"LEONARDO DA VINCI" PROGRAMME

Training Plan

CURRICULAR DESIGN

IRIS

THE ORGANIC AGRICULTURE, AN INNOVATING LABOUR MARKET

Nº: E/00/B/F/PP - 115125

INDEX

1. Introduction..... 4
2. IRIS: project: ecological agriculture: an innovating working camp..... 8
3. Formation plan..... 9
4. Temporisation..... 13
5. Materials and didactic resources..... 15
6. Evaluation..... 16
Formative Modular Itinerary..... 17
Module 1 Introduction to ecological agriculture..... 18
Module 2 Soil fertility and systems..... 30
Module 3 The physical factors and the agrosystem: climate, water and 45
Module 4 Election of horticultural, fruit cultural and extensive crops..... 55
Module 5 Basic techniques in ecological agriculture..... 67
Module 6 Restructuring..... 83
Module 7 Crops protection..... 95
Module 8 Introduction to ecological stockbreeding..... 109
Module 9 Food Conservation and transformation..... 124
Module 10 Integration and sustainability of agriculture..... 137
Module 11 National and European legislation..... 150
Module 12 Socio-economic aspects in agroecology..... 162
Module 13 Working education and orientation..... 173
Practices..... 187
Practice 1 Doing a herbarium..... 188
Practice 2 Quantitative analysis of the soil..... 189
Practice 3 Restructuring processes..... 190
Practice 4 Compost fabrication..... 191
Practice 5 Protected agriculture..... 192
Practice 6 Smallholding organisation and seeding..... 193
Practice 7 Monitoring the Crops..... 194
Practice 8 Crops health 195
Practice 9 Pruning..... 196
Practice 10 Grafting..... 197
Practice 11 Ecological stockbreeding..... 198
Practice 12 Apiculture..... 199
Practice 13 Conservation and transformation processes..... 200
Practice 14 New technologies initiation..... 201

1. INTRODUCTION

The V action programme of the EU adopts the expression of sustainable development to identify a development following the Brundtland report: “satisfy the present generations not putting into risk the future ones to satisfy their own necessities”.
To talk about environmental integration in agriculture is to talk about all the techniques that are applied to respect the environment and carry out the least possible perturbations.
Nowadays there are few causes to think about respecting techniques with the environment:
Lost of biodiversity.
Lost of soil (erosion, desertisation).
Rising prices of the production costs.
The prices do not go along with the production costs.
The alarm that the industries carry out.
With all these aims ecological agriculture offers an answer to the future.
The sustainable agriculture has **three fundamental aims:**

- Conservation of the natural resources and protection of the environment: biodiversity, landscape, autoctone or locally adapted crops etc.
- Economic viability: the productive system allows obtaining a continual benefit of the water, soil, genetic resources etc. not destroying the basic natural resources.
- Social equity: people that live from the agriculture should be at the same social level than other types of workers.

Agroambiental measures.

- Use the natural resources rationally.
- Soil conservation as a basic resource.
- Use the water in an efficient way.
- Optimise the use of energy.
- Rational use of fertilisers.
- Rational and caring use of the fitosanitary.
- Conserve the ecological diversity and genetic resources.
- Reduce the agrarian pollution.
- Limit the emissions to the atmosphere.
- Reduce the production of solid waste.
- Minimise the production of solid effluents.
- Conserve and improve the environment.
- Agrarian landscape.
- Ecosystems.
- Ecological processes.
- Traditional rural infrastructures.

But being an ecological agriculture means having some knowledge and know some techniques without which is impossible to do this kind of agriculture. It is not going backwards, against what some people think, is applying the actual knowledge in a rational way, so without using the synthesis chemical products, reach good production rates, quality food and above all “clean”, no chemical pollution.
Shares with it some aspects:

- Equilibrated rotations.
- Policultives.
- Mechanical methods of control of the grass weed.

The modern ecological agriculture tries to develop taking into account concepts such as:

- Mycorrhiza.
- Symbiotic fixation of N.
- Rhizosphere.
- The renovation of organic material.
- Soil life.
- Crops and stockbreeding.

All them discovered by the modern science.

Ecological agriculture does not imply a life change of the farmer but a mentality one.

It is based on:

- Produce high quality food and enough quantity.
- Work with the ecosystems instead of dominating them.
- Foment the biotic cycles of the agrarian system (soil flora and fauna, plants and animals).
- Keep and raise the soil fertility in a long term.
- Use to the most the reusable resources.
- Work all you can inside a close system of organic and nutritients matters.
- Give the cattle the necessary life conditions.
- Avoid all the pollution techniques that can result from the agricole techniques.
- Keep the genetic diversification of the agrarian system and its environment.
- Obtain satisfactory incomes.
- Consider the social and ecological impact in the biggest agrarian system.

"The ecological agriculture will be promoted thanks to an Strategic Action Plan of the European Union". This is the most important conclusion of the Conference taking place in Copenhagen on the 10th and 11th May where all the European states were represented. Need to do an extensive information campaign, reinforcing and promoting the Ecological Agriculture in the actual agriculture policy of the European Union.

It is a bet of the European Union to promote this sector. And at the same time is an expansion market which limits are marked by their own production, which is now insufficient to cover a demand, which increases year buy year.
Nowadays in Spain the surface dedicated to the ecological crops is more or less 400,000 has. Against the 3,5 mill. Of hectares of the whole Europe. In Spain we have 14,000 ecological products. The value of the commerce in this sector is around 20,000 mill. PTAs annually. The majority of which are destined to exporting. This figures are still very low comparing to the ones in other countries. For example Germany has a 475,000 mill. PTAs. France 237,000 PTAs, Italy 209,000 PTAs, and the United Kingdom 171,000 mill PTAs per year.

The developing of the market and the consumer's demand runs parallel to the developing of conversion of the ecological techniques. The ecological market in the US is 3 billion dollars and it is foreseen to be multiplied in the next 2 years.

In Germany the sector of the children food will become completely ecological.

Egypt has an important ecological production that sells in 6,000 pharmacies and more than 1,200 shops.

The local ecological markets are also settled in the third world countries.

The ecological sector is probably the most developed one when talking about food. The annual increase is a 25%.

The analysts say that the 11 billions of the world commerce would be 100 billions in 10 years.
No press campaigns, no subsidies, no support, against the majority of the experts and though the abuses of the agroalimentary sector, the ecological agriculture is a fact.

The ecological agriculture allows the good conservation of land in fertility productions (annually there are 225 millions hectares deserted and 26000 millions of land are lost, Paul Erlich, U. Stanford, 1990) helping the crops diversity to maintain the alimentary security of the world and can nourish in quantity and quality the world population with a diet based in traditional varieties of vegetables.

The price is superior due to the fact that the prices in the markets are fake, because they do not take into account:
- The costs of environmental problems they generate.
- The costs of public health created by the agroindustry.
- The quality of the product sold.

Country	Hectares 1998	Hectares 1999	Increase 1998-99
Belgium	6.418	11.350	+76,8%
Denmark	64.329	160.369	+149,5%
Germany	351.062	416.318	+18,6%
Finland	125,550	133.000	+5,4%
France	120.241	234.800	+95,3%
Greece	6.000	14.628	+143,8%
u. kingdom	54.270	291.538	+437,2%
Ireland	23.591	28.704	+21,7%
Iceland	119	2.500	+21,7%
Italy	550.000	788.070	+43,3%
Liechtenstein	630	620	-1,6%
Luxembourg	625	742	+18,7%
Netherlands	17.500	22.120	+26,4%
Norway	11.769	15.581	+32,4%
Austria	345.375	345.375	0%
Portugal	11.584	29.533	+154,9%
Sweden	118.175	127.000	+7,5%
Switzerland	71.790	79.142	+10,2%
Spain	269.465	352.164	+77,2%
Total	**2.149.120**	**3.053.554**	**+46,2%**

SÖL (Stiftung Ökologie & Landbau)

However, the high prices are not a rigid norm, but they can adapt to the market. The tendency to the future is to conquer the local markets.

In the future the ecological agriculture will have to face the new outcomes of a unique and controlled technology with economist criteria exclusively, which is the production of genetic alterated plants (transgenic).

At the same time it will be evolving to a technology applied to the ecological agriculture once the soil is better known, interactions between plants and micro-organisms. New aims will be reached on the production area.

The going backwards to food quality in relation to sanitary means will push the ecological agriculture in the future.

2. THE "IRIS" PROJECT: THE ECOLOGICAL AGRICULTURE: AN INNOVATING WOKING CAMP

The learning process in the rural areas is complicated due to the characteristics of the environment and the mentality of their inhabitants. Getting out of what is known as regulated systems of the countries, there are not many other valid alternatives that could give a specific formation in the environment.

The necessities are very varied and it is very difficult sometimes to find a homogeneous group of interested people and who are prepared to learn.

The interests should not only be learning but the necessities of the population it is lead to and its capacity to solve difficulties.

In this point it is necessary to say that the philosophy of the LEONARDO DA VINCI project allows the possibility of putting into practice new methods without which it is easier to reach the population, that the results sought are obtained and at the same time they will be appreciated by the population and demanded by them.

Aims: improve the aptitudes and individual competencies, especially of the young people in the first steps of work, to facility insertion and the professional reinsertion. Three **measures**: **a)** elaborate a programme and educational material adapted to the detected necessities; **b) creation of a permanent working net (transnational association) that allows education, jobs, experience interchange and the relationship between public and private institutions; c)** collaboration with the education institutions of each country to improve the divulgation of the programme.

3. EDUCATION PLAN

Conscious of the importance of the human resources in Ecological Agriculture, an educational plan has been designed to give an educational answer to the needs of the agricultural sector taking into account the technological advances.

Taking into account the context analysis and anticipating to the future needs, a basic educational plan has been designed with very well defined characteristics: open, versatile, flexible, muti-faceted and innovating.

Se pretende que el itinerario formativo básico se convierta en un instrumento pedagógico y una guía que oriente y simplifique la labor de los formadores.

Another innovating thing is the muti-faceted. This focus will permit the realisation of different activities inside the sector and adapting to the future changes that will be coming as a consequence of new technologies.

The main aim of the educational plan has a professional profile: prepare multi-faceted technicians, able to act in a responsible way, with an own identity and a professional maturity that will help in the permanent formation process, known the resources of the area, compromised with the local development and prepare to respond to initiatives and creativity of the actual and future aims in the Ecological Agriculture area.

The educational plan has three phases:
- Sensibilisation phase.
- Education phase.
- Continuation phase.

The Sensibilisation phase has a double aim: imply the social agents in the education development to guarantee the constant adaptation to the real needs and to facilitate the work insertion and motivate the collective, so they are able to adapt to the conditions that the ecological working method exiges and incentive the initiative and its capacity of work.

The activities proposed for this phase are:
Meetings of the educational responsible with representants of the social agents of the sector.
Conferences and seminars directed to the collective and the professionals already part of the sector.
Relate the representants of the social agents and the representants of the aimed collectivity.

Didactic and methodological orientations

The educational phase is established on a structuring working programme on educational modules, each of which introduces the students in a new conception of agriculture with the capacity to value the advantages that represents the actual agriculture.

The programme pretends not only the learning of a series of techniques more or less interesting, but also the facing of the student with the real problems that are presented, think about them and above all present solutions. It fomentates the group work and develops the attitude to join the defence of the product and the diversification of it.

This will be developed mixing theoretic and practical seminars according to the work modules and using a participate working method that helps with reflection.

