicles of the host plant.

In the presence of parasites, plants produce certain substances released by the roots in order to hinder their development. Sometimes the infection can be caused by the absence of fungistatic substances in the soil.

Teliospores can remain in the soil for months or even years waiting for the right moment or for a plant that is appropriate for their development.

In order to become active, they need the presence of certain substances that act as stimuli for them to start their activity.

Their infectious capacity can be hindered by the presence of fungistatic substances in the soil. These substances may have been produced by micro-organisms around the root living in symbiosis with it. Thus, these micro-organisms use such substances in order to compete with other micro-organisms that may interfere in their symbiotic relationship by infecting the



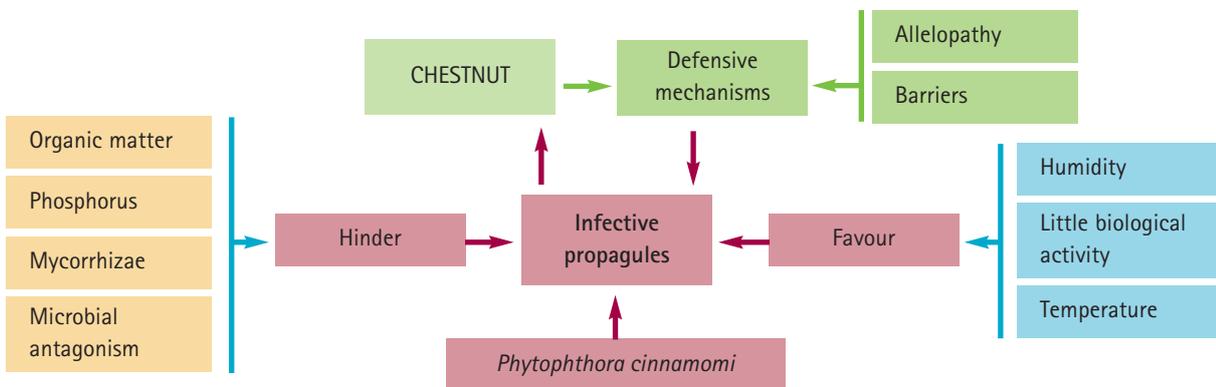
Figure 14. Dead chestnut presenting some of the signs of ink disease, as the small cupules and leaves in the edges of branches.

plant with a disease. These substances are known as allelopathic substances. They are specific substances whose role is to prevent certain fungi from growing.

The propagation to other plants takes place when the fungus comes into contact with its roots. The living mycelium of the fungus is in the area where the disease is spreading, which

means that if we want a sample of the mycelium we have to look for it in the infected area.

The infection affects the peripheral upper roots first, and spread inwards until it reaches the neck of the root. At this point, the plant loses its capacity to produce new roots that substitute the ones that have been injured, and dies. If the infection takes place near the trunk, the tree dies fast.



- **Symptoms**

The symptoms of this disease can only be seen in the aerial portion of the plant, as the roots are not visible. By the time symptoms are visible, the

infection is already in an advanced stage. The existence of infected plants nearby may be useful to determine the probabilities of healthy plants to be infected too.

**The most common symptoms are the following:**

Upper branches with dry tips. The tree dries out from the top to the bottom as the disease progresses.

Yellow leaves, especially the ones in the upper part.

Sometimes the leaves of the sides may be yellow too, in one or more directions, depending on the part of the roots that have been affected. In addition to this, leaves fade and bend.

General weakening of the plant.

Small cupules remain on the tips of the branches.

Some leaves remain on the branches when they die in the vegetative period of the plant.

The tree produces more fruit but the cupules are smaller and the quality of chestnuts worsens.

When the plant dies, it loses its bark very fast, revealing the black stains with the shape of a flame that may spread up the trunk about 50 cm.

As a consequence of the rotten roots, the tree falls down with the wind or the rain, which softens the earth.

**Damages caused by the pathogen:**

When it goes into the roots, the pathogen causes the following damages: It corrupts the tissue and hinders sap circulation.

Roots become black and soft, as sap comes out of the vessels and invades the rest of the tissues.

Thick roots may tear off due to the changes in the bark and in the cambium. The plant loses its capacity to absorb nutrients, becomes weaker and finally dies.

- **Control methods**

It is a difficult situation, as there is no truly effective remedy to chestnut ink disease this far.

Using chemical products only solves the problem partially, and in many cases, they are difficult to apply. However, given that there are no better options, chemical products should be used to control the disease.

Nowadays researchers are working in a new field of investigation based on the presence of mycorrhizae and their influence in the tree that they live in association with.

Genetic hybridisation is a control method, which is being widely used in some countries, especially France, in order to obtain ink-resistant patterns.

The Japanese chestnut *C. crenata* is 75% resistant to ink. Research centres have started to work in selection techniques in order to improve the resistance of trees with the hybridisation of *C. sativa* x *C. crenata* and *C. crenata* x *C. sativa*.

The INRA (French National Institute of Agricultural Research) has developed several controlled hybridisation programmes that have resulted in several hybrid ink-resistant plants, which were successfully grafted into several Japanese varieties. These varieties include: Marigoule, Maraval, Bouche de Bétizac, Maridonne, etc.

## 2. CHESTNUT BLIGHT DISEASE

Chestnut blight is caused by a fungus of the Sphaeriaceae family, known as *Cryphonectria parasitica* (Murr) Barr. This organism has been classified under other names before.

This fungus develops in the aerial portion of plants. It has not got the necessary enzymatic mechanisms in order to trespass the bark, and needs to find a way in order to infect the tree.

Its mycelium is resistant to cold and desiccation. Once inside the plant, it develops within the bark and the cambium, and kills the affected branch. If the infection is in the trunk, it ends up killing the tree.

It reproduces thanks to two types of spores:

Asexual ascospores

Sexual conidia

The propagation of these spores is conditioned by humidity and temperature. They propagate in the spring, with the first rains, reach their peak in the summer, decline in the autumn and cease in cold winter months.

### • Characteristics

We must be acquainted with some characteristics of the biological cycle of the pathogen. This pathogen is semisaprophyte, that is, it can live on decomposed organic matter or on living plants, as the one that causes chestnut ink disease.

The infection takes place when the pathogen comes into contact with the plant. The fungus can reach the plant in several different ways:

Swept by the wind.

In rain water.

Thanks to insects and birds that move from tree to tree.

In the pruning and grafting tools.

The infectious inoculum is usually formed by:

Spores produced in the sporangia.

In favourable ambient conditions, the spores produce mycelium, which infects the plant entering by some kind of gap: pores, bites, wounds, grazes in branches etc.

The plant has its own defensive mechanism based on physical and chemical barriers that attempt to prevent the development of the pathogenic organism.

### • Symptoms

The most typical symptoms are to be seen in the aerial portion of the plant. It is possible to detect the infection in early stages, and to use control methods in order to prevent the development of the pathogen.

The most common symptoms are:

There are brownish-yellow stains with crooked edges around the infected area.

Canker causes cracks in the bark and the living part of trees, which run parallel to the axis of the affected plant or branch. These cracks become deeper and eventually reach the woody part.

Near the cracks there may be orange-red pustules that produce infective spores, which will eventually infect other branches or trees.

The fungus corrupts the invaded tissues and block vessels, which hinder sap circulation.

The fungus ends up destroying the vascular cambium around the affected branch or trunk. At this point, the part of the branch or tree above the infection dies.

Leaves do not fall from dry branches in the vegetative period.

It is possible to see the yellowish mycelium of the fungi under the bark in infected areas, in the shape of a fan.

When the plant dies, the fungus becomes saprophyte again and lives on the dead wood.



Figure 15, 16 y 17. In this sequence of pictures we can clearly see the characteristic colour of the barks infected with blight.

Figure 18. Detail of the structures in the shape of a fan.

## 1.2. Evolution in the use of the resource.

Chestnut trees had an important role for the survival of local population in the past. After a few years of forgiveness, people are rediscovering the interesting culinary possibilities of chestnuts and derived products, and the subsequent improvement of the economy of

many families. In some regions of Portugal, Spain, France, Italy and Greece, chestnut trees are the main source of income of families.

The future of chestnut trees depends on several elements that are changing in the last few years and that have a great influence in them.

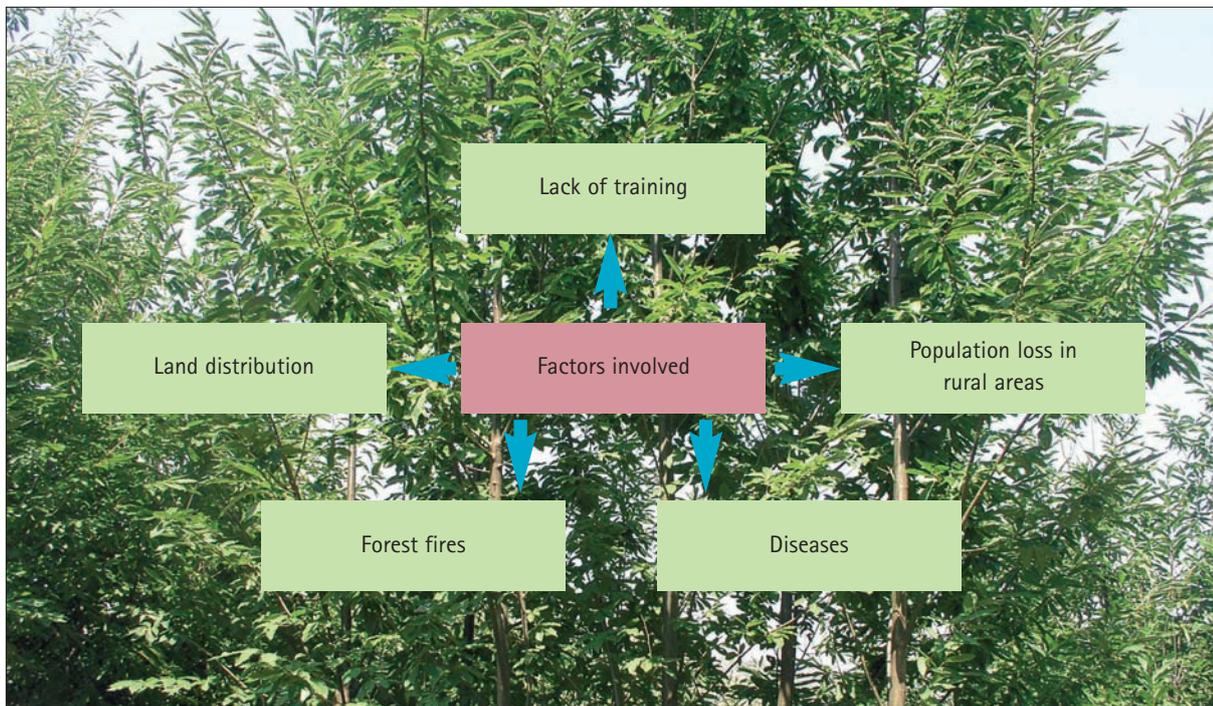


Figure 19. Factors that influence the present situation of chestnut trees.

- **Most relevant factors:**

**Population loss in rural areas**, as a consequence of the migration of young people, forced by the lack of professional opportunities in their villages. Only old people stay in rural areas, and they do not have economic needs. A brighter future implies stopping migrations by encouraging chestnut growing and processing industries that help preserving the resource.

**Plantations are very old and have three major problems: Chestnut ink disease, blight and forest fires.**

- Ink disease has a direct effect on chestnuts (*Castanea sativa*) and jeopardise the

preservation of the habitat, as it kills both young specimens and centenary trees of incalculable environmental value. In order to fight this disease efficiently, a study of the actual situation of chestnuts must be made, and preventive and control measures should be set out.

- **Chestnut blight** has serious effects on chestnuts and their habitat, as it is an airborne disease that dries branches and trunks out. This pathogenic fungus works its way into the host plant through wounds (pruning cuts, cracks, scars, bites etc.).

Airborne transmission lends this pathogen a great spreading capacity.



Figure 20. Chestnut blight is a serious problem.

It can live in all climates, which favours its propagation too. Thus, it spreads fast from a small source of infection over large surfaces, affecting almost all chestnuts on its way and killing them. Preventive measures must be set out in order to control the disease in the short term, at least to a certain extent. Then, long term measures should be put forward.

- **Forest fires.** Chestnut tree maintenance is neglected as a consequence of diseases and the reduction in the exploitation due to population loss. As a consequence, plantations are in bad conditions and have been invaded by undergrowth that cover the soil and increase forest fire risk. Forest fires damage chestnuts and cause the disappearance of the biodiversity of mycorrhizal fungi.

The impact of forest fires is very serious, and affects both animal and vegetable species. Chestnuts need some 30-40 years in order to regenerate the biodiversity of mycorrhizal fungi. Therefore, it is advisable to plant mycorrhized plants. We must also bear in mind the economic losses to be expected



Figure 21. Forest fires are very dangerous for forestry habitat.

during these 30 or 40 years in connection with mycological resources (*Boletus*, *Amanitas*, *Russula*, *Cantharellus*), which are providing interesting returns to the rural population.

By taking these factors into account, we will be able to prevent forest fires and to allow for the future use of the resources connected with chestnut trees while protecting them.

**Land distribution** (small holdings) makes the mechanisation of farm work impossible. Chestnut tree growers should unite and make bigger plantations in order to work on bigger surfaces and make mechanisation profitable.

**Lack of specific training** on effective and adequate phytosanitary management.

There are several transnational European projects that intend to preserve forests and manage their sustainable exploitation.

Cooperation is important, as it allows for the exchange of experiences and for a joint approach to the same problems, in order to find common solutions that may apply in all EU regions.

These projects are showing that forests can provide many benefits beyond direct exploitation, as they are the best contexts for certain emerging leisure activities.

These leisure initiatives include some traditional activities as hunting or fishing, as well as



Figure 22. Chestnut trees are part of the landscape of some European regions.

emerging ones as hiking, climbing and other outdoor sports comprised in green tourism, cultural tourism and low impact tourism.

These leisure and rural tourism activities connected with the forest are getting very popular, which implies management and planning efforts that allow our forests to hold these tourist activities in a sustainable way.

The management of chestnut groves implies having an exploitation plan that improves production and acts as a base for the processing and marketing of chestnuts. There is a need for a better sectoral structure.

- There are two outstanding European projects connected with chestnuts: FOREST and "III-MILENIO" Projects

These two projects address chestnuts as an instrument for rural development in two different stages.

A curricular design for chestnut growers and a good practices guide were produced in the scope of these projects. The results were successfully disseminated in many sectors.

At present, several years after both projects finished, the results still prevail and the products are used to train professional chestnut tree growers in several EU member countries. This

type of training initiatives has encouraged employment and self-employment in the sector of chestnut tree growing.

## 2. IMPORTANCE AND IMPACT OF THE RESOURCE

### 2.1. Current situation and impact of the resource.

Chestnut trees may be considered as a vital endogenous resource in certain regions.

There is a tendency to make a sustainable use of the environment as an instrument for rural development, in view of the problems brought about by the abandonment of rural areas and agriculture caused by different social and economic factors. Some old traditions and customs are being revived. These traditions, together with new scientific knowledge and experience, allow for the conservation of the rural context, with all the benefits this implies.

In general terms, it could be argued that no defined and unifying strategy that comprises both the valorisation and potential of chestnuts has been devised



Figure 23. The activities connected with chestnut trees must be included within local development schemes.

yet. In addition to this, we must bear in mind the damages caused by forest fires due to the invasive undergrowth in some neglected areas, as well as those caused by diseases.

A sound work programme would be liable to invert this situation in the future.

### 2.1.1. SWOT analysis.

SWOT analyses are useful to define the actual situation of the resource and to find adequate solutions.

This analysis focuses mainly on the chestnut variety that bear fruit, as it is the most liable to provide short-term returns.

#### • WEAKNESSES

- Important population loss, scattering and ageing, which results in the progressive abandonment of chestnut groves.
- Little economic diversification and low innovation capacity in order to improve production.
- Failure to adapt to the changes that are taking place in the rural areas.
- Lack of entrepreneurial initiatives in the field of chestnut processing.
- Difficulties in the professionalisation of rural economic activities as chestnut tree growing.
- Insufficient use of natural resources as chestnuts, wood and woodcrafts...etc, and lack of the resources needed for the processing of their own products.
- Lack of diversity, as a consequence of the wrong techniques being used.

#### • THREATS

- The backwardness in alternative development instruments to manage the whole process of producing, processing and marketing chestnuts.
- Insufficient development of networks of associations and of a support scheme that encourages the production and managerial

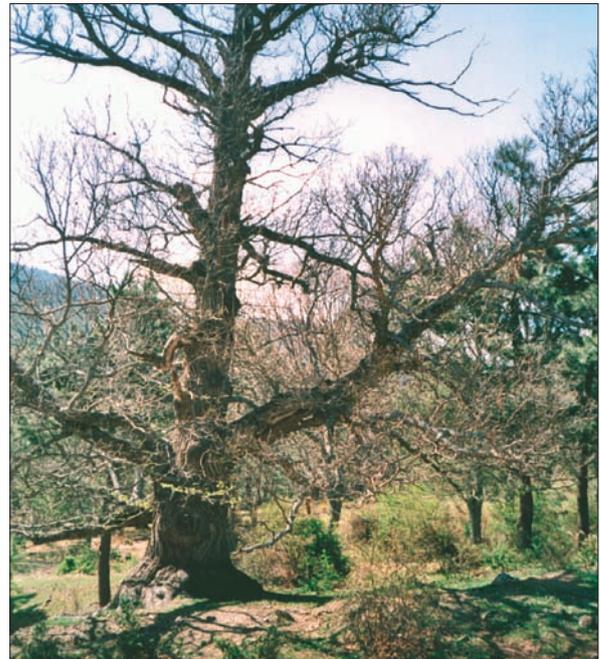


Figure 24. An adequate management system is needed.

capacity and fosters new development and entrepreneurial initiatives at local level.

- The training offer does not answer the needs of rural areas and does not make an extensive use of NICT.
  - Not enough emphasis is made in applying quality standards to agri-food, environmental and tourist products (there is no designation of origin for the high quality, autochthonous chestnuts).
- #### • STRENGTHS
- There are very good agri-food products with an added value (chestnuts and the agri-food industry connected to them).
  - There is an outstanding historical, cultural and natural heritage with a great potential for tourism.
  - The increasing diversification of agricultural activities brought about by the sustainable exploitation of endogenous resources is liable

to create employment and to improve the economic situation at local level.

- The organisation of social partners thanks to the local action groups intended to promote local entrepreneurial initiatives.
- **OPPORTUNITIES**
- Chestnut tree growing understood as the keystone of the agri-food sector and encouraged by increasing the added value of derived products by processing and canning them locally.
- Relying on the possibilities of rural tourism in order to publicise local products, and boosting the natural habitat of chestnut trees by producing posters, brochures and other informative material.
- Support the adequate management of those ecosystems that have always been connected to man, and which are at the moment undergoing many problems, as it is the case of chestnut trees.
- To transfer and implement new technologies, managerial approaches and manpower flows towards traditionally disadvantaged areas, where



Figure 25. Quality of the processed agri-food products derived from chestnuts.

it would be almost impossible to implement any other development instruments.

- The creation of a Chestnut Interpretation Centre, which could be the starting point for many initiatives connected with chestnuts and intended to make a sustainable exploitation of the resource.

Society is gradually changing its attitude towards nature and feel more inclined to discover the rural world and start to consider it as a space for leisure and relaxation.

Tourism as a social activity is continuously growing, and it is focusing more and more in activities connected with natural and local resources, that is, the so-called rural tourism.

Landscapes, natural values, animal and vegetable species and new hobbies are the main elements sought by rural tourists.

Chestnut-picking has become very popular in many European and Asiatic countries, and the number of people that becomes involved in the sector of chestnut trees looking for an economic return is increasing.

The SWOT analysis shows that there is a EU-level network that is becoming quite important and which gathers a varied range of people and institution around chestnut trees and forestry: producers, sales cooperatives and industries involved in preservation, processing and marketing.

We may conclude that, in order to manage this resource in a sustainable way, there is a need for experts with specific training who are liable to transmit their knowledge in an educative way, and carry out dissemination and information campaigns together with the authorities involved in forestry.

**2.1.2. Social, economic and structural problems in the area.**

Economic diversification in the areas connected with chestnut trees would allow for the sustainable exploitation of untapped resources as chestnut trees and other related resources as medicinal plants, berries and beekeeping.

The main problems of the resource are connected with its general phytosanitary condition. We must bear in mind that this tree species is being ravaged by chestnut ink disease and blight. These two diseases are responsible for the short-term production drop.

**2.1.3. Lack of preservation and processing infrastructures in producer regions.**

The processing of chestnuts extends working periods and aids the diversification of production. These processed products have the added value of creating employment.

Some of these chestnut derived products are already appreciated: chestnuts canned in their own juice, dry chestnuts, vacuum-packed chestnuts and frozen chestnuts.

These products encourage others to use these processes in order to diversify production.

At present these products are not processed locally but far away from producer regions. In the future it should be possible to process production locally. It is not a matter of creating large industries, but family undertakings or associations forming a business network liable to contribute to employment creation in producer areas and to improve the economic situation.

Such network of small enterprises would also prevent migrations in depopulated and ageing areas in which quality of life is decreasing due to the lack of services.

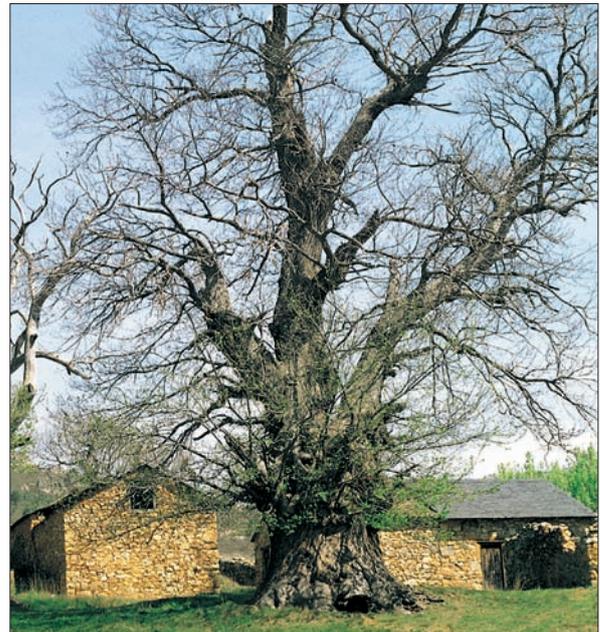


Figure 26. Chestnut grove ecosystems need being protected.



Figure 27. There are many processed chestnut products

Processed chestnut products
Chestnuts canned in their own juice
Dry chestnuts
Vacuum-packed chestnuts
Frozen chestnuts in bags
Confectionery and marron glacé
Chestnuts in syrup
Chestnuts in alcohol and chestnut liqueur
Chestnut creams and purées
Chestnut flour and derived products

#### 2.1.4. Marketing of chestnuts.

##### PRESENT

There is a lack of cooperatives and associations that standardise the type, size and quality of chestnuts in

order to boost chestnut processing and complete the production cycle locally.

Nowadays the sector is going through many difficulties.

##### Some of the problems of the sector are:

It is a divided sector.

Small-scale production units.

Individual production is not sufficient to access the market individually.

There is a lack of cohesion among producers.

Excessive individualism and little capacity to create associations.

There are no processing industries.

There is a lack of specific knowledge of preservation techniques and a lack of facilities.

Intermediaries control the market.

Most of the production is exported.

There are no product standards.

The marketing of chestnuts is controlled by intermediaries who sell the product to wholesalers who in their turn sell them to processing industries or market them directly.

Prices are fixed by intermediaries and fluctuate quite a lot during the season, depending on production and on the needs of the industry. In general terms, prices are quite arbitrary and producers have no decision taking power.

It is difficult to leave marketing channels without knowing how to sell the product or without having any contacts in the market. Intermediaries also change from one year to the next, which influences the final destination of production.

##### FUTURE

The scarcity of the product, together with the increasing demand, especially of processed products, increases the marketing possibilities of chestnuts.

The creation of **small local processing industries** should be encouraged. These industries would provide an added value to the product, which would be marketed in more profitable conditions.

The product is normally supplied to distributors, restaurants, gourmet food stores etc, but only in the local and national scope.

Target market is not very well defined at the moment, but with the passing of time this will change



Figure 28. The market requires homogenous chestnuts.



Figure 29. There is a need for chestnut processing industries.

and producers will focus on the most appropriate markets, always bearing in mind local markets, although other markets shall also be taken into consideration.

Traditionally, there is no local consumption. This problem can be solved with awareness raising activities (chestnut feasts, the so-called "magostos", school activities, meetings with representatives of the restaurant industry etc.) and publicity campaigns (brochures, stickers, posters etc). These initiatives would provide information on the quality and components of chestnuts and of the environmental benefits of using this resource in a sustainable way, avoiding synthetic chemical products as pesticides and herbicides.

Thus, the use of natural chestnuts in typical dishes and consuming derived products should be encouraged.

Local markets should be among the main objectives. Local markets allow for lower transport costs. Moreover, it is easier to know them and influence consumers, as products can be easily advertised. Once local markets become saturated, it is the moment to spread to more distant markets, providing we still can control the situation.

We must convince users that it is not a seasonal product that can only be used at certain times of the year.

Processing allows us to get round that problem and market a wider range of processed products that are scarce, need to be imported or do not exist this far.

This implies using preservation techniques and creating small processing industries that lead to the diversification of chestnut-derived products by adding new elements to them.

There is a need to compete with producers from other areas. In order to do this, the strategy must be based mainly on quality. Quality may be the main distinguishing element. Quality must be present both in the production and the processing stages.

In order to achieve this, production has to be improved not only quantitatively but also qualitatively; the size, beneficial elements and processing techniques must be upgraded. In order to improve production, cultivation techniques must be updated and ink and blight diseases must be controlled with specific measures and with the help of forestry authorities.

It is important to consider chestnuts as organic products liable to open new markets. In order to do so, production must be controlled.

This would allow quality labelling in chestnut production, which is greatly appreciated by many consumers. Chestnuts with quality labels stand out among chestnuts from other areas.

Product distinction is an important distinguishing element in high quality products. Product distinction makes the product known in those markets where it is liable to sell well, and improves the price and marketing potential.

In order to access the markets, producers have to make an effort and overcome all the problems above mentioned.

Future for the marketing of chestnuts
Associationism
Improvement of production
Processing of the product
Product distinction and advertising
Quality products, organic products?

### HOME MARKET

We will first focus on the home market and its current situation.

Nowadays, chestnuts are not as valued as they should at national, regional and local level, not even in producer areas. It is considered as a **seasonal product** only available at a certain time of the year. Chestnuts are not very well known by consumers that do not live in producer areas.

**Product distinction** is necessary in order to market it successfully: producer areas, no chemical products used, easy to peel, good taste...etc.

All these issues make it necessary to have a work strategy addressing each problem individually in order to boost this endogenous product. The product may be understood individually or as part of a group of products with employment creation potential. These initiatives could be the solution for many villages that may disappear due to the lack of economical resources.

In order to compete in the home market and overcome all the obstacles, it is important to be aware of the existing problems. These obstacles must not hamper the development of the activity.

Home market problems
Not traditionally used
Capacity to compete
Local markets
Quality standards should be defined
Still considered a seasonal product

### FOREIGN MARKET

The foreign market gets most of the product, which is normally classified by sizes and quality. The main destinations of production are fresh markets and the processing industry.

The link between production and market is normally an **intermediary** who is able to sell large amounts of chestnuts acquired in many different places. As a result, chestnuts are heterogeneous and have not been previously classified.

Only **cooperatives** are able to access foreign markets and processing industries directly, provided they have the necessary amounts of the product. Cooperatives are liable to become intermediaries, which would not benefit the sector.



Figure 30. Chestnuts intended for exportation.

These cooperatives must work with **distinctive products**, more likely to become popular in the markets. In order to do so, producers must agree on product standards.

Buying chestnuts somewhere else and selling them as own production is a big mistake. This strategy has long-term negative consequences.

**Market control** is important when selling the product. Local markets are easily controlled, as producers know the type of consumers that buy their products. It is very hard to control foreign markets even if producers sell directly to the market, and virtually impossible if they sell raw or processed products to other industries.

Therefore, the foreign market must be taken into consideration, but greater efforts must be directed to local markets.

Characteristics of foreign markets
Large amounts of product
Quality fruits
Not control over the target markets
Better prices but also more expenses
Need for intermediaries

In connection with foreign markets, we may conclude that:

- Nowadays, foreign consumption is greater than domestic consumption.
- In the last few years, there is a growing demand of the product in foreign markets.
- Foreign markets opt for high quality products.
- Large-scale production is needed in order to enter this market, and producers cannot produce it individually.
- In order to enter foreign markets producers must create cooperatives or other similar structures.

The creation of Chestnut Interpretation Centres would encourage research, exchanges of expertise, training etc., which would revive a sector that has the diversification potential required.

## 2.2. Results and impact of the resource.

### PILOT EXPERIENCES

Transnational cooperation projects have played an important role in the development of the resource, and have had a great impact.

Development projects addressing this sector would lose their meaning if they did not have a transnational dimension able to conduct development initiatives in the same direction in different territories.

These initiatives contribute to enhance cross-border contacts between enterprises, groups and social partners.

The projects "FOREST" AND "III-MILENIO" have caused a great impact in the participating countries, both in the period of performance and afterwards: Portugal, Italy, Greece, Spain and France.

Some of these impacts are described below:

- a) **Collaboration among entities from the participating countries**, aimed to establish closer and durable links that enable them to carry out joint activities; exchange technology and technical advice, promote their products etc.



Figure 31. Sustainable management plans for forests are needed.

- b) **Involvement of social partners, SMEs, social action groups, local institutions, associations, beneficiaries and trade unions** that took part in the project and activities connected to it, as awareness raising campaigns and dissemination of results in all the territories covered by the project.
- c) **The entities involved have continued their collaboration after the end of the projects. They have devised new work tools and have worked in experimental pilot centres (experimental pilot enterprises, cultivation and processing of products, nurseries, processing facilities).**

These activities, the dissemination of results in particular, have had a great impact in forestry and chestnut tree professionals and authorities. In some regions, the publication of the book "Chestnuts: manual and didactic guide" has made local authorities carry out specific initiatives to improve the phytosanitary conditions of chestnut trees.

The courses on chestnut tree management have had a great impact among chestnut tree growers.

The informative seminars organised have addressed people connected with forestry and chestnut trees. The main target groups have been forest rangers, employees of forestry enterprises, chestnut tree growers, ecologists and the general public.



Figure 32. Working in a pilot plantation.

These activities have provided a more detailed information on chestnut trees and the related natural resources which can be used as an instrument for rural development.

Awareness raising activities have been more successful than expected, and have contributed to the setting up of several experimental nurseries.

These experimental nurseries work with forest plants in general, and local chestnut trees in particular.

These nurseries are experimental centres and demonstration centres where dissemination activities (management of the plant) and training activities (talks, seminars, workshops) are carried out. In addition to this, these centres carry out a research on the use of mycorrhizae.

The most important impact of these nurseries is connected with chestnut tree growers and employees in forestry enterprises that have visited them and attended some of the information and demonstration activities carried out.

These nurseries are likely to become development centres, as they are located in territories where chestnut trees play a very important economic role.

Several chestnut cooperatives and associations of chestnut tree growers have been created. These entities promote the marketing of chestnuts without any intermediaries and get better prices.

Small processing industries have been promoted. These enterprises have started working with chestnuts and then they have included other natural products in their production.

**d) Experimental pilot plantations.**

The phytosanitary conditions of chestnut trees worries chestnut tree growers and forestry professionals and authorities, especially as ink disease and chestnut blight are concerned.

This situation has made it necessary to set up experimental pilot chestnut tree plantations.

These experimental and demonstration centres have carried out several actions to fight these diseases, with the contributions of the research groups of different countries.

Although it is too soon to know the results, a very promising blight control system has been developed which consists of using hypovirulent strains.

The results of the actions taken to fight ink disease are being much slower. However, the first results of an experimental treatment are encouraging.

The impact of these pilot plantations is based both on the result of the treatments and on the number of people that visit them and take part in the demonstration activities.

These initiatives are having a very good direct influence on production. Therefore, the economic situation of many people may be improved as a result.

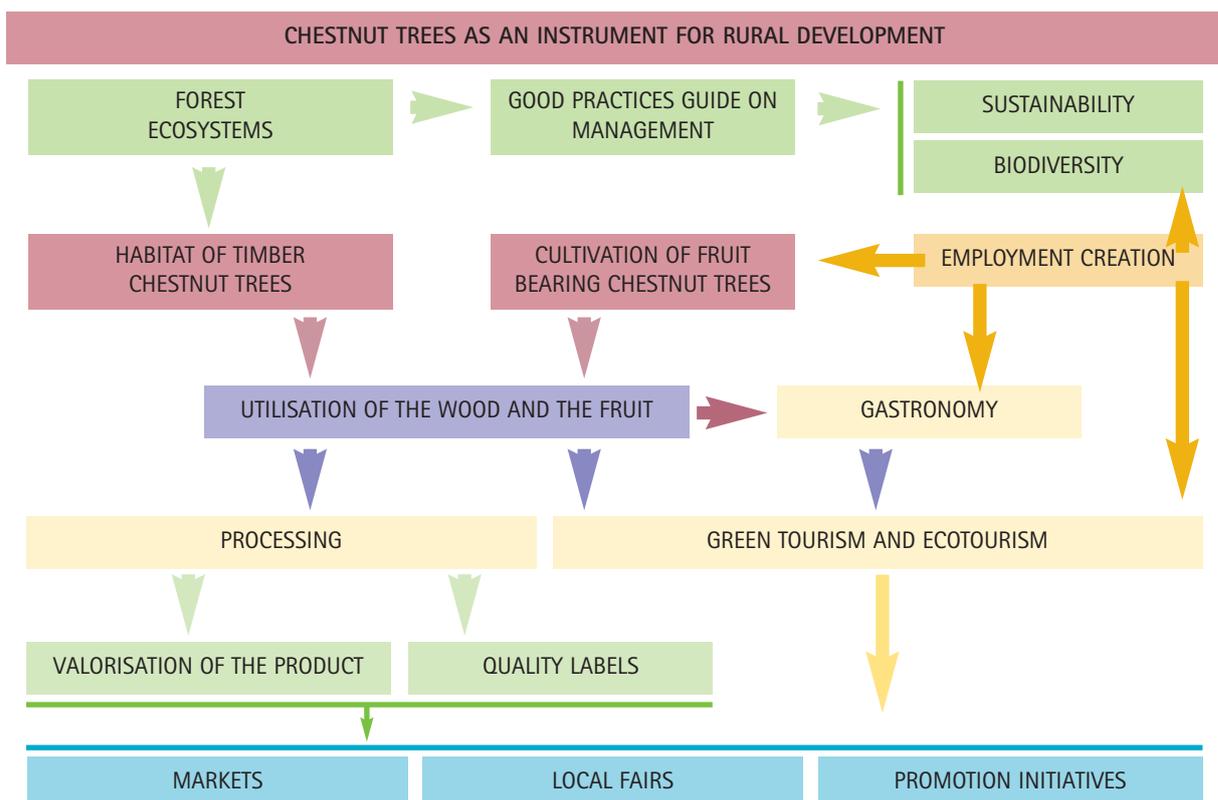
These initiatives have generated new jobs in all the different fields of activity covered by the projects, although in some cases this is difficult to measure.

### 3. USE OF THE RESOURCE AS AN INSTRUMENT FOR RURAL DEVELOPMENT.

#### 3.1. Possibilities and conditions needed for development.

Chestnuts can be considered as an instrument for rural development, as it is an endogenous resource with very promising characteristics. This new idea requires changes in the management of the resource.

We must also bear in mind that, given the current situation of the resource, some time will be needed before being able to fully transform it into an economically profitable activity enhancing cultural and ethnographic values. The period of time needed depends on the starting point and on the policies set up to achieve this target.



The diagram above describes the process that should take place for chestnut trees to become an instrument for rural development.

These actions are intended to improve the quality of life of rural population and prevent the drift from the land caused by the lack of opportunities.

In general terms, quality of life is understood to rest on three main pillars:

- Income.
- Life and work conditions.
- The environmental quality.

The influence of each of these aspects varies depending on place and time.

When the basic needs of the population are covered, income becomes secondary as compared with the other two parameters. Therefore, those activities focusing on one or more of these pillars have greater chances to succeed.

We must understand local development as a global action that aims to mobilise all those concerned in order to achieve the valorisation of the work and the resources of a given territory. In order to do so, there has to be a dialogue with decision takers in the political, economic and social spheres.

An important stage when planning a local development strategy is the identification, valorisation and use of the existing endogenous resources such as chestnut trees.

Forest owners, managers and researchers are starting to realise how important forest management is, in view of the emerging interest in forestry products.

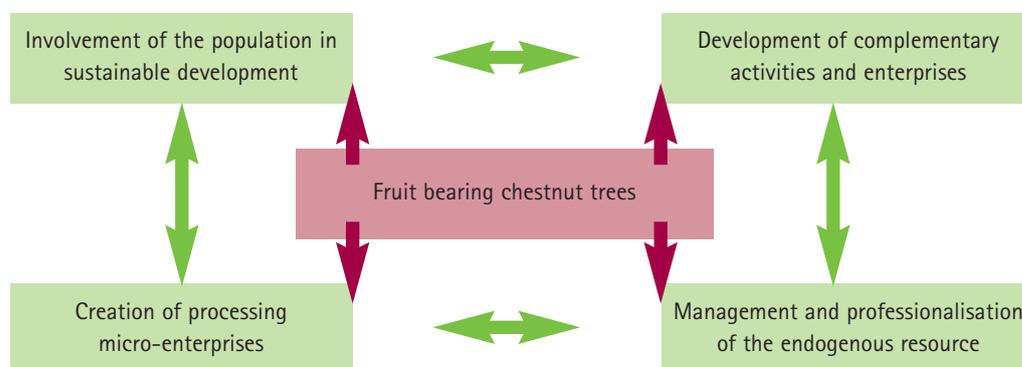
Due to their importance for the landscape and the social and economical structure of many rural areas, all the activities related to fruit bearing chestnut varieties are more and more associated to rural development.

Chestnut tree growing involves other activities that are boosting the economy and the entrepreneurial activity in many villages: chestnut tree interpretation centres, ethnographic museums, gastronomy, production of local products... etc.

The exploitation of fruit bearing chestnut trees must be managed so that synergies can be created.



Figure 33. Hand-harvesting of chestnuts.





These activities connected to chestnut trees boost rural development if they promote the sustainable exploitation of resources, a better land distribution, as

well as other activities related to chestnut trees, while preserving local identity and culture.

This approach to chestnut tree exploitation permits:
Better quality of life in rural communities.
The conservation and sustainable management of forestry resources.
The valorisation of products from producer villages and nearby areas.
The promotion of other local products.
The improvement of the local business sector.
Technical training and professionalisation of those that work with chestnut trees.

Proposal for a Sustainable Management Plan for chestnut trees:	
Sustainability	Needs
Sustainable management of the resource.	Good Practices guide on chestnut tree cultivation.
Conservation of the habitat.	Prevention of agents causing diseases and pollution.
Conservation of biodiversity.	List of species connected with chestnut ecosystems that need to be protected.
Support local economy.	Inclusion in economic development strategies.
Professionalisation of the sector.	Specific training.
Promotion of the product.	Specific training.
Encouragement of research.	Silvicultural applications.
Training needs in connection with chestnut tree growing.	Training schemes adapted to the needs detected.

**SUSTAINABLE MANAGEMENT OF THE RESOURCE.**

In this sense, the most important aspect is phytosanitary care, as the existing bad phytosanitary

conditions have a negative impact with serious environmental consequences.

The following aspects must be paid attention to:
Increase production so as to supply the markets.
Use adequate cultivation methods.
Improve productivity by using environmentally friendly cultivation methods (avoiding pesticides, herbicides etc.).
Phytosanitary control to prevent ink and bleach diseases, so harmful for chestnuts.
Use of new mechanical harvesting methods.



Figure 34. Chestnuts can boost local economy



Figure 35. Storage places where chestnuts used to be kept.

Productions must increase in order to satisfy market needs avoiding intermediaries. If production falls short of demand, it is impossible to enter specific markets without resorting to intermediaries and to increase the price of the product.

#### CONSERVATION OF THE HABITAT

Good practices must be observed when working with the plants in order to have stable productions while preserving the characteristics of the habitat. For instance, undergrowth around trees must be controlled, as it has negative effects on chestnut production.

In addition to this, the phytocides used to control undergrowth in forests are very harmful, as they attack woody vegetation and weaken chestnut trees. Using cultivation methods that prevent the development of phytosanitary diseases is advisable.

#### CONSERVATION OF BIODIVERSITY

The conservation of biodiversity is the conservation of the animal and vegetable species that are associated to chestnut trees and that contribute to the natural values of these ecosystems. Those species that are in danger of extinction must be included in a list in order to protect them against excessive pressure.

#### SUPPORT LOCAL ECONOMY

Chestnut tree growing is liable to create a small network of processing enterprises that improve local

economy and create employment. Thus, rural areas may become more dynamic and allow younger people to stay in them.

Public Administrations must support these processes by setting up policies that limit the lengthy paperwork entailed in the creation of small processing industries and in the extension and improvement of chestnut tree plantations.