The theoretical classes are developed in sessions that will be alternated with different activities on the aim to improve the efficiency and help the developing of the intellectual faculties of the student, and the same time the group activity is potentate , attitude which is more and more important in the rural areas. The teacher will be complemented with individual and small group's work.

The theoretical expositions will be complemented with slices and documentaries.

In other occasions qualified people will be invited and new points of view will be introduced or his/her experience in the field will enrich the content and new practical solutions will appear to solve the problems and the project will more and more related to the field work.

The practical activities will take place in the ground by the students or their relatives to work on real problems, to increase the interests and dedication and above all they will be adapted to the fenological periods of the plants not to interrupt their growing. This means an alternation of the education in relation to the time of the year, so as the practicals to be really educational.

Organisation of the theoretical activity:

The general scheme of the theoretical activity that will be followed during the sessions goes as:

Activity
1. Theoretical exposition by the teacher.
2. Proposition of the questionnaire.
3. Consult the pedagogical material.
4. Personal resolution of the questionnaire.
5. Small groups work. Elaboration of the conclusions.
6. General conclusions of the whole group.
7. Resolution to marginal questions and doubts.
8. Slices projection and documentaries when useful.

Main aims of the theoretical activity

With this working method the following aims are meant to be obtained:

Personal level	Group level
Help observation and reflection.	Expose their own opinion in front of the others.
Establish relationships with the others.	Improve the oral expression.
Analyse the problems and its repercussions.	Listen and value the other's opinions.
Delimit problems.	Understand the different points of view.
Understand the causes that produce them.	Collaborate in the search for solutions.
Establish possible solutions.	
Improve the writing expression.	

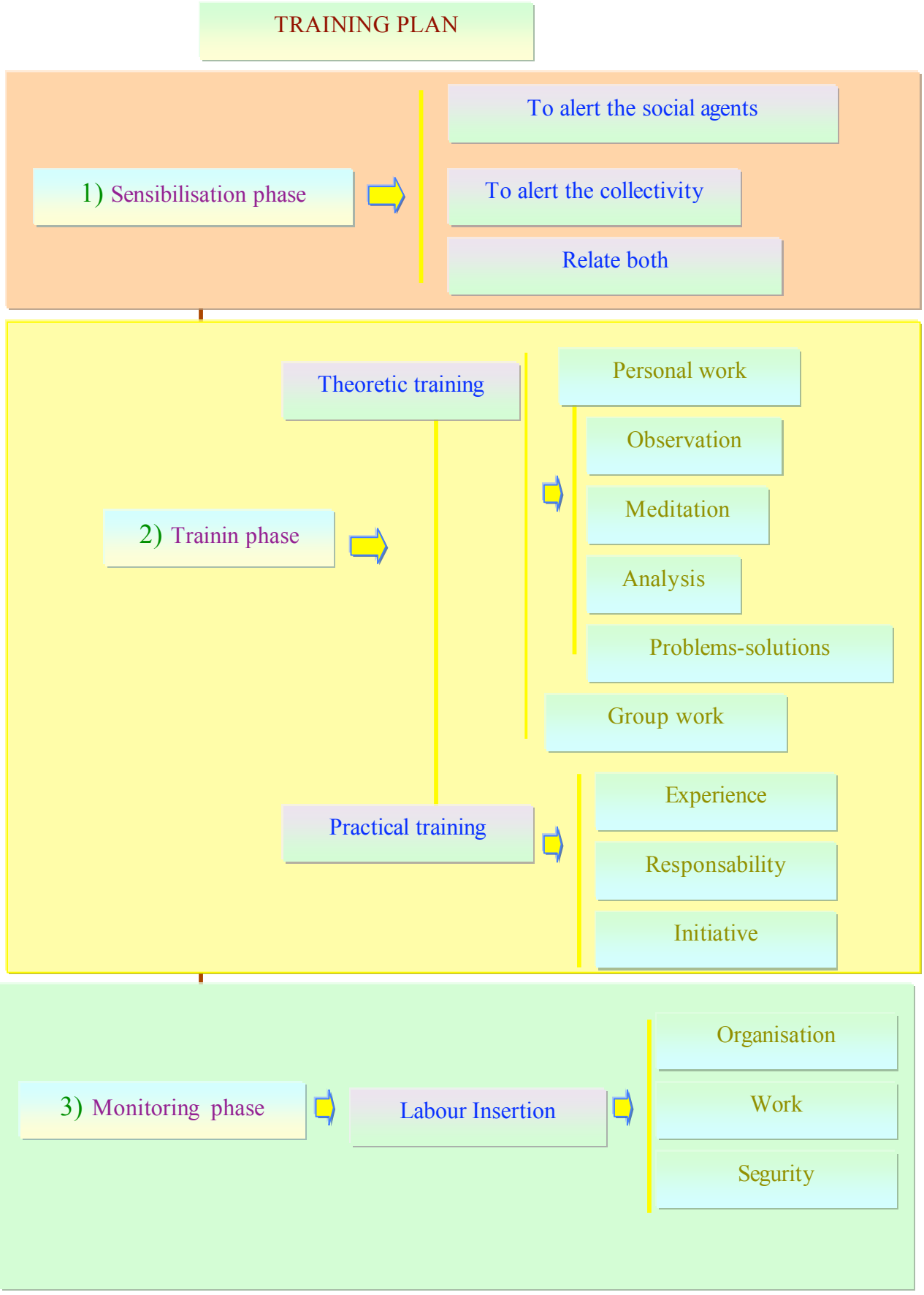
Dynamic of the working groups:

In the working system that will be used we see that an important step in the educational methods are the "working groups". These groups will be established before any personal work will take place so everyone will propose fresh ideas.

The dynamic of the working groups will be as follows:

4-5 people groups.
Designation inside the group of a secretary that will take notes of all the agreements taking place in the groups.
Designation of a co-ordinator that will establish the intervention turn and moderate the discussions.
Participation of all the group members.
Elaboration of a scheme or final report.

After the general conclusions are taken the scientific and technical knowledge that is missed is proposed and the possible doubts are solved for a better understanding of the project.


TRAINING PLAN
1) Sensibilisation phase
To alert the social agents
To alert the collectivity
Relate both
2) Trainin phase
Theoretic training
Personal work
Observation
Meditation
Analysis
Problems-solutions
Group work
Practical training
Experience
Responsability
Initiative
3) Monitoring phase
Labour Insertion
Organisation
Work
Segurity

1. TEMPORALISATION

The duration established for the educational plan is 408 hours. It is important when presenting the design to remember that is characterised above all for its flexibility. The times showed for each module are approximate and they will be the characteristics of the students and the concrete necessities of education that will determine the timing for each module.

Modular programme of theoretical education

Subject	Theoretical hours
1. Introduction to agroecology.	**8**
2. Ecological soil: soil fertility and systems.	**20**
3. The physical factors and the agroecosystem: climate, water, and environment.	**12**
4. Restructuring.	**16**
5. Basic techniques of ecological agriculture.	**24**
6. Election of horticultural, fruit cultural and extensive crops.	**24**
7. Protection of crops: pests control, illnesses and adventitious.	**24**
8. Introduction to ecological stockbreeding.	**32**
9. Conservation and transformation of ecological food.	**20**
10. Integration and sustainability of agriculture.	**12**
11. Socio-economic aspects of agroecology.	**20**
12. Alternative energies.	**20**
13. National and European legislation.	**8**
14. Working education and orientation.	**20**
TOTAL	**240**

The practices will take place in agricultural and stockbreeding ecological companies, alternating with theoretical modules. With them the student will face real problems, understanding the different aspects of the day by day in a real smallholding. Also it will help the personal resources of the student: capacity to interrelate, observe , assimilation of the different activities, dialogue capacity, initiative when doing jobs and help in the resolution of problems, analyse the different factors of the smallholding and introduce possible improvements. During these periods a practical notebook will be done relocating most of the aspects mentioned before and it will help for the evaluation and using of the practices.

Modular programme for the practical education

Subject	Practical hours
1. Doing a plant collection.	**16**
2. Analysis of the soil.	**12**
3. Restructuring processes.	**8**
4. Compost fabrication.	**12**
5. Protected agriculture.	**12**
6. Organisation of the farm and the seeding activities.	**12**
7. Monitoring the crops.	**12**
8. Crops health.	**12**
9. Grafting	**8**
10. Pruning	**12**
11. Ecological stockbreeding.	**16**
12. Apiculture.	**8**
13. Conservation and transformation processes.	**12**
14. Initiation to the new technologies.	**16**
TOTAL	**168**

5. DIDACTIC MATERIALS AND RESOURCES

The selection of didactic materials and resources depends on the concrete context and characteristics. Taking into account the flexibility of the design, it will be part of the teacher's job to apply it to selection and criteria of the didactic materials and resources. It will be taken into account that the materials and resources help with the education and its function is to help the developing.

With the design a content developing has been done. This document can help as an orientation. It will be consider for the putting into practice the use of computers, audio-visual equipment etc.

The installations in which the education will take place should have classes that allow flexibility in use, different ways of grouping, facilitating the education.

The practical education will take place in ecological farms with collaborating plans where the owners will take the students during the practical period.

Apart from the farm material that will be used, the students will elaborate a practical note book that will have their perceptions, ideas, and their point of view of the different jobs done, noting all the doubts and solutions to the problems and their personal opinions during the developing of the practices, above all those aspects they have helped them the most and can be improved.

6. EVALUATION

Through the evaluation the progression will be evaluated in relation with the main aims of the activities.

The evaluation is presented as a process with three main moments:

Initial evaluation: it will be done to measure the knowledge and attitudes of the students; from the result the corresponding analysis will be done. This will help to adapt the educational techniques to the necessities of the students. This evaluation will take place before the initiation of the theoretical phase and before each module.

Educational evaluation: this will take place continuously during the whole educational process and it will assure the adjustment of the education to the information obtained. This progressive adjustment requires the systematic observation of each student that will show where the problems are and the solutions.

The student should think of himself as the main character of this educational process that will help in the completion of his/her aims. This implies a sensibilisation phase where the student will be really interested in hi/her own progression.

Summing up evaluation: it will be done at the end of each module and it will show if the students have reached the main aims as well as taking these results as starting point for a new intervention.

The procedures of information recollection for the evaluation will be the systematic observation, the productions of each student, class diaries, group activities and predesigned questionnaires.

The participation of the students in the evaluation procedure will foment the "autoevaluation" and "coevaluation".

The education of the students will evaluate the teaching procedures, the intervention of the teacher, the used resources, the spaces, the content temporisation, the criteria and the applied evaluation instruments and the own curricular design.

MODULAR TRAINING ITINERIES

MODULE 1

INTRODUCTION TO ORGANIC AGRICULTURE

1. Introduction.
2. Module curricular elements.
3. Programme.
    - 3.1. Educational units.
    - 3.2. Curricular elements of each educational unit.

Bibliography.

Evaluation questionnaires.

1. INTRODUCTION TO ECOLOGICAL EDUCATION

1. INTRODUCTION

The module "introduction to ecological education" has a transversal nature and helps as a base for the rest of the designed modules. The module has an important specific weight though its contents are designed in a spiral, so its acquisition will be progressive and it will be reinforced during the educational process.

General aim of the module:

- *Know the functions of the ecosystem and all the varieties that intervene in it to determine when is more or less stable or if our action can make it change.*

With this module they will be able to:

- *Analyse and know the basic elements that will be used during the course.*
- *Understand the ecological agricultural processes and the composing factors.*
- *Analyse and observe the different relationships established inside the ecosystem.*
- *Differentiate the different impacts of the natural ecosystems and the agrosystems.*
- *Analyse the role of diversity inside the ecosystem.*
- *Analyse and come in contact with the problematic of traditional agriculture.*

The contents that answer to these capacities are concepts, procedures and attitudes; but they need take into account the attitudinal charge of the module through the assimilation of knowledge and procedures.

Los contenidos que responden a estas capacidades son conceptuales, procedimentales y actitudinales, pero se debe tener en cuenta que la fuerte carga actitudinal del MODULE, mediante la asimilación de procedimientos y conocimientos, se configure el bagaje actitudinal previsto.

2. CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	EVALUATION CRITERIA
1. Analyse and know the basic elements that will be used in the course.	• Analyse the basic elements of the ecosystem. • Identify the ecosystems. • Determine their functioning. • Analyse the material cycle.
2. Understand the ecological agriculture processes and their composing elements.	• Relate the ecological agriculture principles with the functioning of the natural ecosystems. • Analyse the factors that differentiate the ecological agriculture. • Recognise the impact of these factors in the environment.
3. Analyse and observe the different relationships established among the inhabitants of the ecosystem.	• Know the different types of relationships established among the inhabitants in the agrosystem. • Enumerate the similarities and differences of the ecological systems and the conventional systems. • Analyse the type of relationships and the mechanics in them.
4. Differentiate the impacts in the natural ecosystems and in the agrosystems.	• Know the importance that ecological agriculture has nowadays and try to imagine the future of it.
5. Analyse the role of diversity in the ecosystems.	• Analyse the biodiversity principle and the importance in the ecosystem. • Relate the biodiversity principle with the richness and stability of the ground.
6. Analyse and come into contact with the problematic that conventional agriculture has.	• Understand the sustainability concept and apply it to ecological and conventional agriculture to determine which of them is closer to the sustainability concept.

3. PROGRAMME

3.1 PROGRAMMING UNITS

Educational unit 1:

Agricultural evolution.

This educational unit has an initial character. It pretends to motivate the students and give him/her a general vision of the agricultural evolution and its actual situation taking into account the sociocultural and economical aspects of agriculture.

Educational unit 2:

Basic concepts

The students must understand and use the different concepts that are part of the agricultural ecosystem comparing them to other ecosystems.

Educational unit 3:

Relationships and properties of the ecosystem

This unit shows the importance of the interspecific and intraspecific relationships inside the ecosystem, how material and energy flow and how the ecosystems have evolved.

Educational unit 4:

Sustainable agricultural systems

The aim is to analyse and understand the concept of sustainability, the importance of this concept in the biodiversity and how this one is not taken into account in actual conventional agriculture.

3.2. CURRICULAR ELEMENTS OF EACH OF THE EDUCATIONAL UNITS.

EDUCATIONAL UNIT 1: AGRICULTURAL EVOLUTION

CONCEPTS.

General history of agriculture.

Concept and definitions in agriculture.

Agriculture: an economic activity.

Economical impacts of agriculture.

Sociocultural impacts of agriculture.

Environmental impacts of agriculture.

PROCEDURES

Analysis of the agricultural and stockbreeding phenomena: historic evolution, impact, actual situation, tendencies, and future evolution.

Analyse the life style changes.

Analyse the environmental impact of agriculture.

ATTITUDES

Attention to the social changes.

Receptive disposition on new perspectives.

Sensibility on the actual situation.

EDUCATIONAL ACTIVITIES- LEARNING

Promote ideas to determine the agricultural concept.

Investigate the economical, cultural, social and environmental changes that agriculture has.

EVALUATION ACTIVITIES

Analyse and relate the evolution that agriculture has on a world level.

Understand if agriculture has aims of local developing in a social, cultural etc. level.

EDUCATIONAL UNIT 2: BASIC CONCEPTS

CONCEPTS

Concept and definition of ecological agriculture.

Basic factors of ecological agriculture.

Aims and finality.

Concept and definition of the environment.

Concept and definition of ecology.

Concept, definition and elements of the ecosystem.

PROCEDURES

Analysis of the ecological and environmental phenomena.

Analyse the changes to an ecological agriculture.

Analyse the importance of ecological gestion in ecosystems.

Environmental implications.

Identification of the actual tendencies and its causes.

ATTITUDES

Attention to the social changes that the ecological agriculture imply.

Receptive disposition facing new working techniques that combine old techniques with new advantages.

Sensibility faces the actual environmental situation.

EDUCATIONAL ACTIVITIES- LEARNING

Group discussion on the importance of environmental care, forms, models and ecological agriculture.

Elaboration of a dossier containing the main environmental, social and cultural related problems with agriculture nowadays.

EVALUATION ACTIVITIES

Analyse and relate the evolution that ecological agriculture has in a world level.

EDUCATIONAL UNIT 3: RELATIONSHIPS AND PROPERTIES OF ECOSYSTEMS

CONCEPTS

Material cycle evolution in the ecosystems.

Energy evolution in the ecosystem.

Nets and tropic chains.

Interspecific relationships.

Ecosystem properties.

Ecosystem dynamics.

PROCEDURES

Analysis of the ecosystems characteristics.

Analyse the need of the functioning of a material cycle and its consequences.

Analyse the importance of quality alimentation in the tropic chain.

Identification of the more important interspecific relationships.

ATITUDES

Value the importance of the cycle material in the developing of ecosystems.

Flexibility in the measures to adopt.

Sensibility on the actual problematic.

EDUCATIONAL ACTIVITIES- LEARNING

Have a debate on the concepts taught by the teacher on situations, necessities, and methodology to use in the ecosystems.

EVALUATION ACTIVITIES

Analyse and relate the evolution of determined ecosystems known by the student.

EDUCATIONAL UNIT 4: SUSTAINABLE AGRICULTURAL SYSTEMS

CONCEPTS

Concept and definition of sustainability.

Concept and definition of biodiversity.

Need of the diversity in the sustainable agricultural systems.

Problems with conventional agriculture related to sustainability.

Need of changing.

Aspects that will do the change viable.

Sustainability perspectives in the future.

PROCEDURES

Analysis of the structure based on conventional agriculture.

Make exercises to compare the bases of conventional agriculture and sustainable one.

Identification of the most important friction points.

Analysis of the motivation that sustainable agriculture supports.

Analyse the biodiversity principle and the importance in the ecosystem.

ATTITUDES

Opening to the future changes.

Alternative approach.

Problematic curiosity and solutions proposed.

EDUCATIONAL ACTIVITIES- LEARNING

Debate the aims of conventional and sustainable agriculture.

Determine if they are compatible or not.

Determine if ecological agriculture has the sustainability requisites.

EVALUATION ACTIVITIES

Understand the sustainability concepts, alternative agriculture, and integrated agriculture. Identify the determined aspects of the sustainability applied to agriculture.

Understand the concept of sustainability and apply it to ecological and conventional agriculture to determine which one is closer to the concept.

BIBLIOGRAPHY

1. A. Gómez Sal. Ecología de los Sistemas Agrarios. Rev Ecosistemas.
2. FAO. La agricultura mundial hacia el año 2000. Ed. MAPA.
3. I. Arnon. La modernización de la agricultura en loa países en vías de desarrollo. Ed. Limusa.
4. J. Smith. Agriculture and Environment in Europe. Club Bruxelles.
5. J. Vandermeer. The ecological basis of alternative. Rev. Ecol.
6. J.M. Naredo y A. Valero. Desarrollo Económico y Deterioro Ecológico. Ed. Visor.
7. L. López Bellido. Agricultura y medio ambiente. Ed. Universidad de Córdoba.
8. M.A. Altiery. Agroecología bases científicas para una agricultura sostenible. Clades.
9. R Carson. The Silent Spring. Fawcet.
10. R. Chambers. Rural Development: Putting the Last First. Longman.G. Guzmán Casado, M. González Molina y E. Sevilla Guzmán. Introducción a la Agroecología como Desarrollo Rural Sostenible. Ed. Mundiprensa.
11. Rafael M. Jiménez Díaz, Jaime Lamo de Espinosa. Agricultura sostenible. Ed. Mundiprensa.

WORK QUESTIONNAIRE

1. What is your opinion in ecological agriculture. An old or new science. Reasons.
2. Why does ecological agriculture need a mental change of the farmer?
3. Estate the most important 3 principles which ecological agriculture is based on and explain why.
4. Explain the differences between population and community.
5. What is necessary for an ecosystem to be more stable?
6. What relation you find between the lost of diversity and the increasing of pests?
7. Reason why the energy flows in the ecosystem unidirectional.
8. Why is it necessary the reinversion of material in the agrarian systems?
9. Choose an ecosystem of your community and enumerate the different elements, which form it.
10. Explain why monocultives are very inextable agrosystems.
11. Enumerate the different reasons why changes have been produced in agriculture in the last 10.000 years. Have the systems become more sustainable or not? Why?
12. Can the agriculture applied in your area be consider sustainable? For and against theories.
13. Differences between conventional agriculture, ecological and integrated. From your own point of view explain the advantages and disadvantages of each of them.
14. Name 6 problems provoked by conventional agriculture that you consider the most important.
15. Explain which type of pollution is the most important, air or water. Reasons.
16. Which measures would you use to decrease the pollution problems that agriculture generates?
17. Explain the difference between population and community?
18. From the base that all aims of ecological agriculture are important, choose tow that you consider the principal and reason why you choose them.
19. Read and article " to determine which".
    - Main ideas
    - Resume the content in three lines.

MODULE 2

The ecological soil:

soil fertility and systems

1. Introduction

2. Curricular elements of the module

3. Programme

3.1 Educational units

3.2 Curricular elements of each educational unit

Bibliography

Evaluation questionnaires

2. THE ECOLOGICAL SOIL: SOIL FERTILITY AND SYSTEMS

2. INTRODUCTION

This modules gives an answer to the necessity to acquire some clear knowledge on functioning, composition and evolution of the soil to apply later other elements on ecological agriculture.

The soil is one of the most important elements in ecological agriculture where all the agricole productivity is based. Concepts such as formation and erosion of the soul, fertility, the most important soil characteristics to understand the way of working and the techniques used that are positive or not for the better conservation of the soil.

It is also important to understand the role of the micro-organisms in the fertility face of the soil. All the actions destined to the soil have the aim to make the soil life easier for micro-organisms. Through this module the student will understand the funtionning of the soil and the deep basic pillar that the soil is in ecological agriculture.

Main aim of the module:

- *Understand the functioning of the soil and all the positive and negative factors that influences the dynamics to find out which are their potential productions related to their characteristics.*

Through this module the students will be able of:

- *Know the soil influence in the lives plants.*
- *Diagnose the soil situation in their slots.*
- *Determine the advantages and disadvantages of the soil in their slots.*
- *Analyse the parameters of the soil, determine and interpret them.*
- *Propose new measures to improve the soil.*
- *Explain the importance of the organic material to keep the soil fertility.*
- *Know the function and importance of the micro-organisms and the Mycorrhiza in the plants developing.*
- *Determine a plan of acting to potentate an edaphic life.*
- *Specify the actions of the different nutrients in plants.*
- *Explain why the compost is the best fertiliser that can be used.*

3. CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
• Know the influence of the soil on the lives plants.	• Determine the existing relation between the soil and the plant. • Define the rizosphere concept.
• Diagnose the situation of soil in the slots.	• Define the soil concept. • Analyse the situation in a concrete slot.
• Determine the advantages and disadvantages that soil have in the slots.	• Identify the characteristics of the soil.
• Analyse, determine and interpret the soil parameters.	• Know the plants as indicators of the soil characteristics. • Do simple analysis.
• Propose measures to improve the quality of the soil.	• Determine the measures related to season, climate, orography, and to improve the soil characteristics.
• See the importance of the organic material in the fertility of the soil.	• Propose different sources of organic material. • Specify the organic material function in the soil.
• Understand the function and importance of the micro-organisms and the Mycorrhiza in the developing of the plants.	• Analyse why the soil acts as a life organism. • Know the functions of the micro-organisms in the soil.
• Determine how edaphic life can be potentate.	• Propose manuring plans using organic material.
• Specify the actions of the different nutrients on plants.	• Analyse the functions of the different nutrients on plants.
• Explain why the compost is one of the best fertilisers that can be used.	• Do heap and surface compost. • Determine the characteristics of compost.