Entrepreneurs should be given the necessary advice for them to get more information and solve the problems that they may have with the cultivation, production, processing and selling of chestnuts.

Chestnut tree growers must obtain a satisfactory quality of life comparable to that provided by other rural activities.

#### PROFESSIONALISATION OF THE SECTOR

This sector needs specific training programmes that provide professional qualifications in order to solve the existing problems and improve work conditions.

At present, the people involved in the activities connected with chestnut trees are not experts in the field. Old-fashioned methods that pass from generation to generation are still in use.

However, these people must become acquainted with the problems of chestnut trees, the pathogens affecting them and production, for them to find

solutions. Here lies the importance of training initiatives.

An adequate professional training will enable them to defend their products in the market and preserve them when prices are not high enough to make them profitable.

They would not need any intermediaries and they would be able to manage all the processes that take place after the harvesting.

The most important problem lies in the fact that chestnut tree growing is not a primary economic activity, but a complement to the pensions of the local inhabitants.

Chestnut tree growers are normally old people that find it very hard to adapt to new work methods and devote little time to the maintenance of chestnut trees. Young growers are needed for this activity to become profitable.

Another important issue is the lack of cohesion among chestnut tree growers. They should organise in associations and cooperatives in order to gather a big enough production to be marketed at better prices.

#### PROMOTION OF THE PRODUCT

This is another important aspect. A sound promotion strategy is necessary in order to inform consumers on the beneficial characteristics of chestnuts, the existing derived products and its culinary possibilities. In addition to this, consumers must be informed on the environmental benefits of using cultivation methods that respect the habitat of chestnuts (animals, plants, biodiversity, etc.).

At present, there are not enough promotion campaigns because chestnut growers lack the necessary economic resources. A product can only be promoted successfully if it meets the requirements needed to be in the target markets.

Only if consumers trust the product and the production processes will it be possible to maintain a given market share.

#### ENCOURAGEMENT OF RESEARCH

The techniques used in chestnut tree growing are evolving very fast, which requires an extra effort for those that want to know the state of the art and take advantage of new possibilities.

For instance:

- Mycorrhization techniques allow for faster plant growth and better plant adaptability.
- The use of certain work techniques help preventing the two main diseases affecting chestnut trees and causing economic losses which discourage growers.
- New methods to handle the fruits and to process them in order to diversify chestnut-based production.

#### TRAINING NEEDS IN CONNECTION WITH CHESTNUT TREE GROWING

Training activities are necessary for the professionalisation of the sector, which would make raw production, processed products and other connected products more profitable.

One of the main problems of the rural context is the lack of training, both general and specific. Most of the professionals that work in the sector are not qualified and have not finished secondary education (high school and vocational training) although they have completed primary education.

These training needs must be addressed, as chestnut tree growing can be considered as a New Source of Employment, due to its employment creation potential and its economic, social and cultural possibilities.

### 3.2. Employment creation potential of the resource.

The New Sources of Employment connected with chestnut tree growing are related to:

The improvement of plantations, by improving work methods and preventing the two main diseases affecting chestnut trees, that is, ink and blight diseases. Such improvements would allow for larger productions and thus for better economic returns for those that use environmentally friendly work methods.

Given the age of most growers, the creation of small forestry enterprises that deal with the cleaning and maintenance of forests, and which carry out other tasks as pruning or phytosanitary care. These initiatives would provide new jobs in the forestry and chestnut sectors, very likely to become important economic sectors.

The creation of small enterprises dealing with the processing, canning and marketing of the product. These enterprises would form a small network that would improve the economy at local level and create new jobs.

The creation of Chestnut Learning Centres that promote all the activities connected with chestnut trees (such as ecosystem, flora and fauna, cultural and gastronomic activities -traditions, tools used locally and ethnography - and cultivation) is also likely to provide new employment opportunities.



Figure 39. In some cases harvesting can be mechanised.

Employment creation based on chestnuts must also take the activities connected to its distribution into account:

- Local markets
- Hotel sector
- Restaurant sector
- Rural tourism centres
- Shops and small stores
- In some cases, superstores of the region
- Fairs
- Promotional activities
- Recovery and support of the culture and traditions connected with chestnut trees

Summing up, chestnut tree growing can be a rural emerging profession with employment creation potential:

#### Farming sector:

- Agricultural production based on better production techniques and on disease control. (Chestnut cultivation specialist).
- The product should be marketed directly by cooperatives and associations of chestnut growers. (Chestnut cultivation specialist).

#### Business sector:

- Enterprises that process and market chestnut-derived products. (Processed chestnut product specialist).
- Shops and markets that sell processed chestnut products. (No specific qualification required).
- Chestnut wood furniture and woodcrafts production. (Expert woodcrafter).
- Chestnut tree nurseries and plantations. (Specialist on chestnut cultivation and tree nurseries).

**Agri-food sector:**

- Restaurants with chestnut-based menus. (Catering specialist).
- Food stores that sell processed products. (No specific qualification required).

**Environmental and rural tourism sector:**

- Forestry and agricultural enterprises dealing with chestnut care (planting, pruning and grafting). (Chestnut cultivation specialist).

- Activities connected with the environment and the so-called green tourism. (Environmental specialist).
- Chestnut Learning Centres. (Specialist in forestry ecosystems connected with chestnut trees and related flora and fauna).

**ACTIVE TOURISM****1. GENERAL DESCRIPTION.****1.1. Description of the resource.****1.1.1. What is Active Tourism?.**

The demand for active tourism activities has grown in the last few years. At the same time, the scope of the term has changed. Thus, the activities that were considered to be reserved to professionals in the past are now within the reach of the general public in mountain tourist resorts. This type of tourism consists of practicing sports in rural contexts.

It is closely related to ecotourism, green tourism, and adventure tourism. It also involves some cultural

interests connected with history, art, crafts and architecture.

The basic principles of active tourism are high quality, an environmentally friendly attitude and a sustainable management that makes the activity compatible with the context where it is carried out. This concept is the opposite of passive tourism, that is, mass tourism and other practices that are considered to damage the environment and local culture.

Active tourism requires an active involvement of visitors, whether physical or mental. Tourists have to interact with the culture and the environment, and learn from them and respect them.



Figure 1. Active tourism includes activities connected with ecotourism, green tourism and adventure tourism.



Figure 2. European countries have plenty of mountains, lakes, rivers, forests etc. Tourist activities must respect the characteristics and traditions of the region where they are being developed.

New professions connected with this resource are conditioned by an increase of the opportunities in each area. These new opportunities would boost the market

and would ensure the availability of certain activities that are considered to be specific of each region.

### 1.1.2. Active Tourism activities.

AERIAL ACTIVITIES:	Paragliding	
LAND ACTIVITIES:	Cycling Horse riding	Trekking Climbing
WATER ACTIVITIES:	Paddle sports (kayaking, canoeing and white water rafting) Water skiing	
SNOW ACTIVITIES:	Skiing Snowboarding	Mushing Snowshoeing

#### A) ACTIVE TOURISM: AERIAL ACTIVITIES.

##### • PARAGLIDING

The word "paraglider" comes from the word "glider".

Paragliding involves free flight. Free flight consists of flying by using gravity to descend and thermals to ascend.



Figure 3. Paragliding involves free flight; it consists of using gravity to descend and thermals to ascend.

There are two free flight sports: Paragliding and hang gliding.

Hang gliding is much more expensive than paragliding. It is possible to fly faster and further. Paragliders fly slower but it lasts longer.

Hang-gliders are heavier and more difficult to control, and therefore most active tourism air activities focus on paragliding rather than hang-gliding.

Nowadays paragliding is governed by federations and other national governing bodies.

In order to practice paragliding, a basic equipment is needed including the tourists' personal equipment:

A protective flying suit

Gloves

A good pair of boots with reinforced ankles in order to walk in steep surfaces

Backpack

Sunglasses to protect our eyes from the sun and the wind

and also the technical equipment needed in the flight:

Paraglider
A harness with back protection, a helmet, and a reserve parachute for safety purposes
An altimeter, in order to measure height during the flight
An anemometer, in order to determine wind speed before taking off
A barometer, in order to determine the wind pressure and ensure an easy take off
A compass or GPS; these instruments will help the orientation during the flight
A radio station, in order to keep in contact the crew

Paragliders are not parachutes. Paragliders have the shape of an elliptic bell, much longer than that of a parachute. These aircrafts are very simple but their design is very complex.

They have several layers of material forming cells within the bell-shaped structure.



Figure 4. Harness with back protection - This device holds the pilot to the paraglide and allows him or her to sit down comfortably while in the air.



Figure 5. The aerodynamic shape of paragliders is maintained during navigation thanks to the pressure caused by wind speed and air over the cells of the bell-shaped structure.

The aerodynamic shape is maintained during navigation thanks to the pressure caused by wind speed and air over the cells of the bell-shaped structure.

There are several groups of ropes hanging from this particular bell, which converge on the harness, where the pilot seats.

Piloting is an individual activity, where everything has to be controlled by the pilot, who must have the necessary knowledge and experience in order to face any unexpected situation.

Paragliders can take off, fly and land with wind conditions between 0 and 20 Km/h. Paragliders can fly for hours. No fuel is needed; it depends on weather conditions, experience and the body's resistance to movement.

At low speeds, paragliders can land in small areas with great accuracy. In order to do so, soft winds and ideal weather conditions are required.

In order to control and handle the paraglider, the pilot must pull two ropes that are connected to the upper edge of the surface of the wing. With these ropes the pilot can reduce speed, turn or increase speed. When there are some turbulences, the inner soft structure and

the elongated bell shaped structure change the pressure over the wing. These changes make the wing close. In order to open the wing again and go on flying, the pilot must descend fast and fly faster.

**The phases of the flight are the following:**

#### 1. Preparation

Take the paraglider out of its cover, stretch it out and check that the ropes are not tangled up.

Connect the bands to the snap hook.

Put on the harness, the boots, the gloves and the flying suit.

Turn on the GPS and check everything is all right before the flight.

#### 2. Take off

Decide on the flying plan and make sure that the weather is favourable.

Stand on the slope facing the wind and hold an brake and a band in each hand. Then push the wing strongly and continuously in order to help it rise with the bands.

When the wing is over your head, start running towards the void.

#### 3. Flight

The first flights of a beginner are normally used to practice landing and using the brakes to make turns.

After mastering the basic techniques and manoeuvres, one can enjoy a bit more "being among the clouds" using air drifts and thermals in order to move in the air.

#### 4. Approximation

Once we are near the soil we must get ready to land.

Before landing, we must spot the best area (free of obstacles).

It is advisable to face the wind in order to loose speed and position ourselves over the chosen area.

#### 5. Landing

Once over the landing area, the pilot must hold the harness allowing the wing to gain speed, and release the brakes.

When the pilot reaches the land, he must brake by moving his hands and the ropes towards his hips. This will convert the kinetic energy (speed) into potential energy (height).

Most of the time, this allows the pilot to loose speed and land softly.

Paragliding can help the economy of rural areas by creating direct and indirect employment.

Users are normally families, tourists or groups of tourists. They are looking for activities that keep them fit, give them peace of mind or even a dose or adrenalin.

### **B) ACTIVE TOURISM: LAND ACTIVITIES.**

#### **• CYCLING**

Cycling is the main means of transport in some flat areas. Obviously, this is not the case of steep and hilly areas.

Flat lands are more suitable for the elderly and for families with small children. Steep, hilly areas are more attractive for young people who are used to physical activity.

It is important to be aware of these aspects when devising a marketing strategy concerning cycling as a tourist amenity, as the needs of each group will probably be different. In general terms, cyclists prefer summer to winter. Excursions are normally planned in autumn and spring.

People that practice mountain biking in rural areas are the group of users more likely to damage the environment. Tomorrow's cycling conditions depend on the way we use mountain bikes nowadays. The International Mountain Bicycling Association has devised a set of rules concerning trails. These rules are accepted worldwide as a standard code of conduct for mountain bikers. The aim of this set of rules is to promote mountain biking as a respectful and environmentally and socially sensible activity.



Figure 6. People have discovered the advantages of cycling as a recreational and sport activity, or as a fast means of transport for daily life.

yourself accordingly. Be self-sufficient at all times, keep your equipment in good repair and carry necessary supplies for changes in weather or other conditions.

A well-executed trip is a satisfaction to cyclists and not a burden to others.

Cycling is very common in rural areas, and therefore can be very important for the promotion of rural areas that lack other infrastructures.

The creation of new trails and the improvement of the existing infrastructures can attract more cyclists to rural areas and contribute to regional development.

On the other hand, the tourism connected with cycling creates employment within the hotel sector and the service sector. Moreover, local tourist enterprises can offer guided tours on the region, providing employment opportunities for tourist guides.

Some of these rules are described below:

- **Ride on open trails only.** Respect trail and road closures and avoid trespassing private properties.
- **Leave no trace.** Practice low-impact cycling and be sensible with the land and recognise different types of soil and trail construction. Wet and muddy trails are more vulnerable to damage, and when trailbed is soft, consider other riding options. This also means staying on existing trails and not creating new ones. Do not cut switchbacks, be sure to pack out at least as much as you pack in.
- **Never scare animals.** All animals are startled by an unannounced approach, a sudden movement or a loud noise. Running cattle and disturbing wildlife is a serious offence. Leave gates as you found them or as marked.
- **Plan ahead.** Know your equipment, your abilities and the area in which you are riding and prepare



Figure 7. When you start cycling, it is very useful to engage in an individual training programme. In order to keep fit one must follow a light diet including plenty of liquids.



Figure 8. Man has used horses for thousands of years as a work tool and means of transport. Not until quite recently have they started being used with recreational purposes.

### • HORSE RIDING

In horse riding as a leisure activity, horses appeal both the audience and the participants. In all tourist activities connected with horse riding, the interest on horses is more active (riding) than passive (watching).

Including horses in recreational and leisure activities has the advantage that they can be rode all year round. This activity can be available full time, and therefore is a good business opportunity for the professionals involved in Active Tourism.

**Service providers must bear in mind several facts when offering horse riding as a tourism activity:**

- They must have stables for horses and horse riders to start and finish their working day, whether the activity has taken place within the leisure centre or somewhere else.

There must be an area where horses can stroll and run during mounting and training. This area is called riding school and is normally fenced and covered with sand.

- There must be different types of horses: affable and quite for children and beginners and aggressive and robust for more experienced riders.

The minimum number of horses necessary for a small business is 4 or 5. However, this depends on the size of the business and the investment.

- Staff must be experienced and trained. They must keep horses in good condition, train beginners and act as guides in horse excursions.
- The basic equipment for riders is described below:

A saddle for each horse and some spare saddles. Saddles must have a raised part in the back, called cantle, which holds riders and protects them.

The reins are normally made of leather and must be kept in good condition.

Boots with the appropriate heel height, riding trousers, cagoule and officially approved helmet.



Figure 9. In order to practice this activity a training arena is needed for children and beginners to practice with the help of a trainer.

**When creating the trails and routes several factors must be taken into consideration:**

- Whenever possible, routes should cross public areas only.
- In order to use private land, permission must be obtained beforehand.
- Busy roads must be avoided.
- Noisy areas, as industrial areas must be avoided.
- Routes must have nice views and landscapes.

- Obvious dangers must be avoided, as for instance very steep slopes, low tree branches, long grass preventing the horse and the rider from seeing the ground, etc.

Horse riding can be classified according the place where it takes place:

- **Mountain horse riding**- trails are in hilly areas. This group can be classified into
  - *Athletic mountain riding* – the rider is very fit and needs to have a lot of experience, as the land can be abrupt.
  - *Tourist mountain riding* – The trail is in a hilly area but it is much easier and riders do not need so much experience and excellent physical conditions.
- **Snow horse riding** – these trails are covered by snow, it usually takes place in the winter.
- **Water horse riding** – the trail crosses different types of water masses. There are different categories within this group:
  - *Lakeshore horse riding*- which are rides along the shores of lakes.

- *Seashore horse riding*- horse riding along beaches.
- *River horse riding*- most of the trails follow the course of a river.

There is another classification based on the aim sought by the riders:

- **Educational horse riding** – the main objective of the activity is not riding itself but learning things such as the local history. The subject matter may be nature, archaeology or culture. In this case riding is an "instrument" for learning, which is the purpose of the activity.
- **Athletic horse riding** – riders compete in different events, and have to overcome obstacles and difficult conditions.
- **Casual riding** – where the main objective of riders is to enjoy riding itself and the trail and the peacefulness and the beauty of the landscape.

There is another classification of horse riding activities based on the duration of riding sessions:

- **Daily/hourly excursions**, the trail can take a few hours or a whole day (normally they take 2-6 hours).



Figure 10. Horses are a new opportunity for the economy of rural areas. Horse riding can have an important role in tourist development. This activity strengthens the links between people and nature and is a different alternative to hikes. Rural trails can be used for horse rides.

- **Multi day excursions**, tourist service providers design long routes, including meals and lodging.

When planning multi day excursions, several aspects have to be taken into consideration:

- The guide must stay with the group all along.
- Provisions must be dealt with in advance.
- Overnight accommodation must be arranged and planned. It is advisable to have some alternatives in case the programme has to be altered due to bad weather conditions.
- The guide must know the trail and must be able to guide the group safely.
- The trail should have some connection with local natural and historical settings, as old cork tree forests or castles. This will make the itinerary much more interesting for riders.

Horses are a new opportunity for the economy of rural areas, both as a stand-alone activity or combined with other leisure activities. It can have a positive effect in the development of rural areas, due to:

- A better knowledge of the villages of the area;
- The use of local lodgings;

- A greater involvement in local activities;
- The use of local trails and routes;
- The restoration and use of local buildings.

Horse riding can have an important role in tourist development. This activity strengthens the links between people and nature and is a different alternative to hikes. Rural trails can be used for horse rides.

#### • TREKKING

Walking is the best way to explore the environment, especially when following trails marked with the international codes.

Trekking is suitable for all seasons and all types of territory, including parks, forests, coastal areas, plains, tablelands and protected areas.

Moreover, trekking is the most intuitive activity that can be performed in nature.

It requires no specific technical skills or equipment, only comfortable clothes and good shoes.

A good technique can prevent damages and ensure that trekkers enjoy the itinerary.

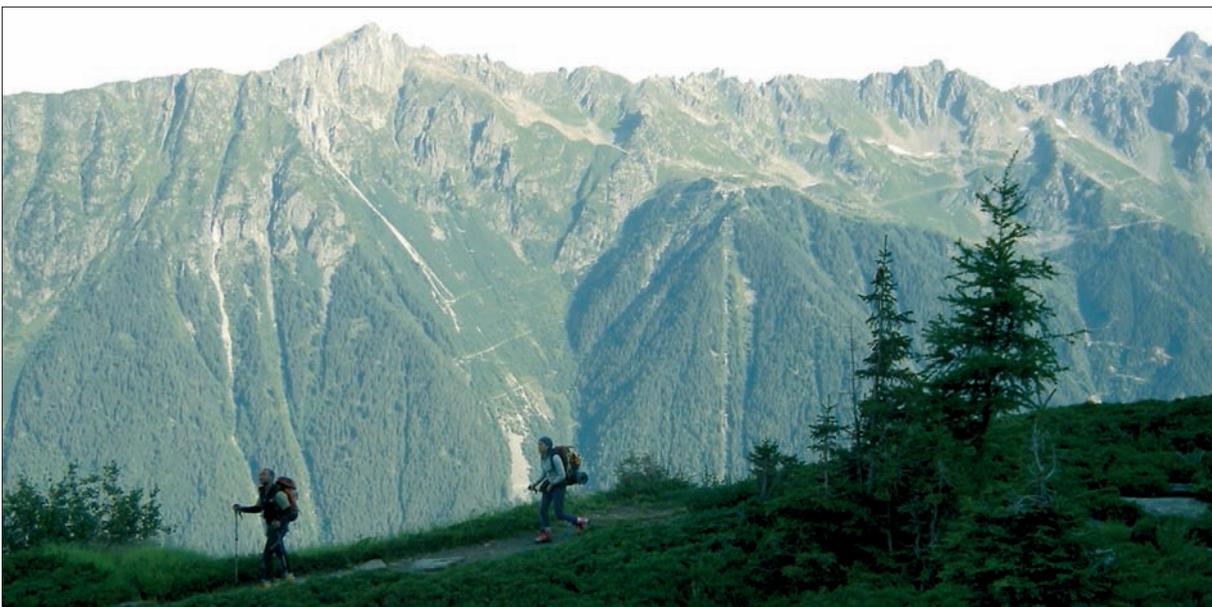


Figure 11. Walking is a peasant way to know natural sites; it is a very popular open-air activity. Almost anyone can enjoy walking. There is no need for special knowledge or equipment.

The following aspects have to be born in mind:

- **Adequate body position.** The spine must be stretched out, we must stand straight and relaxed, the head must be upright, eyes looking to the front, our chin should be parallel to the ground.
- **Relax your shoulders.** Arms should be slightly bended and should swing naturally as we walk.
- **In order to move the lower limbs,** we must use abdominal muscles and hip flexors to rotate the hip forward and allow the leg to move forward.
- **Ankles should be flexed,** and toes should be curled upwards. First, we must move one foot in front of the body.

When our body weight passes over the leading leg, we must take the next step pushing the toes against the ground.

There are different trekking levels, depending on the duration of the trail or the need to stay overnight. If the route can be finished within a day, it is called a **walk or hike**. If the route takes more than one day to be completed, we speak of **trekking**.

As for equipment, walking does not require special gear, only comfortable clothes, good shoes and a backpack:

- **Boots:** Boots are the most important element. Boots with an appropriate shape are comfortable. There are many different types of boots in the market; it is important to choose the right kind for each activity.
- **Backpack:** A small backpack should be enough for one-day excursions. For multi day excursions, the backpack should be bigger, as we need to carry the camping equipment with us. The ideal backpack should have an anatomical shape and should have adjustable straps in the waste and shoulders. External pockets are very useful to keep objects that we are going to need often.
- **Clothes:** Clothes must be suitable for the weather conditions we expect. We should wear comfortable clothes that can draw sweat away from the body.

We should avoid tissues as cotton, as they hold sweat and may lower body temperature and cause hypothermia.

Modern, perspirable tissues that draw sweat away from the body are advisable.

These modern fabrics keep the body fresh and dry even when doing physical efforts.

In the mountain weather can change quite fast and unexpectedly.

Therefore, we should always wear spare in case there are weather changes.

**In special weather conditions:**

- **Heat:** We must wear light coloured clothes that reflect sunlight. Sun hats and sunglasses protect from direct sunlight and dazzles. It is advisable to wear long trousers instead of short ones, in order to protect our legs from UV rays.
- **Cold:** Warm clothes (such as wool), gloves and a warm hat prevent an excessive heat loss, which may lead to hypothermia.
- **Mountain routes:** We should wear several layers of clothes, as this is an effective way to preserve



Figure 12. Trekking is suitable for all seasons and all types of territory, including parks, forests, coastal areas, plains, tablelands and protected areas.

heat. Wearing a thin layer of thermal fabric next to the skin allows sweat to pass through it. The next layer should be a thick and warm fabric. The outer layer should protect us against weather conditions. This system allows us to take off or put on the different layers depending on the weather conditions and the effort we are doing. One single layer would not be effective.

Even though there is not a specific system to measure the difficulty of a route, it is possible to distinguish physical and technical difficulty.

Technical complexity refers to the route itself: the existence of a trail which is conveniently marked, the need to use a map or a compass, the need to use safety measures and technical equipment.

As routes become more complex, we must be acquainted with the following:

- Navigation techniques (map reading, distance estimation, correct use of compass and other navigation devices.)
- First aid.
- Emergency protocols.
- Weather forecast.
- Group guiding.

We must also take into account that leisure activities can have a negative environmental impact. When trekking, we must follow some simple rules, known as the "landscape code" which are intended to protect and at the same time enjoy the environment.

These rules can be summed up in three main principles:

RESPECT
PROTECT
ENJOY

*Trekking contributes to the conservation of the diversity among regions and also attracts the interest of visitors in these areas, reducing the seasonability of tourism.*

## • CLIMBING AND ABSEILING

The activities involving ropes and height can be divided in two main groups:

- Climbing (indoor and outdoor) consists of moving forward in a wall that may be or not be rocky.
- Abseiling consists of coming down a wall with the help of ropes.

All these activities entail risks, and therefore special training is required. For instance, anyone that decides to start climbing or abseiling must know how to make knots. Climbing can be performed in different places and at different difficulty levels.

The physical activity can range from easy and free of risks to very challenging and seemingly risky. We say seemingly risky, because quite often such risk does not actually exist, it is only perceived risk.

In most cases climbers are well equipped and trained. Learning the different techniques usually takes a long time.

The equipment used in this type of activity is complex and includes many different devices:

### • PPE – Personal Protective Equipment.

The concept of PPE is applied to products that have been designed to protect a person and guarantee their safety in different risky situations.

There are three types of PPE regulations:

- *Low risk* – These products protect people from minor injuries, such as small muscular injuries or sunburn.
- *Medium risk* – These products protect people from more serious damages, and include equipment such as sports helmets and protective vests.
- *Serious or fatal risk* – These products protect people from very serious risks or life threatening injuries, and include inhalers, ropes, harnesses, security snap hooks.

### • Ropes.

Modern ropes are made of a material called kernmantle. The kern is the inner support, and the mantle is the surrounding heath that



Figure 13. It is important for instructors and guides to have the appropriate training and experience in order to manage tourist activity programmes.

protects the kern. There are different types of ropes:

- *Static and semi-static ropes* – these ropes are used in rope descending, caves and caverns and alpine works.
- *Dynamic ropes* – These ropes are used in cliffs, ice climbing and mountaineering and alpine mountaineering.
- *Single ropes* – These ropes have been designed for climbing, and are the most suitable in narrow climbing trails.
- *Double ropes* – These ropes are commonly used in alpine mountaineering and in long routes. The advantage of these ropes is that in case one of them breaks there is always another one to protect you.
- **Climbing slings.**  
Slings are static nylon bands of different length and thickness forming a sort of knot. They are used to fix the ropes in places that may damage them.
- **Climbing harnesses.**
  - *Harness* – This device secures the body of the climber to the rope. It is an essential part of the security system. It is a belt with two loops for the legs called leg loops.

- *Chest harness* – This type of harness is worn around the chest and is used together with sit harnesses. They provide stability and protect the back in case of falls.
- *Full-body harness* – This type of harness includes a chest harness and a sit harness in one single piece. It is advisable for children. It provides a greater stability when descending the rope.

- **Safety equipment.**

- *Helmet* – This is an essential part of the equipment when climbing rocky walls. It must have an inner adjustable cradle.
- *Security snap hooks* – Two different types of hooks are used in rope descending:

HMS – security snap hook used in abseiling.

D-shaped snap hook – this type of snap hook has a hinge that keeps the rope near the bar and far from the hinge, which provides extra security in case of falls.

- *Jumar* – This device is used to climb up the ropes.
- *Eight descender* – This device is attached to the snap hook of the harness. It helps the climber when abseiling. It slows down the descent of the climber by creating friction. The shape and size of these devices prevent the rope from getting too hot or damaged.
- *Belaying device* – This device is attached to the snap hook of the harness or to an anchor point and it can stop a falling climber. It creates friction and stops the rope from sliding beyond a certain point. There are many different belaying devices. All belaying devices perform the same functions, although some of them are adapted to specific types of ropes or climbing conditions.

**One of the most important aspects of this sport is safety:**

1. Before starting climbing or abseiling, we must check our equipment both visually and with our hands.
2. Any defective material must be immediately discarded.

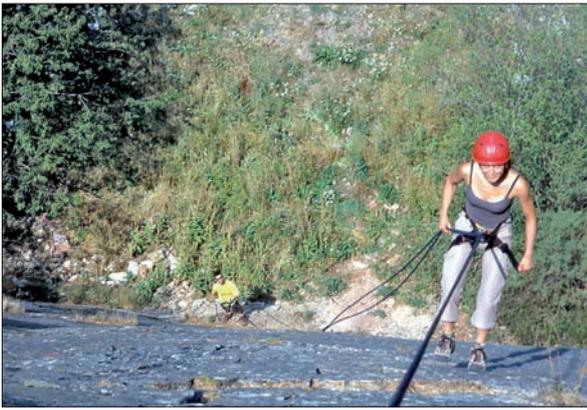


Figure 14. Abseiling consists of coming down a wall with the help of ropes.

#### Necessary checking:

- **Belt:** we must make sure that there are no open seams or signs of excessive use.
- **Ropes:** We must check and verify every rope after every session. If there are uneven areas in the ropes, we must discard them and replace them with new ropes.
- **Technical equipment:** there should not be any signs of excessive use in technical equipment. If a synthetic or metal device falls from a considerable height and hits a hard surface, it must be discarded, as there may be micro-fractures causing malfunctioning of the equipment that may provoke a fall.

#### Rescue

It is preferable to avoid rescue situations. We can avoid them with appropriate planning, good communication and thorough preparation.

However, unexpected accidents may occur and someone may need to be rescued. Each situation is different, and therefore the guide or instructor must be ready to face a rescue operation and be acquainted with all rescue techniques.

#### *If a rescue situation occurs:*

1. Make sure the rest of the group is safe.
2. Identify the problem.
3. Make a plan to solve the problem.

4. Explain the plan to all those that are involved in it.
5. Assign the appropriate task to each member of the group.
6. Make sure that everyone knows what they are expected to do.
7. Carry out the plan, making sure that there is communication between all those implied in the rescue operation at all times.
8. Once the injured have been rescued, apply first aid procedures.
9. After the accident, analyse what went wrong and plan how to avoid the same problem in the future.
10. Next, inform those involved in the activity of what has happened and tell them what must be done in order to avoid it from happening again.

Climbing and abseiling are normally performed in natural settings. However, these activities can also be carried out in cities, in rock climbing gyms. Rope descending training courses and artificial rock climbing intend to imitate the activities that are normally performed in rural areas.

Rural areas attract climbers wishing to enjoy nature and climbing in a natural setting. This activity is boosting the economy of the areas where it is available.

#### C) ACTIVE TOURISM: WATER ACTIVITIES.

##### • PADDLE SPORTS

Men have sailed rivers, lakes and seas for thousands of years. Nowadays people can travel to remote areas by waterways and discover their natural environment, landscapes and cultural heritage. Moreover, water activities represent an important economic activity in rural areas.

Canoeing, Kayaking and white water rafting are the most popular water activities available in active tourism resorts, as they cover a wide range of difficulty levels and can be adapted to the need of each family member. We may choose between still waters or the rapids of rivers.



Figure 15. Nowadays people can travel to remote areas by waterways and discover their natural environment, landscapes and cultural heritage. Water activities represent an important economic activity in rural areas.

Different types of vessels can be used in active tourism water activities. There are canoes, kayaks, rafts, catamarans etc.

- **Canoeing and Kayaking**

Canoes exist from very ancient times, and are still used as a means of transport in many places around the world. Normally canoes are open deck boats, although there are closed deck ones too.

The main difference between a canoe and a kayak is that the former is propelled with an oar or single bladed paddle. Canoe paddlers tend to kneel down rather than sit in the canoe.

Kayaks are closed deck boats. Kayaks are propelled with an oar or a two-bladed paddle, with a paddle in each side. Normally, the longer and the narrower, the faster and unstable.

Shorter and wider kayaks, with a flat frame, are slower but safer in turns.

A kayak can be meant for just one person (K-1), two people (k-2) four people (K-4) or eight people (k-8). The last two types are only used in competitions.

Kayaks can be made of rigid material, such as composite materials, marine wood and plastic, or

of non-rigid materials, as it is the case of collapsible kayaks and inflatable duckies.

- **Rafting**

White water rafting uses some canoeing and kayaking techniques, even if it normally consists of travelling down rough water rather than still water.

Rafting is normally a team sport, as it takes more than one person to drive these boats in white water.



Figure 16. Canoes are normally propelled by one or two paddlers.

**Rafts** are open deck boats with inner and outer inflatable supporting tubes. There is a thin security rope attached all around the tire tube for the crew to hold on to them and for swimmers to get in the boat. Rafts are normally made of hypalon, a very tough and waterproof synthetic material that require special and regular maintenance.

Most rafts are propelled by 6-8 paddlers using single-bladed paddles.

Paddlers distribute uniformly around the outer tire tube and secure their feet to the boat with straps.

Some rafts have a hard frame, called "oar rig". In these rafts, one single crewman drives the boat by using oars that are attached to the boat by means of tholepins.



Figure 17. Canoes can be made of rigid materials, as composite materials, aluminium or plastic, or of non-rigid materials, such as a hard frame covered by fur or fabric.

There is another type of raft, called **cataraft** or **catamaran**. These rafts have two parallel tire tubes attached to a hard frame. They can be propelled by means of oars, as oar rigs, or by means of paddles.



Figure 18. Rafting is normally a team sport, as it takes more than one person to drive these boats.

Unlike kayaking and canoeing, white water rafting is suitable for people with little experience or technical knowledge.

A guide is in charge of controlling the boat and command the crew in order to make the necessary manoeuvres when crossing rapids.

#### International scale of river difficulty

Active tourist agents providing water activities must bear in mind environmental conditions (for instance, water level, water quality, wind strength, water and air temperature and other potentially dangerous aspects) when planning tours. They must also adapt the activity to the level of expertise of each group of clients.

On the other hand, active tourism agents or operators must make sure that their instructors have the adequate training as regards safety and rescue in the area where the activities are performed.

In order to determine the degree of difficulty of rivers, an international classification system is used, I being the lowest difficulty grade and VI being the navigability limit:

Difficulty level	Necessary knowledge / equipment	Risk and Rescue
<p><b>GRADE I – EASY</b></p> <p><b>Difficulties</b></p> <ul style="list-style-type: none"> <li>- Rapid currents with small waves, without drops.</li> <li>- Few obstacles, very obvious and easily over passed with a little training.</li> </ul>	<p>Basic manoeuvres (Forwards, backwards, turns and rowing against the tide).</p>	<p>The risk for swimmers is small and self-rescue is simple.</p>
<p><b>GRADE II – BEGINNER</b></p> <p><b>Difficulties</b></p> <ul style="list-style-type: none"> <li>- Small rapids with open and clear channels.</li> <li>- Medium sized rocks and waves that are easily passed by trained people.</li> </ul>	<p>Basic manoeuvres in limited space and time (forward, backwards, turns and against the tide).</p> <p>Warm clothing, life jacket and helmet.</p>	<p>Rare danger for swimmers, help from the group seldom needed to rescue someone falling into the river.</p>
<p><b>GRADE III – INTERMEDIATE</b></p> <p><b>Water:</b> with moderate to strong water currents.</p> <p><b>Difficulties</b></p> <ul style="list-style-type: none"> <li>- Rapids with moderate and irregular waves that can be difficult to avoid.</li> <li>- Big waves and strainers are easily avoided.</li> </ul>	<p>Experience in manoeuvring in reduced time and space (Forwards, backwards and turns against the tide).</p> <p>Company, warm clothing, life jacket and helmet.</p>	<p>Injuries to swimmers are rare and self-rescue is easy, but assistance from the group may be needed to avoid distant swimming.</p>
<p><b>GRADE IV – ADVANCED</b></p> <p><b>Water:</b> strong water current, whirlpools and waves.</p> <p><b>Difficulties</b></p> <ul style="list-style-type: none"> <li>- Intense flows, powerful but predictable that requires precise control.</li> <li>- Depending on the river's characteristics, it can have unavoidable water features.</li> </ul>	<p>Experience and control of the technique.</p> <p>Good level of personal fitness.</p> <p>Knowledge of the river, company, warm clothing, life jacket and helmet.</p>	<p>Risk of injuries to swimmers is moderate to high, the water conditions make self-rescue difficult.</p> <p>Group assistance is necessary and requires pre-viously developed skills.</p>
<p><b>GRADE V – EXPERT</b></p> <p><b>Water:</b> very high jumps with strong water currents, wave and whirlpools.</p> <p><b>Difficulties</b></p> <ul style="list-style-type: none"> <li>- Extremely long, violent rapids.</li> <li>- Big, unavoidable waves and hydraulics with steep flows and demanding complex routes.</li> </ul>	<p>Experience and excellent control of all techniques.</p> <p>High level of fitness required.</p> <p>Exploration of the river is essential, occasional difficult areas. Requires company, warm clothing, life jacket and helmet.</p>	<p>Swimming is very dangerous and rescuing is difficult even for the experts.</p>
<p><b>GRADE VI – EXPERT TEAM</b></p> <p>Generally regarded as the limit of navigability.</p> <p><b>Difficulties</b></p> <ul style="list-style-type: none"> <li>- As grade V but more continuous, steeper, greater volume and less obvious routes.</li> </ul>	<p>Total commitment physically and mentally.</p> <p>High level of experience.</p>	<p>Swimming potentially fatal.</p>

Table 1. In order to determine the level of difficulty of rivers, an international classification system is used.



Figure 19. Rafts are open deck boats with inner and outer inflatable supporting tubes. There is a thin security rope attached all around the tire tube for the crew to hold on to it and for swimmers to get in the boat.

These group activities boost the development of rural areas with navigable lakes or rivers, and contribute to employment creation, and to prevent the drift from the land towards cities.

#### • WATER SKIING

Water skiing is a very fun sport. However, it is important to remember some safety clues concerning first aid, equipment and water movements.

Only authorised federations can provide training in order to perform this sport. Boat users must have a licence and appropriate training.



Figure 20. Water skiing has become very popular. It may seem surprising but it is very easy to learn.

This sport can only be practiced in authorised areas. Water skiing is performed in natural settings such as lakes, dams, former sandpits and gravel pits. Once the activity is developed, these places are more attractive to tourists, and demand grows.

National and international official associations enforce laws and directives in order to protect bodies of water and their environment.

When performing this sport, skiers are normally towed in a boat, but a towing wire can also be used.

Water skiing can be classified in different categories: barefoot, cable ski, disabled water skiing, racing and tournaments.

- *Barefoot*

In this water skiing category, the feet of skiers are in direct contact with water.

The advantage of this category is that it requires very little equipment and is quite easy to learn.

- *Cable Ski*

Cable skiing is very similar to water skiing, but skiers are not pulled by a boat but by a wire connected to a platform. The wire tows skiers in a lake. Skiers use a wakeboard or other similar devices used in this water sport.

Cable skiing is a very safe sport. The system is controlled by a computer, and it is not very energy-consuming. There is no need for a boat (normally very expensive) and therefore most skiers can afford it.

Skiers are pulled by a wire instead of a boat, and therefore there is no risk of petroleum or fuel spills.

**Wakeboarding** is another version of water skiing. In this case, a snowboard is used. This sport is divided into boat and cable ski categories.

A wakeboard is similar to a snowboard but it is used in the water, as in water skiing. Wakeboards are shorter than snowboards, and also slightly broader.



Figure 21. Water skiing is a water sport that can be performed by several users in an hour, as it is possible to pull 8-12 people at the same time.

Wakeboard skiers can be towed by a boat or by a towing wire.

Wakeboard boats are heavier than the ones used in water skiing and the shape is also different (intended to create a larger wake) and have a tower or pole to tie the rope.

A hydrofoil is a device used in order to practice water skiing but sitting down.

The sportsman is towed behind a boat with a driver and a spotter.

Water skiing has a great potential for rural development. Together with the beauty of the landscapes, it is an added interest for rural tourism.

#### **D) ACTIVE TOURISM: SNOW ACTIVITIES.**

Nowadays there are many different activities connected with snow and hilly areas that can be performed by all kinds of people.

Some of the most important snow activities are listed below:

- Skiing, including the different categories and disciplines, as Nordic skiing, alpine skiing and snowboarding.
- Dog sleigh or mushing.
- Snowshoeing.

#### **• SNOW ACTIVITIES: SKIING AND SNOWBOARDING**

Modern skiing was first practiced in Norway in the 14<sup>th</sup> Century and fast spread to the rest of Scandinavian countries.

Skis are made of wood, metal or synthetic materials and have special devices to secure ski boots.

The length of the skis may vary depending on the height of the skier and on what they are going to be used for. Beginners are advised to use short skis, as they are more easily handled.



Figure 22. Snow activities contribute to the promotion of rural areas and their cultural, natural and scenic heritage.



Figure 23. World War I (1914–1918) contributed to the development of skiing, as special skiing troops were trained.

### Nordic Skiing or Cross-Country Skiing

In this category, relatively flat or wavy surfaces are used, and long distances are covered.

In Cross-Country Skiing almost every important muscle of the body is used, and therefore it is considered as one of the most complete sports.

### Alpine Skiing

This is the most popular skiing category. It is performed in ski resorts.

Skiers use mechanic lifting systems to go up the slopes. Each ski run is graded according to its steepness and difficulty.

### Ski Mountaineering

Ski mountaineering is a more professional category.

It is advisable to have previous knowledge of Alpine skiing, for descending and cross-country skiing for ascending and moving in flat surfaces.

### Snowboarding

Snowboarding consists of sliding on snow with the boots secured to a surfboard. Snowboarders must bend their knees and keep their shoulders parallel to the knees.

The main snowboarding categories are:

*Free-riding.* It consists of surfing on the mountain freely, preferably out of the ski runs, among the trees and over untrodden snow.

*Free-style.* It consists of jumping with the board and making a series of routines in the air. This sport is practiced in snowparks.

*Freecarving or Alpine snowboarding.* It consists of descending the slopes at high speeds.

*Extreme snowboarding.* It consists of skiing down the mountains and out of ski runs. It requires previous knowledge, not only of snowboarding, but also on the mountain, avalanche risks and weather conditions.