3- PROGRAMME

3.1 PROGRAMME UNITS

Educational unit 1:

Edaphology

This educational unit pretends to awake the interest of the students for the soil and also the plants and the geographic medium- climatic, which work at the same time as a life organism. Special emphasis on the different phases of the soil to determine the actual situations, future evolution and the measures to be taken into account to improve and stabilise it.

Educational unit 2:

Soil analysis

The main aim of this unit consists in being able to interpret the different parameters of the soil and do a test. In it different parameters are analysed and the situation is diagnoses so as to make decisions in the measures to be taken to improve or keep the fertility of the soil.

Educational unit 3:

The life component of the soil

The student will get familiarised with the different types of organisms that live in the soil and understand their function to make the soil fertile. The student could be able to describe the important organisms and explain their function in the soil.

Educational unit 4:

The compost

Though this unit could be included in the subject fertility of the soil, however, as the compost is an ideal way of improving the soil capacities and to increase the number of life organisms it is better to talk about it here. The student will understand how to make compost, which are their properties and its influence on the soil.

MODULE 2:

THE ECOLOGICAL SOIL: SOIL FERTILITY AND SYSTEMS

EDUCATIONAL UNIT 1: EDAPHOLOGY

EDUCATIONAL UNIT 2: SOIL ANALYSIS

EDUCATIONAL UNIT 3: THE LIFE COMPONENT OF THE SOIL

EDUCATIONAL UNIT 4: THE COMPOST

EDUCATION UNIT 1: EDAPHOLOGY

CONCEPTS

Definition of the concept soil.

Analysis of the dynamic of the soil.

Analysis of the evolution phases of the soil:

- Formation phase.
    - Mineral origin.
    - Organically origin.
    - Formation of the clay-humid complex.
- Maturation phase.
- Erosion phase.

PROCEDURES

Identification of the soil phases.

Analysis of the soil characteristics in each phase.

Description of the soil evolution.

ATTITUDES

Value the importance of the soil.

Use of good practices.

Reject the adverse practices.

EDUCATIONAL ACTIVITIES- LEARNING

Debate exposition on the importance of knowing evolution of the soil.

Group work on improving measures and the bad practices.

Collect articles on the soil.

EVALUATION ACTIVITIES

Define the soil concept.

Identify the main characteristics of different types of soils.

Identify the plants of different types of soils.

EDUCATIONAL UNIT 2: SUSTAINABLE AGRICULTURAL SYSTEMS

CONCEPTS

Approaches to the soil characteristics.

Physical analysis.

Influence of the pH in the absorption of nutrients.

Change complex.

The relation C/N.

Evolution of the organic material on the soil.

Humus formation.

Nutrient flux in the edaphic system.

PROCEDURES

Correct use of the language.

Problem resolution from the soil data.

Description of the soil characteristics, sandy, clay etc.

Relate the different concept of analysis of the soil.

ATTITUDES

Understanding of the physic- chemical characteristics of the soil.

Opening to the different interpretation of the soil.

Compare different criteria.

EDUCATIONAL ACTIVITIES- LEARNING

From specific data determine the characteristics of the soil.

Propose an improving of the data.

Interpret the analysis results of the soil.

EVALUATION ACTIVITIES

Do simple and practical analysis.

Propose improvements to increase the fertility of the soil.

Describe the soil profile.

Explain how the water works in the different types of soil.

EDUCATIONAL UNIT 3: THE LIFE COMPONENT OF THE SOIL

CONCEPTS

The micro-organisms.

Evolution and metabolism microbial.

The macrofauna of the soil: types and activities.

The mesofauna of the soil: types and activities.

The microfauna of the soil: types and activities.

The seaweed and the fungus: types and activities.

The procariota world: types and activities.

PROCEDURES

Analysis of the soil organisms.

Description of the most important groups.

Data recollection of different sources and its functions.

ATTITUDES

Group work in the importance of micro-organisms in the soil.

Dialogues on their functions.

Expose and debate the relationship between soil and organisms.

EDUCATIONAL ACTIVITIES- LEARNING

Analysis of the relationships among organisms- soil.

Analysis of how micro-organisms improve the plants health.

Use a field in your community as agroecosystem, enumerate the entries and exits of the organisms in that ecosystem and how are they related.

EVALUATION ACTIVITIES

Determine the measures to be taken to improve the edaphic life.

Classification of the micro-organisms in different groups: macrofauna, mesofauna, microfauna, seaweed, fungus etc.

Establish the importance of the biodiversity of the soil.

EDUCATIONAL UNIT 4: THE COMPOST

CONCEPTS

Definition and concept of compost.

The heap compost.

Needed materials to obtain an equilibrated compost.

Compost additivess.

The humidity in the compost.

The aeration.

Fermentation phase.

Decomposition phase and formation of humus.

Compost characteristics.

The surface compost.

When use one or the other systems.

PROCEDURES

Analysis of the correct technique of the compost.

Application of the correct equilibrium technique of the compost.

Description of the compost processes.

Description of the benefits of compost.

ATTITUDES

Exposition and debate of the benefits of compost.

Attention to the technique of heap compost.

Description of the surface compost.

EDUCATIONAL ACTIVITIES- LEARNING

Practical activity on the heap compost.

Practical activity on the surface compost.

Determine the relation of use materials in the compost.

EVALUATION ACTIVITIES

Explain how the compost is formed.

Enumerate the compost characteristics.

Enumerate the compost functions in the soil.

Analyse the relationship between fertility and soil work.

BIBLIOGRAPHY

1. A. Burges. Soil Biology. Academic Pres INC.
2. A. Primavesi. Manejo Ecológico del Suelo. Ed. Ateneo.
3. Alan Wild. Condiciones del suelo y desarrollo de las plantas según Russel. Ed. Mundiprensa.
4. Claude Bourguignon. El suelo, la tierra y los campos, de la agronomía a la agrología. Ed. Asociación Vida Sana.
5. J. López Ritas, J. López Melida. El diagnóstico de suelos y plantas. Ed. Mundiprensa.
6. Jean Marie Roger. El suelo vivo, manual práctico de agricultura natural. Ed. Integral.
7. José Luis Fuentes Yagüe. El suelo y los fertilizantes. Ed. Mundiprensa.
8. Juana Labrador Moreno. La materia orgánica en los agrosistemas. Ed. Mundiprensa.
9. Laura E. Powers, Robert McSorley. Principios ecológicos en agricultura. Ed. Paraninfo.
10. Mark Coyne. Microbiología del suelo: un enfoque exploratorio. Ed. Paraninfo.
11. N. Lampkin. Agricultura Ecológica. Ed. Mundiprensa.
12. P. Urbano Terrón. Tratado de fitotécnia general. Ed. Mundiprensa.
13. R. Aragües y A. Cerdá. Salinidad en aguas y suelos en la agricultura de regadío. Ed. Mundiprensa.
14. R.P.C. Morgan. Erosión y conservación del suelo. Ed. Mundiprensa.
15. Victor Sánchez-Giron Renedo. Dinámica y mecánica de los suelos. Ed. Agrotécnicas.

Work questionnaire

- Explain which are the meteorisation processes more used in our area.
- Which processes are needed for the formation of the soil?
- Which role the micro-organisms have in the formation of the soil?
- What is said by the soil profile?
- Enumerate the factors that intervene in the soil erosion in your are explaining how they work.
- Propose some measures to stop the soil erosion.
- How would you differentiate the maturity state of the soil: young, mature, old?
- How the B-horizon is formed and which are its characteristics?
- Explain how the colour and hear influete in the plants developing?
- What happens with the pH5 in the elements: Ca, N, Fe, Mn?
- What happens with the pH8 in the elements: Ca, Fe, Mo, Zn?
- Which are the needed elements in the formation of the clay-humid complex? Explain the role of the soil.
- What a pH of 5,8 explain on the elements solubility?
- In what conditions deficiencies of phosphorus appear? Why?
- How does organic material evolves in a calcareous soil?
- Indicate the processes in the organic material decomposition in the soil. When is it necessary to have one or the other?
- Which are the steps to fabricate a heap compost?
- Why is important the aeration in a heap compost?
- When do you know a heap compost is mature?
- What does the relationship C/N indicates? What effect has the introduction of inorganic nitrogen in the evolution of the CO2 in a new heap compost which relationship is C/N of 50:1?
- Calculate the quantity of organic material that would be necessary for the following soils:
    - Organic material: 0,8%
    - Organic material: 1,4%
    - Organic material: 2,5%
- What are the Mycorrhiza?
- Why the plants with Mycorrhiza adapts better to the soil?

- Determine the type of soil and the characteristics of all the following soils:

Clay	30	70	10
Sand	30	20	80
Loam	40	10	10

- Determine the characteristics and the possible problems soils with the following characteristics could present:

Parameter	Soil A	Soil B	Soil C	Soil D
Organic material	2%	0,5%	1,2%	3%
Cation exchange capacity	10	1	5	14

- Determine all the possible characteristics of the following soils:

Parameters	Soil A	Soil B
Clay	40	25
Sand	40	45
Loam	20	30
pH	6	8,2
Organic material	2,4	1,9
CIC	10,9	3,2
C/N	12	28

- Determine the characteristics of the following soils taking into account the data given:

Parameters	Soil A	Soil B	Soil C
Clay	15	5	35
Sand	60	54	45
Loam	25	11	20
pH	6,4	5	5,3
Organic material	2,1	11	3
CIC	7	6	5
C/N	10,6	20	42

- Determine all the possible characteristics of the following soils taking into account the data given:

Parameters	Soil A	Soil B	Soil C	Soil C
Clay	20	25	40	10
Sand	60	45	40	80
Loam	20	30	20	10
pH	5,8	6,3	6,8	5,2
Organic material	2,1	1,7	2,4	1,3
CIC	6,9	6	12,9	5
C/N	10,5	9,8	14	25

- Put 250 kg of manuring richness in N=13%. How many UF we have created?
- Need to put in a crop 230 UF of calcium as a dolomite richness 23%. How much quantity we need to buy?
- Need to put in a crop 70 UF of calcium. We have manure of 12% richness at 23 PTAs/kg and another of 16% at 28pts/kg. Which one is cheaper?
- We manure with 2,5Tm of manure with a richness of 2,3 of N. How much UF we have created?
- In a crop we need to lime the soil on 680 UF of lithothamme with a richness of 30%. What quantity we need to buy?
- Need to put 125 UF of phosphorous in a crop. We have a manure of 7,8% at 22pts/kg and another one of 12% at 30pts/kg. Which one is cheaper?

MODULE 3

The physical factors and the agrosystem:

climate, water and environment

1. Introduction

2. Curricular elements on the module

3. Programme

    3.1. Education units

    3.2. Curricular elements of each educational unit

Bibliography

Evaluation questionnaire

3- THE PHYSICAL FACTORS AND THE AGROSYSTEM: CLIMATE, WATER AND THE ENVIRONMENT

1-INTRODUCTION

The climate is one of the most important factors that influence the agrarian production. In general the crops are adapted to very concrete climatic situations. This is a reality we need to know and estimate in its true value.

With this module we pretend to initiate the student in the study of the climate and its influence in plants and in the agricole practices, sometimes avoiding really disastrousus situations. It is one of the elements that will determine the formation speed or erosion of the soil.

General aim of the module:

- *Understand the importance of the physical environment and the meteorological conditions in the developing of the plants and the most important problems that can appear, and at the same time establish control strategies.*

Through this module the students will be able of:

- *Understand the importance of meteorology.*
- *Know the different atmospheric elements and their manifestations.*
- *Know how to interpret a weather map.*
- *Differentiate the different types of frost.*
- *Determine what method should be used when fighting frost.*
- *Observe the influence of climate in plants.*
- *Learn how to take preventing measures when doing plantation, orientations and other aspects that can be taken into account when bad weather conditions.*
- *Value the importance of the physical medium and its complement with the meteorological factors.*

2- CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	EVALUATION CRITERIA
Understand the importance of meteorology.	• What is meteorology? • Importance of it
Understand the different atmospheric	• Explain the different elements

elements and its manifestations.	• Identify them • Know how to interpret a climatic map
Understand the risks of the different climatic elements.	• Enumerate the risks that each of the climatic elements implies
Differentiate the types of frost.	• Explain the different types • Determine the methods that can be used to fight them
Observe the influence of climate in plants.	• Analyse the behaviour of the plant related to the climate • Explain the positive and negative effects they had on plants
Learn to take preventing measures when doing plantations, playing with varieties, orientations and other aspects to face adverse climatological conditions	• Learn to planify crops taking into account the climate. • Learn to planify the activities taking into account the weather.
Value the importance of the physical medium and its complement in the meteorological factors.	• Enumerate the positive and negative aspects that meteorological factors have.

2- CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
• Understand the importance of meteorology.	• What is meteorology? • Importance of it
• Understand the different atmospheric elements and its manifestations.	• Explain the different elements • Identify them • Know how to interpret a climatic map
• Understand the risks of the different climatic elements.	• Enumerate the risks that each of the climatic elements implies
• Differentiate the types of frost.	• Explain the different types • Determine the methods that can be used to fight them
• Observe the influence of climate in plants.	• Analyse the behaviour of the plant related to the climate • Explain the positive and negative effects they had on plants
• Learn to take preventing measures when doing plantations, playing with varieties, orientations and other aspects to face adverse climatological conditions	• Learn to planify crops taking into account the climate. • Learn to planify the activities taking into account the weather.
• Value the importance of the physical medium and its complement in the meteorological factors.	• Enumerate the positive and negative aspects that meteorological factors have.

3- PROGRAMME

3.1 PROGRAMME UNITS

EDUCATIONAL UNIT 1:

Meteorology and climate factors

This educational unit pretends to introduce the student in the meteorological camp and make him/her familiarise with the knowledge of the different meteors, and the causes that originate them. This unit is together with the following two where the students will explore his/her observation capacity from a climatic point of view; being able later to take all these aspects into account when doing plantations.

Educational unit 2:

Meteors

From the agricultural point of view the meteors are part of the local climatology; they will define the type of orientation the agriculture production will have: silviculture, agricole, stockbreeding, horticole, fruticole. They will also determine the election of crops and rotations and the especies and breed will be chosen. They will also define the cultivation strategies that will be taken and the fertilisation plan, farming, watering and the fitosanitary treatments. All these aspects will be treated in this module so as the student to have a global vision of the climate and its influence in agriculture.

Educational unit 3:

The influence of weather in vegetables

The climate not only influences the agrarian system in general but each of the vegetables in particular as well as the animals. This influence takes place as: fenology, ecological cycles, behaviour depending on the seasons etc. with this unit the student should be more conscious of these influences and therefore can take the more convenient measures, in times of seeding or farming, or concrete actions to preserve the plants of these climatic effects.

MODULE 3:

THE PHYSICAL FACTORS AND THE AGROECOSYSTEM: CLIMATE, WATER AND THE ENVIRONMENT

EDUCATIONAL UNIT 1: METEOROLOGY AND CLIMATE FACTORS

EDUCATIONAL UNIT 2: THE METEORS

EDUCATIONAL UNIT 3: CLIMATE INFLUENCE ON VEGETABLES

EDUCATIONAL UNIT 1: THE METEORS

CONCEPTS.

The atmospheric pression.

Air masses.

Clouds.

Fronts.

Winds.

Water meteors.

Frost.

Defence methods against frost.

PROCEDURES

Analysis of the atmospheric meteors.

Analysis of the water meteors.

Identification of the types of frosts.

Analyse of the defence methods.

ATTITUDES

Compression of the atmospheric meteors.

Valuation of the influence of meteors in agriculture.

Compression of the water meteors.

EDUCATIONAL ACTIVITIES- LEARNING

Description of the origins of atmospheric meteors.

Interpretation of the atmospheric maps.

Catalogation of the different types of frosts.

Influence of the water meteorological agents.

EVALUATION ACTIVITIES

Answer to the questionnaire.

Explain which are the most important atmospheric meteors.

Explain which are the water meteors.

Relate the different types of frost.

EDUCATIONAL UNIT 2: INFLUENCE OF THE CLIMATE ON VEGETABLES

CONCEPTS

Influence of the meteors.

The feneology.

Phases and steps on the crops cycle.

Meteorological exigencies of vegetables.

Behaviour of the cultivated plants against the different meteorological elements.

Importance of the physical environment of plants.

PROCEDURES

Identification of the fenological procedures.

Description of the different steps in the vegetables cycle.

Analysis of the behaviour of vegetables.

Analysis of the importance of the physical environment of plants.

ATTITUDES

Relate the meteors with the different vegetable phases.

Understanding of the meteorological exigencies in vegetables.

Value of the vegetable behaviour.

EDUCATIONAL ACTIVITIES- LEARNING

Understanding of the pheneology of the vegetable.

Description of the ecological cycles of vegetables.

Evaluation of the behaviour of vegetables.

Group work on the influence of the meteorological factors in the functioning of a plant.

EVALUATION ACTIVITIES

Answer to the questionnaire.

Describe the phenological process of vegetables.

Determine the meteorological influence in the vegetable cycles.

Identify the details that characterise the ecological cycle.

Tell the importance of the physical environment on vegetables.

BIBLIOGRAPHY

1. A. Miller. Meteorología. Ed Labor.
2. E. Torres Ruiz. Agrometeorología. Ed. Diana.
3. F. Llauge. Iniciación a la meteorología. Ed. Marcambo.
4. G. Viers. Climatología. Ed. Oikos-Tan.
5. H. Flohn. Clima y tiempo. Ed. Guadarrama.
12. Jose Luis Fuentes Yagüe. Iniciación a la meteorología agrícola. Ed. Mundiprensa.
6. R. Candel Vila. Atlas de meteorología. Ed. Jover.
7. T. Lobsack. El aliento de la tierra. Ed. Labor.

Work questionnaire

- Of all the water meteors which you consider the most dangerous for the agriculture? Why?
- How is irradiation frost produced?
- What factors need to be taken into account when planting a crop in an area where each winter irradiation frost is produced?
- Explain the functions of mulching when fighting against atmospheric adversities?
- Why is interesting in agriculture know the sensibility to the duration of a day for a crop?
- How are winds produced?
- What differences are there between warm and cold fronts?
- What difference is there between air and wind?
- The rain and the snow are produced in the lower clouds that are very extent. Indicate briefly when rain and snow are produced.
- In December 1962 a cold wave attacked the Iberian Peninsula, provoking big damages in fruit crops. What type of frost were produced and what methods are there to fight them?
- A same crops frozes with more facility when it is planted on sandy soil than on clay soil. What is the cause?
- What is phenology and how phenological maps are elaborated?
- Enumerate the different steps on the cultivation of wheat.
- What differences are there between short- day plants, long-day plants and plants indifferent to the duration of the day.
- Indicate some example of damages caused in some crops due to the excessive heat.
- Describe briefly the beneficial effect of rain and snow on crops.
- Enumerate the parameters of the physical means in your area and determine their importance related to the other crops.

MODULE 4

ELECTION OF HORTICULTURAL

FRUIT CULTUE AND EXTENSIVE CROPS

1. Introduction.
2. Curricular elements of the module.
3. Programme.
    - 3.1 Educational units
    - 3.2 Curricular elements of each educational unit.

Bibliography.

Evaluation questionnaires.

4. ELECTION OF HORTICULTURAL, FRUIT CULTURE AND EXTENSIVE CROPS.

1. INTRODUCTION

Traditionally the extensive and horticultural crops have been the most beneficial part of the ecological agriculture; with the products high prices, big beneficial margins are obtained.

With the development of the curricular contents, we pretend that the students obtain a global vision on the related activities using these crops. The contents of the module will answer the conceptual, procedural and attitudinal capacities, though we do not pretend to obtain a deep knowledge on specific techniques. Procedures and techniques will be taken into account. The level of concepts should be basic and enough so as the student applies the learnt techniques to the horticultural, fruit culture and extensive crops.

General aim of the module:

- *Understand the organisation and applied techniques to these types of crops taking into account the ecological methods used.*

Through this module the students will be able to:

- *Understand the applied techniques in ecological horticultural.*
- *Design rotation and association models of horticultural agriculture.*
- *Understand the applied techniques to ecological fruit culture.*
- *Design crops models of fruit trees integrated with other crops.*
- *Understand how the cultivate of fruit trees is arranged with the smallholding biodiversity.*
- *Understand the applicable techniques to extensive crops.*

2-CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
• Understand the applicable techniques to ecological horticulture.	• Propose intensive horticultural models. • Propose extensive horticultural models. • Know the applied techniques on horticulture. • Applied those techniques to specific crops.
• Design rotation and association models to horticultural crops.	• Elaborate rotations and associations designs for intensive horticulture. • Elaborate rotations and association designs for extensive horticulture.
• Understand the applicable techniques to ecological fruit culture.	• Propose fruit culture design models. • Applied the management techniques to the fruit trees.
• Design models of fruit trees integrated with other crops.	• Propose designs of associations with fruit trees. • Design rotation models in fruit culture.
• Understand how the cultivate of fruit trees is combined with the biodiversity of the smallholding.	• Introduce biodiversity elements in the fruit trees systems. • Understand the importance of biodiversity in this type of crops.
• Understand the applicable techniques to extensive crops.	• Propose non-horticultural extensive crops models. • Know the techniques applied to this type of crops. • Apply those techniques to specific crops.

3.1 PROGRAMME UNITS

Educational unit 1:

Intensive and extensive horticultural crops.

This educational unit pretends to familiarise the students with the different working methods in ecological horticulture. This unit allows to compare them so as the student is able to distinguish them and know what each of them brings into ecological agriculture and that using different techniques the same methods can be obtained. The student will have a global vision of ecological horticulture and the different points of view of looking at it.

Educational unit 2:

Fruit trees.

The cultivate of fruit trees carries out the knowing of the techniques, such as pruning that is very important to improve production. Though there are tendencies in ecological fruit culture that fight for the non-intervention, leaving the tree to grow freely. The student will be able to choose his/her way of working depending on his/her intentions towards the crops.