Figure 24. Unlike skiing, in snowboarding both feet are attached to a single board.



Figure 25. Snow activities that take place in rural areas can help visitors discover and respect rural areas, which is essential for development and conservation.

Nowadays there are specialised ski resorts with all the necessary infrastructures. They are equipped with different types of drag lifts (ski lifts, chairlifts, gondola lifts, aerial tramways, inclined railways, etc.) that adapt to different types of hilly areas and to different volumes of users.

However, snow activities in the scope of active tourism can be performed with much simpler infrastructures.

• **MUSHING**

Mushing is based on dog sleigh as a means of transport on the snow.

In this sport men and dogs must become a perfect pairing. In mushing there is a "musher", or pilot, a helper and the dogs. The number of dogs varies depending on the discipline.

The main mushing disciplines are the following:

- **Sleigh.** A sleigh is a transport method equipped with skates or skis instead of wheels, that slides on snow or ice.

There are different categories, depending on the number of dogs, which ranges between 3 and 10 or 12.

- **Pulka.** a pulka is a small sleigh, normally made on a single piece of rigid plastic or metal. In this

discipline dogs pull the small sleigh to which the skier is attached.

- **Skijoring.** This discipline consists of skiing behind the dog, to which the skier is bound by a rope with a damper.

The tow-line must be tied to the skier by means of a belt.

- **Canicross.** This sport consists of a runner on snowshoes being pulled by one dog.



Figure 26. The origins of mushing are lost in time, suffice it to say that sleighs were already used before the wheel in many places.

More and more dog breeds are being used in this sport. However, most of them are Nordic breed dogs.

DOG BREEDS	COMMENTS
Alaskan Malamute 	The ones that run closer to the sleigh. The biggest and more powerful Nordic dog breed. Domineering dogs, they require very strict training.
Siberian Husky 	They are in front, to pull the sleigh. Active, light and fast dogs. Traditionally used as shepherd dogs or as hunting dogs.
Greenlander 	They are normally placed in the middle, in order to make the most of their stamina. Very strong dogs. Sleigh dogs par excellence. This breed was used by the first explorers (such as Admunsen) in their journeys.
Eskimo 	Similar to Greenlander.
Samoyed 	Normally placed in the centre of the sleigh. They are very furry, even woolly dogs, with curled tails. These dogs are very powerful but not specially fast.
Akita Inu 	Strong, vigorous dogs, similar to Nordic breed dogs, but used in game hunting in Japan. They are excellent and powerful sleigh dogs, but are less common in sprints.

Table 2. Characteristics of the dogs that are most used in mushing.

• SNOWSHOEING

Snowshoes are among the oldest transport methods on snow. For centuries, snowshoes have been used as a means of transport in areas where it snows a lot in winter and where walking on the snow can be rather difficult. These platforms cover a wider surface of snow, and therefore the weight of our body does not cause our feet to sink in the snow when walking.

In general, walking on a surface covered with snow requires an extra effort, as our feet are not adapted to it and are too small. Snowshoes are "bigger feet". They must adapt perfectly to the size of the feet of the sportsman.

Learning how to walk with snowshoes is not difficult, we must simply get used to the new dimensions of our feet.





Figure 27. Snowed forests, deep valleys, trails or forest trails are perfect for a snowshoe walk.

Snowshoes are not suitable for uneven or hard surfaces. The itineraries for a snowshoe walk must be flat, always snowy and easy to cover.

Snowed forests, deep valleys, trails or forest trails are perfect for a snowshoe walk in the midst of the magical and quite nature.

Snow activities normally take place in rural areas, which are increasingly attractive for those interested in

active tourism. These areas can help visitors discover and respect nature, which is essential for development and conservation.

Tourist snow activities are very beneficial for rural areas, as they normally entail the creation and development of other activities: hotels and restaurants, as well as other services as chemists, post offices or shops.

### E) AN EXAMPLE OF AN ACTIVE TOURISM ACTIVITY: MOUNTAIN TOURISM.

As a conclusion of the different types of active tourism, we will now describe a specific example of active tourism: mountain tourism in the Italian Alps.

The six Italian regions in the Alps, namely Valle de Aosta, Piemonte, Lombardia, Veneto, Trentino – Alto Adige and Friuli Venecia-Giulia, are suitable areas for active tourism:

- during the winter, sport lovers take their chance to go down the slopes and slide down the hillsides,
- in the summer, climbers can climb to mountain tops using almost inaccessible paths,



Figure 28. Punta Lachena, Mont Blanc. Mont Blanc is the highest mountain in the Alps; it is 4,808 metres high.

- there is also room for nature lovers, as they can enjoy their natural parks and dramatic landscapes,
- also families with children can enjoy Italian hospitality in countless little villages.

In this context, the profile of the Alpine professional Guide has gained importance. These guides accompany individuals or groups of people in excursions or as they climb iced or rocky mountains. These guides instruct people on alpine techniques and skiing techniques, except for those technical disciplines that must be taught by specialists.

The job of alpine guides takes place in the mountain, and is often hard. It is very important to have an appropriate equipment, consisting on ropes, emergency harnesses, ice axes, ice and rock pitons, warm clothes and trekking boots.

In the Alps, mountain guides work for private agencies or public bodies that manage parks, mountain resorts or natural areas. Guides can perform their activity in an individual way or as part of the CAI (Italian Alpine Club). They normally are self-employed workers with contracts that end by the end of the tourist season, but they may also work all year round.

Their fees vary from one region to another, and also according to the level of difficulty of the job. Specific rates are fixed in accordance with a minimum established in each region.

In Italy, there are two ranks of professional mountain guides: junior guides (they must be 18 or over) and senior alpine guides (they must be 21 or over). In addition to this, they must take an exam before being admitted in the training course, in which they have to take several technical and practical mountaineering tests.

The course to become junior guide takes 2 years approximately. It includes tests on subjects as the following: first aid, alpine skiing, ascent stages, topography, alpine geography, geology, glaciers and their origins, flora and fauna, history of mountaineering.

Junior alpine guides are very autonomous and can take individuals or groups ice climbing or rock climbing.

After a compulsory training phase that lasts two more years, they can become senior alpine guides, after completing another course that lasts one year. This is the highest professional level.

Senior alpine guides are absolutely autonomous and independent.



Figure 29. The job of alpine guides is often hard. The very different situations that they have to experience imply several physical and technical skills.



Figure 30. In Italy, there are two ranks of professional mountain guides: junior guides and senior guides.



Figure 31. New professions connected with this resource are conditioned by an increase of the opportunities in each area. These new opportunities would boost the market and would ensure the availability of certain activities that are considered to be specific of each region.

According to the Italian Association for tourist training, Arfotur, there is an increasing demand of these new professional profiles, in particular, of guides that take groups to unaltered places. "Environmental" active tourism is growing fast. This type of active tourism is especially interesting in order to illustrate the resources of a given territory.

## 1.2. Evolution in the use of the resource.

### 1.2.1. Origin and development of tourist activities.

In the last few years, tourist activity has increased substantially in rural areas. There are many initiatives going on, both in the public and private spheres, intended to satisfy the leisure demands and to achieve the appropriation of the resources that are associated to tourist activities.

The increase of the tourist activity started in the 80's, as a result of many different internal and external factors combined:

- a) The changes that were taking place in the agriculture sector. These changes made it necessary to find new alternatives and attempt to diversify rural economy by developing and boosting tourist activities, industry and crafts.

- b) The changes brought by new approaches to holidays and leisure time. Tourism has become a very important activity in urban societies. The fact that the quality of life of part of the urban population has increased, together with the improvement in transport infrastructures has made it possible for people to travel more and further, especially on the weekend.

These factors have contributed to increase tourism in rural areas.

- c) The EU policies on spatial development implemented in the scope of the ESDP (European Spatial Development Perspective) These development policies intend to ensure a balanced and sustainable development of EU territories, in accordance with the main Community objectives.

- d) The new and alternative employment opportunities in the environment and leisure sectors. The search for new sources of employment includes activities related to leisure and environment.

### 1.2.2. The evolution towards active tourism.

For more than 150 years, tourists have devoted their leisure time to adventure and sport in unique natural settings. At the beginning, these activities included mountaineering and travelling by balloon.



Figure 32. The search for new sources of employment has included the possibilities of activities related to leisure and environment.

Active tourism has become very popular in the last few years. More and more people want to spend their holidays in nature, experiencing adventures.

With the passing of time, the offer of this type of activities has increased a great deal.

Nowadays, it comprises a wide range of activities including trekking, rafting, canoeing, bungee jumping, paragliding, mountain biking and even different kinds of safaris.

These active tourism activities can be performed individually or as part of a more complex product, as the so called multi-activities, where nature, culture and training are combined in adventure packs that take place in natural settings.

The new promotion and advertising methods, including brochures and web pages on the Internet, have made this type of tourism more accessible and more attractive to more people.

The demand for active tourism can grow more in the future, when tourist experts likely to promote and manage outdoor activities become more involved in these activities.

Thus, it would be possible to attract varied types of public looking for adventure and new sensations and wishing to spend more time in natural areas.

### 1.2.3. Rural tourism and the sustainable management of territory.

We must bear in mind that not all places have the same appeal. Tourists are very selective when choosing a destination.

Therefore, nowadays tourism is seen as **another development opportunity** in rural areas and not as an alternative main economic activity replacing the existing ones.

Tourism in rural areas cannot be the main economic activity, as in some coastal areas. It must coexist with other activities in order to achieve sustainable management.

Tourist destinations are products or consumer goods and productive areas at the same time. Therefore, the



Figure 33. The Internet has favoured the dissemination of information on active tourism. There are more and more visitors coming to rural areas on the weekends.

development of tourism in rural areas must face two important challenges:

- Address the need to re-organise space, with a new land distribution that makes it possible to combine the new leisure demands with other traditional activities.
- The management of the environment, heritage and villages must be consistent with sustainability principles.

These two aspects are especially important concerning green tourism, where land management becomes particularly important.

When studying the sustainable management of a given territory, its load capacity is normally taken into consideration. This concept is used in order to measure at what point tourist places become too congested and packed.

The World Tourism Organisation defines tourism carrying capacity as "*The maximum number of people*

*that may visit a tourist destination at the same time, without causing destruction of the physical, economic, socio-cultural environment and an unacceptable decrease in the quality of visitors' satisfaction".*

Nowadays there are several indicators in order to measure the level of tourist saturation in a given area. The most common indicators relate the number of tourists per time unit, the number of tourists per hectare or the proportion between the number of tourists and of local inhabitants.

Tourist activities in rural areas must enhance and encourage several values:

- Respect to regional culture and local customs.
- Compliance of regional and national environmental rules and regulations, in order to preserve and protect local flora and fauna.
- Use of existing trails, tracks and paths for safety reasons and in order to avoid damaging natural settings.

Thus, the relationship between tourist activities and rural areas can be beneficial.

## 2. IMPORTANCE AND IMPACT OF THE RESOURCE

### 2.1. Current situation and impact of the resource.

#### 2.1.1. Global Code of Ethics for Tourism.

The code of ethics of the World Tourism Organisation considers tourism as a beneficial activity for host communities and countries. Its fifth article states that:

- Local populations should be associated with tourism activities and share equitable in the economic, social and cultural benefits they generate, and particularly in the creation of direct and indirect jobs resulting from them.
- Tourism policies should be applied in such a way as to help to raise the standard of living of the populations of the regions visited and meet their



Figure 34. When studying the sustainable management of a given territory, its load capacity is normally taken into consideration. The load capacity is defined as the maximum number of people that may visit a tourist place at the same time without altering its physical, economic, social or cultural characteristics and without reducing the quality of the experience of visitors.

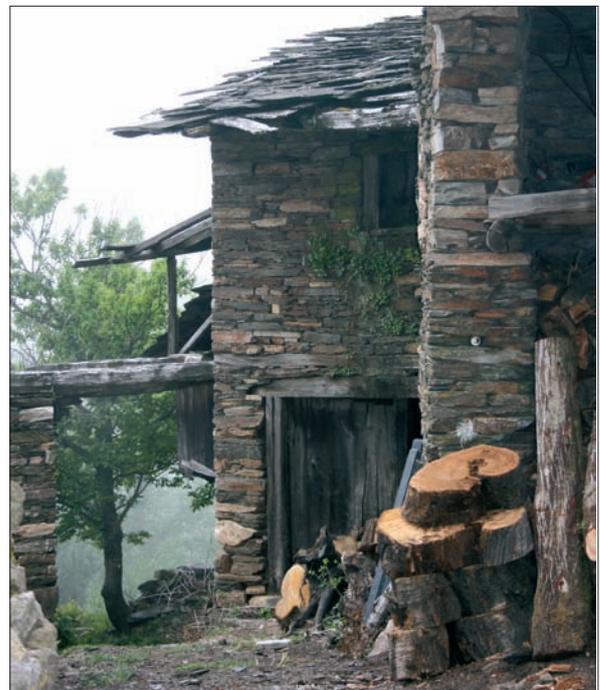


Figure 35. The planning and architectural approach to and operation of tourism resorts and accommodation should aim to integrate them in the local economic and social fabric.

needs. The planning and architectural approach to and operation of tourism resorts and accommodation should aim to integrate them in the local economic and social fabric. Where skills are equal, priority should be given to local manpower.

- Special attention should be paid to the specific problems of coastal areas and island territories and to vulnerable rural or mountain regions, for which tourism often represents a rare opportunity for development in the face of the decline of traditional economic activities.

### 2.1.2. Active Tourism in Europe.

Nowadays Europe is the leading destination of international tourists.

Some of the aspects that have contributed to tourism growth in Europe are listed below:

- The removal of borders,
- the integration of the different means of transport,
- the support of institutions,
- the improvement of cultural relationships,
- the increase of commerce among the different regions
- and the creation of links between tourism and enterprises.

In Central and Eastern Europe, active tourism, outdoor tourism and rural tourism are new important elements in tourist offer.

The World Tourism Organisation has made general forecasts for tourism in 2020:

- Sport tourism.
- Adventure tourism.
- Tourism connected with nature.
- Cultural tourism.
- Rural tourism.
- Theme parks and cruises.

In those regions where rural economy has been affected by changes, economic and social factors are important elements in the development of rural tourism.

Many European countries have natural resources: mountains, lakes, rivers, forests etc. in lively rural areas with an outstanding rural heritage.



Figure 36. Active tourism and rural tourism can contribute to the diversification of rural economy, as they create employment and they enhance and protect culture and local traditions.

These elements, combined with rural activities and sports as climbing, trekking, fishing or cycling, are the foundations of profitable rural tourism.

The proximity of the main markets and the growing demand of genuine rural tourism allowing people to interact with the environment are important elements in Europe.

However, we must bear in mind that tourist activities must respect the traditions, laws, customs and characteristics of the region where they are performed.

## 2.2. Results and impact of the resource.

### PILOT EXPERIENCES

Active tourism, outdoor tourism and rural tourism are new important elements in tourist offer. However, there is no specialised training for this specific sector.

Due to the growing demand for this type of tourism, and to the lack of specialists in the sector, it is necessary to create a new training scheme to train the future professionals of active tourism and rural tourism.

In this sense, the Lenoardo da Vinci Pilot Project "Active Tourism: A New Professional Profile" has contributed to the promotion of this type of training. In the scope of this project, an Active Tourism Manual was devised, as well as a training itinerary that provides guidelines for those who may be interested to create and implement this type of training.

In addition to this, the actions carried out within the project:

- Have contributed to establish closer relationships between partners from different countries, thanks to the exchange of experiences and good practices.
- Have included information and dissemination seminars intended to promote this new source of employment in rural areas.
- Have included training and initiatives with rural tourism providers liable to create employment.
- Have included the design of several tools intended to contribute to the professionalisation of the sector and the creation of an European Qualification in "Active Tourism", which would also contribute to the Forum on the Transparency of Qualifications.



Figure 37. In Europe, the demand for qualified staff in active tourism activities is growing day by day, specially in rural areas.

### 3. USE OF THE RESOURCE AS AN INSTRUMENT FOR RURAL DEVELOPMENT.

#### 3.1. Possibilities and conditions needed for development.

The key concept of active tourism is using the environment in order to perform physical activities. Therefore, an active tourism professional must know how to manage the environment, the resources and the host communities, in order to address economic and social needs, while preserving their culture, ecology, and resources for the future generations.

The sustainability of tourist activities rests on aspects as the ones listed below:

- preserving the natural environment,
- integrating local socio-cultural elements in tourist activities, without altering the elements that characterise the region,
- promoting the equal distribution of the benefits of tourism between the locals and the visitors, in order to increase their quality of life and
- addressing cultural and environmental elements respectfully and carefully.

Rural tourism encourages the recognition of the area where it takes place.

Rural tourism is liable to enhance the culture and natural diversity of the region and promote the protection and conservation of historical, cultural and natural heritage.

Tourism can be a sustainable development tool, as it can improve the quality of life of local population and contribute to the conservation of the environment. Tourists will be enabled to enjoy an improved tourist product.

However, in order to protect the environment and the quality of life in tourist areas and areas affected by the connections with tourist resorts, a European strategy for sustainable development and an appropriate action plan are needed.

This is essential for the long-term success of European tourist industry.

Local development policies are intended to achieve a balanced development of the European Union.



Figure 38. Active tourism professionals must understand the relationship between the conservation of local resources and the role of tourism and tourist managers.

Active Tourism can contribute to the three objectives of Europe's regional policy:

- Economic and social cohesion; as active tourism can be a source of income in rural and remote areas.
- Conservation and management of natural resources and cultural heritage; the main assets of tourist resorts.
- A balanced competitiveness within the European Union; as the tourist industry usually implies the development of other local enterprises and industries.

Active tourism professionals may use the following principles in order to apply the concept of sustainable development in tourist offers:

- They must protect and manage natural resources, as they are the foundations for economic and social development. In order to do so, they must have a plan that limits and controls the impact of the activity in the environment.

- They must understand the relationship between the conservation of local resources and the role of tourism and tourist managers.
- They must make a proper use of the environment in order to develop tourism, without altering ecological processes and preserving natural heritage and biodiversity.

In order to do so, they must be acquainted with environmental processes (as the bird's coupling season or the areas with unusual flora) and must teach others on good practices that minimise environmental impacts.

- They must respect cultural heritage and the traditional values of the local communities. Thus, they must comply with local and national regulations and the local codes on the use of the environment.

The sustainable management of tourism is beneficial for the local population, as they can become directly or indirectly involved in the activities connected with it.

Active tourism can exert too much pressure on local communities if the load capacity of the region is exceeded.

The main aspects in this context are:

- the size of the area devoted to lodging facilities,
- the traffic generated by tourist transport,
- water consumption,
- the pollution caused by sewage and the amount of rubbish produced,
- the large tourist resorts and the events and tourist activities that involve an intensive use of the countryside (as for instance, golf courses or ski resorts),
- and finally, some motorised activities, which can exert a lot of pressure on these areas.

In order to encourage the involvement of communities in sustainable tourist development, all those local people connected with the sector must be well informed and become involved:

- In order to achieve sustainable tourism, special attention must be paid to the possible impacts.

- Preventive or corrective measures should be applied whenever necessary.
- Sustainable tourism should be able to maintain a very high level of client satisfaction; it should be able to offer visitors meaningful experiences. Sustainable development should be promoted among visitors.
- Clients should be able to learn and understand the interactions between nature, local community and tourism, while they enjoy taking part in the different activities.

### 3.2. Employment creation potential of the resource.

New initiatives are being developed in rural areas, which create employment and support local resources and SMEs.

These initiatives are the response to the demands coming from the outside (improvement of the habitat and the environment, rural tourism) and from the inside (services for the local population).

These measures address the demands of local and foreign people. They are based on the new concept of rural culture, the valorisation of local products, the new cultural approaches, tourism, leisure, environmental awareness and market decentralisation.

These employment creation measures have received public support in the last few years.

The diversification of the economy is being achieved with the development of new economic activities and enterprises, based on the resources and the potential of rural areas.

#### 3.2.1. New types of rural tourism.

As we have previously mentioned, the tourist sector has changed to a great extent in the last few years.

There are many new tourist approaches that differ greatly from the traditional tourism that used to be the most common type of tourism.

The main types of rural tourism can be classified attending to the following concepts:

**Tourism in rural areas:** it consists of leisure activities performed in rural areas, and includes:

- rural tourism,
- ecotourism,
- adventure tourism,
- cultural tourism,
- business tourism,
- young tourism,
- social tourism,
- health tourism,
- and sport tourism.

All these activities are connected in one way or another with natural, cultural and rural tourism. Moreover, most of the existing tourist offers combine more than one of these types of tourism.

Even though in some cases accommodation facilities and restaurants are the main sources of income for rural resorts, there are other services connected with sport, learning and culture.



Figure 39. Rural tourism includes activities that boost the economy and culture of rural areas.

- **Rural tourism:** activities that are connected with nature and wildlife. These activities boost the economy and culture of rural areas.
- **Agrotourism:** activities that complement the standard farming activities.

For example:

- farm lodgings,
  - fish-and-pay activities,
  - hunting estates, boarding houses,
  - traditional restaurants,
  - products sold directly by producers,
  - crafts,
  - home made goods,
  - and other leisure activities linked to daily life in the countryside.
- **Ecotourism:** it comprises activities performed in protected rural areas. These activities consist of studying, admiring and enjoying flora and fauna, and all those cultural elements (whether contemporary or from the past) within these natural areas.

### 3.2.2. Employment created by tourist development.

1. Jobs directly related to the management and development of tourist industry.
2. Jobs created as a result of the development of tourist industry, in sectors such as transport, agriculture, banking etc.

Tourism can encourage the production of foodstuff for tourists and for the local market. This alternative activity may be a complementary income for rural families.

This new market should include traditional regional products whose quality is much higher than that of the products found in city markets.

Rural tourism should complement farming activities.

Depending on the season, on the characteristics of the territory, and on the seasonality of some

activities, tourist flows may vary. Therefore it is advisable to combine both farming and tourist activities, and to avoid expectations that may not be fulfilled.

3. Indirect jobs resulting from tourist activities, and from the productive activities of local people.



Figure 40. Tourism can encourage the production of foodstuff for tourists and for the local market.

Tourism brings about many improvements in rural areas, as the improvement of infrastructures or the creation or upgrading of services as:

- basic clean-up activities,
- paving of paths,
- electricity,
- telecommunications,
- schools, hospitals,
- public transport,
- safety,
- recovery of damaged areas,
- conservation of parks, forest reserves, etc.

The creation of a specific market for farm products, the recognition of the cultural and natural characteristics and the improvement of infrastructures create employment opportunities within farms and in other sectors.

Tourist activities in rural areas are liable to improve local economy if they are carried out in harmony with agriculture and if they are compatible with rural development, as they increase employment opportunities and improve the quality of life of the population involved.

However, tourist initiatives that are detached of rural areas, that is, those carried out by external agents that do not intend to involve the local population should be avoided. This type of tourism has little or no benefits for local population. It is typical of some tourist resorts connected with specific natural areas as forest reservations, where tourists are brought directly to the resort. They normally stay there just for one day. In these cases, the tourist operator and the visitors themselves are only interested in taking, and forget giving something in return to the local community.



Figure 41. Rural tourism can be a very valuable instrument for the promotion and development of depressed rural regions with stagnant economies, provided these activities are organised and managed in a coherent and sensible way.

Rural tourism can be the driving force of development, as it contributes to the recognition and preservation of the historical, cultural and natural heritage of the regions where it takes place.

### 3.2.3. Emerging professions: Active Tourism professionals.

There are already specialists in the different sports connected with active tourism and rural tourism. Therefore, the profile of **Active Tourism Professionals** will be more general and it will cover the management of the tourist offer as a whole, not only the sport activities as such.

Therefore:

#### 1) Active Tourism operators or providers must know the region where they work:

- They must be acquainted with the geographical and environmental characteristics of the area and they must be able to transmit such knowledge to their clients.
- They must know how to conduct themselves when in the countryside in order to avoid any damages in the habitat.
- They must know and comply with local regulations, laws and restrictions.



Figure 42. Active Tourism professionals must know the region where they work.

**2) Active Tourism providers must focus on organisation:**

- All technical requirements needed in order to develop a tourist programme must be written and explained in detail before putting it into practice.
- In addition to equipment, several factors must be taken into account, such as: the number of participants, weather, accesses to the place where the activity will be performed, separation in genders and age ranges.
- A risk management plan should also be devised.
- The activities carried out must comply with the regulations currently in force.
- They must have all the necessary insurances.

**3) Client needs must be a priority when offering a product or a service:**

- Good verbal and non-verbal communication skills are required.
- A good relationship with customers is necessary in order to find out what do they want.
- The product or service must be developed taking the skills of participants into account.
- Customer satisfaction surveys should be made before, during and after the activity.

**4) Active Tourism operators or providers must know the business and the market:**

- They must decide who are going to be their target customers.
- They must carry out an effective marketing strategy.

**5) Active Tourism operators or providers must have financial knowledge:**

- Cost planning is needed in order to assess the feasibility of the project.
- Some knowledge on cost estimates is necessary when developing the project, as it will help predicting benefits and expenses.
- Cost planning must take into account the costs derived from personal, material, communications, outsourcing and external financing.

**6) Active Tourism operators or providers must take competition into account:**

- They must focus on a market liable to provide good returns.
- They must remember that technical expertise is not enough to ensure success.
- They must establish long-term strategies to keep the interest of their clients and expand the business to new areas.
- Being an expert does not necessary imply being a specialist. However, being specialised in a given area ensures quality and stable demand.

A new training itinerary for Active Tourism professionals was created in the scope of the Leonardo da Vinci Pilot Project "Active Tourism: A new professional profile". This itinerary contemplates the different activities that can be offered in Active Tourism as well as different issues concerning the tourist offer, such as the knowledge of the territory or the quality of the services provided. This itinerary was intended for 700 hours of training, distributed in the following training modules:

- Nature Interpretation.
- Active Tourism Activities.
- Risk Management.
- First Aid.
- Client management.
- English for Active Tourism Specialists.
- New Technologies of Information and Communication.
- Career guidance and Work Experience.

This training itinerary is a guidebook for trainers. It provides some useful information on the training of well-prepared Active Tourism specialists. The programme has been adapted to the market, as it combines theory and practical issues. It provides several tools that encourage critical thought and the exchange of experiences.

## INTERPRETATION IN RURAL AREAS

### 1. GENERAL DESCRIPTION.

#### 1.1. Description of the resource.

##### 1.1.1. What is Interpretation?

The term "interpretation" makes reference to the techniques used in order to transmit the value of things. The interpretation of a given territory consists of a series of initiatives aimed to improve the knowledge of users on the different aspects that distinguish such territory.

AIP (La Asociación para la interpretación del patrimonio, The Spanish association for the Interpretation of Heritage) defines interpretation as:

*The "art" of revealing the meaning of natural and cultural heritage on the spot to an audience that visits a given place in their leisure time.*

Interpretation is a creative, communicative process, in which the meaning and value of a group of elements that represent a given territory are revealed to an audience for them to understand, appreciate and enjoy it and contribute to its conservation.

The interpreter uses several communication techniques in order to help people connect emotionally

and intellectually with the natural resources, the culture and the historical heritage of a given territory.

*"Interpretation is an educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience and by illustrative media, rather than simply to communicate factual information".*

Therefore, the aim of interpretation is to detect the existing resources and devise specific techniques in order to illustrate their value by arousing people's interest and making them understand their functioning and the importance of their conservation.

The rural realm interpreter acts as a link between the visitor and the resource. The interpreter helps the audience build their own idea of reality, according to their opinions, values, memories and experiences, by using a communicative technique consisting on creating emotional, physical and intellectual connections between people and the resource being interpreted.

##### 1.1.2. Interpretation in Rural Areas: Culture and Nature.

Interpretation first began in natural parks. This is why it was initially associated with nature alone.



Figure 1. Interpretation is the art of defining the role of mankind in its context, to raise awareness on the importance of that interaction, and encourage the public to contribute to the conservation of the environment.

During the 90, the concept was broadened to include cultural elements too, history and the connections between man and nature. Thus the unique values of cultural heritage became evident: the historical, artistic, aesthetic, documental, ethnographic and anthropologic values of cultural heritage.

The interpretation of the rural context made it possible to show other lifestyles and the cultural heritage of rural areas, as well as its meaning.

The cultural background is part of the local and regional identity of a given territory.

Good interpretative practices entail the understanding of the real meaning of the culture, tradition and history of local communities. Interpretive activities help visitors understand the relationship between people and the place their live at.

The interpretation of nature, history and culture give rural areas a chance to become recognised. Thus, rural areas will not only be considered as producer areas but also as valuable nature reserves with cultural landscapes.

Using an interpretive approach, the sustainable exploitation of rural areas will contribute to the knowledge, protection, respect and recognition of cultural and environmental values.

### 1.1.3. Interpretation principles.

In 1957 Freeman Tilden, one of the fathers of interpretation, formulated the following principles:



Figure 2. Rural areas are characterised by having all sorts of cultural and natural resources at hand.

1. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile.
2. Information, as such, is not Interpretation. Interpretation is revelation based upon information.  
They are entirely different things. However, all interpretation includes information.
3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical, or architectural. Any art is to a certain extent teachable.
4. The chief aim of Interpretation is not instruction, but provocation.
5. Interpretation should aim to present a whole rather than a part, and must address man as a whole rather than any facet.
6. Interpretation addressed to children should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. To be at its best it will require a separate program.

These principles can be summed up in the three main aims of the interpretive activity:

#### Provoke – Relate – Reveal

1. **Provoke:** The interpretive act must provoke interest and curiosity in the audience.  
This may be achieved by providing new ideas and presenting information in a different way, and by creating links with visitors (by using a theme, a specific language, asking questions etc.).
2. **Relate:** We intend to relate the interpretive activity with the experience of visitors, by delivering a relevant message (with personal meaning) connected with their knowledge and experiences (examples, comparisons, metaphors etc.).

3. **Reveal:** The interpreter must reveal a memorable message. The audience must be able to remember it after the visit.

Therefore, when interpreting, it is essential to focus on a key concept. It is quite useful to use a unifying theme that helps the interpreter to sort and organise information, and identify and deliver the key message.

- Making information accessible to all types of audience.
- Provoking a reaction in the audience.

The interpretation of the rural realm has the following aims:

- To provide a general idea of the place which is being interpreted.
- To communicate the meaning of a given territory in an interesting and effective way.
- To make people understand how the evolution processes happen in natural areas and how human impacts have affected the environment.
- To help to understand how social and economic needs have changed and influenced nature.
- To contribute to the satisfaction of the needs of visitors.
- To stimulate visitors' interest in an object or place and to encourage them to revisit and discover new features by their own initiative.
- To protect and preserve the resource and contribute to its sustainability in time and space.
- To improve the quality of life of local population.

All these aims are present in every interpretive initiative, but some prevail over the rest.



Figure 3. Information, as such, is not interpretation.

#### 1.1.4. Characteristics of Interpretation.

The interpreter transmit the visitors a given reality that does not express itself to its full extent. The interpretive act intends to motivate, attract, "provoke" and amuse visitors, but it also to contributes to sustainable development.

It implies:

- Creating a comfortable and pleasant atmosphere for the audience.



Figure 4. The interpretive act intends to motivate, attract, "provoke" and amuse visitors, but it also to contributes to sustainable development.

In addition to this, every interpretive process must pursue the following specific objectives:

- Educational objectives: what do we want visitors to **know**?
- Emotional objectives: what do we want visitors to **feel**?
- Behavioural objectives: what do we want visitors to **do**?

In order for interpretation to be effective it must take place on the spot, that is, in front of the element being interpreted.

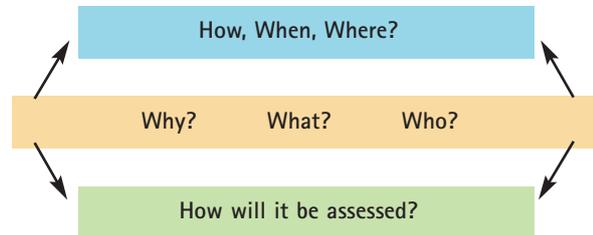
The visitors taking part in the interpretive act have gone to the rural setting in their leisure time. As it is a recreational activity, the level of attention of visitors will not always be high. However, the relaxed atmosphere will enable the audience to establish emotional connections with the place learn things about it and understand it to a greater extent (which goes beyond mere learning).

### 1.1.5. Planning interpretation: The interpretation Programme.

During the planning process, we must answer the following questions:

- Why and what for? (Objectives)
- Where and what? (Analysis of the resource)

- Who? (Analysis of the target audience)
- How, when and where? (Interpretive media and programmes)
- How and when will it be assessed? (Setting up of indicators and evaluation procedures)



Interpretive planning is the key for all rural interpretation programmes and for the design of effective and attractive activities. All interpretive activities should be the result of a previous interpretation plan.

During planning, the programmes, services, media and staff needed in order to transmit the message to the visitors are analysed. This process is based on the detection of those characteristic elements that that define the area and the heritage that will be subject to interpretation, in order to choose the media that best illustrate the interpretive message we want to transmit.

The **Interpretation Plan** is the result of this process. This Plan will provide guidelines to those involved in the interpretive initiative.

### Interpretive tools

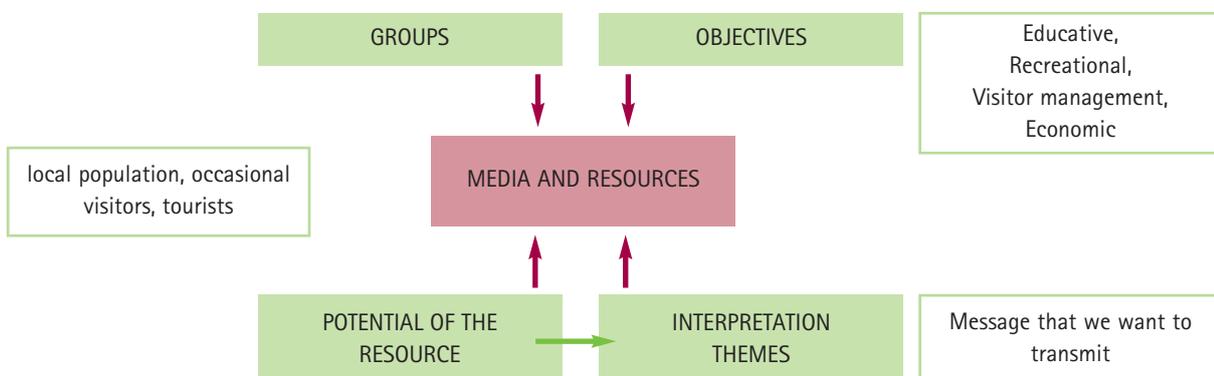
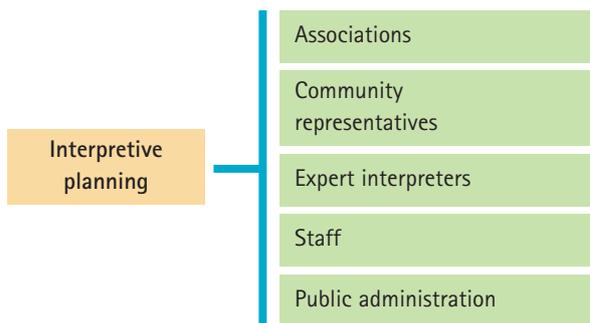




Figure 5. Historical elements are very attractive, both due to their physical appearance and their historical implications.

Interpretive planning involves working with different groups of people:



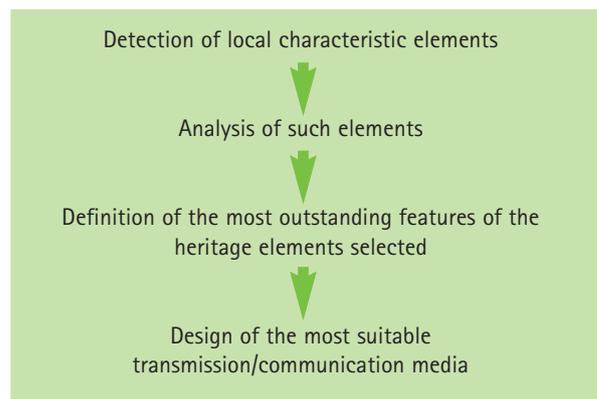
In general terms, and getting into more detail, interpretive planning consists of several stages based on:

1. We must gather and analyse information on the place that is going to be interpreted.
2. We must analyse and define who will be the target audience of the interpretive actions.
3. Finally, we must choose and develop the interpretive media and communication strategies that are most suitable in order to transmit the message to the audience.

The stages of interpretive planning are as follows:

1. Previous situation.
2. Planning aims.
3. Gathering of information.

4. Analysis.
5. Synthesis.
6. The Interpretive Plan.
7. Implementation.
8. Assessment and follow-up.



### 1. PREVIOUS SITUATION.

The previous situation is the starting point. At this point we study the place that will be subject to the interpretation action:

- We must know the size of the territory;
- we must study the area, its problems, its values and interests;
- the aim the area is devoted to;
- main fauna and flora, historic interest, cultural and ethnographic sites;
- the different accesses to the place, the times of the year when the environment is most sensitive, etc.

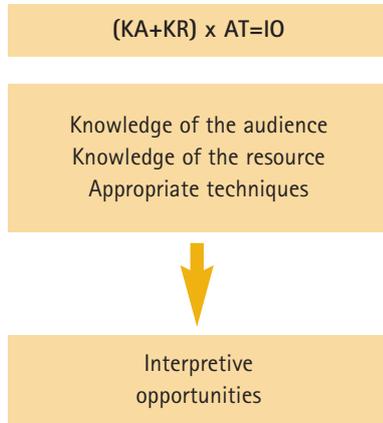
### 2. PLANNING OBJECTIVES

Any interpretation programme should include the aims and objectives. Such objectives can be classified into seven categories:

1. EDUCATIONAL.
2. LEISURE - ENTERTAINMENT.
3. TOURISM MANAGEMENT.
4. RURAL DEVELOPMENT.
5. MARKETING AND PROMOTION.

- 6. INCLUSION OF LOCAL POPULATION
- 7. HERITAGE PRESERVATION - ENVIRONMENTAL CONSERVATION

The following formula sums up the aims of interpretation, and may be applied to any interpretive activity:



**KA:** Knowledge of the audience  
**KR:** Knowledge of the resource  
**AT:** Appropriate techniques.  
**IO:** Interpretive opportunities.

<b>Knowledge of the resource</b>
Why is it so important? The interpreter must be aware of the meanings that are inherent to the place, but also of its fragility. The interpreter will try to influence the attitude of the audience as regards these and other aspects.
<b>Knowledge of the audience</b>
There are many interpretation media available. Choosing one or other depends on the characteristics of the visitors. The interpreter should make sure that visitors have a positive experience, fulfil their expectancies, and take something valuable with them.
<b>Knowledge of the appropriate techniques</b>
The decision must be the result of the analysis of the of the themes connected to the resource and the characteristics of the audience. The interpreter must evaluate the effectiveness of his or her techniques frequently. If objectives are not achieved, the interpreter has to change or update the techniques.
<b>Interpretive opportunities</b>
The different techniques used by the interpreter will have different effects on visitors, both in the short and the long term. The reaction of visitors cannot always be seen immediately.



Figure 6. The context of the element being interpreted is also important, as it usually enhances it.

### 3. GATHERING OF INFORMATION.

In this stage information on the resource is gathered, although this process goes on during all stages.

Only useful information should be taken into consideration, there is no need for an exhaustive inventory of the resources of the territory. It is a **selective information collection**. In order to do this, we must resort to existing sources of information, studies and original data. Such data will constitute the basis of the interpretive initiative.

We will need information on:

- 1.The value of the resource.
- 2.Potential and real target users.

### 4. ANALYSIS.

In order to define the interpretative potential of a group of elements or single heritage element, we should evaluate the actual suitability of the resource and its context to be visited, understood and used.

Taking the data we have collected as a base, we will analyse the following aspects:

- The resource (the place and its value).
- The target audience of the interpretive act.
- The tentative aims of interpretation.
- Contents (future messages).
- The interpretation / communication media.

#### 4.1. Analysis of the resource.

We will decide which places have the most interpretive opportunities.

Several criteria are used in order to assess the interpretive potential of a given resource:

- access,
- singularity,
- attractiveness,
- visibility and permanence of interpretive features,
- resistance to the impact of visitors,
- safety of visitors etc.



Figure 7. Natural resources must be analysed in order to maximise the outputs of interpretation.



Figure 8. Cultural heritage is a source of income for rural communities.

By analysing the features with interpretative potential, we may come up with further ideas, concepts, meanings and histories that will help us in the interpretation.

The following chart describes the criteria usually used for the assessment of the interpretive potential of a given resource:

Singularity	Singularity of the element that is going to be interpreted as compared with the context where it is located. The more singular the element is, the bigger the interpretive potential.
Attractiveness	Attractiveness deals with the capacity of the feature to attract the curiosity of visitors.
Resistance to impact	Fragility of the interpretive element. Capability of the resource to resist the impact of visitors.
Accessibility	Accessibility of the place for different types of visitors.
Seasonality	Time during which the resource is accessible (or restrictions imposed in order to preserve the element at different times of the year).
Present affluence of visitors	We must assess whether the element (or any nearby interpretive element) is already well known and has a certain amount of visitors.
Availability of information	We must assess the quality of the information available on the interpretive element. Without information, interpretation is not feasible.
Level of difficulty of explanation	Level of difficulty of a schematic explanation of the interpretive element and its meaning.
Pertinence of contents	Coherence of the interpretive element with the rest of contents.
Safety	The safety standards of the element and the surrounding area.
Level of difficulty of setting up	Adaptation capacity to the interpretive activity (seats, entrances, roads, drinking water, etc.).