Educational unit3:

Non-horticultural extensive crops.

In non-horticultural extensive crops the way of working is very similar to the one used in traditional agriculture with the exception of the way of working the ground and the fertilisation of the crop. These are the main challenges the student will face; decide how he/she will work the ground and design a manuring plan depending on the crops used. Need to take into account not only the climatic conditions but also the geographical and geological of the soil. These aspects are very important when establishing a gestion system for these crops.

MODULE 4:

ELECTION OF HORTICULTURAL, FRUIT CULTURAL AND EXTENSIVE CROPS

EDUCATIONAL UNIT 1: EXTENSIVE AND INTENSIVE HORTICULTURAL CROPS.

EDUCATIONAL UNIT 2: FRUIT TREES.

EDUCATIONAL UNIT 3: NON-HORTICULTURAL EXTENSIVE CROPS.

EDUCATIONAL UNIT 1: INTENSIVE AND EXTENSIVE HORTICULTURAL CROPS

CONCEPTS.

Vegetables big families.

Nutritive necessities.

Implantation and organisation of a slot.

Taking care of the crops.

Intensive and extensive vegetable crops.

Importance on the election of varieties.

PROCEDURES

Analysis of the nutritive necessities of plants.

Description of the principal cares to apply depending on the vegetable.

Analysis of the horticole varieties that can be used.

Know the vegetable big families.

ATTITUDES

Relate the vegetable families with the caring and nutritive needs.

Understanding of the crops exigencies for each type of vegetables.

Value the management to obtain better working results.

EDUCATIONAL ACTIVITIES- LEARNING

Classification of the different types of vegetables.

Advantages and disadvantages of intensive and extensive crops.

Evaluation on the management of vegetables.

EVALUATION ACTIVITIES

Answers to the questionnaire.

Describe the most important vegetable families.

Design intensive and extensive horticultural models.

Know the most important general crop techniques.

EDUCATIONAL UNIT 2: FRUIT CULTURAL CROPS

CONCEPTS.

The big fruit trees families.

The nutritive necessities.

Implantation of a fruit trees plantation.

Caring of the fruit trees.

Grafting techniques.

Pruning techniques.

Fitosanitary aspects of fruit trees.

Recollection techniques.

Conservation and management of fruit.

PROCEDURES

Analysis of the plants nutritive necessities.

Description of the principal cares that fruit trees need.

Analysis of the grafting and pruning techniques.

Know the management of fruit for its conservation.

Analysis of the principal Fitosanitary cares related to the used fruit trees.

ATTITUDES

Aspects to value when start a fruit plantation.

Making compatible the fruit trees and biodiversity.

Value the Fitosanitary situation and the different forms to face it.

EDUCATIONAL ACTIVITIES- LEARNING

Group work on the pruning techniques depending of the use of the plants.

Discussion on the technique of the non-intervention in fruit trees.

Propose different sanitary protection forms.

EVALUATION ACTIVITIES

Questionnaire solving.

Design associations with fruit trees.

Planify the Fitosanitary protection methods.

Do practices on pruning and grafting.

EDUCATIONAL UNIT 3: EXTENSIVE NON HORTICULTURAL CROPS

CONCEPTS.

The cereal family.

The leguminous crop family.

Other important families.

Nutritive needs.

Management techniques.

Fitosanitary aspects.

Recollection techniques.

PROCEDURES

Analysis of the nutritive needs of plants.

Description of the principal cares that need to be applied.

Analysis of the principal Fitosanitary cares in function to the plant being treated.

ATTITUDES

Valuable aspects when working with a slot with extensive crops.

Make compatible an extensive crop with biodiversity.

Value the Fitosanitary situation and the different forms to face it.

EDUCATIONAL ACTIVITIES- LEARNING

Group work on the implantation techniques of an extensive crop.

Discussion on the seeding techniques of extensive crops.

Propose a Fitosanitary protection strategy.

EVALUATION ACTIVITIES

Questionnaire solving.

Propose rotation designs on extensive crops.

Planify the Fitosanitary protection methods.

BIBLIOGRAPHY

1. Bello y J.A. González. Ecología de los sistemas agrarios. ITG Agraria.
2. Brickell y D. Joyce. Enciclopedia de la poda. Ed. Blume.
3. Claude Aubert. El huerto biológico. Ed. Integral
4. Kusche y M. Siewniak. Técnica arbórea actual. Ed. Proflor Ibérica.
5. Michau. La poda de los árboles ornamentales.
6. Enrica Boffelli y Guido Sirtori. Guía fotográfica de los injertos. Ed. De Vecchi.
7. González Bernaldez. Diversidad ecológica, gestión de ecosistemas y nuevas políticas agrarias. F. Areces.
8. Fausta Minardi Fazio. El cultivo biológico de hortalizas y frutales. Ed. De Vechi.
9. Fausta Minardi. Guía ilustrada de la poda y de los injertos. Ed. De Vecchi.
10. J. Aracil. Máquinas, sistemas y modelos. Ed. Tecnos.
11. M.L. Kreuter. Jardín y huerto biológicos. Ed. Mundiprensa.
12. M. Muncharaz Pou. El Nogal. Ed. Mundiprensa.
13. Nicolas Lampkin. Agricultura ecológica. Ed. Mundiprensa.
14. R. Margalef. Ecología. Ed. Omega.
15. R.J. Garnier. Manual del injertador. Ed. Mundiprensa.

Work questionnaire

- What are macroelements?
- Enumerate the most important macroelements, explaining their functions.
- Design the general planification for a vegetable slot.
- Differences between extensive and intensive crops?
- Explain why is so important to choose well the varieties
- Explain what is lacking fisiapathy.
- Enumerate the most important vegetable families and give two examples of each of them.
- Explain how you would planify a fruit trees plantation.
- Explain what is the planning framework and what it is used for.
- Describe the different plantation plannings of fruit trees related to the function and structure of the trees.
- Define what a grafting is and its use.
- Describe the most liking grafting methods for you. Why?
- What is and what is it due incompatibility?
- Describe the different pruning types that can be applied to trees and explain briefly each of them.
- When would you do the pruning? Why?
- What conditions should the cut has in able to heal?
- What function does the pruning and grafting vascular cambium has?
- Enumerate the most important fitosanitary problems in trees.
- Enumerate and describe the two control methods of pathogen organisms in trees.
- Planify a tree slot: manuring, plantation framework, fruit trees, management, sanitary control etc.
- What type of associations you would carry out with fruit trees? Explain why?
- Explain what is the importance of leguminous in general.
- Planify the extensive crops: rotations and associations, manuring, management etc.
- Which are the principal elements in a rotation crop system?
- Explain the different manures you would use for: a vegetable slot, a fruit trees slot and an extensive crops.

- Explain how to control the pests in an extensive crop.
- Enumerate the different in management of ecological and conventional extensive crop.
- Explain what it is and the advantages of direct seeding.

MODULE 5

BASIC TECHNIQUES

IN ECOLOGICAL AGRICULTURE

1. 1.- Introduction.
2. Curricular elements of the module.
3. Programme.
    3.1 Educational units.
    3.2 Curricular elements of each educational unit.

Bibliography.

Evaluation questionnaires.

5. BASIC TECHNIQUES IN ECOLOGICAL AGRICULTURE

1. INTRODUCTION

The ecological agriculture is able to harmonise the high ecological quality with the practice of a stable agriculture, on the condition that the farmer controls the techniques. The ecological agriculture is not enough on its own, as it always occurs in conventional agriculture, it is better to apply some valid more or less universal techniques. It is necessary to adopt the techniques according to the soil and climate.

Only a coherent and rational application of all these techniques in the different crops allows to obtain better and safer results. And only the reaching of these results can guarantee the viability of the slots that practice ecological agriculture, so as the progressive generalisation of this kind of agriculture, that is needed to improve the soil and the inhabitants.

The contents of this module will be related to the conceptual, procedural and attitudinal capacities with the concrete aim to get deeper into the specific techniques knowledge.

General aims of this module:

- *Understand the different methods that can be used in ecological agriculture applying the basic techniques of ecological production.*

Through this modules the students will be able of:

- *Understand the advantages of using organic material as fertilisers.*
- *Design cultivation plans introducing green manures in rotations.*
- *Use the mulch techniques in crops.*
- *Understand the function of the soil activities.*
- *Elaborate a calendar with the activities taking the crops into account.*
- *Propose the use of water in a rational way.*
- *Understand the importance of the rotation and associations of crops.*
- *Understand the most important criteria in crops associations.*
- *Value the importance of bushes and the use of crops protection in the biodiversity.*
- *Understand the basic techniques in the seeds selection and can apply them in their smallholdings.*

2.CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
• Understand the advantages of using organic material when fertilising.	• Elaborate a manuring plan. • Explain the advantages of organic fertilisation. • Enumerate the different forms of organic fertilisation.
• Design crops plans introducing green manure on rotations.	• Prepare rotations and associations of green manure. • Identify the best green manure taking into account the soil and the crop. • Describe the necessary elements to do a rotation or a crop associations.
• Use the mulching techniques with crops.	• Describe the importance of the mulching technique. • Explain the materials that can use this technique. • Know when is convenient to use it or not.
• Understand the function of the soil activities.	• Describe how the soil activities are done. • Determine the aims to obtain those activities. • Elaborate a calendar on activities depending on the crops. • Make a list of the implements to use.
• Propose the water use in a rational way.	• Describe how to save water. • Determine which is the most useful watering system in relation to the soil and crops. • Identify the deficit or excessive amount of water in crops.

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
• Understand the importance of the putting into practice of associations and crops rotations	• Introduce associations and rotations varieties. • Identify the needed elements when doing a rotation. • Value the importance of an equilibrated rotation.
• Know the most important criteria in crops associations.	• Determine why are there good and bad rotations. • Identify the elements to do a good rotation.
• Value the importance of hedge and its use in the crop protection and biodiversity.	• Know how to organise a hedge. • Know the types of plants to use depending on the hedge. • Know the importance of the hedge in the slot biodiversity. • Know how to plant a hedge and choose the forming plants.
• Understand the basic techniques of the seeds selection that can be applied in smallholdings.	• Value the importance of autoctone seeds. • Know how to recollect seeds from their crops. • Know how to germinate and work with them.

3.1 EDUCATIONAL UNITS

Educational unit 1:

Ecological agriculture methods

This educational unit pretends to familiarise the student with the different working methods in ecological agriculture. It permits to compare them so as the student is able to distinguish them and understand what each of them brings to ecological agriculture and experiment how good results are obtained with different techniques. This way the student will have a more generalised vision of ecological agriculture and different ways to see it.

Educational unit 2:

Fertility and watering

Fertility is one of the most important pillars in ecological agriculture. Using it, the systems begin to be equilibrated and it will also potentate the natural fertility of the soil. The fertilisation techniques are varied and with them different aims can be reached. Relates to these aims and the necessities of the soil and the geographic-climatic characteristics they will be mixed to obtain different results. The water us one of the most important elements of the soil and needed in the development of the plant. It is necessary to know how the soil acts against the water and how we could put the necessary water or not to help the system. It is a fundamental unit the one related to fertilisation and watering.

Educational unit 3:

The soil activities, rotations and biodiversity

Know how to treat the soil is one of the fundamental characteristics of the ecological farmer. Part of the production rests in it and the maintenance of the soil in continuous production conditions. Work with the soil activities together with rotations and crops associations let estabilise the system and introduce the necessary diversity in its maintenance. The equilibrated rotations permit a better economic use. The implantation of hedges in the better climatic conditions in the plants allows to obtain other aims make ecological agriculture very interesting.