#### 4.2. Analysis of the target audience of interpretation.

We must also take into consideration several aspects concerning real and potential target users.

The target audience are the types of visitors that may come to the place if interpretive services were made available.

The following aspects that must be taken into consideration:

- The visiting patterns of the place (seasons, schedules, space usage).
- The duration of the visit.
- The size, structure and type of visitor groups.

- The possibility of adapting the interpretive activity to groups with special needs.
- The social and economic characteristics of visitors.
- The origin of visitors.
- The different accesses to the site being interpreted, etc.

#### 4.3. The aims of interpretation.

Apart from setting up the planning objectives, we must consider the aims that will define WHAT is the place going to be interpreted FOR, that is, the frame of reference for the interpretive initiative.

The aims of interpretation will lay the foundations for the actions, strategies and messages that are going to be delivered.

**4.4. Selection of contents.**

Once we have analysed the audience and the place, we must decide on which contents are we going to focus on, bearing in mind the aims of interpretation.

**4.5. Interpretive media and facilities.**

Another important aspect is finding the way to help visitors come into contact with the interpretive message.

The interpretive media are the channels that the interpreter uses in order to illustrate an idea to visitors.

These mechanisms, sources, tools or work methods can be classified into:

- personal and non personal: according to the type of interaction existing between the interpreter and the audience.
- media which are/are not staff assisted: according to this classification, the services that are not managed by staff are those that use objects and other instruments in order to transmit the interpretive message.

We will now describe the interpretive media according to Stewart (1981):

**1. NON PERSONAL MEDIA**

**1.a. SIGNS AND SIGNALS**

Advantages
Clear and synthetic information Easy to build and not expensive Low maintenance costs
Disadvantages
They are static They do not provide details They are subject to vandalism Possible negative visual impact

**1.b. PUBLICATIONS**

Advantages
Low costs They can be taken as souvenirs They can be read any time They can be used by several visitors at the same time They provide detailed information
Disadvantages:
No direct contact with staff They do not answer specific questions They may be discarded as litter They cannot be updated regularly

**1.c. MASS COMMUNICATION MEDIA**

Advantages
They provide different types of information to a wide range of visitors They encourage people to visit the place They can be used to advertise special activities
Disadvantages
Production is expensive They are usually associated to "marketing strategies"



Figure 9. Signs and posters are the most common non-personal media.

### 1.d. SELF-GUIDED TRACKS

Advantages
Visitors can walk at their own pace. They help managing the use of space They involve the participation of visitors They stimulate the use of senses
Disadvantages
They are impersonal, they do not answer questions They are difficult to maintain and may be subject to vandalism

### 1.e. AUTOMATIC AUDIO-VISUAL MECHANISMS

Advantages
Quality information They create a special atmosphere They provide complementary information They encourage people to visit the place
Disadvantages
They are expensive They require electric power They are impersonal, they do not solve doubts They need permanent control and maintenance

### 1.f. EXHIBITIONS

Advantages
They are real objects Visitors can go at their own pace They can be moved from one place to another They have low maintenance costs
Disadvantages
They are static They do not tell the complete story They do not solve specific doubts They normally require "do not touch" signs



Figure 10. Self-guided tracks allow visitors to walk at their own pace, according to their needs.

## 2. STAFF-ASSISTED MEDIA

### 2.a. GUIDED TRACKS OR ITINERARIES

Advantages
Personal contact with the interpreter Contact with the resource They make using senses possible Questions can be answered There is direct control over the usage of the resource
Disadvantages
Outcomes depend on the ability of the guide Visitors cannot walk at their own pace The number of people is restricted to less than 20



Figure 11. In guided tracks, one can find ruins with historical value.

**2.b. TOURS IN MOTORIZED VEHICLES**

Advantages
They allow for larger itineraries Collective transport allows for the participation of a larger number of people Allows direct control over the usage of the area
Disadvantages
If they are individual, someone must be able to drive them They do not adapt to groups of all sizes In some cases they can pollute the environment They require special safety measures

**2.c. TOURS IN NON-MOTORIZED VEHICLES**

Advantages
They require certain skills They encourage the use of the senses Contact with the interpreter They allow direct control over the usage of the area
Disadvantages
Constraints in the time and length of the itinerary They do not adapt to any type of group They depend on weather conditions They require special safety measures Animals require special maintenance

**2.d. STAFF-ASSISTED AUDIO VISUAL MECHANISMS**

Advantages
Many people can participate at the same time They encourage the use of the senses They make many different activities possible They do not depend on weather conditions
Disadvantages
They require appropriate facilities They require special safety measures They require maintenance for the material used to be in good condition

**2.e. SPECIALISED STAFF**

Demonstrations – Development of activities – Conferences

Advantages
They allow more personalised attention They allow for more specific activities They allow to make the most of the resource being interpreted
Disadvantages
They require specialised staff

**2.f. ANIMATION**

Passive – Active

Advantages
Users can get some new skills It allows an active usage of the context There is more contact with the interpreter It is more inclusive
Disadvantages
It requires specialised staff In some cases it may require special facilities

**2.g. CASUAL SERVICES**

Advantages
They adapt to some specific situations Suitable for large groups of people
Disadvantages
They require staff with some specific qualifications In some cases they require specific facilities

## 5. SYNTHESIS.

Once we have analysed all these aspects, we must take decisions.

All feasible possibilities must be considered, taking into account methodological, economic and information aspects.

At this point, all crucial elements of the Interpretive Plan are decided upon.

## 6. THE INTERPRETATION PLAN.

The Interpretation Plan is the frame of reference for the implementation of interpretive services. It contains flexible and well-structured guidelines. It must not be understood as a static document; it is subject to continuous revision and updating.

The following data are included in the Contents of an Interpretive Plan ( by the AIP, La Asociación para la interpretación del patrimonio, The Spanish association for the Interpretation of Heritage):

- Technical equipment, collaborators.
- Introduction (Background, Context).
- The Interpretive Resource.
- Target users of the interpretive initiative.

- Aims of Interpretation.
- The message.
- The Interpretive Services.
- Follow-up and Assessment.
- Recommendations for the implementation
- References and annexes.

## 7. IMPLEMENTATION.

The interpretive services will be provided taking into account the Interpretive Plan.

## 8. ASSESSMENT AND FOLLOW-UP.

Visitor's assessment of the interpretive message is necessary in order to know if it was successful.

We must remember that the main aim of interpretation is to transmit or reveal a meaning, and therefore we must evaluate "what do visitors remember after participating in an interpretation programme".

We will now provide two examples of evaluation forms: one is meant for cultural heritage and the other was devised for natural heritage. These forms have been extracted from the Nature Interpreter Guide created in the scope of the project INNATURE.



Figure 12. There must be an interpretive plan in order to increase the value of the elements being interpreted.

**EVALUATION FORM**

**Cultural heritage**

**Resource**

Architectural heritage				
Artistic heritage				
Ethnographic heritage				
Complementary heritage				

**Identification**

Name / designation				
Style / period				
Place / location				
Level of protection / status				
Nature				
Use	Public	Private		

**Conservation**

	Good	Reasonable	Bad	Ruin
Conservation conditions				
Threats				
Other				

**Access**

Types of accesses	Highway	A road	B road	Pedestrian
Public transport	Yes	No		

**Visits**

Visit rules	Yes	No		
Free entrance	Yes	No		
Paid entrance	Yes	No		
Infrastructures	Yes	No	Which ones?	
Picture and location in the map	Yes	No		
Nearby sites of tourist interest	Yes	No	Which ones?	

## EVALUATION FORM

### Natural heritage

#### Resource

Natural setting / landscape				
Rural setting / landscape				
Protected tree				
Track				

#### Identification

Name / designation				
Level of protection / status				
Place / location				
Administrative status				
Short description	Public	Private		

#### Conservation

Natural interest	Flora	Fauna	Rivers	Geology
Rural interest	Landscape	Agriculture/cattle	Villages	Legends
Threats for its conservation				
Other				

#### Access

Tipos de accesos	Highway	A road	B road	Pedestrian
Public transport	Yes	No		

#### Visits

Time of the year recommended	Winter	Spring	Summer	Autumn
Visit rules	Yes	No		
Free entrance	Yes	No		
Paid entrance	Yes	No		
Infrastructures	Yes	No	Which ones?	
Picture and location in the map	Yes	No		
Nearby sites of tourist interest	Yes	No	Which ones?	

## 1.2. Evolution in the use of the resource.

### 1.2.1. Origin and development of the interpretation of the rural realm.

Heritage interpretation has always existed under different forms and in different places worldwide. In ancient times, elderly people, travellers and socially relevant people were the ones that carried out this task, which they did orally.

Nowadays, interpretation is a specific field in heritage management.

At present interpretation of cultural and natural resources uses more complex instruments, while retaining the primitive function of communicating something to someone in order to increase the comprehension.

The economic welfare of industrial societies made possible a generalised use of automobiles and an improvement of communications, which have brought about mass tourism. One of the consequences of these changes is that leisure areas are considered a *common asset*.

The undeniable appeal of rural areas is complemented by a growing interest on the so-called "new tourism": a type of tourism that is more interested in culture, nature and sport and which appreciates (or at least wishes to be able to appreciate) the complexity and diversity beyond apparently simple things.

Tourists feel that the natural sites they "consume" should meet certain quality standards. These processes have made people think that rural landscapes are a common asset.

In the urban societies of industrialised countries, there is a cultural conception of nature as a *common asset*. This cultural model is a modern tendency present in societies where mass tourism exists. These new leisure activities are associated with "*nature icons*". These natural sites are an important economic activity and must be taken into consideration when devising interpretive activities in rural areas.

In this new context, **Nature Interpreters** are the answer to the new needs of the mass tourism market.



Figure 13. Nature as a "common asset" is a modern concept common to all urban and industrialised western societies. Tourists feel that the natural sites they "consume" should meet certain quality standards.

### 1.2.2. European approach to land use planning and rural development.

Rural areas cover 90% of the enlarged EU's territory and are home to approximately half of its population.

Agriculture and silviculture play a key role in the management of natural resources in rural areas, and can contribute effectively to their development. Nevertheless, the primary sector is in decline.

This fact makes the diversification of the economy necessary in order to preserve the structure of rural societies.

In order to achieve this, it is important to participate and become beneficiaries of regional, national and European schemes and initiatives for rural development.

The European Union has devised several rural development schemes.

## ESDP: European Spatial Development Perspective.

Its objective is to define at Union level policy objectives and general principles of spatial development to ensure the sustainable balanced development of the European territory, according to the main objectives of Community policies, namely: the economic and social cohesion and economic competitiveness based on knowledge and observing the principles of sustainable development and of the conservation of the diversity of cultural and natural resources.

The ESDP has selected four major areas, which interact and exert considerable pressure on the spatial development of the European Union:

- **The development of urban areas:**

Almost 80% of the population of the Union now lives in towns. Urban centres are being restructured or emerging and networks of towns are forming and cooperating across frontiers. A new relationship between the town and the country is required to meet the challenges faced by our territories.

- **The development of rural areas:**

The rural areas of the European Union are often threatened by marginalisation, mainly because of the possible concatenation of constraints such as distance from the main towns, harsh climates, thinly spread population and inadequate infrastructure or a lack of economic diversification because of the preponderance of agriculture.

The environment offers both problems and assets, so demonstrating both the need to protect natural resources and ecosystems and the opportunities offered by various ways of exploiting economic potential (green and cultural tourism, agricultural diversification).

- **Transport:**

The development of the single market implies a constant growth in road and air traffic, which generates pressure on the environment.

The European Union is among the main producers of carbon dioxide emissions worldwide. Moreover, the uneven distribution of infrastructure across its territory may result in



Figure 14. The natural settings of cultural heritage elements enhance their value.

substantial imbalances in terms of economic investment and call into question the principles of territorial cohesion.

- **The natural and cultural heritage:**

The diversity of the natural and cultural is a valuable asset in Europe.

Some processes of economic and social modernisation are threatening heritage.

The fauna, flora, water, soil and traditional landscapes have to cope with the imbalances generated by an over-exploited environment. With an eye to sustainable development, Europe's spatial planning policy seeks to reduce such practices and encourage the rational use of resources.

At EU Level, Rural Development Policies are based on the following axes:

- **Axis 1: Improving competitiveness of the agriculture and forestry sector.**

Which includes:

- Measures aimed at promoting knowledge and improving human potential through vocational training, help to the setting up of young farmers, early retirement schemes, farm/ forestry management and advisory services.
- Measures aimed at restructuring physical potential and promoting innovation through measures as farm modernisation, improvement

of the economic value of forests, and adding value to agricultural and forestry products, as well as improving infrastructures and restoring the potential of resources damaged by natural disasters.

- Measures aimed at improving the quality of agricultural production and agricultural products. This will be done through initiatives including helping farmers to meet with the demanding EU standards, support food quality schemes, promotion and support of producer groups.
- **Axis 2: Improving the environment and the countryside.**

Agri-environmental measures are compulsory: Farmers have to comply with 18 standards in the fields of environmental protection, public health, animal and plant health, animal welfare, other compromise statutory requirements for farmers, as well as to keep land in good agricultural and environmental conditions. In addition to this, measures concerning the use of fertilisers and pesticides are included.

Support under this Section concerns the following measures:

- Measures targeting the sustainable use of agricultural land through, inter alia, natural handicap payments to farmers, NATURA 2000 payments and those linked to Directive 2000/60/EC and support of non-productive investments.
- Measures targeting the sustainable use of forestry land by means of afforestation measures, agro-forestry systems on agricultural land, NATURA 2000 payments and non-productive investment support.
- **Axis 3: The quality of life in rural areas and diversification of the rural economy.**

The measures in this section are addressed to farmers, their families and the wider rural population.

These measures include:

- Measures to diversify the rural economy, comprising the diversification into non-

agricultural activities and encouragement of tourism.

- Measures to improve the quality of life in rural areas, comprising village renewal and development and conservation and upgrading of the rural heritage.
- Training and information measure for economic actors operating in the areas covered by axis 3.
- **Leader approach.**

This axis mainstreams the Leader approach, which has been experimented successfully since 1989 and has contributed to innovation, employment and growth in rural areas by promoting local development strategies defined through a bottom up approach and public-private partnerships.

The Leader approach, since it is an innovative method for rural development, may be applied in a wider scale to the three other axes, if Member States wish to do so.

### 1.2.3. Global Code of Ethics for Tourism.

This Code was adopted in 2001 by the United Nations. Its fifth article, **Tourism, a beneficial activity for host countries and communities**, states that:

1. Local populations should be associated with tourism activities and share equitable in the economic, social and cultural benefits they



Figure 15. The interpretation of historical resources should be compatible with the conservation of the environment.

generate, and particularly in the creation of direct and indirect jobs resulting from them.

2. Tourism policies should be applied in such a way as to help to raise the standard of living of the populations of the regions visited and meet their needs. The planning and architectural approach to and operation of tourism resorts and accommodation should aim to integrate them in the local economic and social fabric. Where skills are equal, priority should be given to local manpower.
3. Special attention should be paid to the specific problems of coastal areas and island territories and to vulnerable rural or mountain regions, for which tourism often represents a rare opportunity for development in the face of the decline of traditional economic activities.
4. Tourism professionals, particularly investors, governed by the regulations laid down by the public authorities, should carry out studies of the impact of their development projects on the environment and natural surroundings. They should also deliver, with the greatest transparency and objectivity, information on their future programmes and their foreseeable repercussions and foster dialogue on their contents with the populations concerned.

## 2. IMPORTANCE AND IMPACT OF THE RESOURCE

### 2.1. Current situation and importance of the resource.

#### 2.1.1. Situation of Nature Interpretation in rural areas.

Due to the process of "industrialisation" of agriculture, this activity cannot provide jobs for all the rural population anymore; therefore, there is a need for new alternatives that contribute to the diversification of the economy of rural areas.

There are new business opportunities and rural development initiatives that must at least cope with the two main aspects below:

- the low quality of life in rural areas (mainly caused by a defective services sector).
- the new work opportunities derived from the production, processing and marketing of natural products.

In this context, **Nature Interpreters** represent a new employment opportunity addressing the needs of the mass tourism market, especially in rural areas.

Apart from its employment creation potential, interpretation is also liable to revitalise rural areas, provided it is carried out jointly with the local population.

Interpretation initiatives must be carried out jointly with those that live in the territory, from the very beginning to the stages of planning and implementation.

The interpretive activity is based on communication, and such communication is based on a thorough knowledge of the area or site that is being interpreted. Therefore, it is important to have a good understanding of the relationship that exists between people and their local context, history, culture, traditions, legends etc. It is also crucial to involve local population in the process.

The involvement of local inhabitants in the revalorisation of Heritage will be the key element in the awakening of social awareness of the importance of the preservation of Heritage for the sake of local population.

The strengthening of the link between heritage and society requires innovation and a management effort at all levels.

That is to say, we have to take into consideration the singularities of each community and involve the population in the valorisation and development of heritage:

- Knowledge and recognition of the importance of the natural and cultural heritage in the territory.
- A better insight into social demands and into the behavioural and cultural attitude towards heritage.
- The elaboration, based on the knowledge above mentioned, of heritage indicators (i.e. planning

tools and policy design tools) and global strategies aimed at providing an inclusive and democratic access to heritage.

## 2.2. Results and impact of the resource.

### PILOT EXPERIENCES

The transnational cooperation developed in the scope of the LEONARDO DA VINCI project "INNATURE", has had a remarkable impact in the different fields of action addressed by the participating countries:

- a) The impact of the cooperation between the participating countries has contributed to the creation of strong and durable links that will enable them to collaborate in further initiatives and carry out joint activities, technological exchanges, technical advice, promotion of products,... etc.
- b) The involvement of social partners, such as SMEs, social action groups, local entities, associations, trade unions and beneficiaries that took part in the project and in activities connected to it, as awareness raising campaigns and dissemination of results.
- c) After the project finished, the partnership has devised new work tools and has worked together in several joint experiences, activities and demonstration pilot centres.

The greatest impact of these activities is seen among professionals and authorities of the rural context. This was possible thanks to the dissemination of results.

The publishing of "Nature Interpretation" has encouraged specific actions to improve the sector in some regions.

- d) The courses on Nature Interpretation have had a very positive impact in the areas where they were organised.
- e) The main aim of the seminars organised was dissemination. The main target groups were young people, unemployed people, women and the general public.

These activities have promoted the potential of



Figure 16. The local population must appropriate their endogenous resources, that is, their natural, cultural and historical legacy. Therefore, it is not possible to carry out a sustainable exploitation of heritage without the involvement of local inhabitants, as they are the ones that really know such heritage in depth.

Interpretation as a new source of development, as well as the natural resources connected to the interpretive action and their sustainable management.

Awareness raising activities have been more successful than expected, and have encouraged some actions liable to provide new jobs and generate self employment.

- f) It has also motivated some employment initiatives based on the interpretation of rural heritage in rural areas where the project's courses had been organised.

All these initiatives have a very positive influence and encourage the development of rural areas.



Figure 17. The natural values involved in tourist activities must be preserved and sustainably managed.

### 3. USE OF THE RESOURCE AS AN INSTRUMENT FOR RURAL DEVELOPMENT.

#### 3.1. Possibilities and conditions needed for development.

Nowadays, society considers the environment as a "common asset", as it is beneficial for the community, and therefore must be preserved. Natural resources must be protected, as well as the right of future generations to enjoy it as present generations do. In order to do so, sustainable development must be encouraged.

Apart from considering the environment as a common asset of present and future generations, we must take into consideration the benefits of nature conservation (in a geoclimatic, scientific and economic sense) and also the rights of living beings as such, regardless their usefulness for human beings.

The fact that a given place is considered a common asset implies, on the one hand, that it must be accessible to everyone in the community and, on the other, that such place must be protected to ensure it meets certain quality requirements. Sometimes these two principles are in conflict.

Whenever this happens, the managing entity must find a solution and determine the relative importance of economic and environmental criteria in each case.

Interpretation is an instrument for visitors to discover rural areas. Interpretation conveys some implicit values as respect, that may help visitors to become aware of the importance of individual actions for heritage protection and the importance that heritage has in rural areas.

Interpretation must conciliate the adaptation of rural areas to tourist activities with their development. Thus, the increase in the number of tourists is compatible with conservation and with the respect to the lifestyle of local inhabitants. The collaboration and advice of local population must be encouraged constantly.

Heritage interpretation and sustainable development are interrelated, especially in the following aspects:



Figure 18. The key element in sustainable development schemes is the knowledge of the local, and the prints that it leaves throughout history.

#### ECONOMIC ASPECT

- **Valorisation of products in producer areas**

In order to encourage the recognition of local products, there must be a collective effort to bring back to life old crafts, as well as traditional professions connected to them.

These old trades, based on traditional methods, started disappearing years ago, and are nowadays associated with old fashioned and archaic societies. Thus, not only have these trades disappeared due to the fact that they are little profitable (and also because normally they were hard to accomplish), but also because they are associated to "old" lifestyles.

In order to valorise them, they must be adapted and improved, by means of new technologies. This would contribute to the survival of these traditions, but also to better work conditions thanks to technological development.

- **Improvement of the industrial and social fabric.**

The increase of industrial activity and the subsequent creation of jobs can be connected to the services and other economic activities linked to Heritage.

The sustainable exploitation of heritage provides both direct and indirect jobs, and it also reduces

the seasonality in the labour market. Moreover, the work opportunities it creates go beyond the short term, and are liable to generate stable positions in the long run.

These new opportunities are especially suitable for young population with skills on management, recovery and dissemination of heritage and tourism.

- **Support of local economy.**

The strategies intended to achieve local development include an attractive presentation and promotion of heritage, with a varied range of activities connected with culture, sports, leisure, ecology etc.

It is also very important to offer distinctive products, that cannot be found in other places or regions.

#### SOCIAL ASPECT

- **Valorisation of the endogenous.**

The valorisation of the local resources, opportunities and traditions must be carried out both by visitors and local people.

On the one hand, the local population will experience the benefits of recovering (or enforcing) their community identity and values. On the other hand, visitors will be able to experience collective memory, and become aware of other lifestyles, respecting them and learning from them.

Interpretation has a very important educative dimension for young people, as they will have the opportunity of learning humanistic values and other social and cultural teachings.

Rural development and heritage interpretation allow for better relationships between the visitors and the locals, thus somehow narrowing the gap between both worlds (urban and rural realities). This can only be achieved through active participation of both parts, enhanced and promoted through the interpretive initiatives.

#### HUMAN ASPECT

One of the most important benefits of sustainable development is the achievement of respect towards rural communities, too often associated to obsolete and old-fashioned lifestyles.

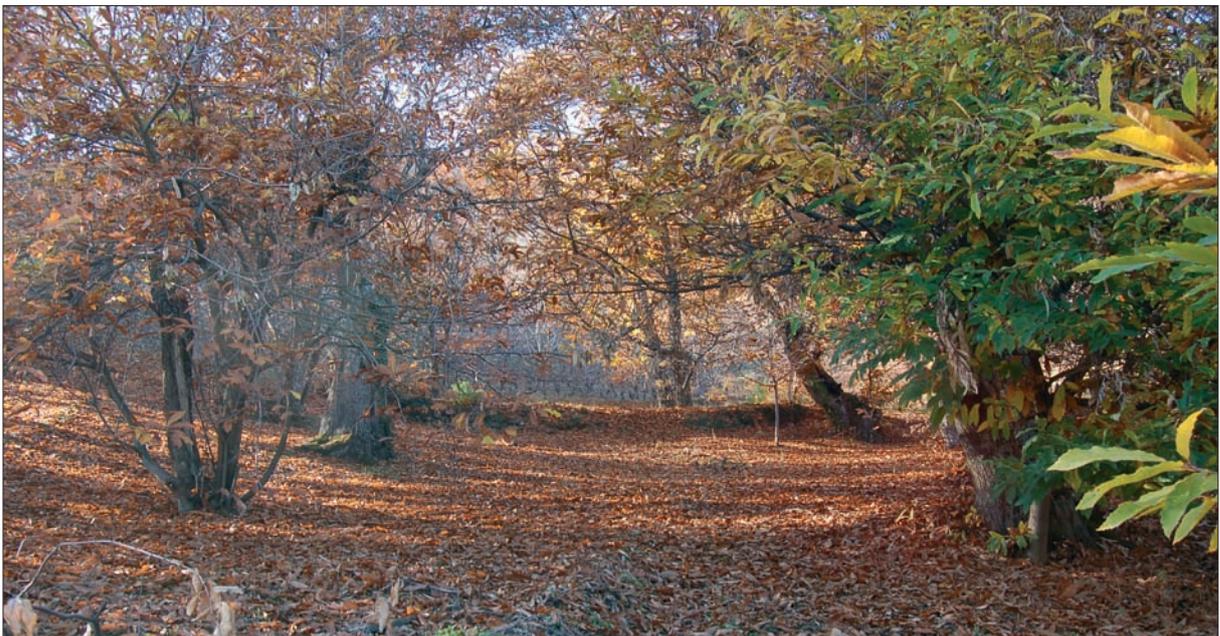


Figure 19. The importance of natural endogenous resources needs to be recognised.

Along with this goes the raise of awareness (from both locals and visitors) on the need to preserve natural and rural environments while improving and developing them.

- **Promotion of rural skills and knowledge and professionalisation.**

The importance of the revalorisation of rural traditional occupations brings about new opportunities for individual and community development, both professionally and as regards self-esteem and self-image.

### ENVIRONMENTAL ASPECT

When alternative sources of development are sought (i.e. sustainable development based on heritage and endogenous resources) natural resources can be used in a moderate, sustainable way, as they no longer represent the sole source of income. This allows for sustainable practices, less aggressive with the environment and more coherent with biodiversity and nature conservation, without implying fewer benefits for the area.

### PHYSICAL ASPECTS

Heritage interpretation implies setting up and/or improvement of several basic infrastructures: roads, railways, and conditioning of the access to the different elements of heritage. There is also the need for accommodation facilities, as hotels, hostels, restaurants, etc.

Due to the increase in human activity, this sort of initiative implies the setting up of waste processing measures, which will have a positive effect not only for newcomers and tourists but also for the community.

Finally, these initiatives usually entail reconstructions and new conservation projects in the area.

A **rural developing model** must seek the definition and reaffirmation of heritage, bearing in mind cultural diversity and the complexity of history and current social activities.

Thus, territorial diversity is a key element in local identity and represents its distinctive features: language, crafts, gastronomy, industry, and agricultural, silvicultural and farming practices in the agro-ecosystem, etc.

The respect and tolerance of different lifestyles should be promoted in order to contribute to the social, economic, and environmental development of the place being interpreted.

The conservation of endogenous elements and "local diversity" comes up as a great advantage as compared with areas where the modernisation and homogenisation processes have taken place to a much greater extent.

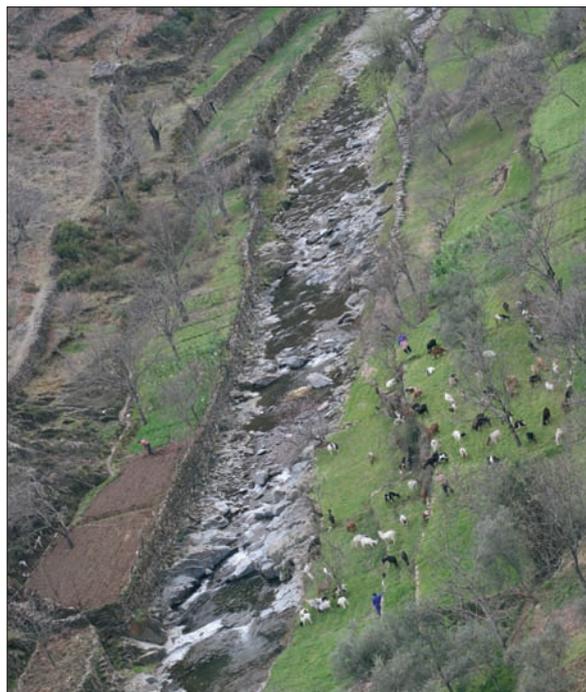


Figure 20. The work of interpreters must show visitors a territory with its own identity, its own people, with unique characteristics and lifestyles that must be respected and recognised.

The promotion of the heritage of a given territory must take several elements into consideration:

- Take local identity as a base.
- Ask local population to provide some information on heritage.
- Consider the resource and its context.
- Integrate natural and cultural heritage in landscape.

- Heritage protection and conservation.
- Include heritage in development plans.
- Raise awareness on the inherent values that cultural heritage has in the rural areas.
- influence public policies.
- Prepare for the growing demand of cultural tourism and reinforce the identity of rural areas.

Interpretation is not only a communication strategy used in a specific context, but also a management tool.

Interpretation must be understood as a management tool based on an effective interpretive programme:

1. It contributes to the compliance of regulations and reduces maintenance costs.
2. Visitors may be concentrated in the most appropriate areas.
3. The entity providing interpretation services may get a greater public support.

Interpretation, as a management tool, is beneficial in several ways. These benefits can be summed up<sup>1</sup> as follows:

- It improves the visitor's understanding of the places they are visiting
- It provides visitors more enjoyment opportunities.
- It reduces the number of dissatisfied visitors.
- It avoids the need to remind people of rules and regulations.
- It reduces non-compliance of rules on the part of campers, hikers and visitors in general.
- It reduces the risk of visitors interfering with each other, and therefore it reduces the risks of conflicts among them.
- It reduces the intrusion of administrations in the activities, and visitors feel freer.
- It reduces vandalism.



Figure 21. Territorial diversity must be detected, valued and exploited in a sustainable way.

- It reduces maintenance and operational costs.
- It helps managing other aspects within the protected area (for instance: security, restoration, maintenance).
- It helps explaining people the role and activities of certain institutions in a way that is understood by everyone.
- It improves the image of institutions as it encourages positive public relations.
- The audience gets information, and a well-informed society can take sound decisions on the management of their heritage.
- They help people to understand some unpopular measures (controlled hunting, management of fauna, fencing, etc.)
- It provides information on the needs of a given territory, which encourages public support.

<sup>1</sup>Extraído de Morales, Jorge. 2001. Guía Práctica para la Interpretación del Patrimonio. Consejería de Cultura de la Junta de Andalucía y TRAGSA, Segunda edición.

- It can help concentrating people in less vulnerable areas that can assume the impact of human activity better than others.
- It contributes to the promotion of areas where tourism has a great economic importance.

### 3.2. Employment creation potential of the resource.

Rural areas have some needs that can be covered by interpretation initiatives:

- There is a need for qualified professionals that can develop programmes and devise interpretive activities, in order to improve the effectiveness of the design and the suitability of interpretive programmes.
- Interpretation needs to be promoted as a useful and necessary instrument for an adequate management of natural, Cultural and Historical Heritage in rural areas.
- The access, promotion and stability of employment for the youth must be promoted by providing training schemes concerning this innovative profession, which is a new source of employment that encourages the active involvement of women in rural development.

Nature interpretation can have a very positive influence in local development. However, nature interpreters need strong technical skills and specific competences. Therefore, the adequate training programmes must be made available to them.

#### 3.2.1. The New Sources of Employment and the Interpretation of the Rural Realm.

The interpretation of nature, history and culture implies the recognition of some elements of heritage that have a great importance for society, or at least for a portion of society. These elements enrich society and imply certain values, sometimes hidden or tacit.



Figure 22. Several activities can be carried out in order to improve the economy of the territory where the resource is.

Interpretation is the most powerful tool that can be used in order to make these values explicit and protect their meaning and essence, while improving working opportunities in rural areas. Thus, endogenous development is possible. The local people are enabled to become involved in development and earn a living without leaving the rural area.

The new information and communication technologies improve the visibility of cultural and natural sites and thus a much larger number of people can become interested in them. This means new development opportunities in areas that used to be somewhat outshined by the most popular natural and cultural resources and therefore unknown to many people.

#### PLACES WHERE NO ENVIRONMENTAL INTERPRETATION SHOULD BE CARRIED OUT:

The working space is inside areas of natural and cultural interest like regional and national parks, reserves, botanical gardens, etc.

The interpreter usually acts as external consultant (self employed) on behalf of Public Administrations, tourist agencies or associations that manage resources. He or she may belong to cooperatives or associations involved in the environmental sector.

- **NATURE LEARNING CENTRES**

These centres include several services for visitors, as lodging, learning facilities, workshops, etc. Normally they are intended for primary school students, but secondary school may also be included. The aim of these centres is to foster the relationship between children and nature.

- **EDUCATIONAL FARMS**

These farms are connected with natural sites but are not necessarily located within natural resources. As learning centres do, they intend to create links between nature and education.

- **OTHER INITIATIVES**

There are other types of facilities, normally seasonal, as camps and work camps. These activities normally take more than 7 days and are not included in school activities.

- **VISITOR CENTRES**

These centres include all the facilities visitors need: car parks, first aid, toilets, information centres etc. Visitor centres, interpretation centres and ecomuseums fall in this category.

In these centres visitors are welcomed and get information and a general interpretive explanation of the resource. This first contact with interpretation will stimulate their curiosity about the resource.

- **TRACKS**

Tracks are normally used in self guided itineraries.

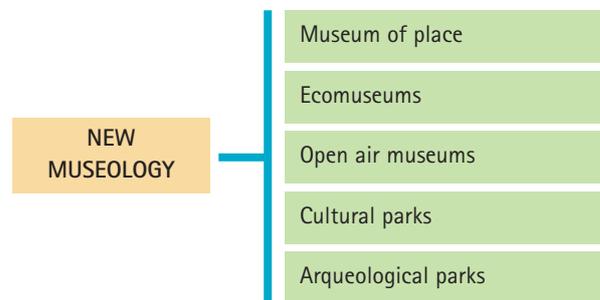
- **OBSERVATORIES AND VANTAGE POINTS (birds, landscape, animals, etc.)**

Observatories and vantage points do not have an intrinsic interpretive nature but can be complementary to the interpretive activities carried out if signposts and explanatory devices are implemented.

- **NEW MUSEUMS**

This relatively new conception is especially adequate for rural areas, as it combines the interpretation of cultural, ethnographic and historical elements with nature and landscape interpretation.

There are several types of museums. The most important ones are described below:



In a didactic sense, this new conception, which takes museums outdoors or combines both indoor and outdoor exhibitions, is very interesting.

### 3.2.2. Emerging professions: Training possibilities as regards the interpretation of the rural realm.

#### SPECIALIST IN THE INTERPRETATION OF THE RURAL REALM

Nature Interpreters help others to understand and value cultural and natural heritage. Interpreters do not simply lecture, they have a thorough understanding of their subject matter and share their interest and knowledge with others.

Interpreters must have good communication skills and must be able to provoke the audience with interpretation techniques.

In addition to this, interpreters must have some knowledge on the techniques and resources that they are showing to people, even if they at the same time encourage them to draw their own conclusions.

This is a hard task that requires the skills to choose the most suitable techniques for each resource and each group of visitors.

The following list of attributes is desirable in interpretation professionals:

- Sensible performance of their duties
- Environmental awareness
- Analysis / Assessment
- Ability to detect the most suitable message in order to deliver it to the audience

Despite the fact that there are very good professionals in this field, the full professionalisation of the sector is being a hard task. Therefore, training itineraries are needed in order to promote the official recognition of this profile as a professional qualification.

Professional interpreters must take part in clerical tasks, in design and planning and in the programming and management of interpretive activities. The curricular design for the qualification of "interpreter of the rural realm" must include specific innovative aspects and has to integrate a wide variety of competences that will help them encourage tourism, regional development and heritage.

The importance of nature and rural realm interpreters in employment creation and in the promotion of nature and culture is undeniable. Therefore, specific training must be made available. Training should cover the several different areas that are connected with this professional profile.

## RURAL TOURISM SPECIALIST ADVISER

Given the growing importance of rural tourism, there is a need for specialists in this field who are able to advise entrepreneurs wishing to enter the sector.

The general competences of these professionals would be:

- Encouraging people's interest on regional development connected with the setting up and management of small or medium-sized enterprises.
- Giving professional advice on the management of national and local resources.
- Giving professional advice on the creation and management of rural tourism projects.
- Having a thorough knowledge on rural tourism and on the area and the resources available.
- Awareness raising activities oriented to promote advisory services and foster the creation of local enterprises.
- Promotion of the relevant territories.
- Educational support activities.

There are other emerging professions that are connected to some extent to the interpretation of the rural realm, such as:

- Farmers.
- Rural tourism managers.
- Leisure managers.
- Craftsmen/craftswomen.
- Rural development project managers.

## RENEWABLE ENERGIES

### 1. GENERAL DESCRIPTION.

#### 1.1. Description of the resource.

Renewable energies are the new sources of energy that will progressively substitute fossil energy sources, which are not renewable.

Fossil energy sources are increasingly expensive, and cause a serious environmental impact in the medium and long term.

Renewable energies are more environmentally friendly. This is important, given the gradual deterioration of the environment caused by the use of work techniques that are not sustainable as regards energy use and the protection of natural ecosystems where we live.

Renewable energies are not only less pollutant, they also allow for the sustainable management of resources and for employment creation.

Most renewable energy producing sources are located in places with environmental value, as rural areas. Moreover, these energies can be said to be a new source for employment that requires specific training and technical qualification, which are necessary in order to enter this emerging market.

Often, when we make reference to renewable energy sources, we think of wind power and solar energy, and forget the importance of agroenergy (renewable energy sources from processed agricultural and forest products and by-products).

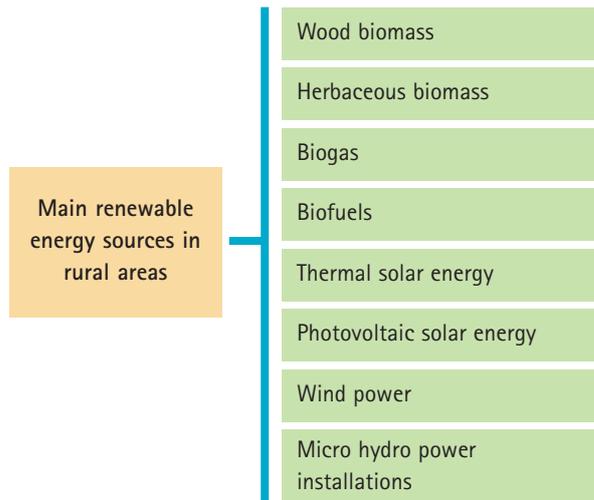
However, data show that the development potential of agroenergies as biomass, biogas and biofuels is quite relevant.

Research as regards these clean and renewable energy sources addresses new and more efficient procedures that allow for the creation of specialised employment and improve the infrastructures used.

Nowadays these energy sources are being developed, but in the future they will gain importance at all levels

and will provide many jobs in rural areas, where renewable energy sources are warmly welcomed.

Their influence is very positive, as they are environmentally friendly and allow for the setting up of new enterprises.



#### 1.1.1. Wood biomass. Wood energy.

The term biomass makes reference to any organic substance of plant or animal origin. The solar energy stored in biomass can be transformed into thermal energy, electricity or vegetable fuels. The chemical composition of biomass includes large amounts of carbons similar to those in natural fuels (coal, gas and petroleum) but they do not pollute, and are constantly renewed.

Biomass is considered as a renewable energy source when the net emissions of carbon in the cycle are 0 or less. That is, biomass is a renewable energy source when the carbon that is absorbed in photosynthesis during its production is equal or higher than the amount that is released to the atmosphere in the process of energy production.

Photosynthesis generates 120,000 million tons of dry matter yearly, which amounts to 40,000 million tons of crude oil in energetic terms.

The term **wood biomass** makes reference to the fuel that is extracted from wood and to the energy sector that uses waste wood. It is the third source of energy worldwide, after petroleum and coal. In general terms, its energy quality is higher than that of herbaceous biomass due to its woody structure.

Nowadays bioenergy is obtained from the wood of fast growing trees. The expenses of cultivation are very small and the energy yields are very high.

Therefore, this resource is essential, especially taking into account that farming and cattle production are in decline. This new production may substitute these activities and generate employment.

Wood biomass may be an instrument to prevent population from leaving rural areas and level their quality of life with the standards considered decent. Woody biomass uses natural resources located in rural areas and fosters the sustainable use of lands that have been abandoned and may be devoted to the production of clean and renewable energy.

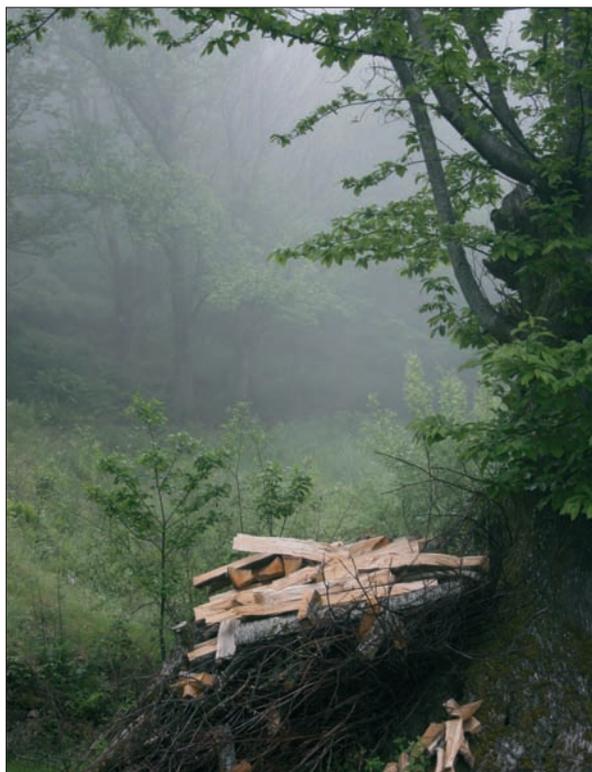


Figure 1. Wood biomass is obtained from wood.