Educational unit 4:

The selection of plants

The ecological seeds are one of the most important items in ecological agriculture. The need to consevate the autoctone varieties together with the keeping of the genetic diversity and the aim to obtain productive varieties from an economical point of view gives this unit an extremely importance on ecological agriculture. This is why that needs to know and take into account all those activities that keep our seeds and not being lost or substituted for lower genetic ones.

MÓDULE 5:

BASIC TECHNIQUES ON ECOLOGICAL AGRICULTURE

EDUCATIONAL UNIT 1: METHODS IN ECOLOGICAL AGRICULTURE

EDUCATIONAL UNIT 2: FERTILISATION AND WATERING

EDUCATIONAL UNIT 3: SOIL ACTIVITIES, ROTATIONS AND BIODIVERSITY

EDUCATIONAL UNIT 4: SELECTION OF PLANTS

EDUCATIONAL UNIT 1: ECOLOGICAL AGRICULTURAL METHODS

CONCEPTS.

Ecological agriculture methods.

Biodinamic agriculture.

Permaculture.

The Müller method.

The Lemaire- Boucher method.

The Jean Pain method.

Other methods.

PROCEDURES

Analysis of the different work systems.

Identification of the differences that mark each technique.

Analysis of the work methods.

Global sistesis on each of them.

ATTITUDES

Understanding of the working processes.

Value of the aims that each of one pretends to reach.

Opening to the different working techniques.

EDUCATIONAL ACTIVITIES- LEARNING

Debate in a group the different working techniques, value the advantages and disadvantages.

Analyse the fertilisation process.

Determine the elements of each method.

Establish the influence of each method.

EVALUATION ACTIVITIES

Questionnaire solving.

Do a synoptic scheme with the techniques of each activity.

Explain which are the differences of each method.

EDUCATIONAL UNIT 2: FERTILISATION AND WATERING

CONCEPTS.

Fertilisation.

Basic aims.

Organic fertilisers.

- Manure
- Compost
- Green manure
- Mulching

Complementing fertilisation.

- Soil activities.
- Watering.

PROCEDURES

Analysis of the different organic material systems.

Identification of the differences between each technique.

Analysis of the work activities.

Global synthesis of each of them.

ATTITUDES

Understanding of the work processes.

Value of each of one aims.

Opening to the different working techniques.

EDUCATIONAL ACTIVITIES- LEARNING

Group work in the different working techniques, value the advantages and disadvantages.

Analyse how each of them sees fertilisation.

Determine the elements that each method gives more importance to.

Establish the influence on each method.

EVALUATION ACTIVITIES

Questionnaire solving.

Make a synoptic scheme for each working technique.

Explain which are the differences between the methods.

EDUCATIONAL UNIT 3: SOIL ACTIVITIES, ROTATIONS AND BIODIVERSITY

CONCEPTS.

Crops associations and rotations.

Importance of rotations.

How to do rotations.

Importance of the hedges in ecological agriculture.

Hedges effects.

Uses.

PROCEDURES

Analysis of the bringing to the associations and rotations systems.

Identification of the differences that mark each technique.

Analysis of the working methods.

Analysis of the hedges giving.

ATTITUDES

Understanding of the different working methods.

Value the use of associations and rotations.

Interest on the work planification and each element on it.

Work responsibility.

Receptive disposition to work techniques.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the different working techniques, value the advantages and disadvantages.

Analyse the rotations.

Determine the importance of diversity.

Establish the functions that hedges can represent in ecological agriculture.

EVALUATION ACTIVITIES

Explain the importance of diversity.

Do the rotation and association plans.

Establish a hedge of what you want to reach taking into account the environmental conditions.

EDUCATIONAL UNIT 4: PLANTS SELECTION

CONCEPTS.

Plants selection.

Multiplication of plants with flowers.

Flower types.

Pollination and seed formation.

Plants improvement.

Transgenic crops.

PROCEDURES

Analysis of the plants selection techniques.

Identification of the differences between plants, polinisations and seeds.

Analysis of the working methods in the plants improvement.

ATTITUDES

Understanding of the different working processes.

Value of the use to preserve autoctone or locally adapted plants.

Interest in the improvement of plants.

Responsibility in the use of selection techniques.

Attitude against Transgenic crops.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the Transgenic crops valuing the advantages and disadvantages.

Group work on the importance of plant selection.

Selection methods applicable to ecological agriculture.

EVALUATION ACTIVITIES

Explain the importance of selection.

Confectionate plans on the seed selections.

Know what the use of Transgenic crops mean.

BIBLIOGRAPHY

1. C. Montecinos y M. Altieri. Situación y tendencias en la conservación de recursos genéticos a nivel local en América Latina. Egroecología y Desarrollo.
2. Carlos Bellapart Vilá. Nueva agricultura ecológica. Ed. Mundiprensa.
3. Claude Aubert. El Huerto Biológico. Ed. Integral.
4. F.E. Allison. Soil Organic Matter and its role in crop production. Ed. Elsevier.
5. Fausta Minardi Fazio. El cultivo biológico de hortalizas y frutales. Ed. De Vechi.
6. G. Guzmaán, M. González, E. Sevilla. Introducción a la Agroecología como Desarrollo Rural Sostenible. Ed. Mundiprensa.
7. G. Guzmán Casado, M. gonzález Molina, E. Sevilla Guzmán. Introducción a la agroecología como desarrollo rural sostenible. Ed. Mundiprensa.
8. J. S. Flores Guido. Las Técnicas agrícolas tradicionales en Mesoamérica y su importancia en la conservación de la diversidad genética. Del Amo S.
9. Juana Labrador Moreno, Miguel Angel Altieri. Agroecología y desarrollo. Ed. Mundiprensa.
10. M. A. Altieri, Agroecology: The scientifics basis of alternative agriculture. Intermediate Technology Publications
11. M. A. Altieri, L.K. Letourneau. Vegetation, mangement and biological control in agroecosystems. Ed. John Murray.
12. M. Bertoldi. Compost: production, quality and use. Ed. Elsevier.
13. M.A. Altieri. Biodiversity and pest management in agrosystems. Haword Press.
14. Nicolas Lampkin. Agricultura ecológica. Ed. Mundiprensa.

Work questionnaire

- Which are the main characteristics of the Lemaire- Boucher method?
- Name the bases and aims of the Permaculture and comment briefly its aportation on the environment keeping.
- What is the use of the Biodinamic method on ecological agriculture based?
- All the learnt methods which one would you use in an horticultural production? Reasons.
- What is the planification of fertilisation based on ecological agriculture?
- Explain why the corrections on ecological agriculture need to be done in a certain way.
- What errors should be avoided when applying mineral fertilisers?
- What advantages you find in the use of compost in the fertilisation over manure.
- Which is the aim of green manure?
- In what conditions green manures should be used or not?
- Which are the fundamentalities of farming in ecological agriculture. Why?
- Explain the differences between the conventional farming and the inverted farming techniques used in ecological agriculture.
- What do you think on the non- crop technique?
- What measures should be taken to avoid the number of risks?
- Explain which is the sense of use associations and rotations in crops.
- What needs to be taken into account when doing associations in crops?
- Why is the use of leguminous so important when planifying associations and rotations?
- When deciding what type of plants to use what criteria should be taken into account?
- Organise a manuring plan for:
    - An horticultural crop
    - A cereal
    - Fruit trees

- Prepare an associations and/or rotations plan:
  - In an horticultural crop in 3 years. A slot divided in 3 parts
  - Extensive crop in 5 year. 1 slot
- What advantages you find in the mulching technique?
- Elaborate a plan on green manure for:
  - An agricole crop: when, how, species etc.
  - A fruit tree.
- What factors need to be taken into account when doing mulching?
- Elaborate an association and rotation plan on horticultural crops of 3 years.
- How would you do a fruit tree rotation?
- Elaborate a rotation plan of horticultural crops in 3 clots in 4 years.
- Elaborate an association and rotation plan of extensive crops in 3 slots of slow duration in 6 years rotation.
- Association and rotation plan of crops in 2 slots in 4 years: horticultural plants, medicinal, flowers, hedges, watering system, manuring plan, disposition of the plants in the ground.
- What functions do hedges have in ecological agriculture?
- Design a hedge for an horticultural plantation:
  - For protection against the wind.
  - Obtention of fruits.
  - Mixed.

MODULE 6

RESTRUCTURING

1. 1.- Introduction
2. Curricular elements of the module.
3. Programme.
    3.1 Educational units.
    3.2 Curricular elements of each educational unit.

Bibliography.

Evaluations questionnaires.

6. RESTRUCTURING

1. INTRODUCTION

The restructuring is the transitory adaptation period from the conventional crop to the ecological and according to a plan not putting into an agronomic, social or economical danger and the problems are corrected. The restructuring has an aim to reach an equilibrium to the soil, the crops and the environment.

Through this module the student should be able to understand the importance of this period so as to face it with all the guarantees, knowing where the risks are and how to avoid them. It is meant to see this period a the intermediate step to ecological agriculture.

The contents of the module will answer the conceptual, procedimental and attitudinal capacities putting the emphasis in the specific technical processes of the restructuring of smallholdings or ecological farms.

General aim of the module:

- *Take the restructuring process as a progressive step not only if coming from conventional agriculture or starting from new, valuing all the actions and determining the rentability of it in the time.*

From this module the students will be able to:

- *Understand the meaning of restructuring not only in a technical but economical level.*
- *Know how to restructure the slot in its different steps.*
- *Design the different steps that restructuring should follow machinery, activities, associations and rotations, fertilisation etc.*
- *Determine the main problems that could arise.*
- *Give solutions to those problems.*

2. CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
• Know the significance of the restructuring not only in the technical level but the economical one.	• Identify the most important aspects of restructuring. • Relativise the most common problems of the period.
• Know how to restructure a slot following the different steps.	• Describe the steps that need to be follow on restructuring. • Apply the corresponding techniques.
• Design the different steps that restructuring should follow.	• Prepare a restructuring plan. • Do the activities designed. • Describe the applicable techniques during the process. • Organise equilibrated associations and rotations economically rentable.
• Determine the most important problems that can appear.	• Correct the problems that can appear. • Design alternatives to those problems. • Evaluate the final results.

3.1 PROGRAMME UNITS

Educational unit 1:

Importance of restructuring.

This educational unit pretends to familiarise the student with the different factors that need to be taken into account when restructuring a farm. This phase is important because the future of the slot should be analysed taking into account the actual situation to obtain a situation that allows to correct the minimum possible risks and find the more adequate answers to the problems. The student should have enough initiative to get it.

Educational unit 2:

Stockbreeding restructuring.

The **ecological breeding** need to be placed inside an **agrosystem** (cannot talk about ecological stockbreeding without its corresponding ecological agriculture and viceversa). The animals have a fundamental role closing the production cycles, bringing the needed manure for fertilisation and allowing to amplify the rotations with forage crops or temporal fields and reaching more autosuficiency. The **intensification** of the stockbreeding production has brought dangerous **medioambiental problems** increased by the massive concentration of animals in reduce places. The relationship between animals and soil has been broken, bringing in an **industrial stockbreeding** very far away from the traditional stockbreeding of our ancestors. The students will be able to understand the problematic and do a viable restructuring plan.

Educational unit 3:

Agricole restructuring.