### 1.1.2. Herbaceous biomass. Energy crops and traditional crop waste.

In order to produce herbaceous biomass we must use crops with large amounts of dry matter per surface unit. We must distinguish energy crops and waste crops that can be used as fuel in energy production.

The energy quality of herbaceous biomass changes depending on the species used.

According to a study made in the late 90 in S. Anna School, Pisa, the species that are most suitable as energetic raw material are forage sorghum, reed, miscanthus and thistle (the latter is very common in Southern Europe).

YEARLY SPECIES
forage sorghum ( <i>Sorghum bicolor</i> L., Moench)
kenaf ( <i>Hibiscus cannabiss</i> L.)
some species of the genus <i>Phalaris</i> ( <i>Phalaris</i> spp.)
lawson's cypress ( <i>Kochia scoparia</i> ., Schrad)
topinambour ( <i>Helianthus tuberosus</i> L.)
PLURIANNUAL SPECIES
thistle ( <i>Cynara cardunculus</i> L.)
miscanthus ( <i>Miscanthus sinensis</i> Anderss.)
common reed ( <i>Arundo donax</i> L.)
perennial millet ( <i>Panicum virgatum</i> L.)

Table 1. Species that are most suitable as herbaceous biomass crops.

The waste generated by commercial crops of herbaceous nature is another important source of biomass. The most common waste biomass for energy purposes is:

- Straw.
- Leaves and stalks.

	biomass d.m. (t/ha)	Heating value (MJ/kg)	Energy contents (MJ/ha)	Ashes (%)
<b>Yearly species</b>				
<i>Helianthus tuberosus</i>	25,6	15,1	386,6	6,9
<i>Hibiscus cannabifolius</i>	18,6	15,3	284,6	5,6
<i>Kochia scoparia</i>	26,7	14,7	392,5	6,8
<i>Sorghum bicolor</i>	28,2	16,4	462,5	5,6
<b>Pluriannual species</b>				
<i>Arundo donax</i>	36,4	16,7	607,9	5,0
<i>Cynara cardunculus</i>	14,8	14,1	208,7	13,9
<i>Miscanthus sinensis</i>	37,4	16,9	632,1	2,8
<i>Panicum maximum</i>	17,0	15,1	256,7	nd
<i>Panicum virgatum</i>	11,0	15,2	167,2	nd
Coal reference		27,4		

Table 2. Production and energetic characteristics of some species (S. Piero a Grado, Pisa). Source: Angelini et al., Pisa, 1999.

Type	Production (t/ha)	LHV (kcal/kg d.m.)	Type	Production (t/ha)	LHV (kcal/kg d.m.)
Straw	3	4100	Vine pruning cuttings	1,5	4100
Maize stalks	8	4100	Marc	-	4100
Sunflower stalks	4	4300	Tailings	-	3600

Table 3. Production and energy characteristics of some agricultural waste material. Source: ITALIA 2003.

There are two main reasons to use this waste material in energy production:

- It is much more abundant than forestry waste.
- and mainly because this raw material is not expensive and can be reaped and used when necessary, unlike forest wood or short-rotation forest crops.

As regards herbaceous biomass, a suitable combustion technology needs to be developed, as the high contents of ashes damage the boilers available on the market.

However, studies carried out by the project Bioenergy Farm point out that herbaceous biomass is the most suitable for energy production.

Moreover, at this point, according to the Common Agrarian Policy (CAP) energy crops, including biomass, are as important as conventional agriculture, and they may be planted in lands within the European Scheme that aims to reduce the cultivated area meant for food production.



- Forage sorghum (*Sorghum bicolor*)**
- Yearly herbaceous species
  - Yearly average production: 28,2 t d.m./ha
  - Ash contents: 5,6%
  - Silica content in ashes: 33,1%

*Sorghum* contains high levels of dangerous elements. In order to avoid this problem, a wood pellet made of a 1:1 mixture of sorghum and black poplar has been used. This mixture allows for a substantial reduction of the negative parameters.

Figure 2. Forage sorghum.



- Common reed (*Arundo donax*)**
- Rhizomatous yearly species
  - Yearly average production: 37,4 t d.m./ha
  - Ash contents: 5%
  - Silica content in ashes: 44%

*Arundo donax* has a relatively low caloric output but the rest of parameters are equally moderate, and are quite similar to the ones obtained with the sorghum/black poplar mixture, which makes it a suitable herbaceous biomass.

Figure 3. Common reed.



- Cardo (*Cynara cardunculus*)**
- Pluriannual species
  - Yearly average production: 11,4 t d.m./ha
  - Ash contents: 13,9%
  - Silica content in ashes: 15%

*Cynara cardunculus* has a low caloric output and high levels of ashes, oxides and chlorides (the amounts of chlorides exceeds the limits established by the regulations of some EU countries).

Figure 4. Thistle.



- miscanthus (*Miscanthus sinensis*)**
- Rhizomatous pluriannual species
  - Yearly average production: 28,2 t d.m./ha
  - Ash contents: 2,8%
  - Silica contents in ashes: 56%

*Miscanthus* has the lowest ash contents of all the crops considered, but has very high silicon oxide contents. The absolute amount of silicon in a Kilo of wood pellets is by far the highest of all energy crops, and may damage boilers and cause too high maintenance costs, depending on the technique used.

Figure 5. Miscanthus.

### 1.1.3. Biogas.

The chemical composition of biogas is similar to that of natural gas. The difference is the relative proportion of methane gas.

Methane contents ( $\text{CH}_4$ ) in natural gas represent the 95-97% of the volume.

The energy values of biogas depend on the relative proportion of methane ( $\text{CH}_4$ ). In the case of biogas, the proportion of methane reaches the 50-70%. Therefore, the energy value of biogas as compared with natural gas is very low.

Apart from  $\text{CH}_4$ , biogas contains nitrogen and sulphur if the raw material used is protein rich (for instance, if waste from slaughterhouses or dairy industries have been used).

Thus, the composition of biogas depends on several physical, chemical and microbial factors, but normally presents the following values:

Biogas is obtained by the anaerobic fermentation of green biomass and wastewaters from cattle farms. Mass production of methane gas can be used in order to produce electricity with turbines.

Methane ( $\text{CH}_4$ )	50 - 75%
Carbon dioxide ( $\text{CO}_2$ )	25 - 50%
Nitrogen ( $\text{N}_2$ )	0 - 7%
Oxygen ( $\text{O}_2$ )	0 - 2%
hydrogen ( $\text{H}_2$ )	0 - 1%
hydrogen sulphide ( $\text{H}_2\text{S}$ )	0 - 1%

Table 4. The composition of biogas.



Figure 6. Millions of tons of organic waste are produced daily, which generate millions of cubic metres of methane when they ferment. Methane is a greenhouse gas.

The raw organic matter used to produce biogas is biomass.

There are different types of biomass:

Biomass crops	<ul style="list-style-type: none"> <li>- Energy plantations (fast growing trees).</li> <li>- Energy crops (maize, rapeseed, etc.).</li> <li>- Cereals.</li> <li>- Oil crops.</li> <li>- Other.</li> </ul>
Waste of plant origin, processed or resulting from maintenance works	<ul style="list-style-type: none"> <li>- Different types of straw.</li> <li>- Maize, sunflower and tobacco stalks, etc.</li> <li>- Vine shoots, branches from fruit trees.</li> <li>- Waste from pastures and meadows.</li> <li>- Green waste resulting from the pruning of bushes and maintenance works in green spaces.</li> <li>- Other.</li> </ul>
Manure of animal origin	<ul style="list-style-type: none"> <li>- Manure and silage from cattle and poultry farms.</li> <li>- Forage remains.</li> <li>- Waste from parallel productions.</li> <li>- Other.</li> </ul>
Urban organic waste	<ul style="list-style-type: none"> <li>- Sewage water.</li> <li>- Solid urban waste.</li> <li>- Other.</li> </ul>
Organic waste from the food industry	<ul style="list-style-type: none"> <li>- Waste from the storage and processing of products of plant origin.</li> <li>- Waste from canning industries and distilleries.</li> <li>- Waste from wine cellars and the beer industry.</li> <li>- Other.</li> </ul>
Forest waste (wood biomass)	<ul style="list-style-type: none"> <li>- Wood resulting from thinning (sanitary felling).</li> <li>- Branches, pruning remains, bark, leaves etc.</li> <li>- Wood processing by-products (sawdust, shavings, odds and ends).</li> <li>- Other.</li> </ul>

Table 5. Types of biomass.

	DM dry matter (%)	Organic dry matter (%)	Output (litre of gas/kg of DM)	biogas (m <sup>3</sup> )
Liquid cattle slurry	10	81	400	32,4
Fresh manure with straw silage	22	83	420	76,7
Pig slurry	7	81	450	25,5
Sheep slurry	27	80	750	162,0
Fresh poultry droppings	15	77	654	53,7
Horse manure	28	25	580	40,6
Waste from beer industries	25	66	700	115,5
Apple pulp	3	95	500	14,2

Apple waste	25	86	700	150,5
Green waste	15	76	450	51,3
Mowing waste	42	90	780	294,8
Potato waste	25	79	840	165,9
Ripe and fruit waste	45	93	670	280,4
Maize stalks	86	72	900	557,3
Barley	85	85	500	361,2

Table 6. Characteristics of the main raw materials used in biogas production. (for 1 T of raw material). Source: St. Stanev.

Maize has the highest biogas contents of all energy crops.

As for the biomass made of waste materials, manure from pigs and other cattle breeding industries has the greatest potential.

In order to optimise the output in both cases, we must minimise the time between the moment biomass is fed to the digester and the conversion into biogas.

The main technical and technological pillars of organised biogas production are:

- The reduction of the amount of methane gas that is released to the atmosphere.
- The reduction of the organic waste that is discarded and left in the surface (the soil and subterranean water flows).
- The production of renewable energies (biogas) as an alternative to fossil energy sources.

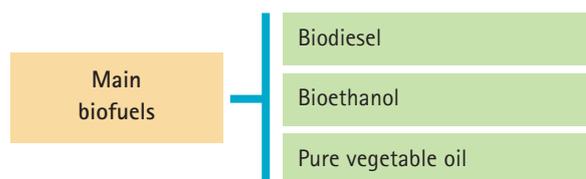
Millions of tons of organic waste products are produced daily, including food waste, bedding for cattle (mixture of manure and straw), sewage, etc. All these waste materials generate millions of cubic metres of methane when they ferment. Methane is a greenhouse gas, and is responsible of 3-5% of total emissions. This has caused an increase of 18% in the greenhouse effect.

The greenhouse effect is worsened by new and uncontrolled landfill sites and by an indiscriminate use

of biomass (especially of animal origin) from the farming and processing industries. On the other hand, these waste materials are an important source of renewable energy, given their volume, and have remarkable energetic potential that should be used.

#### 1.1.4. Biofuels.

Biofuels are another type of biomass. Each type of engine requires a different type of biofuel.



Biodiesel and pure vegetable oil can be used instead of diesel oil or they can be mixed with it. On the other hand, bioethanol is mixed with petrol.

The production of biodiesel and bioethanol implies a complex industrial process that entails organised and interlinked installations. This fact reduces the margins of the farming sector. As for pure vegetable oil, production can take place on the spot, enabling dispersed energy production.

## BIODIESEL

Biodiesel is the most important biofuel. It is made of vegetable oils. It is the result of a chemical process that takes place in the transesterification of vegetable oils, mainly from rapeseed.

Other vegetable oils from the family of the cruciferae can be used, as sunflower oil rapeseed.

Biodiesel is very similar to conventional diesel oil. It is suitable for diesel engines, after adapting the diesel circuit.



Figure 7. Biodiesel is obtained mainly from rape.

## BIOETHANOL

Bioethanol is obtained by fermentation and distillation of sugar and starch-rich plants as cereals, beets, potatoes etc. Ethyl alcohol (ethanol) is suitable for petrol engines. The combustion of bioethanol is much cleaner than that of petrol or diesel fuels.



Figure 8. Bioethanol is obtained from crops such as potatoes.

## BIOGAS

There are other alternatives to the gas that is obtained from petroleum and fed to gas engines.

A methane-rich gas suitable for conventional engines can be obtained from the fermentation and thermochemical gasification of biogas and gas from treatment plants.

## SYNTHETIC BIOFUELS (SYNFUEL)

Synfuels or BTL fuels are artificially produced hydrocarbons.

Synthetic biofuels can substitute petrol, diesel oil and natural gas.

Biofuels and other conventional fuels can be used both as fuels and in heating systems. They may be used in heating systems, given the fact that they produce heat. In heating installations, biofuels can be used instead of diesel oil.

Fuel	Density (kg/L)	Caloric output (MJ/kg)	Caloric output (MJ/L)
<i>Diesel oil</i>	0,84	42,7	35,87
<i>Rapeseed oil</i>	0,92	37,6	34,59
<i>Biodiesel</i>	0,88	37,1	32,65
<i>BTL</i>	0,76	43,9	33,45
<i>Petrol</i>	0,76	42,7	32,45
<i>Bioethanol</i>	0,79	26,8	21,17

Table 7. Characteristics of biofuels. Source: FNR.

Fuel	Density (kg/L)	Caloric output (MJ/kg)	Caloric output (MJ/L)
<i>ETBE</i>	0,74	36,4	26,93
<i>Biomethanol</i>	0,79	19,7	15,56
<i>MTBE</i>	0,74	35,0	25,90
<i>DME</i>	0,62	28,4	19,03
<i>Biomethane</i>	0,72	50,0	36,00
<i>Hydrogen</i>	0,016	120,0	1,92

The main crops used in the production of biofuels are the following:

#### RAPE

Rape has been cultivated since the 16th Century. It is the most important energy crop. It belongs to the family Brassicaceae (=Cruciferae).

In Europe, summer and winter varieties are cultivated. Summer varieties are cultivated in latitudes as high as Norway. These varieties are used as oilseed plants and in order to collect the seeds.

In Southern Europe temperatures are not low enough to allow for the growth of stalks and for inflorescence. Summer varieties can be cultivated in autumn.

In Central Europe, rapeseed is used as fodder, that is, as an intercrop in rotation schemes.

We must distinguish between two types of rapeseed. There is one variety that is very rich in erudic acid, and there are two varieties called 0 and 00 rapeseed. In 1974, a new erudic acid-free variety was developed, which is not suitable for human consumption: the 0 rapeseed. A new agronomic success brought about the varieties 00 in the 80's, which were developed from the 0 varieties. 0 and 00 varieties have a very low content of glucosinolates, which makes them much better than rapeseed cake for cattle consumption. Nowadays, this "double zero" variety is also used in the production of detergents, anti-foam agents, paints etc.

The average output of winter rapeseed variety is 3,500 Kg/Ha, which corresponds to some 1,200 L of rapeseed oil per hectare. Summer varieties produce 1,500-1,500 Kg/Ha on average.



Figure 9. Rape cultivation.



Figure 10. Sunflower.

#### SUNFLOWER (*Helianthus annuus L.*)

The genus *Helianthus* is part of the Family Asteraceae (= Compositae). The species in this genus present very different shapes. Just two of the 49 species are cultivated (sunflower and topinambour).

In some countries like Germany, the temperature is too high for large-scale cultivation of sunflower, which only takes place in more favourable climates. In not too warm climates, there may be low yield risks in cultivation and harvesting.

Countries with favourable climates (as Spain, France, Southern Germany, etc) get average outputs of 1.5-1.2 t/ha.

#### SUGAR BEET (*Beta vulgaris*)

Sugar beet was first cultivated in the late 18<sup>th</sup> Century as a result of the selection of beet with high sugar contents.



Figure 11. Sugar beet.

Around 1800, they managed to increase the sugar content of beet from 1.6% to 16%. Nowadays the percentage of sugar has risen to 18–20%. Sugar beet is one of the most important raw materials used in sugar production worldwide.

Sugar beet is cultivated mainly in warm climates, especially in Europe, USA, Canada and Asia.

Sugar beet is also used in order to produce bioethanol, although it is mainly used by the sugar industry. Sugar beets are harvested during the first year, as at that point the sugar contents are the highest, due to the substances stored in the plant.

The average output is 40–70 t/ha that correspond to 10 tons of sugar. The leaves discarded after the harvest may be spread in the soil as organic fertilizers or may be used to feed cattle.

#### **WHEAT (*Triticum L.*)**

Wheat is one of the most common cereals worldwide.

It belongs to the Family of the Poaceae (=Gramineae) and comes from the primitive emmer wheat.

The earliest findings as regards wheat date from 7800–5200 BC. Therefore, wheat is, after barley, the cereal that has been cultivated for the longest time.

Wheat is cultivated in all continents, being China, India, USA and Russia the most important producer countries. In Spain, most of the cereal-cultivated areas are devoted to wheat.



Figure 12. Wheat.

Wheat is very useful in bioethanol production, due to its high contents of starch. The starch in the cereal grains determines the amount of alcohol that can be obtained, and therefore, the selling price itself.

#### **RYE (*Secale cereale*)**

This cereal is essential in dry lands and poor soils, and is a very interesting source of starch, so useful in the production of ethanol.

The price of rye is undergoing a downward trend in the last few years. Nevertheless, the demand – especially in the energy sector – is growing due to the setting up of new bioethanol plants.

Rye can also be used as substrate to be fermented in biogas plants, both in the form of cereal or as whole crop silage.



Figure 13. Rye field.

This cereal uses humidity very effectively and generates a remarkable amount of biomass, even when the temperatures drop in the spring.

#### **MAIZE (*Zea mays L.*)**

Due to intensive farming methods, maize is very productive, resistant and stable, even in some Southern European areas .

Moreover, it has a great potential; the production techniques used are very modern, and can still be improved.

Thanks to its capacity to produce biomass with high contents of dry matter, and its efficient water and



Figure 14. Maize field.

nutrient intake capacity, maize silage is very useful in biogas plants or for the production of biofuels, both for the own consumption of farmers and for the bioenergy industry.

As maize is concerned, the existing varieties can produce 15-20 tons per hectare, which represents a methane production of 4,500-6,000 m<sup>3</sup>/Ha.

Raw material	Output (moist t/ha)	Output final product obtained (l/ha)	Biomass needed to produce a litre of fuel (kg/l)
Maize	9,2	3520	2,6
Wheat	7,2	2760	2,6
Rye	4,9	2030	2,4

Raw material	Output (moist t/ha)	Output final product obtained (l/ha)	Biomass needed to produce a litre of fuel (kg/l)
Triticale	5,6	2230	2,5
Potatoe	44,0	3550	12,4
Sugar beet	61,7	6620	9,3

Table 8. Outputs of the different raw materials used in bioethanol production. Source: FNR.

### 1.1.5. Thermal solar energy.

Solar radiation can be used in an active or passive way.

The passive use of solar radiation allows for a reduced demand of heating and artificial light in buildings. This can be achieved by means of appropriate building structures (buildings facing South, appropriate distribution of glazed surfaces for them to absorb heat etc.).

On the other hand, an active use of solar radiation implies using technical devices and specific installations. There are two main systems: thermal installations and photovoltaic modules.

Thermal solar installations are used to save the heat of the sun by means of collectors, while photovoltaic modules transform sunlight directly into electricity.

All the applications of solar energy in cities is also valid for rural areas, where the conditions are even more favourable for solar installations: wider roofs and less shadowy areas.

Thermal solar installations, or collectors produce thermal energy by transforming the sunlight that hits them. The heat is transported to the exchanger in a liquid or air stream. Thermal solar installations (collectors) may be used in order to obtain:

- Domestic hot water.

- Backup heating.
- Solar district heating.
- Swimming pool conditioning.
- Air heating.
- Solar cooling.

The solar energy can be used *in situ*. Taking into account energy that is used in the production process and the normal outputs of solar installations (in some areas, the expenses are written off quite soon) the use of solar installations saves fossil energy sources and reduces greenhouse gas emissions.

Almost 50% of the total energy spent in Europe is connected with heating and hot water, both in households and industries.

Thermal solar energy is one of the most important alternatives in heating and hot water production.

Nowadays, the solar devices used in order to produce domestic hot water are simple but technically developed, as they can replace non-renewable energy sources as diesel oil, gas or coal. Thus, a four-member family using a solar device can save about 300 litres of diesel oil for heating, 300 m<sup>3</sup> of gas or 3.000 Kw/h of electricity yearly.

The so-called district heating or teleheating is even more efficient. It uses inertial accumulators (deposits that can store hot water for a relatively long period of time) that can cope with 50% of the total heating needs

in inhabited areas and contribute to saving fossil energy sources.

### 1.1.6. Photovoltaic solar energy.

Photovoltaic solar energy allows for the production of electricity from solar radiation.

There are two types of photovoltaic installations:

**Isolated systems**, with batteries or accumulators, which can be used directly according to the needs (stand alone installations).

**Grid-connected systems**, which avoid the need for batteries and allow the connection to the mains whenever solar radiation is not enough. This technology has developed a lot and there are different products available in the market.

The main component is a photovoltaic installation where solar radiation is converted into electricity, which is called the **photovoltaic cell**. Each cell is made of a thin layer of semiconductor material, normally silicon that serves as a small battery.

Photovoltaic cells are implemented in a single structure, the so-called "**photovoltaic module**" that in its turn is placed in a structure called "**panel**".

A row of serial modules forms a "**string**". Several strings connected in parallel form a "**photovoltaic generator**".



Figure 15. Thermal solar strings.

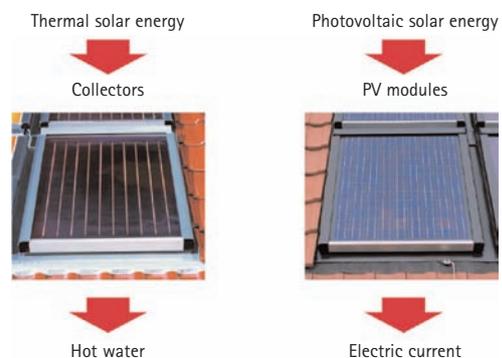


Figure 16. Different active uses of solar radiation.

### 1.1.7. Wind power.

Wind power is the energy technology that is growing the most rapidly worldwide.

This energy resource can be produced virtually anywhere. Wind power installations can have different sizes and can adapt to different needs.

- Large wind farms can produce enough electricity in order to supply thousands of families through the mains.
- Small turbines can supply the energy needed by a farm or a village that has no access to the mains.

Wind power is very useful for the electricity supply of rural areas with no access to the conventional electric network. Moreover, it represents new economic and employment opportunities for the rural population.

Due to the fact that the wind is conditioned by day/night cycles, by seasons, geographical location and microclimates, and taking into account that there is also a randomness component, it is impossible for isolated systems to ensure a constant supply.

Therefore, local consumption must be dealt with by means of networks involving other sources of energy, that is, mixed systems where wind power is used to save fuel or where it is combined with other renewable energy sources.

Wind power in rural areas can serve several purposes:

#### 1. Supply of isolated systems ("stand alone" and "off-grid" systems):

In areas that are isolated from the mains supply: rural tourism lodgings, campsites, farms, mountain huts, second homes etc, where it is not economically feasible to bring mains supply.

In such cases, it is possible to implement small wind turbines and accumulation systems (batteries) and hybrid systems (with photovoltaic panels and diesel generators).

Small wind turbines can also be used for power supply of telecommunication systems as

repeaters, mobile phone antennas etc. in isolated areas.

Wind turbines can be useful in pumping and drainage systems, public lightning and energy supply of natural protected areas.

#### 2. "On-grid" or "Grid-connected" systems:

These wind power micro installations use the energy that is required and supply the rest to the mains by selling it to the distributing company.

These energy producers have the right to use at all times the energy they need in order to carry out their activity, paying the distributing company accordingly.

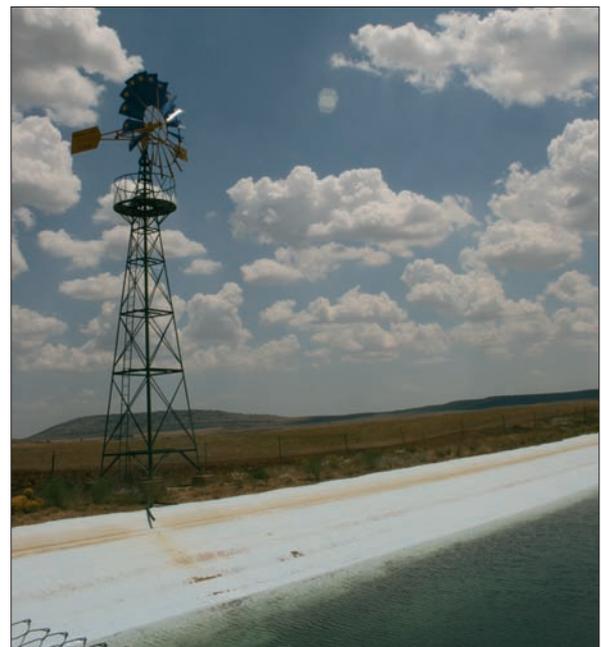


Figure 17. Wind power is an important alternative energy source.

### 1.1.8. Micro hydro power plants.

Micro hydro power includes all the hydropower systems having an electrical power of 100 Kw or less. (A 100 kW system produces 100 standard units of electricity in an hour).



Figure 18. Micro hydro power is a clean energy resource with a great potential.

Micro hydro systems differ from larger hydro systems, as they require much smaller water stream volumes. This fact allows for many micro hydro power plants to be placed in regions with many streams and rivers.

The growing interest in renewable energies and the decentralisation of energy production has put micro hydro power plants on the map.

The added value of micro hydro power plants can be increased if **old watermills** are re-used. Traditional watermills can be restored and installation costs can be reduced by using some of the structures of the old mills, as the dam or the flume. In some cases, only the electrical system needs to be restored.

Micro hydro power has a great potential in hilly areas with spring fed streams. In these cases, turbines can use small streams for energy production, provided the fall is sufficient. In these places, there is no need for installations that require large water streams, such as dams, and it is possible to produce energy at reasonable costs.

## 1.2. Evolution in the use of the resource.

### 1.2.1. Origin and development of renewable energies.

Renewable energies have satisfied the energy requirements of men for centuries, up to the late 19<sup>th</sup> Century. Renewable energies have stopped being the main sources of energy in the last 100 years: first came coal, then, from 1950 onwards, petroleum and, to some extent, natural gas, took the lead.

In Europe, renewable energies have an huge development potential, although all kinds of obstacles have hindered their development in the past.

Eurostat data for 2002 show that in the Europe of 25, the main renewable energy sources used were biomass, with 62,000 TOE (Tons of oil equivalent) and hydro power, with 25,500 TOE (26%) while solar energy and wind power together represent only the 3% of renewable energies used.

### 1.2.2. Energy policies: a framework for the development of renewable energies.

The European Union welcomed the **Kyoto objectives** and anticipated the moment when it entered into force in 2002 with the Council Decision 2002/358/CE of 25 April 2002. The Community Directives addressing this sector laid down the following objectives:

- Increase energetic efficiency in 1% approximately every year.
- Cover the 12% of the overall energetic demand with renewable energies by the end of 2012.
- Cover the 22% of the overall electricity demand with renewable energies by the end of 2012.
- Cover the 2% and the 5.75% of fuel demand with biofuels by the end of 2005 and 2012 respectively.

The main EU regulations in this field are the following:

- Directive 2001/77/CE on the promotion of renewable energy sources.
- Directive 2002/91/CE on the energy performance of buildings.
- Directive 2003/30/CE on biofuels.
- Directive 2004/8/CE on cogeneration.

As for renewable energies, the EU had already set up its own policies before Kyoto, by issuing two important Commission documents: The Green Paper and the White Paper.

The **Green Paper** was published on November 20 1996, and it sets forth the European strategies for the development of renewable energies. Apart from

establishing the objectives, it explains the advantages of renewable energies:

- Environmental sustainability.
- Ensure security of supply.
- Employment and development.

There are some obstacles that hinder the development of renewable energies, as the lack of knowledge of decision taking bodies, and the technological and organisational problems in the different sectors.

Emphasis is put in the following strategies:

- Regional policies should foster renewable energies, especially in peripheral and rural areas.
- Agricultural policies should support the production and the development of renewable energies.

The White Paper was published in 1997. It contains the actions that should be taken in order to put the guidelines in the Green Paper into practice.

It sets up the following quantitative objectives:

- Installation of one million photovoltaic systems.
- Installation of wind farms providing 10000 megawatts of electric power.
- Installation of biomass plants providing 10.000 thermal megawatts.
- Carrying out of 100 experimental projects on renewable energies in communities, cities and regions.

Some of the main EU directives and initiatives are the following:

- **Directive 2001/77/CE "Green electricity".**

The enforcement of this Directive by the European Parliament and Council on September 27 2001 was a very important step.

Unlike the Green and White Papers, which contained non binding guidelines, the Directive 2001/77/CE was binding, and it imposed specific measures to Member countries.

This Directive includes procedures for the verification and subsequent intervention in the Countries that do not accomplish the objectives.

- **The "Intelligent Energy- Europe Programme".**

This programme unified all previous Community programmes. 200 million euro were available for funding the following types of actions during 2003-2006:

SAVE – improving energy efficiency in the construction sector and industry.

ALTENER – promotion of renewable energies.

STEER – fuel diversification and use of renewable energy sources.

COOPENER – promotion of renewable energies and energy efficiency in developing countries.

- **Biomass Action Plan.**

The European Commission approved the Biomass Action Plan on December 7 2005.

- The Plan sets out a target of energy production based on biomass that doubles current production of Member States . In fact, the Plan intends to go from the production of more than 69 tons of oil equivalent (TOE) in 2003 to the production of 150 million TOE by 2010.
- The Plan explains the need to promote actions addressing the use of biomass in all energy sectors: transport, electricity and heat.
- The Plan addresses sustainability by supporting energy production based on biomass.

It foresees, in general terms, new regulations on the ratios of imported and local raw materials.

- Finally, it makes provisions for the creation of binding rules for member states on the market share of biofuels.

- **Reform of the Common Agricultural Policy (CAP).**

The CAP revision, approved in 2003, implied a lot of changes in the aid schemes for agriculture. The tree main elements of the reform are:

- The dissociation of aids and production: Aid is not calculated according to the type of production anymore, but according to a complex procedure based on the surfaces and previous aid received (rights). Therefore, aid is no longer associated to land use.
- The increase of the resources allocated to rural development programmes; this measure allocates more funding to local development programmes.
- Conditionality. This measure implies that aid is conditioned to the compliance of a series of environmental Community Rules.
- As for agroenergy, this reform makes provision for 45 extra /ha for energy crops.

## 2. IMPORTANCE AND IMPACT OF THE RESOURCE.

### 2.1. Current situation and impact of the resource.

#### 2.1.1. Current situation of renewable energies. Analysis of the different energy farming systems.

##### A) WOOD BIOMASS.

Wood is the second renewable energy source in Europe.

The main use of this energy source is the production of thermal energy by means of combustion.

The production of electric power is far more complex: the conversion of thermal energy into electricity that takes place when the biomass is burned has an energy performance below 25%. This low energy performance, added to the installation expenses and the



Figure 19. Wood is a very important energy source in Europe.

expenses of transporting the raw material to the plant, makes it necessary to establish a specific scheme for the application of energy policies, based on dispersed energy production, in view of the increase in the use of renewable energies.

Dispersed or decentralised energy production is based on minimising the expenses derived from the transportation of raw materials, thus reducing the negative environmental impacts, and supporting rural development schemes.

Nowadays most of the wood is burned using traditional systems, and therefore environmental and energy performances are quite low (50-60%).

Nevertheless, in the last few years, the development of new technologies have enabled an efficient use of wood as energy source:

- As for wood fuel, wood chips and pellets are being sold and used for boilers and automatic feeders. In smaller heating systems, chips are normally used, but new possibilities are emerging, as the so-called briquettes: highly efficient, small compressed wood blocks.
- As for large combustion plants, the new generation of reverse flame boilers, which is being implemented fast, ensure energy performances over 80%.

### Analysis of the current situation of wood biomass.

The main advantage of wood energy production installations is the availability of the raw material.

1. The forest surfaces of many European countries have grown a lot in the last few years. Forest use is below the yearly biomass growth rates.

This allows using waste wood resulting from silviculture and forestry activities for energy production. The use of this type of biomass is beneficial for forests (removal of weak trees, more room for the best specimens), and helps reducing forest fires and pest risks.

2. Energy crops represent another source of wood biomass for energy production. The experimental short-cycle cultivation (2-3 years) of black poplar has been very successful, both as regards the amount of dry substance produced (17-20 t/ha per year) and the amount and components of the ashes. In the case of waste wood, the weakest point is in economic concerns, as profitability is assessed as compared with the returns obtained with other soil uses.

The development of local installations of production/consumption of thermal energy based on wood, has the following advantages:

- Support of forestry and fostering of new work opportunities for forest workers.
- Sustainable cultivation and conservation of the territories concerned with this type of activity.
- Environmental benefits in the concerned territories.
- Reduction of energy expenses of enterprises, and in the case of collective boilers, of population.

#### **Weak points**

- In this case, the weak point of **collective boilers** is the relative complexity of the system. Building up the links between installations in order to have district heating is more complex than

buying diesel oil or LPG. The process implies **awareness of local development needs**. In order to achieve the main objectives of these systems the implication of the economic and institutional stakeholders in the territory must be encouraged.

- Other important aspects concern the higher prices of wood boilers as compared with traditional ones. However, we must take into consideration that there is an important reduction of energy expenses; therefore, the investment is paid off in 4-7 years. Moreover, if the demand grows, the expenses associated to these installations will presumably be reduced.
- Finally, we must point out that there is little information about the sector and a lack of specific training. There is a lack for specific training addressed to enterprises and to agriculture and forestry specialists, for them to become aware of the energetic uses of biomass. In addition to this, local administrations lack the necessary knowledge and awareness on these subjects. Finally, there is a need for designers and installers specially trained for the purpose.

The first initiatives concerning the installation of wood boilers have had a multiplier effect: administrations, installers, designers and forestry enterprises are getting more and more interested in this type of renewable energy.

As regards the evolution of the production systems, there are two main aspects that would contribute to their improvement:

- The possibility of producing high quality wood pellets made of certified wood.
- The evolution of cogeneration technologies would make it possible and convenient to install wood-fuelled cogeneration plants. Of course the prospects for these installations depend greatly on the local development schemes adopted by the administrations, and on the economic systems in the territory.

## B) ENERGY PRODUCTION BASED ON HERBACEOUS BIOMASS.

The exploitation of some herbaceous energy crops has been thoroughly studied. In spite of the efforts made, the use of these crops for energetic purposes has not evolved significantly, except for some experiences with farm products (maize) for thermal energy production.

Other experiences which are worth mentioning concern pellets made of herbaceous waste (sorghum, maize, etc.).

### Analysis of the current situation of herbaceous biomass.

The experiments made show that the use of this type of crops has **more disadvantages than advantages**:

As for productivity, the dry matter (measured in tons) per hectare of each of the four crops used in the pilot experiences<sup>1</sup>, is the following:

- Sorghum: 22,5
- Thistle: 9,1
- Discanthus: 22,6
- Reed: 29,9

Taking into consideration the expenses derived from production, and the market value of biomass, we may presume an average yearly output of 200-500 € per hectare. These returns must be compared with the ones that may be obtained using the same soils for a different activity.

Moreover, the experiments show that the ash contents are relatively high, and have high silica contents.

As for the **advantages**, apart from the environmental benefits of using a renewable energy source, this type of crops contributes to the fertility of the soil if they are planted in a rotation basis.



Figure 20. Maize is used in thermal energy production.

As it was the case with woody biomass, the energetic use is conditioned by the implementation of installations locally, in order to reduce the costs derived from transportation and processing and thus allow forestry enterprises to improve their benefits.

This type of agroenergy can be interesting in some territories due to the tendency towards the diversification of production (caused mainly by the crisis of the agricultural sector) and the return to crop rotation systems (encouraged by the environmental objectives of PAC) and the increase of the aids for the implementation of energy crops.

The recent reformation of the Common Agricultural Policy (CAP) provides an extra incentive of 45 €/ha for energy crops, which may be very convenient in some cases. The importance of using local raw material as biomass is stressed:

- In order to avoid bringing it from far away places and having high transportation expenses.
- It generates an added value at local level.
- It reduces energetic dependence.
- The use of biomass allows for a CO<sub>2</sub> neutral energy cycle and revitalises regional economies.

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<sup>1</sup> Data and estimates are the result of projects promoted by the Agency for the Research, Development and Innovation of Agriculture in the Toscana: The projects ACTIVA (2004-2005) and BIOENERGY FARM.

- The rural structures are reinforced; employment rates are maintained or even improved.

### C) BIOGAS.

The growing interest in seeking alternative uses of the soil, together with the management problems caused by waste of animal origin, have encouraged the development of biogas production in the last few years, especially in mainland Europe.

In order to set up a biogas installation, raw material must be available locally. This is more important with biogas than with other biomass installations. Medium to large installations are preferable for the investment and the write off period to be profitable.

Therefore, the development of this production system is connected with territories with large areas of agricultural soil and an important cattle-breeding activity.

#### Analysis of the current situation of biogas.

Biogas has the following advantages:

- The cycles of biogas are fully compatible with the productive cycle of cereal-fodder-livestock farming.
- Using wastewater from cattle in energy production turns an environmental problem into an opportunity for the enterprises that generate this type of waste.
- Biogas production can be managed jointly by farmers themselves.
- Biogas is very versatile; it may be used to produce thermal energy or electricity. A combined production is also possible.

The main weak point is that biogas installations require a strong investment. In addition to this, the organisation of the installation is quite complex. Finally, we must bear in mind that biogas production adapts just to some types of agriculture that ensure enough amounts of raw material.

In spite of the fact that many progresses have been made, this production system based on renewable energy sources can be further evolved.

### D) BIOFUELS.

Many experiments have been carried out in Europe concerning the energetic potential of herbaceous plants for the production of biogas and biofuels.

The difference between the objectives set by the EU on biofuel use and the actual development of this type of production is in general quite big (according to Directive 2003/30/CE, 2% in 2005, 5.75% in 2010).

This sector has not developed properly, and is largely conditioned by the logic of the market.

The Community Action that made provision for support actions for enterprises that had contracts with processing industries has not been very successful among farming enterprises. The few industries that work in the sector have resorted mainly to imported products.



Figure 21. Biogas production can be managed by consortia of agricultural producers.



Figure 22. Biofuels are a hope for the future.

### Analysis of the current situation of biofuels

The main element liable to encourage the development of biofuels is the increase of demand, caused by many different factors, some of them concerning international agreements:

- The ratification of the Kyoto Protocol.
- National and Community regulations.
- The growing interest in other energy sources, caused by the behaviour of the crude market and the upward trend of prices.
- The growing environmental awareness of the population.

Apart from these positive aspects, there are some **weak points** that hinder the development of biofuels:

- The price of biodiesel is higher than that of diesel oil.
- The complexity of the relationships between installations make the activity little profitable for farming industries.

There is a very obvious contrast between the factors that favour the development (of political and social nature) and those that hinder it (of economic nature).

In the case of biofuels in particular, development is strongly conditioned by political and administrative decisions at all levels.

At national level, the main actions in order to boost the use of biofuels include an extension of tax privileges.

In this sense, there are very different situations: actually, some countries as Germany have deregulated the market of biofuel. In other countries, such as Spain, liberalisation is only applied to fuel used in agriculture. In other countries, as Italy, fuels are exempted from taxation.

These actions have proved to be insufficient for the promotion of production. The benefits have been devoted to the production stage, hence to the industry, which in many cases uses import raw materials.

Recently a Community agreement on the use of biofuels has been signed, which imposes political decisions at national and local level addressing this sector. Presumably, appropriate and sound measures will be taken in order to improve the results.

In particular, support policies should focus on the promotion of biofuel consumption.

The public services sector (transport, large services systems) uses large amounts of fuel, both for locomotion and heating purposes. If this sector made an extensive use of biofuel, even in a 5% mixture, production would be boosted.

The authorities should put into practice further support measures encouraging the use of biofuels in the industry and the public sectors.

Finally, the use of pure oil is another interesting option. In that case, no industrial transformation is required, and therefore local production and supply installations could be set up, which would benefit local farmers and would contribute to environmental sustainability.

### **E) THERMAL SOLAR ENERGY.**

The main purpose of this technology is the production of thermal energy (domestic hot water and backup heating). There are two main types of installation:

- Natural circulation.
- Forced circulation.

The first type is cheaper and the installation is simple (no electric pumps, strings are integrated in the accumulator), but also less efficient.

On the other hand, the second type has separate accumulator and strings. This makes the installation more complex (electric pumps and pipes).

The costs are higher, but the energetic efficiency is also much higher, and more appropriate in cases where hot water must be supplied all year round, and heating must be supplied in the winter.

The tendency nowadays is to develop thermal solar technologies combined with other technologies, as wood-fuelled boilers. Thus, all energy needs can be satisfied by using renewable energy sources.

#### Analysis of the current situation of thermal solar energy.

With good radiation conditions, as the ones found in the Mediterranean areas, a thermal solar installation (of the appropriate size) may be able to satisfy the 70% of hot water needs and sometimes even the 30-40% of the costs of the fuel needed in backup heating.

Nowadays, there are many products in the market which address different needs:

- Collectors have an energy performance of over 500 thermal Kwh per year.
- The costs of erecting an installation are some 700.00 €/m<sup>2</sup>.
- In general, a string of 1m<sup>2</sup> is able to satisfy the hot water needs of one person.



Figure 23: Strings in an ecological undertaking.

Write-off periods are quite low, normally never beyond 5 years. The main obstacle for the development of thermal solar installations is the lack of information:

- Consumers do not have enough information on the potential of this technology.
- The technical staff and designers that suggest and assess the suitability of this option do not have enough preparation.

In a very near future, this sector will grow significantly due to the new technical improvements and the support policies implemented. In some cases, this new technology is compulsory in new buildings.

#### F) PHOTOVOLTAIC SOLAR ENERGY.

In many European countries, photovoltaic systems are considered as a very good option. This is reflected in the support strategies that have been devised in member countries, always bearing in mind Community guidelines.

The so-called "energy account" is being quite successful. This mechanism consists of buying the electricity surpluses of enterprises at higher rates than normal kw/h.

This system allows for the reduction of the write-off period of the investments made in order to erect photovoltaic strings.

#### Analysis of the current situation of photovoltaic solar energy.

Using photovoltaic solar energy contributes to the balance of the electricity needs of a building, as it allows to produce the amount of electricity that is normally needed (even sometimes more than the amount needed).

Thus, the costs derived from the production and transport of electricity are avoided, as it is produced in the same place where it is going to be used.

#### Advantages of photovoltaic systems:

The isolated installations that need batteries have the advantage of reaching places with no access to the mains. Connecting these areas to the electric network would be much more expensive than erecting the photovoltaic installation.



Figure 24. Photovoltaic installation.

In these cases, the installation requires batteries in order to store the electricity and use by night.

The 10-30% of the price of the installation (depending on its power) may correspond to the price of the batteries.

However, with this system it is not possible to transfer energy surpluses, it can only be used and/or stored.

**Grid-connected systems** allow for energy exchanges with the electric network: The energy produced by the installation is used by day, and the electric network supplies energy during the night as if it were a battery.

If the installation produces more than is required, the surplus is transferred to the mains.

From the environmental point of view, each kW of energy that is produced contributes to the Kyoto

Protocol, as it prevents the use of 0,3 TOE and 0,9 tons of CO<sub>2</sub> a year.

Solar radiation is normally enough (although it depends on the region) to ensure the functioning of the installations. Photovoltaic systems can be erected in the roof of farm facilities (always with the right orientation). Ideally, it is even possible to install them in the ground.

The **main weak point** of photovoltaic systems is for the moment the economic aspect.

The costs of erecting these installations are quite high (6,000-7,000 €/kw) and the write-off periods are quite long (20-30 years). The "energy account" should allow reducing the write-off period.

In addition to this, it is possible to enter the market of **Green Certificates** if the installations that produce electricity with renewable energy sources reach 25001 kWh a year.

Producers that reach these figures will be entitled to issue a Green Certificate that can be sold in the market. It costs some 0.09 € per kWh produced and can be obtained for a period of 8 years.

The development potential of photovoltaic solar systems is connected with the energy account: in fact, the only reason why this technology is not spreading faster is the strong investment required in order to erect the installations. The Energy Account allows for the reduction of the write-off periods from 20-30 years to about 7 years.

#### G) MINI WIND POWER SYSTEMS.

Mini wind systems allow for the production of electricity using wind energy. Nowadays generators reach 20kW, and can be adapted to small-scale production.

The power of these generators can be 1kW, 5kW, 15kW and 20kW.

These wind turbines have rotors of 2-8 meters and are installed in the top of a tower of about 8-20 meter high.

The wind machines that are in the market nowadays are able to move at about 3m/s when they are started (10km/h approximately) and reach a rated speed of 12m/s (43 km/h approximately).

The energy that these machines can produce yearly depends on the number of wind hours and the intensity of the wind. In general, when the anemometric conditions of a place are assessed, a wind gauge is installed for a period of 6-12 months. As a result, annual electricity production estimates are obtained multiplying the number of equivalent hours by the rated power of the machine.

#### Analysis of the current situation of mini wind power systems.

##### **Advantages**

The small scale production of electricity from wind power is very interesting in rural areas, as these systems require wide open and empty areas.



Figure 25. Energy production in wind power installations has many advantages.

The technology is quite well developed, and the write-off period would be substantially reduced with the implementation of support mechanisms enabling a profitable energy production with mini wind generators.

From the environmental point of view, each kW of energy that is produced contributes to the Kyoto Protocol, as it prevents the use of 0,3 TOE and 0,9 tons of CO<sub>2</sub> a year.

Electricity production in mini wind installations is the cheapest nowadays, as it has a cost of 2000-3000 per kW.

The environmental impact is limited to the visibility of the wind turbine. However, the visual impact is reduced with respect to wind turbines used in large wind parks, which may reach 70 m of height.

As compared with solar radiation, day and night does not make any difference, as the wind can blow anytime.

##### **Disadvantages**

On the other hand, however, the wind is not a constant resource. Therefore, the need to be connected to the mains supply cannot be avoided, and the installation needs to have batteries when there is no access to the mains supply.

Mini wind installations below 20 kW are convenient only if the number of potential users of the energy produced is sufficient to compensate the investment.

At present not every European countries have specific regulations on this field. For the time being, it is convenient to erect these installations for self-consumption, provided we are going to require energy in a constant way and use all the energy produced.

Mini wind installations are also eligible for **Green Certificates**: an hypothetical case foresees the following: installing a single 20 kW machine, and having 1500 hours of wind a year, 30,000 kWh would be produced, and, with the Green Certificate, that would represent 45000.00 € a year for 8 years.

## H) MICRO INSTALLATIONS OF HYDRO POWER.

Micro installations of hydro power are different from large hydro power stations, as they need much smaller streams.

The advantage of this type of installation is that many more places may be suitable in any country with rivers and water streams.

During the first half of the 20<sup>th</sup> Century, many watermills were adapted to produce electricity by means of turbines and direct current generators that supplied households and neighbourhoods with electricity, especially for street lighting.

Most of these installations were abandoned when the national electric network reached all the country and was substituted by a generalised use of alternating current.

The growing interest on renewable energies and the decentralisation of the electric network has encouraged the recovery of these forgotten technologies.



Figure 26. Micro hydro electric installations have great chances of development.

Nowadays technology makes it possible to use small falls efficiently, and allows for further developments in micro hydro installations, especially in some areas:

**Hilly areas with small falls fed by brooks and streams:** Some turbines are adapted for the production of electricity in very small falls.

These places can be conditioned with relatively low investments, as no large structures are needed, as the drainage channels used in large hydro power systems.

Many of the **drainage channels and anti-plugging devices**, as well as the water supply structures, the channels, the barriers and the **dam** can be used in order to develop micro hydro installations.

### Analysis of the current situation of micro hydro installations.

Some of the main **advantages** of micro hydro installations are:

- If placed in the right location, it is a constant and reliable source of energy.
- The environmental impact of the installation is very small.
- This constant and durable energy production system is not intermittent, as wind power and solar energy.
- The installations are very durable; more than 30 years may lapse before they need major maintenance works.
- Low maintenance needs and low production costs.
- The write off period is very reasonable in the installations that are connected to the mains, normally not reaching 10 years.
- The technology needed has already been developed.
- It is very profitable for rural areas (employment, profits, tourist interest, preservation of water streams).

### Weak points

A few years back there were several obstacles for the development of hydro power installations of less than 100 kW for electricity production:

- The costs and complexity of the network hindered the promotion of small generators.
- The low prices of the electricity produced by small generators.
- The lack of public funding covering installation costs.
- The incredibly high prices of turbines and generators.

The increasing interest on this type of installations will help overcoming these obstacles.

#### 2.1.2. European context for the development of renewable energies.

The EU is starting to consider renewable energies as a reasonable alternative and as a source of employment in rural areas where there are not many economic activities encouraging people to stay in their villages.

The European Union is strengthening its policy against polluting energies; regulations are getting more severe, while clean energies, renewable energies in particular (those that cannot be exhausted), are being promoted. In fact, energy saving and clean technologies programmes are being very successful.

Renewable energies among other initiatives imply a very important development opportunity. Many endogenous resources in rural areas, such as forests, rivers or crops are being managed in a sustainable way.

The aim is not only to develop clean, environmentally friendly energies, but also to involve rural population and contribute to employment creation in order to stop

the drift from the land that is affecting most rural European areas.

At EU level, the development of renewable energies in rural areas is supported by means of initiatives as the following:

- The Kyoto commitments and the agreements that bind member states to double the use of renewable energies.
- Directive 2003/30/CE intends to achieve a 5.75% of biofuels use. In some European countries, that implies a 1000% increase in the use of renewable energies.
- Some emerging technologies in the scope of agriculture and forestry have become more competitive in the last few years, even in the case of small-scale production. This is the case of wood biomass.
- The European legal framework is being put into practice at local and regional level, which will bring about new opportunities for enterprises of the agricultural and energy sectors.
- Some renewable energies, as wind power or solar energy can be very profitable for the agricultural industry when energy market liberalisation takes place in a few years time.

Rural areas have many possibilities to produce clean energies thanks to their natural resources, which can be exploited sustainably. In the future, renewable and clean energies may become the main source of income, or the main alternative, in rural areas.

Therefore, this type of energies is a hope for the future in the European Union, not only in order to solve environmental problems, but also in order to support new emerging professions in the rural context, in this case, professions connected with renewable energies.

## 2.2. Results and impact of the resource.

Due to the exhaustion of petroleum resources and the evident climate change, energy has become a major issue of debate. Two main strategies have been devised in order to solve the energetic problems. These strategies are connected with energy saving and new sources of renewable energies.

The development of renewable energies and energy efficiency policies will also contribute to employment creation.

The study "*Ecotec: The potential for Employment Opportunities form Pursuing Sustainable Development*" (1994) reached the conclusion that 880,000 new jobs could be created in the EU by 2020 by developing renewable energies and improving energy efficiency. These same conclusions are backed by other studies, as the one carried out by *TERES II IN 1996, The European Renewable Study* or the one carried out by *ALTERER*.

The results and impacts of new renewable resources this far can be said to be important for rural areas, not only because of the jobs this new sector can create, but also because alternative energy sources can solve other local problems.

By 2010, almost the 10% of the energy supply in Europe may come from renewable energy sources. In the next few years, renewable energies will be able to satisfy 13% of primary energy needs.

We must all work in order to increase the use of clean energies.

### PILOT EXPERIENCES

We may mention the Leonardo da Vinci Pilot project "**ProAere: Agricultural Projects for Renewable Energies in Europe**". This is not one of the projects that will be promoted in the scope of FONTES Project, but we consider it has had an important impact in the promotion of alternative energies and in the creation of specific training programmes.

This project has achieved many things:

- It has contributed to establish closer relationships among the partners of different European countries, thanks to the exchange of experiences and good practices.
- The information and dissemination seminars organised have contributed to raise the environmental awareness of users in both rural and urban contexts.
- A greater involvement of the different social partners has been achieved.
- Several tools have been devised in order to contribute to the professionalisation of the sector and to increase the sustainable use of renewable energies.

## 3. USE OF THE RESOURCE AS AN INSTRUMENT FOR RURAL DEVELOPMENT.

### 3.1. Possibilities and conditions needed for development.

Renewable energies are an emerging sector and imply new economic opportunities for rural areas, where they represent New Sources of Employment allowing for the sustainable use of natural and cultural resources.

Energy is the main challenge for the sustainability of future development actions.

Development processes in this world always need to use energy in order to take place. Energy consumption is progressively increasing worldwide: energy is present in all human activities.

From 1992 onwards, the worldwide consumption of energy has increased significantly and is expected to continue the upward trend until 2020, at a yearly rate of 2%. Worldwide consumption of primary energy in 2020 will have grown 57% as compared with 1997.

Energy and climate are closely related.

The use and consumption of energy has changed over the last 200 years. The large-scale exploitation of fossil energies has caused several climate changes in very short periods of time, which means that natural climatic processes have been accelerated to a great extent.

### 3.1.1. Traditional energy sources.

Almost 80% of the energy used worldwide comes from fossil energy sources. From 1992 to 1999, the worldwide consumption of fossil fuels increased 10%.

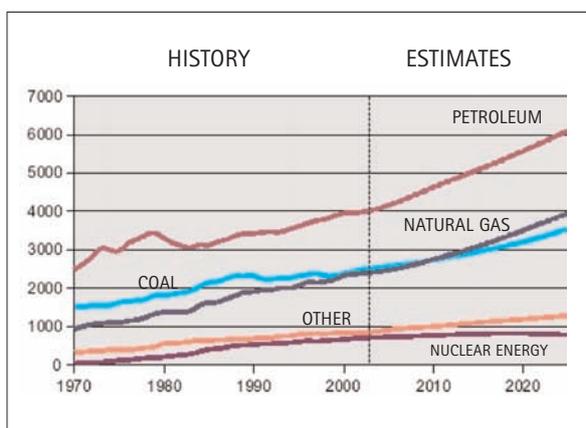


Figure 27. Energy consumption. Source: Data extracted from EIA International Energy Outlook 2004, from the Department of Energy of the USA, D.O. E.

In the future, the world is expected to continue depending on petroleum (35%), coal (23%) and natural gas (26%) as it does at present.

The decline of nuclear energy is also expected to continue and figures are expected to drop from 6.5% to 5%.

### 3.1.2. Pollution caused by traditional energy sources.

Energy production, especially energy obtained from the combustion of fossil resources (coal, petroleum and methane) is causing serious alterations in the planet:

- The heat and carbon dioxide released to the air, contribute to the **greenhouse effect**, and may cause climate changes and disturb the environmental balance on which life is dependant.
- Air pollution and acid rain are caused by the uncontrolled release of dust (particles in suspension) and in particular by carbon, nitrogen and sulphur oxides.

This affects the life of man as well as natural and artificial ecosystems: the atmosphere, the seas, lakes and rivers, aquifers, crops and monuments.

As regards the relationship between pollution and health, we will mention that WHO (World Health Organization) has stated that the pollution caused by traffic in Europe has caused the early death of some 80,000 people. Many recent studies show that children living near roads with heavy traffic are twice as prone to have respiratory complications than those living near less busy roads.

For some time it was thought that nuclear energy was a suitable alternative to fossil resources, but all the problems that remain unsolved concerning the functioning of nuclear plants (radioactive waste, risks of serious accidents with catastrophic consequences, possibility to use it to make atomic weapons) and the well-known disaster occurred in Chernobyl have caused many countries to withdraw from this nuclear unsafe adventure.

### 3.1.3. Renewable energies, sustainability and rural development.

Renewable energies can replace conventional sources of energy as coal, petroleum and gas, and therefore reduce CO<sub>2</sub> emissions. The limited fossil resources can thus be saved easily, so that they can still be available for future uses other than combustion for energy production.

As compared with conventional energy production, renewable energies save costs, risks and losses in the transport and supply (for instance, leaks in gas pipelines or damages in petroleum tanks):

- **Biomass:** Biomass is a renewable source of energy generated in photosynthesis. It can be used to produce heat, fuels or electricity. The main advantage of biomass is that it does not contribute to the greenhouse effect. The balance of CO<sub>2</sub> emissions is neutral: the CO<sub>2</sub> that is released to the atmosphere corresponds to the amount of CO<sub>2</sub> that had been extracted from the air during photosynthesis when the biomass was growing.
- **Sun:** Almost the 50% of sun radiations hit our planet and produce 30,000 times the energy that we need. This energy can be used effectively by storing it in heat collectors (panels that collect the energy of the sun and convert it into hot water or backup heating) and in photovoltaic cells (which generate an electric current if solar radiation hits them).
- **Water:** Water was already used by old watermills, and is nowadays used in hydro power stations where turbines and alternators convert running water into electricity.
- **Wind:** Wind power has been always used in order to sail and activate windmills. Nowadays it is used to pump water (with aero-engines) or to produce electricity (with wind turbines).

Energy saving and new energy sources are linked to economic approaches that focus on sustainability and local development.

Choosing this type of model favours energy saving if small and medium-size renewable energy production installations based on local energy resources are used, thus minimising the environmental impact and improving economic and environmental profits.

The new energy production model must address the following aims:

- **Economic sustainability:** Local installations that use local forestry products are a profitable option for agricultural enterprises. This activity is liable to:
  - Contribute to the development of new products and markets in the forestry sector.

- Control the energy costs of enterprises.
- Provide an added value to the territory.
- **Environmental sustainability:** The profitable use of renewable sources of energy is in short production chains. For instance, the transformation of biomass in large electricity production plants has several environmental disadvantages:
  - Low efficiency energy conversion, with a remarkable dispersion of thermal energy.
  - High energy costs in the transport of fuel to the plant.
  - Negative environmental impact in the territory.
- **Compatibility with rural development:** Rural areas have improved the quality of their products and tourist offer in the last few years, and have adopted a local development model that includes the production of energy from renewable energy sources:
  - Supporting small installations.
  - Encouraging agreements between different production chains.
  - Promoting training and information activities.

#### 3.1.4. Essential elements in the new approach to energy issues.

Sustainable development ensures the fulfilment of three main objectives, namely:

- economic growth,
- social progress
- and a rational use of resources.

The development of renewable energies in rural areas would be boosted, and economic growth would be achieved while using clean and ecological approaches, and bearing in mind the quality of life of present generations and ensuring its permanence in the future.

The growing environmental concerns will lead to a new sustainable energy model that will satisfy current

energy needs but also future needs. This is not possible with fossil fuels.

The main elements in this new sustainable energy model are:

1. **A global vision of energy issues.** Too often energy is associated to electricity. There are three main energy sectors that need to be developed:
  - Electricity.
  - Thermal energy.
  - Motive power.
2. **Energy saving policies.** All work sectors should save energy and use it in a rational way; from civil and productive sectors to public services and households.
3. **The development of renewable energy production systems.** This will be possible if appropriate policies are implemented and funding and support to investors are reinforced.

### 3.2. Employment creation potential of the resource.

The **New Sources of Employment** connected with renewable energies address rural development and modernisation:

1. Cultivation of energy crops.
2. Use of renewable energy sources that lead to energetic self-sufficiency of agricultural enterprises.
3. Use of renewable energy sources as an instrument for the diversification of agricultural activities (energy farms in rural sectors may supply energy).
4. New commercial activities.
5. New farming cooperative projects.
6. Projects addressing the local development of the territory.

#### 3.2.1. Organisation models in the energy sector.

In the last few years, different organisation models have been defined in the energy sector. We will now describe the three main models and their practical application in farming enterprises.

- Closed-cycle energy production model.
- The model that consists of selling raw material for energy production.
- The model that consists of selling energy.

##### A) CLOSED-CYCLE ENERGY PRODUCTION MODEL

The agricultural enterprise produces in its own premises the energy it needs.

The thermal energy that is needed for the heating of households and of the enterprise may be produced in small wood, shaving or pellet-fuelled boilers or may be generated in solar installations.

Electricity demand can be satisfied by erecting photovoltaic systems in roofs or by building mini wind power installations.

In this case it is possible to save a lot of energy, as the products and by-products of the enterprise itself are used, although natural energy sources may also be used.

##### B) MODEL THAT CONSISTS OF SELLING RAW MATERIAL FOR ENERGY PRODUCTION

Energy production from renewable energy sources can be very profitable for agricultural enterprises.

The greatest profit margins are obtained by small and medium installations connected with local development projects and which belong to short production chains. These are the real energy farming systems: farmers provide raw material to the community.

We may mention small district heating networks based on wood biomass as an example.

These networks supply small villages, public buildings and suburban areas.

In these cases, the added value of energy producers is higher, as they use local raw material and fix the prices jointly with the rest of agents in the production chain.

### C) MODEL THAT CONSISTS OF SELLING ENERGY

There are several possibilities in this organisation model.

The simplest case, which we will call "give heating to your neighbour" works as follows: several enterprises form a small district heating network that covers own needs and supply heat to nearby users. These networks are normally quite limited (20-80 meters) so as to prevent excessive connection costs.

The users are supplied the heat produced by the boiler, which is measured with officially certified tools that are tared yearly. Users can obtain as much energy as they require from the primary circuit.

This energy must be sold according to a contract signed among the parts (for instance, a private contract) that must specify the clauses provided for by the law and the clauses that define the price of the energy being sold (€/MWh) as well as the provisions for the regulation of prices according to retail prices.

In other cases, energy agents may create small complete chains and provide clients with the raw material and maintenance required by the installation.

Another possibility is selling energy produced by photovoltaic installations or wind generators to the electric network.

Yet another possibility would consist of supplying biomass: the enterprise supplying the **grinded biomass** presumes that the forestry and farming agents supply wood fuel (for instance, grinded wood) to their own installation, and then they sell the surplus to the local market and sign agreements with one or more private or public clients.

This system implies having appropriate premises – whether owned by the enterprise or not- in order to store and preserve the biomass that needs to be dried and be made available to all users in periods of high demand.

The price of the grinded wood will be fixed according to the price of the energy sold. Therefore, forestry can be profitable even in those cases where stumpage fees

(term that refers to the price of trees before cutting them) are not good.

The grinded biomass comes from the maintenance of local forests, and has a positive effect in the territory and local community, both in an environmental sense and as regards social and employment concerns.

The contract of grinded wood supply can stipulate three different methods:

- Volume rates (cubic meter of bulk material).
- Weight rates (in tons).
- According to the energy content (the energy content in each weight unit can be measured according to the water content; this method is recommended).

Finally, there are some pioneering experiences of **farmer consortiums or cooperatives that produce energy.**

These are real energy farming systems; farmers supply the raw material to the collective structure, and have an active role in society (giving back the energy used, for instance, in the form of biofuel).

#### 3.2.2. Emerging professions: Renewable Energies Promoter.

Achieving a new energy saving culture and developing new feasible energy options implies wider knowledge and competences as regards the suitable contexts for erecting installations and the technical and economic aspects connected to each energy sector.

The promotion of renewable energies implies new professional competences in the sector allowing for the creation of networks for energy production and use.

The new emerging professions connected with renewable energies include both large-scale promotion initiatives and small, specific actions carried out by individuals or small associations in rural areas, such as:

- The use of the biomass from forests or energy crops.
- The use of wind power in farms and other rural activities.
- The use of micro hydro systems to produce electricity.

- The use of solar and thermal energy to power electrical household appliances and as heating in rural households and animal farms.
- Recovery of old watermills.
- Etc.

For all these activities to be profitable and efficient, some specific knowledge is required. In this context, and in the scope of the Leonardo da Vinci Pilot Project ProAere, the profile of the Renewable Energies Promoter has been defined.

In the scope of the project, the manual "Proaere: Agricultural Projects For Renewable Energies in Europe" was elaborated as a tool for all technical staff that works in the renewable energy sector.

This manual contains specific information and techniques, dissemination itineraries, training procedures and information and promotion techniques addressed to professionals devoted to the promotion of renewable energies.

It includes some general knowledge and a general outlook of the problems linked to production chains. By means of this profile, fluent communication between the different production sectors is possible. It contributes to narrow the gap between the specialists that work in the different renewable energy sectors.



Figure 28. The promotion and set up of profitable and efficient sustainable energy options implies specific knowledge.

## PROFESSIONAL CAREGIVERS

### 1. GENERAL DESCRIPTION.

#### 1.1. Description of the resource.

##### 1.1.1. General description.

The percentage of disabled people in Europe is 10-15 % of the total population. In Spain, the Survey on Impairment, Disability and Health (Encuesta sobre Discapacidades, Deficiencias y Estado de Salud, EDDDES 1999) calculates that there are 3.528,221 people in Spain with some kind of disability or impairment that has caused or is liable to cause some disability. This figure represents the 9 % of the Spanish population<sup>1</sup>.

The main causes for disability are illnesses, accidents and disabling conditions associated with age; the number of disabled people is expected to grow constantly, due to the progressive increase in life expectancy<sup>2</sup>.

There is not a common European definition of the term disability, as the Committee of Ministers agreed that this issue had to be dealt with by each member State. However, in a previous recommendation adopted in 1998, dependence was defined as the need for "significant assistance or help in carrying out the usual day-to-day activities" or, more in detail, "a state in which persons, by reason of lack or loss of physical,

*psychological or intellectual autonomy, require significant assistance or help in carrying out the usual day-to-day activities, especially as personal care is concerned*<sup>3</sup>.

The Spanish Law 39/2006 for the Promotion of Personal Autonomy and the Assistance to Dependent People, which was recently enforced, defines dependence as the *"permanent state of people that due to age, illness or disability, and linked to the lack of physical, mental, intellectual or sensory autonomy, require the assistance or substantial help of other people in order to carry out the basic activities of daily living, or, in the case of people with intellectual disability or mental illness, of further support for their personal autonomy"*<sup>4</sup>.

### 1.1.2. Relevant definitions.

The Law for the Promotion of Personal Autonomy and the Assistance to Dependent People, provides



Figure 1. Even severely dependent people can be looked after appropriately in rural areas, with a well-organised action plan.

further definitions<sup>5</sup> that may help understanding Dependence:

1. **Autonomy:** The ability to control, manage and take personal decisions on one's own initiative and live according to own rules and preferences, and to carry out basic activities of daily living.
2. **Activities Of Daily Living (ADL):** The most elementary tasks allowing individuals to develop their life in an autonomous and independent way, such as: personal care, basic housework, mobility, recognition of people and objects, sense of direction, understanding and carrying out of simple tasks or commands.
3. **Support needed for personal autonomy:** the support required by intellectually disabled people in order to live with a satisfactory level of personal autonomy within the community.
4. **Non-professional help:** home assistance provided by family members and relatives of dependent people, which are not connected with any professional care service.
5. **Professional help:** The assistance provided by a public body, private for-profit or non-profit entity or self-employed professional providing care services to dependent people, in their homes or in a specific centre.
6. **Personal assistance:** Service provided by a personal assistant that performs or helps dependent people performing daily life activities, in order to contribute to their independence and promoting their personal autonomy.
7. **Third sector:** non-profit private organisations resulting from different kinds of social initiatives sharing an interest in solidarity and community

<sup>1</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".

<sup>2</sup> Recommendation Rec(2006)5 of the Committee of Ministers of the Member States on an Action Plan of the Council of Europe in order to promote the rights of people with disabilities so that they might play a full part in society: improving the quality of life of people with disabilities in Europe 2006-2015

<sup>3</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".

<sup>4</sup> Section 2.2 Law 39/2006 on the Promotion of Personal Autonomy and the Assistance of Dependent People.

<sup>5</sup> Sec. 2. Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.

welfare and supporting the recognition and exercise of social rights.

### 1.1.3. New model for the protection of dependent people.

The approach to disability is changing: Disabled people are no longer considered as people that do not contribute to society, and are regarded as people that need some obstacles to be removed in order to become participative citizens. The former medical approach to disability has been replaced by a model based on social and human rights.

In 1998, the Committee of Ministers of the Council of Europe adopted a deep reform in order to protect dependent people.

Later, on March 2000, the Council of Europe stated in Lisbon that there was a need to reform the social protection schemes. In 2001, in Gothenburg, the Council of Europe focused on how to address the ageing of population and ordered a report on the social and health situation of elderly people. This report was presented in the Barcelona European Council in 2002, where they set up the objectives that had to be pursued as regards the social protection of dependent population in EU countries.

The recognition of the rights of dependent people has been stressed in several documents by international organisations, as the World Health Organisation, the Council of Europe and the European Union.

In 2002, in the period of Spanish presidency, the European Union agreed upon three criteria that had to govern the dependence policies of member States: **universality, high quality and sustainability in time of the systems implemented.**



Figure 2. Solitude and social isolation can speed up the deterioration of someone's health and increase their degree of dependence.

The conclusions of the report produced by the Subcommission on the study of the situation of disabled people, published on December 13th 2003 stress the need to create an integral system that addresses dependence from a global point of view and with the active participation of society<sup>6</sup>.

We have changed our view, now people go first, and the approach used is comprehensive, coherent and respectful with human rights, fundamental liberties and the dignity of disabled people.

Thus, many European countries have adopted more active policies intended to give disabled people the control over their lives back<sup>7</sup>.

It is a fact that dependent people have the right to stay in their usual contexts for as long as it is possible, provided that they do not wish to live in residential homes<sup>8</sup>.

This fact implies that home assistance to dependent people is not a whim of the user, but a recognised

<sup>6</sup> Explanatory preamble. Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.

<sup>7</sup> The Council of Europe Disability Action Plan 2006-2015.

<sup>8</sup> Section 29 b. Law of the County of Navarra 15/2006 of 14th December on Social Services.

right<sup>9</sup>. Moreover, the experiences of home assistance and tele-assistance have proved that the periodical follow-up of people at risk of becoming dependent is one of the best instruments to prevent dependence and promote personal autonomy.

#### 1.1.4. Dependence and age.

There is a close relationship between dependence and age. The percentage of individuals with limitations in their functional abilities increases with age.

The increase of prevalence ratios in the different age groups is not constant; there is an age (about 80 years old) in which the prevalence ratio increases substantially.

In addition to this, several studies show an evident relationship between age and disability, given the fact that 32% of people aged over 65 have some type of disability, while the percentage is 5% in the rest of age groups<sup>10</sup>.

The fact that dependence is connected with the ageing of population is not surprising.

Thus, we should not be surprised to see that a simplistic view may lead us to think that dependence affects only elderly people<sup>11</sup>.



Figure 3. Elderly people may need assistance to perform activities of daily living, but they have a lot to give and to transmit to society, especially in rural areas, where part of the traditions are still alive thanks to the elderly people that still live in their villages.

On the other hand, there is an evident relationship between the number of inhabitants and ageing. As shown in figure 4, in Spain, the smaller the village the larger the population aged over 65.

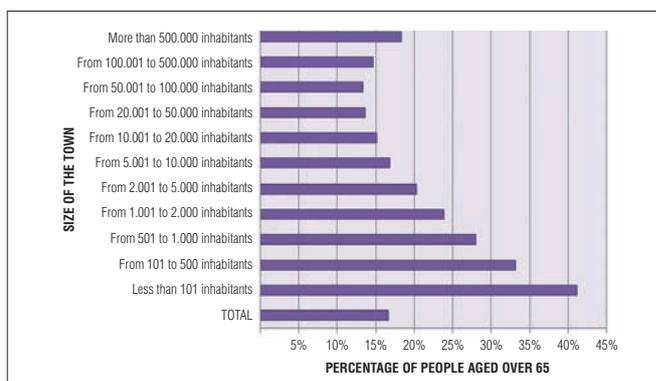


Figure 4. Percentage of people aged over 65 according to the size of the town where they live. Source: Instituto Nacional de Estadística de España, Censos de Población y Viviendas 2001. Resultados definitivos.

<sup>9</sup> Section 3.i Law 39/2006 on the Promotion of Personal Autonomy and the Assistance of Dependent People.

<sup>10</sup> Explanatory preamble. Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.

<sup>11</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".

The ageing of the population shows that in rural areas, most people aged over 65 lacks the support of their children, that is, in most cases, their children live in bigger towns, mainly for work reasons.

This fact could increase the risk of elderly people in rural areas to become dependent.

In Spain, Public Administrations have addressed the needs of elderly people and dependent people through the autonomous and local governments, and in the scope of the **Concerted Plan to Provide Basic Social Services**, in which the National Government takes part too.

At national level, the government has adopted the **Action Plans for Disabled People and for Elderly People**.

On the other hand, the **Social Security** has provided some assistance services to disabled elderly people: severe disability, aids for caregivers within non-contributory disability benefits and benefits for families with disabled dependent child, social services for the re-education and rehabilitation of disabled people and for the assistance to elderly people<sup>12</sup> etc.

#### 1.1.5. Improvement of the health care system.

The **Dependence Law** is the result of the attempt of the Spanish Government to ensure a framework of services for dependent people. This law is a new type of social protection that broadens the former protection provided by the Government and the Social Security System.

The principles of the Dependence Law<sup>13</sup> are the following:

1. The public nature of the system to support Autonomy and provide Assistance to Dependent people.

2. The universal, equal and non-discriminatory access of all dependent people [...]
3. A complete and integrated assistance to dependent people.
4. Mainstreaming of the policies addressing the assistance to dependent people, ensuring an actual equality.
5. Personalised attention, especially to individuals that require more support due to former situations of discrimination of lack of equal opportunities.
6. Provision of the necessary measures as regards prevention, rehabilitation and social and mental stimulation.
7. Promotion of the necessary conditions for dependent people to have a normal life with the highest possible degree of autonomy.
8. Whenever possible, allowing dependent people to be assisted in the context where they live.
9. Quality, sustainability and accessibility of the services made available to dependent people.
10. Involvement of dependent people, and whenever possible, their families and the entities that represent them [...]
11. Cooperation of social and health care services in the assistance to the users of the system to support Autonomy and provide Assistance to Dependent people, which is made provision for in the herein law and in the subsequent regulations of the Autonomous Communities and Local entities.
12. Involvement of private entities in the support personal autonomy and assistance to dependent people.

<sup>12</sup> Explanatory preamble. Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.

<sup>13</sup> Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.

13. Involvement of the third sector in the support personal autonomy and assistance dependent people.
14. Cooperation between administrations.
15. Integration of the services made provision for in this Law in the social services networks of each Autonomous Community, to the extent of the competences that have been transferred, which will recognise such services and implement them in public centres and in private centres and private centres with public funding.
16. Inclusion of the gender perspective, taking into account the needs of women and men.
17. People with severe dependence will have preference.

At present, these new social service are being implemented, in order to broaden the protection of the system.

This is why the **System for the Assistance to Dependent People** was created, in order to improve the social services provided by the Spanish Government and address the needs of dependent people, and promote their autonomy, quality of life and equal opportunities<sup>14</sup>.

The Law on Dependence makes provision for the promotion of personal autonomy and the assistance to dependent people by creating a **System for the Autonomy and Assistance to Dependant People (SAADP)**, in which all Public Administrations will take part.

This system is intended to ensure that conditions are met and in order to establish the levels of protection

referred to in the Law. It is also the instrument for the collaboration and involvement of all Public Administrations, and for the optimisation of the public and private resources available.

Thus, the system provides for a subjective right based on universal coverage, equality and accessibility and develops a comprehensive assistance system<sup>15</sup>.

The Law on Dependence does not only contemplate the right to assistance, but also the way such assistance will be financed and paid for.

Funds will be determined by the number of dependent people and by the services that will be provided. Funding will be stable, sufficient and durable, and will be the joint responsibility of Public Administrations.

The National Government will provide such amounts to the Autonomous Communities for them to provide protection to dependent people.

This system will provide equal assistance to all dependent people.

Users will contribute to the financing of these services, according to their economic situation, the type of service required, and the expenses derived from such service<sup>16</sup>.

Apart from the social aim, which is the one that prevails, we must not forget that the creation of an appropriate social security coverage in order to support the autonomy and assistance to dependent people will also imply saving money and making a better use of the public health system, given the fact that "the existence of an appropriate network of services in order to address

<sup>14</sup> Explanatory preamble. Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.

<sup>15</sup> Explanatory preamble. Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.

<sup>16</sup> Explanatory preamble. Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.



Figure 5. Promoting activities to exercise mental agility is also useful in order to prevent dependence.

dependence socially, would reduce to a great extent the expenses of the health care system, some of which are derived from the assistance to dependent people<sup>17</sup>.

In addition to this, preventive actions to fight the processes that reduce autonomy, and the inclusion of people at risk in the system, will also reduce the sanitary and assistance costs, as constant assistance and follow up of individuals can prevent dependence and health conditions that require further assistance.

#### **1.1.6. Double perspective of the assistance to dependent people: support for dependent people and their caregivers.**

Up to the present, the family, especially female relatives, have been responsible for dependent people, and have provided the so-called «informal support». The

changes in family models and the progressive entrance of 3 millions of women to the job market in the last 10 years, affect this situation, and makes it necessary to update traditional assistance systems in order to ensure assistance to all those citizens that require them. Thus, the demand for assistance services is expected to grow.<sup>18</sup>

In spite of the effort made through previous policies of reconciliation of work and family life, the number of women in the labour market is still very low.

The lack of the necessary social assistance to families leads to an unbalanced share of responsibilities between men and women and is a major obstacle for women to enter the labour market.

There is a huge social debt with family caregivers that look after dependent people.

At present, caregivers (mainly women aged over 45) are not entitled to any benefits for their services, moreover, they will have to overcome lots of problems in order to obtain pension rights.

The fact that the national insurance contribution system will take these services into consideration, and pay pensions to caregivers, partly with funding from the National System of Dependence, will allow them to have a professional career and benefit from a right that they are not entitled to at the moment.<sup>19</sup>

#### **1.1.7. Description of the type of activities liable to be affected by disabilities in Spain.**

The type of daily life activities that are limited by the disabilities of Spanish people are described clearly in table 1 and figure 6.

<sup>17</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".

<sup>18</sup> Explanatory preamble. Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.

<sup>19</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".

Activity of daily living concerned	From 6 to 16 years old	From 17 to 24 years old	From 25 to 35 years old	From 35 to 44 years old	From 45 to 54 years old	From 55 to 65 years old
Sight	188,37	229,07	214,64	196,73	202,48	236,82
Perception of any image	22,42	30,66	5,14	10,28	13,18	11,62
General tasks involving sight	95,51	121,11	137,66	110,7	108,08	128,01
Accurate tasks involving sight	74,07	118,3	86,3	102,92	113,1	141,4
Other sight problems	59,63	63,73	82,96	55,37	58,88	61,94
Hearing	191,64	197,25	176,67	203,12	211,6	230,57
Perception of any sound	31,42	56,57	33,06	32,16	38,64	27,11
Hearing of loud sounds	39,68	46,19	48,99	54,39	34,86	51,15
Hearing utterances	158,77	128,3	134,87	156,52	164	191,58
Communication	459,7	349,82	285,88	184,25	137,38	74,36
Verbal communication	101,82	88,2	54,19	42,77	56,25	34,71
Communication through alternative language systems	139,7	103,35	67,07	37,19	14,08	9,41
Communication through non-signed gestures	78,91	85,66	40,27	24,42	10,62	6,29
Communication through conventional writing-reading	376,97	284,38	253,22	152,65	93,11	48,68
Learning, applying knowledge and accomplishing of tasks	399,89	342,2	287,37	185,63	114,04	83,42
Recognition of people and objects, sense of direction	118,49	91,94	84,42	57,04	26,92	28,73
Remembering information and events	194,82	166,32	135,88	96,62	70,03	68,39
Understanding and accomplishment of simple commands and or tasks	112,36	105,57	90,63	57,96	29,52	17,6
Understanding and accomplishment of complex commands and/ or tasks	380,54	307,63	261,17	158,4	89,12	42,03
Moving	183,52	165,76	208,48	288,06	334,15	348,29
Changing and maintaining body posture	109,6	106,8	133,12	177,21	205,6	190,41
Getting up and lying down	158,31	154,08	178,1	241,53	282,23	296,63
Moving within the home	147,3	100,82	120,53	149,48	153,05	148,74
Using arms and hands	239,16	258,56	223,23	295,3	353,86	365,85
Moving light objects	140,34	161,64	170,24	224,83	286,53	296,97
Using tools and utensils	177,12	198,06	157,81	191,04	206,51	213,18
Handling small objects with hands and fingers	180,66	163,62	149,87	157,99	156,47	161,73
Moving outside the home	438,96	583,73	592,96	530,41	512,69	508,12
Moving without using a means of transport	313,6	257,57	288,38	286,85	302,19	335,37
Moving using public transport	424,13	392,69	358,52	350,56	308,64	338,07
Driving self owned car	0	522,06	528,52	441,79	394,49	370,44
Taking care of oneself	292,93	200,8	185,97	135,76	133,63	130,12
Washing oneself: Having a clean and neat appearance	253,88	175,35	162,32	117,41	104,24	99,98
Controlling the need to go to the toilet, and being able to do it unassisted	155,68	104,47	90,56	56,76	40,72	33,48

Dressing, undressing and dressing up	256,94	147,8	146,96	106,28	97,83	97,8
Eating and drinking	132,89	67,93	70,19	42,11	34,87	22,32
Taking care of housework	424,24	438,76	441,34	373,34	345,59	335
Buying and controlling supply and service needs	338,41	315,55	311,02	256,57	221,73	224,43
Taking care of meals	221,28	267,98	260,43	171,37	133,06	120,11
Taking care of laundry	203,64	249,41	262,55	208,78	183,49	182,74
Cleaning and keeping the house	211,33	273,93	289,72	257,38	260,43	258,08
Taking care of the rest of the family	228,18	271,42	263,9	192,63	141,63	128,62
Mixing with other people	328,79	331,8	276,08	175,64	112,21	90,62
Keeping affectionate relationships with family members	71,76	101,46	106,67	63,3	28,82	17,55
Making new friends and keeping them	276,74	282,23	238,54	137,46	77,86	52,09
Mix with workmates and bosses	287,9	299,26	246,66	157,78	103,7	86,04

NOTE: The same person may appear in more than one disability category.

Table 1. Percentage of people with disabilities out of 1000 people, according to age groups and type of disability. Source: Instituto Nacional de Estadística.

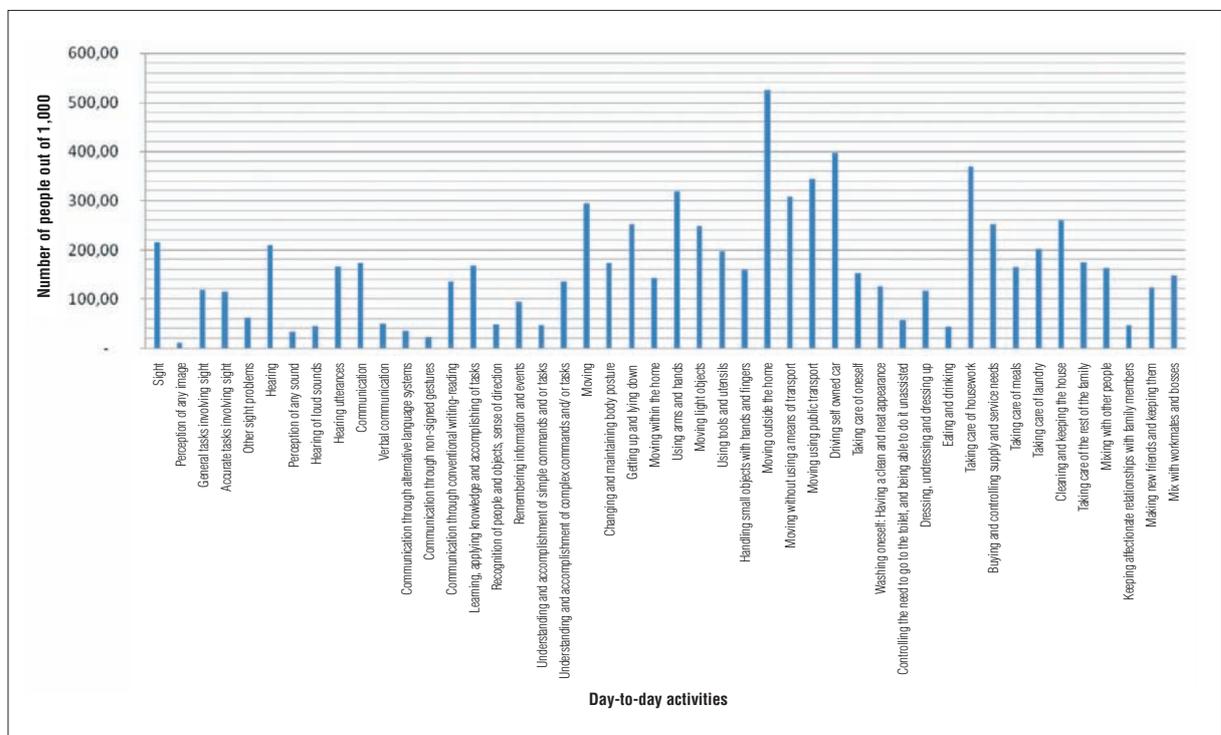


Figure 6: People having some disability out of 1000 people and type of activities that are affected by such disability.

## 1.2. Evolution in the use of the resource.

### The demand for assistance:

The demand of assistance to dependent people has increased substantially in the last few years, and it is expected to continue growing for the next few decades. This is a consequence of demographic, medical and social factors, as population ageing, higher survival rates in people having congenital disorders, severe conditions or serious accidents, and increase of traffic accidents and accidents at work<sup>20</sup>.

The increase of the demand is coetaneous with changes in the traditional family structures. Housewives were in charge of taking care of dependent people, among other tasks. Women started to enter the labour market decades ago. However, at present, they only benefit from equality conditions when training or studying. Women's unemployment rates are higher, and the percentage of women in decision taking positions is lower, and so are their wages.

In many cases, when a dependent person has to move to their homes, women stop working, as society still considers that is the way it should be. In addition to this, women get lower wages, and therefore if a household has to do without one job it will be the worst paid one, especially if it is that of a woman.

Governmental support to informal care-giving is liable to have a positive effect on the equality between men and women, apart from ensuring assistance to dependent people whether they have relatives that can take care of them or not.

We must bear in mind that personal autonomy is now a recognised right.

However, the entrance of women in the labour market is not the only reason for the crisis of "informal" care giving<sup>21</sup>, there are many other causes:

- the reduced number of members of family units,



Figure 7. The population of rural areas has the right to receive assistance without having to move from away from their context, even if they are dependent.

- families are not unbreakable and immutable institutions anymore,
- family members have a greater geographical mobility,
- the democratisation of the relationships within the family and of couples,
- children stay in the family home until much later, even more than 30 years old.

In the near future, the problems of fertile couples to conciliate work and family life may be expected to increase the problems of "informal" care-giving: couples wait longer to have their first child, and the generational replacement takes place slower, which means that parents are more liable to need their children's assistance when the latter do not have a stable economy and family life yet.

<sup>20</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".

<sup>21</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".

## 2. IMPORTANCE AND IMPACT OF THE RESOURCE.

### 2.1. Current situation and impact of the resource.

#### 2.1.1. Current situation in rural areas.

In general terms, rural areas undergo an important backwardness of service provision and centres for disabled people, especially if they are dependent<sup>22</sup>.

According to the study on the needs of people with severe disability and their families in rural areas (Necesidades en el medio rural de las personas con gran discapacidad física y sus familias, Spain, 2006), the 45.3% of disabled people live in rural areas with less than 2,000 inhabitants<sup>23</sup>. These figures may be slanted, as most of the people surveyed in the study live in Autonomous Regions with a lot of rural population (namely Castilla y León, Andalucía and Castilla la Mancha).

In rural areas, few of the people with severe disabilities wishes to live in a residential home, regardless the support they may get, and their relatives share their opinion. Other options are living independently in a flat with the help of a personal assistant and living in a city. On the contrary, almost 30% of disabled people wish to live in their homes but having access to more services.

Summing up, most disabled people wish to stay where they live. There is a general opinion that living in a rural area has the advantages of quietness and a greater social support. The disadvantages are the lack of services or problems to access the existing ones<sup>24</sup>.

Almost 40% of people with severe disability that live in rural areas need more health care assistance. One out of four villages lack a health care centre of their own.

Moreover, there are problems to access the existing centres, and there is not appropriate public transport to get to them.

In some cases, disabled people need to travel some 23 Km. in order to get to the nearest rehabilitation centre, and in most cases they pay for the expenses derived from such journeys<sup>25</sup>.

Only 16% of people with severe disability living in rural areas receive the necessary home assistance provided by the social services. In general, home assistance is not very common, and whenever it is needed, most of the times, it is the disabled person or his or her relatives who has to go to visit the social worker. A 40.7% of disabled people consider that social services are little accessible or not accessible at all<sup>26</sup>.

As for caregivers, they are 55 years old on average, although there are a significant number of older people too. In the 46.3% of the cases, the couple or spouse is the caregiver and in the 35.7%, the mother accomplishes this task. The 81% of caregivers devote their time to housework and claim that they do not work because they have a disabled family member. More than 12% of caregivers are disabled themselves<sup>27</sup>.

In addition to this, most disabled people live in rural areas. This fact makes it necessary to create an assistance model that copes with the specific needs of rural areas.<sup>28</sup>

<sup>22</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".

<sup>23-27</sup> Necesidades en el medio rural de las personas con gran discapacidad física y sus familias. Informe de Resultados 2006. Plataforma representativa estatal de discapacitados físicos.

<sup>28</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".

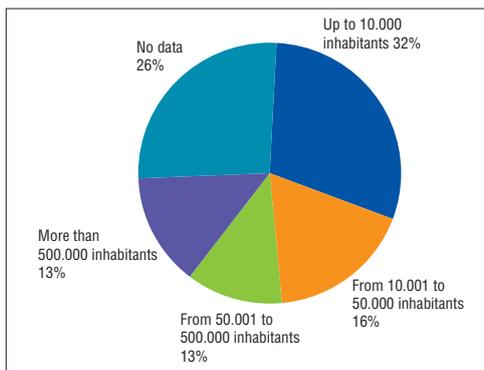


Figure 8. Percentage of disabled people living in rural areas that have moved as a consequence of their condition, sorted by size of the town they have moved to. Source: Instituto Nacional de Estadística.

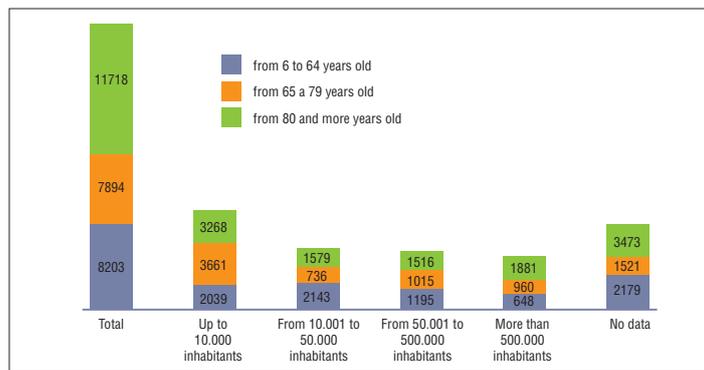


Figure 9. Percentage of disabled people living in rural areas that have moved as a consequence of their condition, sorted by age group and size of the town they have moved to. Source: Instituto Nacional de Estadística.

Most of the people that move from rural areas due to their disability move to towns with less than 10,000 inhabitants, because they have more services and fewer barriers for disabled people. The percentage is smaller in larger host towns.

Although this is not true in all cases, there is a tendency to move to small towns (10,001–500,001 inhabitants) for age groups between 6 and 64, instead of moving to rural areas (less than 10,000 inhabitants). However, rural areas are the second choice, before medium sized towns (from 50,001 to 500,001 inhabitants) and large cities (more than 500,001 inhabitants).

### 2.1.2. Assessment of dependence situations.

The Spanish law for the *Promotion of Personal Autonomy and the Assistance to Dependent People* states that the assessment of the dependence situation will be carried out by bodies appointed by each Autonomous Community, although a national body, the Territorial Council, will establish the common criteria on the composition and functions of assessment bodies of Autonomous Regions, which will in all cases be of public nature<sup>29</sup>.

The assessment of the degree and level of dependence will be determined by the scale agreed upon by the Territorial Council of the System for the

Autonomy and Assistance to Dependant People and approved by a Royal Decree of the Government. Such scale will be based on the International Classification of Functioning, Disability and Health (ICF) by the World Health Organisation.

The scale will establish the criteria used in the assessment of the degree of autonomy of a given person, the ability to carry out activities of daily living, the number of points awarded to each level and degree of dependence, and the protocol and techniques used in order to assess capability, whenever necessary.

This scale will assess the capability of individuals to carry out basic activities of daily living by themselves, and whether they need support or supervision in order to carry them out, in the case of intellectually disabled or mentally diseased people.

The assessment will take into consideration the reports on the health of the individual and his or her context, and the technical assistance, orthosis or prosthesis previously prescribed.

At present, the regulations and the scale used to assess dependence are established by the *ROYAL DECREE 504/2007 of 20<sup>th</sup> April, which approves the use of a scale in order to assess dependence situations as established in the Law 39/2006 of 14<sup>th</sup> December, on the Promotion of Personal Autonomy and the Assistance to Dependent People*.

<sup>29</sup>Sec. 27. Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.

According to the Scale for the Assessment of Dependence, the following situations may exist: moderate dependence, serious dependence and severe dependence:

**Degree I. *Moderate dependence*:** when individuals need help to carry out basic activities of daily living at least once a day or need intermittent or limited support in order to be autonomous.

**Degree II. *Serious dependence*:** When individuals need help to carry out several basic activities of daily living twice or three times a day, but do not require permanent assistance from caretakers or extensive support for personal autonomy.

**Degree III. *Severe dependence*:** when individuals need help to carry out several basic activities of daily living several times a day and have no physical, mental, intellectual or sensory autonomy, and therefore need the continuous and essential support of a caregiver or needs extensive support in order to have personal autonomy.

All these degrees of dependence are liable to get Home Assistance, but the intensity, specificity and daily duration of such assistance will depend on the needs of each user.

According to the Law on Dependence, those entitled to dependence benefits will contribute to finance them,

according to the type of service, the costs derived from it and the economic situation of the user. The economic situation of users is taken into consideration when determining the amount level of the benefits. In order to settle the contribution of the users, the differences between assistance, upkeep and lodging services are taken into account. Above all, no citizen will be excluded from the System due to a lack of economic resources.

## 2.2. Results and impact of the resource.

Nowadays disabled people are being taken care of mainly by means of "informal support".

After analysing the data on Table 2, the maximum number of potential jobs in Spanish rural areas is 627,169.

In order to create the maximum number of jobs, two factors are needed:

- "informal" support should disappear completely,
- the Welfare State in Spain should be able to cope with the expenses derived from this new health care service.

These conditions seem quite difficult to meet, given that in 1999 the percentage of the assistance assumed by the social services was hardly the 0.68%.

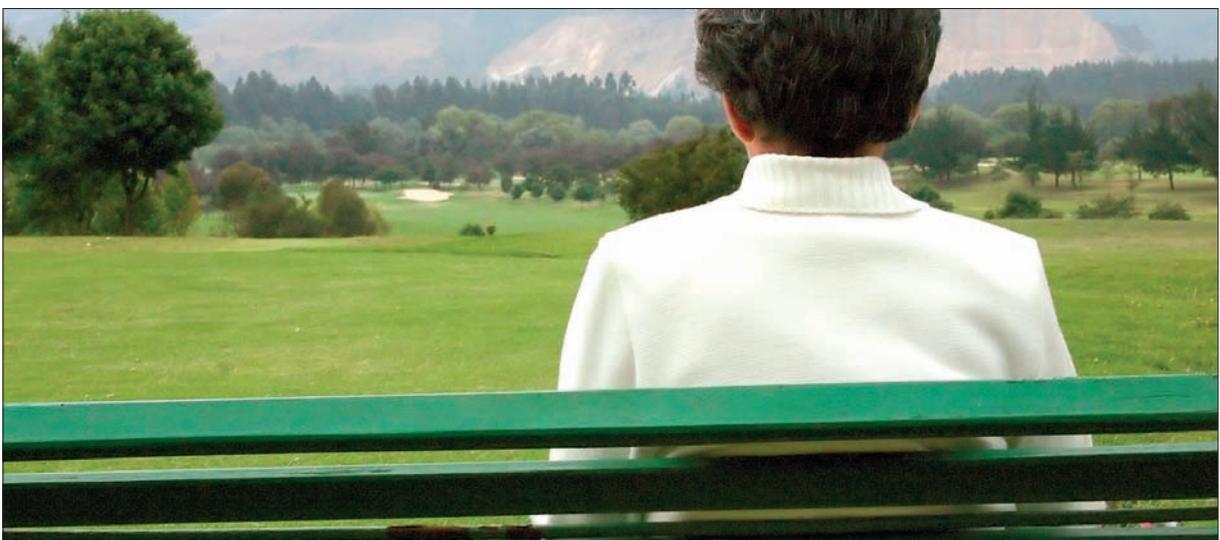


Figure 10. Rural areas have a lot of positive elements for their inhabitants, including disabled people. However, sometimes they lack the necessary services and they are forced to move to other places where more services are available. Moving can cause depression due to social maladjustment.

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Total	Total	556954	605064	508432
	Less than 7 hours	95576	119588	60382
	From 7 to 14 hours	79650	101832	68069
	From 15 to 30 hours	74762	85614	72371
	From 31 to 40 hours	35888	38981	53132
	More than 40 hours	179988	184158	206609
	No data	91091	74890	47869

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Spouse	Total	146783	193791	50649
	Less than 7 hours	34310	24266	4891
	From 7 to 14 hours	26208	31877	5694
	From 15 to 30 hours	25270	31802	6620
	From 31 to 40 hours	10554	15689	5295
	More than 40 hours	49238	88479	27937
	No data	1203	1678	211

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Daughter	Total	65378	151500	200285
	Less than 7 hours	12982	28695	16674
	From 7 to 14 hours	15964	30911	28682
	From 15 to 30 hours	14081	27780	31412
	From 31 to 40 hours	5716	11785	20915
	More than 40 hours	15510	50351	99099
	No data	1125	1978	3501

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Son	Total	17019	30796	31952
	Less than 7 hours	5997	6527	5203
	From 7 to 14 hours	4041	9188	4548
	From 15 to 30 hours	3298	5350	5483
	From 31 to 40 hours	457	2099	4387
	More than 40 hours	2891	6694	11782
	No data	334	938	548

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Sister	Total	18608	16926	8944
	Less than 7 hours	2337	2372	740
	From 7 to 14 hours	1484	1561	651
	From 15 to 30 hours	2578	3180	962
	From 31 to 40 hours	912	655	794
	More than 40 hours	11091	9159	5797
	No data	206	0	0

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Brother	Total	5681	2128	1191
	Less than 7 hours	1508	485	0
	From 7 to 14 hours	1430	153	329
	From 15 to 30 hours	675	453	161
	From 31 to 40 hours	97	188	0
	More than 40 hours	1840	715	701
	No data	130	134	0

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Mother	Total	140094	322	0
	Less than 7 hours	13940	0	0
	From 7 to 14 hours	16684	235	0
	From 15 to 30 hours	15380	0	0
	From 31 to 40 hours	13705	0	0
	More than 40 hours	79712	86	0
	No data	674	0	0

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Father	Total	12481	0	0
	Less than 7 hours	1647	0	0
	From 7 to 14 hours	720	0	0
	From 15 to 30 hours	1913	0	0
	From 31 to 40 hours	529	0	0
	More than 40 hours	7426	0	0
	No data	247	0	0

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Other relatives	Total	27415	63330	94119
	Less than 7 hours	5760	17540	10371
	From 7 to 14 hours	6247	13049	13431
	From 15 to 30 hours	6020	9412	15094
	From 31 to 40 hours	1862	4657	12113
	More than 40 hours	7344	17684	40825
	No data	182	988	2284

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Employee	Total	17957	46548	48188
	Less than 7 hours	6911	22947	10301
	From 7 to 14 hours	4237	8067	6529
	From 15 to 30 hours	2828	5135	8418
	From 31 to 40 hours	1288	2682	7611
	More than 40 hours	1321	6173	12921
	No data	1372	1545	2408

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Friends and neighbours	Total	4939	12566	9140
	Less than 7 hours	2445	6072	4043
	From 7 to 14 hours	830	2877	2269
	From 15 to 30 hours	1034	1208	1221
	From 31 to 40 hours	0	450	274
	More than 40 hours	515	1657	869
	No data	114	302	464

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Lodger	Total	0	455	0
	Less than 7 hours	0	0	0
	From 7 to 14 hours	0	455	0
	From 15 to 30 hours	0	0	0
	From 31 to 40 hours	0	0	0
	More than 40 hours	0	0	0
	No data	0	0	0

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Social services	Total	16286	16384	18217
	Less than 7 hours	7443	10303	7217
	From 7 to 14 hours	1696	3060	4924
	From 15 to 30 hours	1228	598	1286
	From 31 to 40 hours	767	0	1077
	More than 40 hours	2295	980	1326
	No data	2856	1444	2386

	Población	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
Other relationship	Total	1507	3968	8933
	Less than 7 hours	173	316	898
	From 7 to 14 hours	109	347	1011
	From 15 to 30 hours	255	558	1623
	From 31 to 40 hours	0	777	459
	More than 40 hours	773	1891	4943
	No data	198	79	0

	Population	From 6 to 64 years old	From 65 to 79 years old	From 80 years old onwards
No data	Total	82807	66349	36816
	Less than 7 hours	123	64	44
	From 7 to 14 hours	0	53	0
	From 15 to 30 hours	202	139	91
	From 31 to 40 hours	0	0	207
	More than 40 hours	33	290	407
	No data	82449	65804	36068

Table 2. People with disabilities that receive assistance, relationship of the disabled person with the main caregiver, sorted by age group and weekly hours (year 1999).

Assistance to dependent people includes mainly personal care routines.

From an employment point of view, dependence could be said to be quite demanding in terms of manpower. Therefore, the National System of Dependence is going to have a very positive effect on employment, in two different ways<sup>30</sup>:

- The new jobs that would be created in the public and private spheres as a result of the implementation of the assistance programmes.
- The availability of new manpower that is currently out of the labour market, either totally or partly, because they are taking care of dependent people, and who would be able to re-enter the labour market again.

Apart from the above-mentioned positive consequences, other positive effects are to be expected, as the legalisation of work situations that are now irregular, and the increase in the efficiency of other economic or health care services that are currently tackling these situations, even if they are secondary, unequal and incoherent<sup>31</sup>.

Implementing specific actions addressed to satisfy the needs of dependent people, increasing the number of rooms in residential homes and day centres and extending home assistance services and tele-assistance imply many new jobs, and the expenses derived from such actions are perfectly affordable for Spanish economy. Most of these jobs would benefit social groups vulnerable to employment difficulties (such as women, unskilled workers, long-term unemployed people or young people looking for their first job). Therefore, the jobs created will improve employment rates and activity rates, reduce temporary employment and reduce the number of family units in which every member is unemployed<sup>32</sup>.

All the funding devoted to the improvement of the Welfare State and to satisfy new needs by ensuring social rights, is being invested in the quality of life of citizens and in employment creation, as social services

are one of the sectors liable to create more employment, and represent an important New Source of Employment at European level, as mentioned repeatedly by the European Commission and other international bodies<sup>33</sup>.

The economic returns produced by investing in social services (saving derived from less unemployment benefits, and more social security contributions, VAT, personal income tax and corporate tax) show that social investments can contribute to create employment and new economic activities<sup>34</sup>.

In spite of the fact that employment rates have improved in the last few years, there is still a substantial employment deficit, especially among women, who have unemployment rates twice as high as those of men<sup>35</sup>.

#### PILOT EXPERIENCES

We will now describe the Home Assistance Service available in the district of Valdorba, as part of the Basic Social Services of the Area of Tafalla (in Navarra, Spain).

The main objectives of the Basic Social Services, supported by the Government of Navarra and managed by Local Entities wishing to make this service available to population, are the following:

- Supporting the personal autonomy of users and their hygiene.
- Allowing them to stay in their natural context and improving their quality of life.
- Preventing personal situations that may derive in physical or psychological decay and in social discrimination.
- Encouraging alternative possibilities to unnecessary stays in institutions.

The home assistance service provided in the district of Valdorba consists of providing several services and/or personal, social and housework assistance to individuals and families in their own homes, when they are not able to tackle daily routines by themselves or when there are family members with psychological family problems.

<sup>30-35</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".



Figure 11. Social worker arriving to the home of one of the users of the service provided by the Council of Leoz.

These social workers providing their services in the villages of the district of Valdorba were hired by Leoz Council seven years ago. They work for the Municipal Consortium comprising Leoz, Garínain, Barásain, Olóriz, Orisoain and Pueyo-Puiu.

These social workers address the needs of 1913 neighbours. 21 users with different degrees of dependence require home assistance. These users have also been assigned a tele-assistance service, connected with the emergency telephone services (the so-called 112) of the Autonomous Community of Navarra.

Before the new Law on Dependence was enforced, Social Workers of the Basic Social Services of the Area of Tafalla were responsible for the study and assessment of the social and family conditions of users. They were asked to write a report including:

- The type of benefit the user was entitled to.
- The days and hours they were assigned.
- The fee that the user had to pay.

The main change brought about by the new law affects the assessment process, which has now a unified protocol. Thus, before requesting home assistance, users must be assessed. Their degree of dependence must be established in order to provide them the most suitable assistance for their condition and their social background.

According to the experience of the Councils of Leoz and Valdorba, the Assistance System for Dependent

People may create from 2 to 4 employments in each 1,000 inhabitants. Nevertheless, a growing demand of these services is to be expected, as foreseen by all the studies.

At present, four people are hired by the Council of Leoz, and their working hours are the 60% of normal working hours. Their working hours allow them to satisfy the needs of users according to an adequate schedule for each case. Thus, the service is provided in the most suitable way for users and the social workers can conciliate work and family life.

Workers have received continuing training. The courses were organised by several entities connected with home assistance services such as INAP (Institutes of Public Administrations) and the Federation of Councils and Districts (Federación de Municipios y Concejos).

It would be very positive for workers to enrol in more training initiatives connected with social skills and other continuing training. Social workers should be paid for attending these courses, especially whenever job demand is low in the area. Thus, the staff providing this service in rural areas will be fully qualified.

In rural areas as the one we are addressing, councils always attempt to hire local people for the job, in order to boost endogenous development and to favour the relationship between the user and the social worker. This type of job creates close personal links, and the confidence between the worker and the user should be encouraged.

In addition to this, we must not forget that rural users, especially elderly people, tend to have their own idiosyncrasy (habits, customs) and someone coming from the city may consider them as "obsessive".

People sharing the same rural background are more liable to understand each other.

At present the service provided is adapted to existing needs, that is, there are no neglected users due to lack of resources. Nevertheless, there may be potential users that do not wish to apply for home assistance out of pride or embarrassment.

The Service and the entities supporting it are trying to prevent reluctance (they may feel they are allowing a stranger in their homes, they may feel ashamed to be taken care of by someone who is not their daughter or other close relatives, etc. These ideas are quite common in rural areas) by means of information campaigns describing the services provided and their price.

However the best possible advertising campaign is the one made by users themselves and by their families. Their experience may encourage other dependant people to apply for home assistance.

### 3. USE OF THE RESOURCE AS AN INSTRUMENT FOR RURAL DEVELOPMENT.

#### 3.1. Possibilities and conditions needed for development.

The new Law on Dependence is an opportunity to define an integrated services model. The coordination of the different administrations is essential in the implementation of such model. The administration has to make the most of the advantages of rural areas in order to provide a "customised" service addressing the real needs of rural population. The new technologies are an essential tool for people to access these services<sup>36</sup>.

When defining dependence as a social need that has to be addressed, not all the limited activities listed by the WHO, and described in the new classification of disabilities are included.

However, some of these should be taken into account, as the ones concerning:

- personal care (washing, body care, excretion, getting dressed, eating, drinking, caring of one's health),
- mobility and changing or keeping body posture (basic body gestures as standing up, sitting down, laying down,... etc.)



Figure 12. The Basic Social Services in rural areas must work hard to prevent potential users of the service to live secluded in their homes instead of applying for assistance, out of ignorance or pride.

- the ability to move within the house,
- the possibility to deal with housework (cooking meals, home routines and other tasks),
- the basic mental function (recognising people and objects, understanding and accomplishing easy commands... etc)<sup>37</sup>.

Private health schemes concerning dependence, in the places where they exist, are limited to personal care (basic activities of daily living) and do not include other duties of daily life, as housework, home care or the possibility of leaving the house.

In public systems addressing dependence, more activities are partly covered: funding for the removal of physical barriers at home, help with housework and transport services among other services intended to solve the problems of dependent people.

<sup>36</sup> Jornadas Técnicas Sobre Servicios a la Población en el Medio Rural.

<sup>37</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".

Local entities, Autonomous Communities and Central Governments are responsible for the provision of integral public services aimed to improve the autonomy of dependent people.

The assistance to dependent people should promote their personal autonomy and should improve their quality of life and autonomy, according to equal opportunities and to the following objectives<sup>38</sup>:

- Contribute to their autonomous existence in their natural background, for as long they want, whenever possible.
- Improve their quality of life as regards their personal, family and social backgrounds, and encourage their active involvement in the community.

The recognition of their right to be assisted and to live an autonomous life, to the extent possible, and to get support in order to remove barriers, can imply the creation of jobs to assist dependant people in their homes. The economic aids made provision for will allow more citizens to afford these services.

Taking into account that the Law on Dependence recognises the right of users to stay in their background,

home assistance may be the only service allowing rural population to live in their homes, especially in small villages, apart from "informal" support, of course.

However, "informal" support will be reduced (as this system does not seem very fair in terms of equal opportunities) until a substantial change in culture allows for the fair share of family burdens between men and women. This far, family burdens comprising "informal" support are taken on by men only in 12% of cases, and in 11% of cases when the person requiring assistance is 6-64 years old.

The Law on Dependence establishes the "System for the Autonomy and Assistance to Dependant People" in order to ensure the compliance of the basic conditions and the common core of the Law on Dependence, of national scope. This System will encompass the initiatives and competences of all Public Administrations as regards the promotion of personal autonomy and the assistance and protection of dependent people. It makes a better use of public and private funds, and contributes to the improvement of the quality of life of citizens. This system is a public network that integrates and coordinates both private and public services and centres<sup>39</sup>.

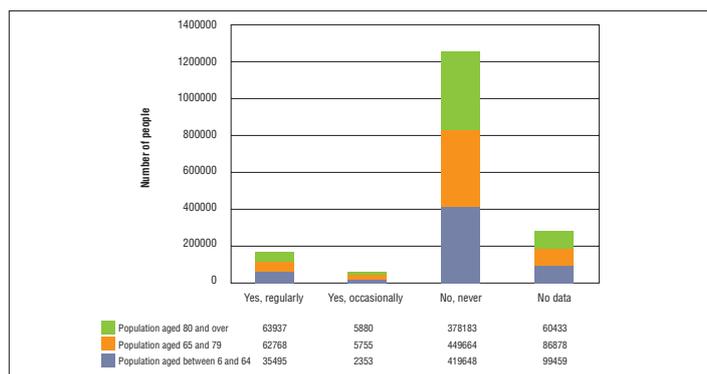


Figure 13. People with disabilities receiving personal assistance, sorted by age groups and existence or not of compensation. Source: Instituto Nacional de Estadística.

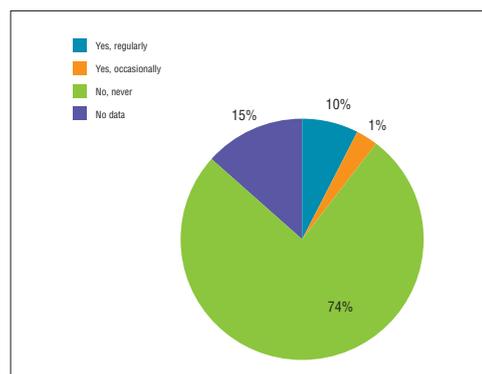


Figure 14. People with disabilities receiving personal assistance, sorted by existence or not of compensation. Source: Instituto Nacional de Estadística.

<sup>38-39</sup>Sec. 13. Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.

Local entities and Autonomous Communities are the ones that must foster public services and support the quality of life of users, caregivers and/or personal assistants. Thus, these elements will have precedence over economic profit.

As shown in figures 13 and 14, the percentage of dependent people receiving an economic aid in order to hire a personal assistant is quite low. Before the enforcement of the law, the 74% of the population did not get any aid, and only a 10% were entitled to a regular subsidy.

The implementation of an assistance system for dependent people in rural areas represents an opportunity for the endogenous development of the area. With this system, universal coverage is granted to rural population, and their quality of life is improved.

It prevents the forced uprooting of dependant people and it creates new employment opportunities in the area, which are liable to prevent and stop rural population from migrating to cities, provided such opportunities are complemented with training schemes for local population.

We are facing the transition to a new social system. We think that this is an opportunity for local entities to support these services by including them in their regular staff or by creating home assistance public enterprises.

This public service will allow users to stay in their villages, and also their assistants. Due to the complexity of the task, and in order to provide a high quality service, it is advisable that both the user and the assistant belong to the same area for them to be able to establish a close relationship.

As it is the case in most rural development projects, the collaboration among nearby villages is essential for the success of the initiative.

The maxim "united we stand" is especially true in these cases. Thus, very small villages can benefit from

the assistance system thanks to joint community services, municipal consortiums and similar associations.

In rural areas, the lack of transport is in some cases a major barrier that has to be done away with. There are only a few villages with less than 1,000 inhabitants that have a public transport service.

### 3.2. Employment creation potential of the resource.

#### 3.2.1. Employment creation.

The assessment of the employment creation potential in Spain is described in the *White Papers on Dependence (Libro Blanco sobre Dependencia)*. The White Paper was published at the end of 2004.

The Ministry of Labour and Social Affairs commissioned the IMSERSO (Instituto de Mayores y Servicios Sociales, Institute of Elderly and Social Services) to produce it.

Employment creation potential of the resource has been assessed according to several staff ratios: The rations used are the following:

- In regular **residential homes**, 0.5 workers per user, and 0.6 in residential homes for people with severe disabilities.
- In **day centres**, 0.35 workers per user.
- In **home assistance**, three different ratios have been used, depending on the services needed for each degree of dependence:
  - Severe dependence: 0.7 workers per user.
  - Serious dependence: 0.05 workers per user.
  - Moderate dependence: 0.21 workers per user.
- In the case of **assistance for personal autonomy**, 0.7 workers per user.
- In **tele-assistance**: 1 worker per each 100 user.

These ratios correspond to full time jobs. The schedule and working hours contemplate the different needs: morning, afternoon and evening shifts, Saturdays, Sundays and bank holidays, holidays, etc.).

According to this employment creation forecast, more than 330,000 jobs would be created by 2010. Residential homes and home assistance would head the list of job creation, followed by day centres, assistance for personal autonomy and tele-assistance.

According to several studies, the demand of this type of services is expected to increase.

In fact, according to the data gathered at national level, and assuming all people with severe disabilities in rural areas benefit from home assistance, 9-17 employments would be created in rural areas per each 1,000 inhabitants.

Most of these jobs would be part-time, which implies more employment creation and allows people with family burdens and other groups with difficulties to access the labour market.

The assistance of dependent people requires staff with some specialised knowledge.

The profiles required may be the following:

- In the first place, a large number of auxiliary nurses and caregivers with some knowledge on geriatrics or disability issues would be devoted to direct personal assistance.
- A second group of workers (less abundant than the first group) would include kitchen porters, cleaning and laundry staff and other housekeeping staff in residential homes and day centres.
- A third group would include technical staff in charge of the maintenance of centres and services, drivers, security, porters etc.
- A fourth group would include highly specialised staff: medical doctors, psychologists, social

workers, physiotherapists, occupational therapists, nursery staff, instructors, etc.

- Finally, administrative staff would be required in order to manage the centres and the programmes.

### 3.2.2. Emerging professions.

Some of the main emerging professions in this sector are:

#### RURAL SOCIAL WORKER

The duties of social workers are the following:

- **Housekeeping tasks:**
  - Cleaning the home of the user.
  - Washing and ironing clothes.
  - Shopping.
  - Meal delivery.
- **Personal assistance duties:**
  - Personal cleaning routines.
  - Special cleaning routines for incontinent users or users confined to bed.
  - Management and administering of medication, excluding those medicines administered intravenously or by intramuscular route, and medical dressings of all kinds.
  - Help the mobility of the user within the house: getting up, going to bed, and eating.
  - Escort services in journeys.
  - Management of several tasks as picking up and delivering of documents.
  - Contact with family members and neighbours.
  - Any other daily life activity.
- **Psychological-social tasks:**
  - Social guidance.

<sup>40</sup> Libro blanco sobre la "Atención a las personas en situación de dependencia en España".

- Technical and professional guidance for users to develop personal skills, promotion of self-help.
- Involvement in educational processes and promotion of personal and social positive habits.

Therefore, the training of these specialists should be consistent with their future tasks, which go from housekeeping to personal assistance, and promotion of the social and family relationships of the user.

#### **DRIVER ASSISTING RURAL DEPENDENT POPULATION**

The duties of Drivers assisting rural dependent population are the following:

Taking the user(s) and, whenever necessary, their social workers, to health care centres, educational centres etc.

Specific training must include techniques for transporting disabled people, guiding of non-sighted people etc.

Home assistance is not only intended to assist dependent people, it must also prevent disabilities and other conditions to appear or to get worse.

In order to achieve this objective, home assistance should be a part within a broader development plan encompassing social and health care services. Such plan would promote healthy lifestyles, prevention and rehabilitation programmes addressed to elderly people and disabled people and to those undergoing complex hospitalisation processes.

Thus, the Territorial Council of the System for the Autonomy and Assistance to Dependant People will agree on criteria, recommendations and conditions that should be included in the Plans to Prevent Dependence

that each Autonomous Community will devise. Special attention should be paid to the risks and preventive initiatives addressed to elderly people<sup>41</sup>.

We must stress the fact that the Law on Dependence makes reference to the permanent training of professional caregivers that will be in charge of dependence situations.

Therefore, the Government will determine which professional qualifications are necessary in order to perform these tasks. The government will promote the programmes and training initiatives required in order to provide the services made provision for in the Law on Dependence<sup>42</sup>.

In order to ensure the quality of the System, the cooperation between the different Public Administrations connected with education, health care, employment and social affairs should be promoted, as well as the collaboration of all these bodies with universities, scientific societies, professional organisations, trade unions, employer's associations and third sector entities.



Figure 15. The social and cultural activities aimed for people at risks of becoming dependant and of dependant people are included in the dependence prevention programme.

<sup>41-42</sup> Sec. 21. Law 39/2006 Law on the Promotion of Personal Autonomy and the Assistance of Dependent People.

### 3.5. Example of a Comprehensive Rural Development Project.

We will now describe an example of a comprehensive rural development project, which contemplates most of the New Sources of Employment and Emerging Professions that have been previously described.

This comprehensive project is conducted by the Council of Leoz, in Navarra (Spain). It is based on the economic resources provided by wind farms that have been erected in the area.

These wind farms have provided enough returns for the Local Government to carry out a local development plan, based on the creation of a public utility company called **Orbalan**, made for and by the population of the valley. This enterprise has carried out several activities allowing for the sustainable use of the resources in the area:

- the rational silvicultural management of forests,
- the conservation of villages and their heritage,



Figure 1. In the installation of wind farms in the territories of the Council of Leoz priority has been given to public welfare over private interests.

- the creation of a plant nursery specialised on autochthonous plants, in order to counteract the impact of the wind farms,
- collaboration in local management,
- the services provided to the local population, and the support to the Basic Social Services of the area of Valdorba,
- the sustainable utilisation (both for tourist and commercial purposes) of the fungal resources of the valley, especially the truffles,
- the development of high quality active tourism activities,
- the interpretation of the natural heritage of the valley,
- and other projects addressing organic production, for instance, the setting up of a windmill for organic wheat.

The creation and management of this public utility company has contributed to prevent migration, and the services it provides have improved the quality of life in the rural area.

#### 3.5.1. Introduction.

The Council of Leoz is in the middle area of Navarra, some 30 km. away from the main city of the county,



Figure 2. The area of Valdorba is starting to revive after the decline that led to its depopulation in the 90.

Pamplona. Leoz belongs to the district of Valdorba, together with 6 more villages.

The Council governs a community of thirteen villages located in three natural valleys, with a total population of 273 inhabitants scattered in 9,000 hectares. The number of people actually living in the area is smaller, as many neighbours are only there during the weekends and in the summer, but they have decided to register there in order to keep their rights as neighbours.

Many people from this area migrated in the 60's; some villages were completely abandoned. The population has lived on their farms and cattle for the last 25 years, mainly thanks to the community aids under the CAP.

Nowadays, the inhabitants of the valley are mainly old retired or soon to be retired people. Nevertheless, thanks to this rural development initiative, the number of young couples with children living in the area has increased.

The Local Corporation has directed all its efforts since it was created in the 90 to manage the 13 villages and provide services as water supply, waste management, clean-up duties, telephone, and social services for elderly people etc. The Corporation has fostered new development proposals in order to prevent migration, and enable elderly people to remain in their homes and live in dignity.

### 3.5.2. Driving force: The wind.

In 1995, after some negotiation with the enterprise E.H.N.S.A. a small wind farm was erected in the area of



Figure 3. The wind is one of the main resources that the Council of Leoz is making good use of.

the Sierra de Guerinda. The Council of Leoz started to ponder on its resources, and realised that the wind was one of the most important ones.

The Council relied on this renewable energy source and in 1996 it signed collaboration agreements in order to erect the wind farm of Guerinda. This initiative intended to get funds in order to start up a local development project, which is still working and has evolved with the passing of time.

The wind farm was inaugurated in the end of 1997, and in 1998 the Council of Leoz had more than 100 wind turbines installed. Nowadays there are more than 150.

The budget of the Council increased substantially with the erection of the wind farm, and allowed the Corporation to carry out a study on the resources of the area and make expenses estimates for the management of a sustainable development plan for the Valley, in order to boost the growth of villages, involving local population.

### 3.5.3. Orbalan.

In order to carry out the local development project, the public utility company Orbalan was created.

This enterprise is owned by the Council of Leoz, and at first it was the sole partner. Nowadays also the nearby Council of Garinoain is involved. The enterprise intended to prevent the migration of population by means of a correct management the resources of the area (ruins, enterprises, art, environment, tourism) and to encourage endogenous development based on the sustainable utilisation of resources.

Thus, the corporate purpose of Orbalan is to provide public local services to the rural population by restoring the cultural and architectural heritage, and performing redevelopment works. In addition to this, it intends to carry out social and economic initiatives connected with the endogenous resources in the Orba Valley.

### 3.5.4. Projects carried out.

All the projects carried out were and still are closely linked to the population of the District of Valdorba.

## 1. SILVICULTURAL PROJECT.

The first measure adopted by Orbalan, was the adequate management of forests, according to the guidelines in the Forest Land Use Planning of the area.

Initially, it intended to obtain sustainable and multi-purpose forests (firewood, timber, hunting, leisure, fungi, protection) and preserve the natural biodiversity of the area, by carrying out the necessary forestry works. Most of the forests within the territory of the Council of Leoz are included in the Special Protection Area of "Montes Valdorba", where there are two Natural Reserves.

The management of community forests lead to the creation of six direct jobs for young people. At first, this initiative had environmental and economic aims. Vocational training and local employment were sought too.

Initially, these young people were not acquainted with forestry or the handling of machinery, and therefore they had to be trained in order to obtain the necessary professional qualification.

With the direct and daily contact with forests, and after four years of experience and training, five of these workers decided to set up their own enterprise: **ORBASOA ZERBITZUAK, S.L.L.** This enterprise was created in 2003. It deals with silvicultural works and gardening among other services. At present they work mainly in the forests of Valdorba, and they combine this activity with gardening services, canopy assembly services, recovery of trails and signalling and cleansing of rivers among other services.

This forest squad intends to get long-term benefits by performing several works in an area of 900 hectares: thinning of the forest (which had become overgrown with scrub) recovery of old trails, pruning of pines, partial cutting of invading trees in order to encourage the growth of commercial trees, seed gathering, reforestation with autochthonous species (and not only timber species) etc.

Most of these forests were neglected when traditional practices as grazing, charcoaling, and thinning stopped being performed in the last few decades.

The silvicultural works performed by this enterprise ensure the conservation of the species and the long-

term productivity of the forest, as well as the conservation and improvement of genetic diversification of animals and plants. Summing up, it enables the permanent utilisation of the forest on the part of men, by conserving and improving environment.

In addition to this, this kind of initiatives contribute to the recovery and maintenance of forests, prevent forest fires and encourage the social and recreational utilisation.



Figure 4. The forestry works carried out by the Council of Leoz enable the ecological maintenance of forests and are a source of employment. In addition to this, the use of fossil fuels in the area is reduced.

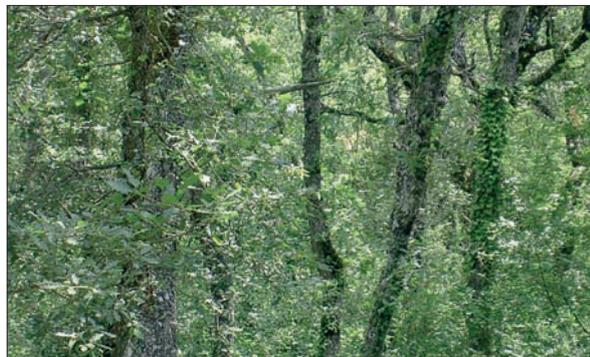


Figure 5. Oakwood before clean-up.



Figure 6. Oakwood after clean-up.

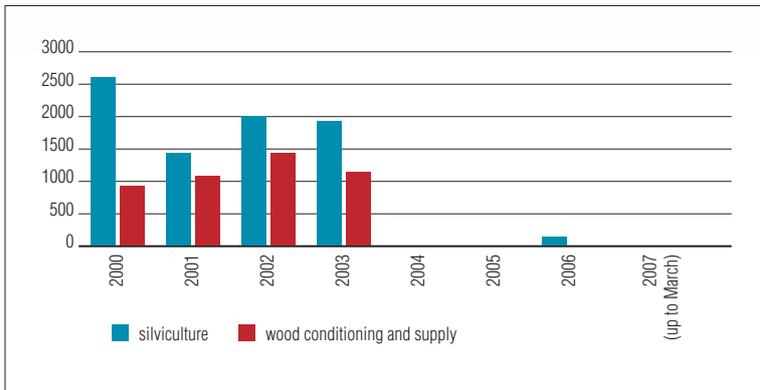


Figure 7. Evolution of the workload generated within Orbalan since its creation, connected with silvicultural activities and firewood supply, measured in hours. From 2004 onwards, these duties were performed by the enterprise Orbasoa Zerbitzuak, created by the workers of the forest squad of Orbalan.

## 2. PROJECT FOR THE MAINTENANCE OF THE VILLAGES.

### 2.1. The squad.

The squad is formed by a group of people in charge of the maintenance works in the 13 villages in the Councils of Leoz and Garinoain. AT the beginning there were four workers, and now they are two more, thanks to the support provided by the Council of Garinoain (sharing of workload and economic contribution) when it entered Orbalan.

Most of the members of the squad are women (at present, the 100% of the staff with permanent contracts are women). They are in charge of cleaning the streets, gardening works, and of the conservation of churches and chapels (small restoration works, brickwork, painting, etc.).



Figure 8. The maintenance works in villages also include mowing the grass and garden maintenance.



Figure 9. When someone litters the streets, which they shouldn't do, they expect someone to clean it afterwards, but who does that in a village with 20 inhabitants?

This activity has improved the looks of the villages, which are now in tune with the beauty of the area of Valdorba. In view of the results, many neighbours (both those that live there permanently and the ones that go only on the weekends) have hired the squad to take care of their small plots.

### 2.2. The Stone and the Recovery of Heritage.

The second maintenance activity is connected with the utilisation of recycled stones in building works.

Up to the present, the stones of the ruins in the valley were constantly stolen, in order to use or sell them.

Now, thanks to the project, these stones are used in the restoration of different buildings of the valley (churches, Roman bridges, restoration of old buildings).



Figure 10. Multipurpose room Eliza Zuria, restored by Orbalan.



Figure 11. Recovery of the ruins of the Benegorri Church, built in Romanesque style.

These stones have been used in the building and restoration of the homes of the neighbours, when they requested them.

Thanks to the awareness achieved with the valorisation of the resources of the area, heritage in particular, the sacking of the stones of the Monastery of Donamaria has stopped; these stones were sold and used in order to build houses outside Valdorba area.

Most of the cemeteries in the territories of the Council of Leoz and Garinoain have been restored, as

well as the ancient washing place of Garinoain, the chapel of Eliza Zuria (converted in an exhibition room, which serves many different purposes), small fences and the ruins of San Bartolomé Church in Benegorri.

In order to ensure the technical appropriateness of the actions performed within the programme, a master builder supervises the works: the starting of the projects, the follow up of the works, and the end of the project.

She is also in charge of the monitoring of all the works performed by the Council.



Figure 12. Restoration of Amatriain cemetery.

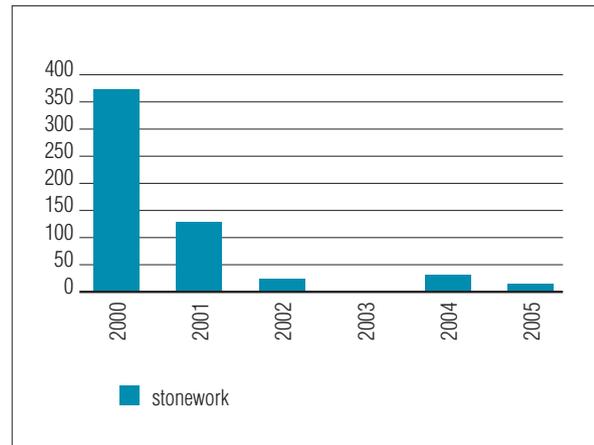


Figure 13. Evolution of the workload generated within Orbalan since its creation, connected with stonework, measured in hours.

### 3. PROJECT FOR THE REDUCTION OF THE IMPACT OF WIND FARMS ACTIONS TO COUNTERACT THE IMPACT.

One of the first duties of the enterprise Orbalan was to install a nursery to supply the villages of the council and nearby areas with autochthonous plants and in order to carry out the reforestation of the area where the wind farms were erected and the surrounding territories.

### 4. PROJECT OF ASSISTENCE IN THE MANAGEMENT OF THE COUNCIL OF LEOZ.

Orbalan has an administrator that deals with the administrative procedures of the Councils. This improves the quality of the services and optimises the use of public local resources. Thus, the same person that manages the administration of the public utility company deals with the administrative procedures of the Council, which were normally dealt with by the Council's Secretary.

In addition to this, the public utility company is responsible for the cleaning and maintenance of the Town Hall.

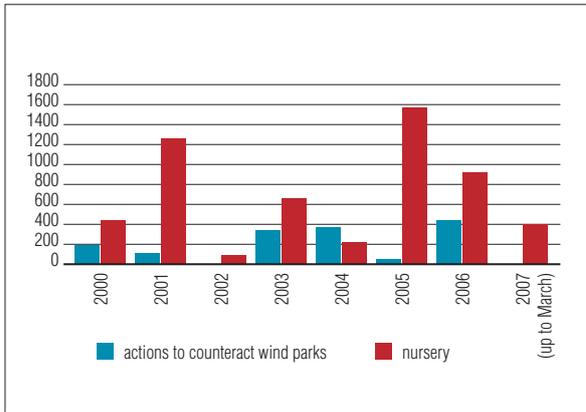


Figure 14. Evolution of the workload generated within Orbalan since its creation, connected with the actions to counteract the impact of wind farms and with the autochthonous plant-producing nursery, measured in hours.

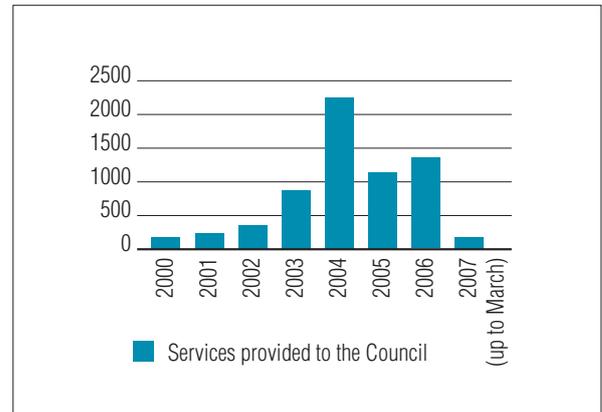


Figure 15. Evolution of the workload generated within Orbalan since its creation, connected with local administration, measured in hours.



Figure 16. Celebration of Elderly Day. This festivity is intended to improve personal relationships among old people at risk of becoming dependent. Orbalan takes an active part in the organisation of this festivity.

## 5. PROJECT OF LOCAL PEOPLE MULTISERVICE OFFER.

The public utility company makes it possible to provide specific services in order to improve substantially the quality of life of the inhabitants of this rural area.

Orbalan helps people with small problems caused by weather harshness, for instance, caused by snow. The enterprise is also responsible of digging the grave when somebody passes away and wishes to be buried in their home village.

The public utility company helps in the development of social and cultural activities as festivities and other initiatives aimed to improve the social life of dependent people. On the other hand, it takes part in the activities carried out by the Basic Social Services of the area of Valdorba.

In addition to this, the facilities, staff and machinery of Orbalan are used in order to provide services to the neighbours that request it, such as cleaning, maintenance and brickwork.

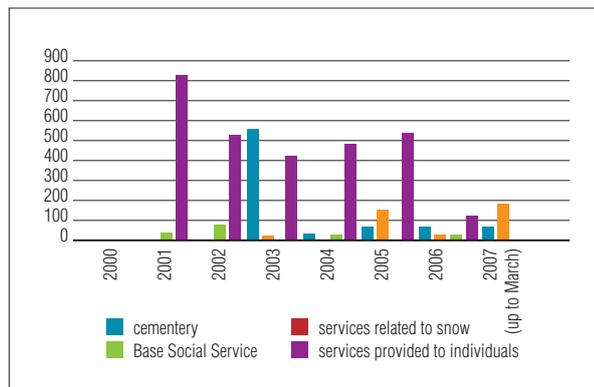


Figure 17. Evolution of the workload generated within Orbalan since its creation, connected with services to local population, measured in hours.

## 6. MICOVALDORBA LIFE PROJECT: INVOLVEMENT IN EUROPEAN INITIATIVES.

Orbalan was involved in a LIFE-environment project based on the utilisation of fungi, truffles in particular, as an instrument for rural development and a way to make the most of the fungi that grow in the forests of the

District of Valdorba (Navarra). This project has been an example for other rural districts. It involved local population, the tourist sector, retailing enterprises and forest owners.

Micovaldorba and the local management of the Council of Leoz (the project Orbalan included) were declared by the UN as one of the 40 best practices in rural development in the world for the period 2002-2004. It has also won the price for rural development best practices in Navarra during this period. Micovaldorba won the "Best Project" award by the European Commission in 2006.

This project has devised two ways of using mushrooms in the district where it was implemented: tourism and sale of the fungal production.

### 6.1. Mushroom tourist hikes in Valdorba.

Seven tourist itineraries have been created in connection with mushroom picking. All the itineraries start and end in a different village of Valdorba. The itineraries cross some of the most important forests and fungi resources, and also the Romanesque architecture and other interesting buildings of the area.

This joint offer is very distinctive. It is advertised on the Internet and in two publications: "*Ecoturismo en Valdorba, Paseos, Setas y Gastronomía*" (ecotourism in Valdorba, hikes, mushrooms and gastronomy) and "*Paseos seteros por Valdorba*" (mushroom hikes in Valdorba).



Figure 18. These itineraries are advertised in panels and printed material made available for consultation in lodgings and on the Internet.

Visitors can choose to eat menus based on fungi in the restaurants of the area, and stay in one of the rural lodgings in the District. There is a regulation controlling collection and pressure on fungal resources.

## 6.2. Tourism and the sale of truffles.

The second way to use mushrooms consists of integrating production and tourism. A model for the utilisation of truffles has been created in the district.

Producers can sell fresh truffles directly to consumers in a market selling products from Navarra. Thus, it is possible to increase the value of the product, to showcase the District and to provide a distinctive tourist offer.

This market increases the interest in truffles and its cultivation, and encourages its production. Thus, truffles become an alternative activity in rural areas.

The following initiatives have been carried out this far:

- 200 hectares of woods devoted to silvicultural production (estimated mushroom production of 20 € per hectare yearly).

- 20 hectares of truffles (estimated production of 3,000-4,500 € per hectare yearly).
- 1 pilot project of combined production of aromatic plants and truffles (yearly production of 2,000-6,000 € per hectare)
- 10 courses on truffle cultivation.
- A truffle marketing model allowing producers to get an extra 30% of benefits, as they sell truffles directly to consumers.
- Advice on truffle production to 200 landowners in Navarra .
- 1 tourist pack consisting on truffle picking, a tasting and staying at a rural lodging.
- Truffle Fair (5 years). The two first Fairs took place in Navarra.
- Regulations in order to control truffle collection.
- New aids for truffle producers using forest and agricultural land have been encouraged.

The total number of tourists visiting the area due to mushrooms and truffles is 5,000 a year. Before the project Micovaldorba was carried out, there were no activities connected with mushrooms in the area. The average number of menus based on fungi served in restaurants is 1,000 per year.

Any rural area can benefit from the results obtained by Micovaldorba.

Mushrooms can be integrated within other economic and tourist resources of rural areas. When starting up a similar project in other areas, the same work programme may be used: a previous study on the fungal resources and their economic potential. The tools used can also be the same: reforestation, forest management, mushroom itineraries, training, awareness, and production.

The model can focus on tourism, on production, or both. This depends on the way the resources are combined by using the different tools developed.

At present, this model is being used in other Counties, as Soria or La Rioja.



Figure 19. Local and Regional authorities and popular cooks that took part in the Truffle Fair.

## 7. A TOURIST PROJECT FOR THE VALLEY.

### 7.1. Study of the tourist resources of the valley.

In the time when Orbalan was created, tourism was not yet developed in the area of Valdorba. Therefore, this enterprise took the first steps to turn the valley into a recreational area for the tourists visiting the District, both those coming from Navarra or other Autonomous Regions.

Orbalan was the first enterprise to turn the area of Valdorba into a tourist destination. Tourist activities are now promoted by the **Association for the Development of the Valley**, of which Orbalan is a member.

The type of tourism sought with this approach is not massive.

This area intends to become a rural tourism destination, an alternative for those that want to spend quiet weekends or holidays, enjoying the landscape and the artistic and cultural heritage of the area.

However, in order to have a demand we must first boost the offer, which must include activities and tourist sites for potential tourists; that is, we must turn the resources into tourist products.

Orbalan carried out a study of Valdorba, in order to know the tourist potential of the area.

A fact sheet was made for each village in the Council of Leoz with the help of the neighbours, of two graduates in Media Studies and History respectively, and using the studies carried out in other valleys of Navarra as a reference. These fact sheet included information on their architecture, culture, customs lifestyle, heritage, location, number of inhabitants, available services and infrastructures (such as roads, accessibility, lodgings and restaurants etc.).

The conclusions of the study pointed out at several **positive aspects**:

- the abundance of Romanesque architecture in the valley,
- landscapes,
- the interest aroused by the wind farms of Guerinda,
- and the potential for many outdoor activities.

The main **flaw** was the lack of infrastructures, and therefore the low accessibility conditions for tourists. This lack has been corrected with the setting up of new rural lodgings and hotels and possible solutions to the lack of services in the area were found.

The study of the tourist resources of Valdorba (**Eco-tourism Project, 2000**) laid the foundations for the development of tourist activities in the area. These activities are currently managed by the Association of the Development of Valdorba, with the support and collaboration of Orbalan staff.

### 7.2. Setting up of a Tourist Office.

At first, Orbalan provided information to the visitors arriving to the valley. Therefore, its qualified staff included tourist information on leisure activities, culture and lodging among its tasks.

Then they started organising visits for tourists to see the artistic and cultural value of the area and the beauty of the landscapes, with educational purposes.

Finally, this task was assigned to the staff of the Association for the Development of Valdorba, who received specific training. At present, the central offices of the Association in Orisoain and Iratxeta provide this service.



Figure 20. The recovery of the Road to Santiago as it passes through Valdorba will allow local entities and neighbours to increase the accommodation capacity of the area, with the new accommodation option of the youth hostel, which had not been developed in the area before.

### 7.3. Youth & pilgrim hostel in Leoz.

Another project is the building of a youth hostel in Leoz. This hostel would lodge groups of visitors in their way to Santiago, as the Road to Santiago goes by Valdrolba.

The hostel would hold up to 20 people, and would be managed by the neighbours of Leoz, with the help of Orbalan staff in maintenance duties.

### 8. ITINERARIES AND HIKES: TREKKING, MOUNTAIN BIKING, HORSE RIDING.

These activities have contributed to the recovery of some trails and tracks that were impassable or covered with undergrowth. In order to provide more leisure options in the area, a program of hikes (both on foot and on horseback) has been made available.

Thus, tourists that like trekking each weekend in different areas and visiting different routes, may decide to come to Valdrolba to go for a walk, enjoy the scenery and the rural Romanesque architecture and the mills.

In this sense, and in view of the growing popularity of mountain biking and the possibilities of the valley to perform this activity, different types and categories of circuits are being designed for both amateurs and veteran bikers. These circuits may also be an opportunity to organise contests and races at different levels (regional, national or European).

Some of these circuits are expected to pass through the trails that take to Guerinda, in order to give people



Figure 21. In Valdrolba, the signalling of itineraries respects the environment; the main material used is wood, in order to avoid an excessive visual impact.



Figure 22. Signposting the local tracks.

a chance to see the installations. Moreover, the works done in order to improve the accessibility to the wind farm would be very useful.

From 2004, the Association for the Development of the Valley is in charge of the management and signposting of the tracks that were designed by Orbalan.

Thanks to this previous work, many thematic visits to the valley are now possible:

- Visits connected with truffle production.
- Visits connected with the Romanesque architecture of the valley.

The first type of visits mentioned above has a seasonal nature, and depend on the production of fungi. The visits to Romanesque buildings started on 2006, and are being very successful. The great interest shown, together with the fact that they are not subject to seasonal changes, allows for weekly visits to be organised all year round.



Figure 23. Children in a school trip to the Olive Oil press in Solchaga. The archaeological works were carried out by Orbalan.

Some visits have been organised for specific groups (Universities, Culture and Education Departments etc). Recently, some itineraries have been adapted to school trips; this service is being very successful and gratifying, although also very demanding.

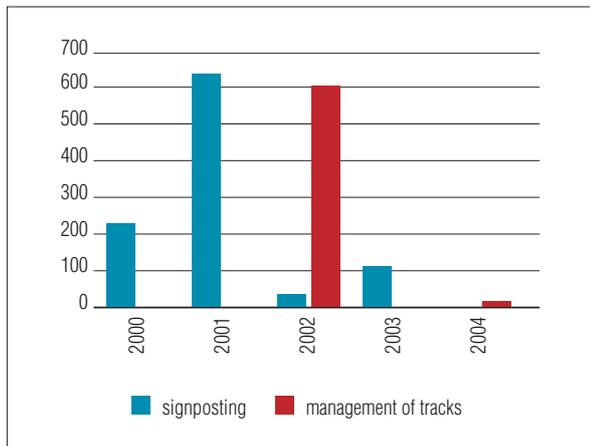


Figure 24. Evolution of the workload generated within Orbalan since its creation, connected with the signposting and management of tracks, measured in hours. From 2004 onwards, the Association for the Development of Valdorba is in charge of these tasks.

### 9. THE INTERPRETATION OF THE NATURAL HERITAGE OF THE VALLEY: VALDORBA RED NATURA 2000 EXHIBITION.

The Community Programme LEADER has funded the project consisting on a Travelling Exhibition on Nature Interpretation. The Association for the Development of Valdorba is in charge of the management of visits and of the facilities, and Orbalan deals with the creation, moving and maintenance of the exhibition.

The Travelling Exhibition Valdorba Red Natura 2000 was born when the natural area of "Montes de Valdorba" was listed in Navarra's proposal of Natural Sites of Community Importance.

This project is one of the most outstanding dissemination activities organised by the Regional Environmental Division and the public utility enterprise Viveros y Repoblaciones. This project describes the natural values of the area that have made it possible to include "Montes de Valdorba" in the tentative list for Natura Network.

The exhibition is a sample of works of the naturalist sculptor Javier Murillo. It shows visitors the fauna and flora of Valdorba, which is rich and varied, as it includes species from Atlantic and Mediterranean climates.



Figure 25. Valdorba Red Natura 2000 Exhibition.

This exhibition has been in three exhibition rooms in the valley. It complements the guided visits to Valdorba, provides information on the natural resources of the area and raises awareness among local population.

#### 10. WINDMILL OF GUERINDA: DIDACTIC INTEREST, TOURIST INTEREST AND EXAMPLE OF ORGANIC MILLING.

This innovative project added up to the tourist sites in Valdorba. It consisted of setting up an organic windmill in the wind farm of Guerinda. At present, is the only windmill in Europe milling organic wheat.



Figure 26. Flour windmill restored in the area of Sierra de Guerinda.

An old 17<sup>th</sup> century flour windmill was found while performing the works to build the wind farm of Guerinda, and it was reconstructed. The excavations performed confirmed that in the ancient times, the very spot where the wind farm of Guerinda stands today was also used for the same purpose, as several windmills were found.

It is very impressive to see how a windmill can work only with the power of the wind. This activity is an example of the benefits of wind power, a clean and non-pollutant energy source, representing a development opportunity for the village.

A shelter has been built near the windmill for visitors to take refuge from the wind. This shelter will be devoted to more activities in the future, as an observatory for people to watch and study the bird species in the area.

#### 11. OTHER PROJECTS CONCERNING ORGANIC FARMING AND CATTLE RAISING.

A group of farmers and cattle-raisers in the area of Leoz formed the Cooperative "Trigo Limpio" (Clean Wheat).

Several projects may be carried out in connection with organic agriculture and cattle raising, in order to develop new employment niches, such as snail farms or organic chicken farms using outdoor systems.

These activities would have two objectives:

- Economic: cattle raising and marketing.
- Social: creation of part-time jobs, mainly for women living in the valley aged over 40.

##### 3.5.5. Analysis of the staff of the enterprise.

The average permanence period is 1.4 years.

From its creation, 41 people have worked in Orbalan, 41% women and 59% men.

This percentage is even closer to equality if we take into account the permanence period (46% women, 54% men). In most cases workers left the enterprise voluntarily or after their contract expired.

Their category within the enterprise changes depending on the tasks they perform. 23 bricklayers and



Figure 27. Members of Orbalan squad in 2006.

four managers were hired, as well as two specialist bricklayers, two administrators, three clerks, one engineer and two technical engineers, a journalist, a

local development agent and two trainees. The average age of workers when they entered Orbalan is 30, and the age range goes from 16 to 57 years old.

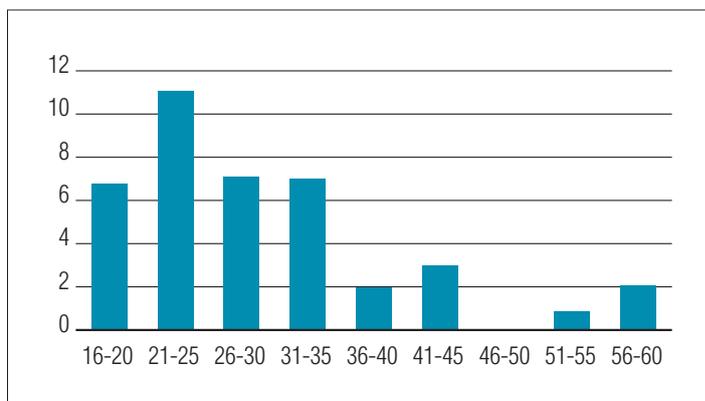


Figure 28. People hired by Orbalan, sorted by age.

	2000	2001	2002	2003	2004	2005	2006	2007 (up to march)
Environmental works	4295	3781	3472	4049	629	1610	1506	424
Land management	254	644	634	106	25		26	
Services to the population		16	22	570	43	232	116	250
Maintenance and recovery of rural architectural heritage	1359	1170	766	86	1330	1259	3008	805
Cleaning of streets and gardens	2398	899	1091	1062	2377	2240	24	248
Culture	168	157	562	616	122	64	68	
Ecotourism project	233	443	141	4		682	1	
Subsidy application procedures	29	31	117	162	78			
Tourism	1018	462	483	600	52			
Management of the enterprise	644	1359	1387	1208	695	612	2958	146
Council Services	209	251	409	840	2140	1188	1257	240
Works for individuals	1	813	541	429	487	539	114	
Other tasks	155	274	62	48		234		31
<b>YEARLY TOTALS</b>	<b>10761</b>	<b>10299</b>	<b>9688</b>	<b>9777</b>	<b>7977</b>	<b>8658</b>	<b>9077</b>	<b>2143</b>

Table 1. Evolution of the workload generated within Orbalan since its creation, connected with all the activities carried out.

### 3.5.6. Conclusions.

The activities carried out within this comprehensive development project are innovative because of their nature, the way they were performed, the objectives sought and the entity that promoted them.

At present, two councils are involved in Orbalan, and the two main objectives have been achieved:

- encouraging the creation of enterprises in the valley,
- expanding its activities to other councils in the valley.

We also intend to provide the necessary funding and training to make these activities independent from the council, as it was the case with Orbasoa Zerbitzuak.

This comprehensive project was funded by the Council of Leoz with the collaboration of E.H.N.S.A. (the enterprise that erected the wind farms) the Association

Cederna Garalur and several divisions of the Regional Government of Navarra (Environment, Tourism and Local Administration).

This project can be replicated in other rural regions. The economic resources of councils with more than 500 inhabitants are normally enough to carry out these initiatives, with the cooperation of regional administrations, if several villages of the area with similar internal structure work together as a single community.

Councils with scattered population and less number of inhabitants may try to find an endogenous source in order to finance the project.

The utilisation of endogenous products in rural areas is a good example of sustainable development. In the case of Leoz, financing "came with the wind", but in other councils it may be solar energy, the utilisation of forestry resources, tourism, or a combination of different resources.

## 4. TRANSPARENCY OF THE PROCESS OF VALORISATION OF THE NEW PROFESSIONS.

The first time that the concept of valorisation of training was mentioned was in the scope of Leonardo da Vinci Programme.

The term valorisation can be defined as *the process of enhancing or optimising project outcomes with a view to increasing their value and impact and integrating them into training systems and practices at local/national level as well as European level.*

Thus, FONTES Thematic Network was created in order to validate and disseminate good practices and high quality vocational training in rural areas, with a view to valorise several curricular designs produced in the scope of Leonardo Da Vinci pilot projects.

The training projects and curricular designs valorised are the following:

- **ECO-AGRO:** International project for organic agriculture.
- **FOREST - CHESNUT IN EUROPE:** Global and vocational training for chestnut growers.
- **INNATURE:** Nature and rural realm interpreter: an innovative training.
- **IRIS:** Organic agriculture: an innovatory labour market.

- **MYKOS:** Fungi as a resource of employment, sustainable development and economic diversification within the rural realm
- **TRADE ON LINE:** A project to create figures of job counselling expert in agriculture and rural areas
- **ACTIVE TOURISM:** A new professional profile.

### 4.1. Good practices in the process of Valorisation.

Valorisation is based on two essential aspects: The capacity of the curricular system to attain the objectives sought (qualification and employment creation) and to be disseminated to new collectives.

In the case of the curricular designs validated in FONTES Project, the analyses concluded that each curricular design attained its objectives, according to the results of the testing activities. The training programmes tested were used afterwards and the results were also positive.

The dissemination activities carried out after the project finished addressed other groups, and the collaborating entities were also different. This fact increases the value of the results as valid references for the qualification.



### THE CAPACITY OF THE CURRICULAR SYSTEM TO ATTAIN THE OBJECTIVES OF QUALIFICATION AND EMPLOYMENT CREATION

The analyses made in order to study and boost employment in the activities concerned were based in five main criteria:

1. **Identification of the source of employment:** each project promoter detected an activity liable to be a new emerging profession.
2. **Strategy to overcome obstacles:** designs and actions carried out within each project in order to avoid and remove the obstacles that prevent or hinder the development of a given profession, resulting in the enhancement of their employment potential.
3. **Actions carried out with a view to address the demand and promote the access of potential target groups (with training and qualification needs) to the new source of employment.**
4. **Encouragement of closer links between the existing qualifications and the new sources of employment, and promotion and validation of the new training systems.**
5. **Agreements between the parts, in order to enhance the results of the initiative.**



Work session.

The social and economic changes of the last few decades have brought about new professional opportunities that require a training curricular design. The main achievements of the projects valorised as regards employment creation are the following:

- Providing a training programme adapted to demand,
- helping the access to professional qualification and to employment.
- improving the technical qualifications of the people that take part in the training,
- coping with the demand of professionals on the part of enterprises.

The objective sought by FONTES is to remove the obstacles detected by the promoters of the previous studies.

In the first place, offer must be adapted to demand, by means of:

- the detection of training needs,
- the adoption of innovative training tools, thanks to the exchanges of experience with European partners,
- the technical and professional contribution of a training that does not exist,
- the definition of the contents of the training models and the methodology for the acquisition of the technical knowledge required to develop a profession.

Secondly, the collectives involved should be made aware of such needs: enterprises, social partners, employees, institutions, authorities and final beneficiaries of the training.

We must stress that one of the achievements of the project was the creation of new opportunities thanks to the identification of the environmental resources liable to be exploited.

## CAPACITY TO BE DISSEMINATED TO OTHER COLLECTIVES

As for the dissemination of results, apart from the ordinary dissemination tools, such as talks and presentations, publication in the media and dissemination in the context of the partners, the promoters of the projects valorised and of FONTES itself, have made a great effort to disseminate their products using alternative means too.

The dissemination of products is an on-going process. However, the promoters that have used all the dissemination instruments agreed consider that they have reached the target audience at local, regional and national level, together with the international dissemination carried out by the European partners.

The projects valorised by FONTES Thematic Network meet the five criteria of the analysis above mentioned. The greatest contributions of the projects to the promotion of the New Sources of Employment are the removal of obstacles and the actions carried out.

These actions provided solutions in order to remove the obstacles detected, such as the lack of symmetry between the training available and the demand, and the lack of awareness on environmental issues in rural areas.

The actions carried out focused mainly on training: development of didactic material, adaptation of the training curricula to the target collectives, training activities, qualification of specific collectives..., etc.

Other initiatives worth mentioning are the identification of new employment / business opportunities in connection of the environment and rural areas in general (utilisation and conservation of the environment, organic farming, fungi, rural tourism, etc).

In order to detect training needs in rural areas, the projects have used innovative elements and have defined the needs of both the target collectives of the training and the potential employers. In addition to this, several joint experiences involving the representatives of the offer and of the demand resulted in valuable examples of developments adapted to the



Dissemination Seminar.

characteristics of the students and the needs of the market.

We must bear in mind that most employment seekers of the environmental sector in rural areas have low professional qualifications. The target beneficiaries of the training actions concerned fall in that category.

The actual development potential for the environmental sector and the rural areas in general is not fully noticed. Therefore, the existing obstacles, the new sources of employment, and their utilisation, must be defined and identified.

The main obstacles for employment creation in the environmental sector and in rural areas are to be found both in offer and demand. There is a lack of awareness among enterprises, and a lack of definition of the jobs that need to be filled. In addition to this, the existing training does not meet the needs of the market.

Obviously it is impossible for the Leonardo da Vinci Programme alone to satisfy all the qualification needs of the environmental and rural development sectors. However, most of the projects addressed have contributed to solve them with training initiatives. These innovative actions may be considered as an example of pilot experience, and may raise awareness among the educational authorities, as they address the

actual needs of the sector in order to create employment and new opportunities.

It is important to valorise these new professional activities, with a view to make the most of the experience resulting from them and to adapt to the actual needs of the sector as regards qualifications and access to the labour market.

**INTERACTION BETWEEN THE RURAL SECTOR, THE NEW SOURCES OF EMPLOYMENT AND THE TRAINING CURRICULA OF THE LEONARDO DA VINCI PILOT PROGRAMMES.**

There is a need to adapt training to the new needs of the labour market concerning rural development and the utilisation of natural resources.

Both enterprises and potential employees need a specialisation enabling them to achieve their objectives effectively in connection with existing and emerging activities.

In this sense, the training systems must take into account the lack of qualified staff in the sectors connected with new emerging professions.

Nowadays, there are several obstacles that hinder the impact of the actions carried out in the scope of VET:

- Formal education adapts to new needs very slowly, and normally is behind the evolution of the sector.
- The existing qualifications are far too specialised, and do not consider continuing training. Thus, there is a gap in the labour market, as the people with these qualifications will most probably perform different activities throughout their

working lives. The training and the progresses of workers must evolve at the same time as the needs of the sector.

- There is a lack of a multi-purpose training system enabling professionals to adapt to the new needs of a constantly changing labour market.
- This far, there are no lifelong training schemes that ensure the adaptation to changes, to the new emerging professions and enabling a true professionalisation of the sector concerned.

The pilot projects carried out in the scope of the Leonardo da Vinci Programme, have attempted to address and solve these problems, by means of innovation and new initiatives in the fields concerned.

These demonstration pilot projects have shown the trends of the labour market and the new sources of employment, as well as the new needs and the best way to access the labour market thanks to adequate qualification.

Therefore, the curricular designs devised within the above-mentioned pilot projects should be taken into consideration in the rural sector, as they would improve it and provide new working systems adapted to the needs of the labour market, and help the target collectives to access the labour market.

Therefore, the pilot projects and the FONTES Thematic Network itself contribute to the valorisation of the new professions, which will have a positive effect in the diversification of rural areas, for more disfavoured collectives to access the labour market in equal conditions with employed people.

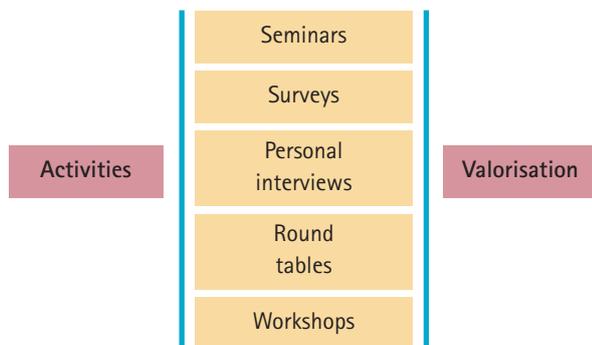
## 4.2. Importance of the involvement of social partners.

Social partners represent the productive, business network of rural areas. Social partners are able to spread information among the collectives that wish to complete their qualifications, and among the enterprises that require more versatile staff capable of developing tasks connected with the new needs derived from the evolution of the sector. Therefore, their implication is essential in order to achieve rural development.

The involvement of social partners is the first step in order to know the problems of the sector and to find solutions. Social partners have been involved in all the projects included in the development of the herein initiative and in the training designs derived from them. Social partners have also helped the dissemination of results among the target collectives and have been the link between them and the enterprises that were interested in these new qualifications.

The influence of social partners has been essential in the impact of the curricular designs that are being assessed by FONTES in rural areas, both during the development of the project and after it finished.

Several activities involving social partners have been carried out in the valorisation process:



Social partners would be directly benefited by the positive changes that would be brought about by the promotion of disfavoured collectives, such as employment creation and the stabilisation of young population, for young people are the ones that can bring abandoned rural areas back to life.

In many cases, rural areas have the necessary natural resources for their inhabitants to exploit them in a rational and sustainable way. This would contribute to employment creation, for men and women, and would enable young people to stay in their rural context and revive some areas that otherwise would be abandoned, despite their resources.

The training opportunities and economic aids encourage more employees to move to rural areas, with the support and influence of the social partners.

## 4.3. Impact on the target group (training and dissemination activities).

Several activities addressed to the target groups were carried out in the scope of the project in order to achieve the desired impact of the projects being valorised.

Activities	
IMPACT	ACTIVIDADES
Short-term	<ul style="list-style-type: none"> <li>- Dissemination of results in both traditional and web media (Web page).</li> <li>- Dissemination of the Good Practices Guide among the target collectives.</li> <li>- Access of target collectives to the activities carried out and fostered during and after the project.</li> <li>- Utilisation of the tools devised and tested during the project.</li> </ul>
Medium-term	<ul style="list-style-type: none"> <li>- Dissemination of the Good Practices Guide.</li> <li>- Information and working sessions with other institutions in order to implement the tools developed by the project in other fields and projects.</li> <li>- Activities concerning the use of the tools developed in the scope of the project.</li> <li>- Involvement of new entities in the FONTES Thematic Network.</li> </ul>
Long-term	<ul style="list-style-type: none"> <li>- Help creating a new framework for transparency, validation and official recognition of the new training itineraries within the EU, bearing in mind the needs of recent member countries.</li> </ul>

#### 4.4. Transference of results.

The transference of results is one of the most important goals of those European projects developed by international partnerships.

The training models and materials designed in the scope of Leonardo da Vinci Pilot projects are useful for specific sectors and are liable to be implemented in different areas and contexts from the ones where they were tested. Therefore, the results obtained are not necessarily connected to a specific context, they may be replicated in other areas with similar needs and final users.

In order to improve qualifications and employment, the entities to which results are transferred should be able to use the tools designed in previous projects. We must bear in mind that the adoption of training programmes previously developed requires prior identification, selection and adaptation to the needs of the new context.

This process of transference of results is also useful in order to assess the durability of the initial results

obtained. The same results may be obtained, or on the contrary, new issues may arise which should be taken into consideration when implementing training itineraries in new contexts.

On the other hand, the transference of results is an effective valorisation method, as it measures the extent to which the training model is feasible and efficient in other contexts.

The assessment of the curricular designs dealt with by the FONTES Network has been very positive. The tests conducted and the tools adopted have proved to be effective for other target collectives and in other circumstances.

Nevertheless, training models and didactic materials transferred from other countries must be previously translated, but also adapted to the target social and cultural background, which may entail additional time and costs.

More intense dissemination activities should be carried out, in order to encourage the involvement of more entities and make the most of all these pilot

projects dealing with training, qualification and access to employment.

Thus, not only the tools developed in the scope of FONTES are important.

Due to the valorisation process carried out, also the training tools created previously and addressing different fields gain importance (curricular design, pedagogic methods, work guides, etc.).

Adapting existing tools to new fields of application generates an added value. The resulting training is more mature, solid and suitable for large-scale implementation.

The importance conferred to qualifications will be bigger when educational authorities become involved

and provide support to the projects, both as regards contents, pedagogical methods and employment potential and concerning the official recognition of the importance of these training designs for the new sources of employment and the new emerging professions.

The challenge faced by the FONTES Network, which was created in order to validate and disseminate good practices models and high quality vocational training in rural areas, is transferring these good practices examples to the representatives of political institutions with competences in areas such as education, employment and rural and community development, for these institutions to make the most of them and include them in their schemes.

#### Possible ways to transfer results:

Through the collaboration with other entities in the same/different territory.

With the new information technologies.

Using traditional methods such as social dissemination.

Relying on the social partners of the relevant sector.

By means of the dissemination of results to other collectives and entities.

By promoting the work tools developed in the scope of the projects.

By the involvement of educational authorities.

By means of the contacts of FONTES Network with other networks that are being built or already in operation.

By organising and taking part in seminars, debate forums, congresses... etc, connected with education and training in rural areas.

By means of a Plan for the dissemination of results.

**TRANSFERENCE OF RESULTS CARRIED OUT DURING THE PROJECT:**

- Awareness rising and information campaigns addressed to the target groups (such as seminars, work sessions, round tables, etc.).
  - Transnational seminars addressed to the social partners and to the authorities connected with employment and training.
  - Involvement of several entities, social partners and authorities that collaborated in the activities carried out in the scope of the project.
  - Publishing of several informative brochures in the languages of the partners.
  - Dissemination through the project's web page.
  - Exchange of experiences with other entities, organisations and social partners.
- Publication of the results in the validation stage, by using the tools devised:
    - European Observatory.
    - Information and Learning Resources Centre.
    - Telework and Teletraining Platform Model.
  - Information on project progress and results provided to direct collaborators.
  - Creation and enlargement of FONTES Network, by encouraging the inclusion of all institutions wishing to enter the network.
  - Utilisation of NICT in order to transfer results.
  - Actions intended to validate the training processes and tools created in the scope of FONTES Network.



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