The restructuring brings with it very radical changes in slots and requires a different management to the one done previously. The restructuring of the exploitation system has to start with the farmer personal change of attitude and thinking. The restructuring also brings, a deep essay on the farm situation, considerate which will be the most important problems that we will face during the process and a complete design of the ecological production system.

MÓDULE 6:
RESTRUCTURING

EDUCATIONAL UNIT 1: RESTRUCTURING IMPORTANCE.

EDUCATIONAL UNIT 2: STOCKBREEDING RESTRUCTURING.

EDUCATIONAL UNIT 3: AGRICULTURAL RESTRUCTURING.

EDUCATIONAL UNIT 1: THE RESTRUCTURING IMPORTANCE

CONCEPTS.

Introduction.

Analysis of the starting situation.

More important problems during the restructuring process.

Main steps in restructuring.

Where to star?

Complete design of the production system.

Restructuring rhythm.

Commercialisation and product distribution systems.

PROCEDURES

Analysis of the restructuring techniques.

Identification of the main important problems.

Analysis of the production systems.

Analysis of the commercialisation systems.

ATTITUDES

Understanding of the different transformation processes of the slot.

Value of the utility of a working method.

Responsibility on the challenge that restructuring is.

Positive attitude on the problems.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the way of planifies restructuring.

Group work on the importance of restructuring and its main aspects.

Restructuring methods.

EVALUATION ACTIVITIES

Explain the importance of restructuring.

Make plans to change the smallholding.

Know the importance that restructuring has from a personal point of view.

EDUCATIONAL UNIT 2: STOCKBREEDING RESTRUCTURING

CONCEPTS:

Ecological stockbreeding.

General principals on restructuring.

Restructuring of the installations.

Restructuring of the alimentation.

Restructuring of the management.

Final products in the process.

PROCEDURES

Analysis of the improving techniques with animals.

Identification of the differences between conventional and ecological stockbreeding.

Analysis of the working methods in the improvement of installations, alimentation and management.

ATTITUDES

Understanding of the different working processes.

Value of the use of the restructuring plan.

Interest in the improvement of stockbreeding.

Responsibility in the use of working techniques.

Positive attitude facing problems.

EDUCATIONAL ACTIVITIES- LEARNING

Debate in the necessity to make changes in stockbreeding.

Group work on the importance of stockbreeding in an ecological slot.

Working methods in stockbreeding.

EVALUATION ACTIVITIES

Explain the importance of stockbreeding restructuring.

Make restructuring plans in stockbreeding.

Understand what make changes in stockbreeding restructuring mean.

EDUCATIONAL UNIT 3: AGRICULTURAL RESTRUCTURING

CONCEPTS.

Main crops.

Ecological fruit culture.

Ecological cultivates of vegetables.

Protected horticultural systems.

Main installations:

- Mulch.
- Tunnels.
- Green houses.
- Other protection systems.

Ecological cultivates of aromatic and medicinal plants.

PROCEDURES

Analysis of the techniques that improve the ecological slot.

Identification of the different techniques to use.

Analysis of the working methods in the improvement of installations, crops and productions.

ATTITUDES

Understanding of the different working processes.

Value of the use of the agricultural restructuring plan.

Interest for the improvement of the production plans.

Positive attitudes facing problems.

EDUCATIONAL ACTIVITIES- LEARNING

Debate which should be the starting point in agricultural restructuring.

Group work on the importance of restructuring as a previous step in the ecological production.

Working methods applied to the agricultural restructuring.

EVALUATION ACTIVITIES

Explain the importance of restructuring.

Make agricultural restructuring plans.

Understand what changes should be introduced in agricultural restructuring.

Apply the different working methods.

BIBLIOGRAPHY

1. Atlas agroclimático nacional de España. Ed. Ministerio de Agricultura.
2. C. Aubert. Plans de conversion. Editions Débard.
3. Claude Aubert. “El huerto biológico”. Ed Integral.
4. Fernando Muñoz. Plantas medicinales y aromáticas. Ed. Mundiprensa.
5. J. Pousset. Conversión a la agricultura ecológica. Ed. Asociación Vida Sana
6. J.L. Porcuna, J. Arnau, A. Giménez, C. Ocón y V. Zacarés. Principios fundamentales de la agricultura ecológica. Rev. Vida Rural, nº 110.
7. J.S. Molina. Hacia una nueva agricultura. Ed. Ateneo.
8. Juana Labrador Moreno. Luis López Benítez. Jose Luis Reyes Pablos. Antonio Guiberteau Cabanillas. Guía de productos utilizables en agricultura y ganadería ecológicas. Junta de Extremadura.
9. Laura E. Powers. Robert McSorley. Principios ecológicos en agricultura. Ed. Paraninfo.
10. Nicolas Lampkin. Agricultura Ecológica. Ed. Mundiprensa.
11. Rafael Jiménez Díaz. Jaime Lamo de Espinosa. Agricultura Sostenible. Ed. Mundiprensa.
12. Y. Herody. Conocimiento del suelo. Ed. BioLur.

Work questionnaire

- What is ecological agricultural restructuring?
- What problems can be found in the restructuring period? How can be solved?
- Explain how you would restructure an agricultural enterprise of five slots.
- In the restructuring period explain to what criteria you would give more importance: the technical or the economical ones.
- Describe briefly which will be the steps to follow in a slot to ecological agriculture.
- What factors need to be taken into account when planifying the rotations in a restructuring period?
- What problems fertilisation presents during the restructuring period? How would you solve them?
- What problems present the use of purines and lisines? In what conditions can be used?
- When choosing a company to work with ecological methods which one is the best: one exclusively agricultural or one that mixes agriculture and stockbreeding. Explain why.
- Which are the main problems that can be found in a cereal crop and how can be solved?
- Make a restructuring plan for a conventional slot of vegetables to an ecological one.
- Planify the restructuring a fruit trees slot.
- Explain which ate the main problems during restructuring when talking on production.
- What importance has the market when thinking of restructuring?
- Explain the differences in the restructuring process between an agricultural slot and a farm.
- Describe the importance of the animal alimentation in the restructuring process.
- Explain the advantages that restructuring has from the animal point of view.
- Which are the most importance changes of introducing a stockbreeding-restructuring plan.
- What are protected crops?
- Describe the different protection methods.
- Advantages and disadvantages of protected crops.

MODULE 7

CROPS PROTECTION

1- Introduction.

2- Curricular elements of the module.

3- Programme:

    3.1 educational units.

    3.2 Curricular elements of each educational unit.

Bibliography.

Evaluation questionnaires.

7. CROPS PROTECTION

1. INTRODUCTION

The protection of crops should have as a main aim to restructure the equilibrium between agrosystems when these are affected by the action of pests and illnesses. In this module the student will understand the functioning of the system in where not only cultivated plants are present but also a group of organisms that live in the system and which also need to be taken into account.

The student should learn how to work with equilibrated systems and plants parasites knowing how to integrate its action and moderate it as not putting plants into danger. This means a different focusing to problems and the solutions to those. The final result will be an armonic management of the system in which parasites and pests will be controlled and so its action will not be determine to the crop developing. The contents of the module will respond to conceptual, procedural and attitudinal capacities to dominate the specific techniques.

General aims of the module:

- *Contemplate the management of the crops and the controlling of the pests, illnesses and weeds as an integrated unit in which the crop management will increase or diminish due to fitosanitary problems.*

Through this module the student will be able to:

- *Understand the importance to work on equilibrated systems.*
- *Know the principal pests, illnesses and weeds that affect crops.*
- *Know how to prevent the problems occasioned by pests and illnesses.*
- *Know how to design new methods facing the fitosanitary problems.*
- *Know the different controlling techniques of pests and illnesses.*
- *Determine when the control method of pests should be used.*
- *Understand the function of weeds in the ecosystem.*
- *Know how to prevent and control the invasion of weed in a crop.*

2- CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	EVALUATION CRITERIA
• Understand the importance of working with equilibrated systems.	• Design preventing measures. • Establish equilibrium methods. • Compose working strategies.
• Know the main pests, illnesses and weed that affect crops.	• Describe the principal parasites. • Know the synthoms of the main pests and illnesses.
• Know how to prevent the problems of pests and illnesses.	• Propose measures of acting against pests and illnesses. • Know the preventing methods against the most common parasites.
• Know how to design new methods against the fitosanitary presented.	• Propose new preventing techniques to face pests and illnesses when they are already installed.
• Know the different control methods against pests and illnesses.	• Describe the most important techniques of controlling parasites.
• Determine when the control pests' method should be applied.	• Analyse the intervention moment according to the situation.
• Understand the function of the weeds in the ecosystem.	• Determine the possible beneficial effects of the weeds. • Use these effects.
• Know how to prevent and control the invasion of weeds in a crop.	• Know the biological cycles of the most common weeds. • Determine the most efficient action method against them.

3.1 EDUCATIONAL UNITS.

Educational unit 1:

Fitosanitary problems

This unit pretends the familiarisation of the students with the different fitosanitary problems that can be found in the ground so as to find preventing and controlling measures. This phase is important because it will try to find a future for Fitosanitary problems according to crops and the risks that can be found, as well as the damages and synthoms of pests and illnesses. The student should be able to reach the aims.

Educational unit 2:

Pests

The causes of the proliferation of pests are related to the plant resistance and the desequilibrium with the biological medium. The student should be able to use plants that have enough resistance against pests and the determine the mechanisms that will use to solve the problems when already installed in a plant. The educational unit will also show the parasites, its biological cycle and the initial syntoms with the aim of finding better solutions.

Educational unit 3:

Illnesses

The illnesses also have their origins in the disequilibriums of the medium and that is why the student should be able to determine which are the best equilibrated conditions and know when plants are more sensible to those. As in the former unit the student should have a global vision that will help him to determine when to intervene and what type of intervention. Also the parasites should be known, as well as their initial biological cycles to determine the better intervention moment.

Educational unit 4:

Weeds

The weeds play against the cultivated crops not only for the space but the food so as its biological cycle is better adapted to the environmental conditions. From the agronomic point of view the weeds are a group of plants that has some beneficial effects and sometimes they help as soil problems indicators.

From this unit the student should be able to learn to distinguish the most common plants in his/her region, its biological cycle and the moment when acting should be done and determine which this should be.

From all these educational modules the student should be able to understand the problematic that fitosanitaty problems carry out and the way of focusing them in ecological agriculture, knowing how to work with the system so as to reach equilibrium and the Fitosanitary problems decrease.

MÓDULE 7:

LA PROTECCIÓN DE CULTIVOS

EDUCATIONAL UNIT 1: FITOSANITARY PROBLEMS.

EDUCATIONAL UNIT 2: PESTS.

EDUCATIONAL UNIT 3: ILLNESSES.

EDUCATIONAL UNIT 4: WEEDS.

EDUCATIONAL UNIT 1: FITOSANITARY PROBLEMS

CONCEPTS.

Introduction.

Need of change.

Actual problems and their causes.

Concepts of pests and illnesses.

PROCEDURES

Analysis of the problems that smallholdings present from the Fitosanitary point of view.

Differences between pests and illnesses.

Analysis of the reasons that provoke the big number of pests and illnesses.

ATTITUDES

Understanding of the different Fitosanitary problems.

Value the motives that aim to them.

Interest on the need to change strategies and work.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the main motives that pests and illnesses increase.

Describe the main Fitosanitary problems.

Working methods to minimise the problems.

EVALUATION ACTIVITIES

Explain the importance of pests and illnesses in the agricultural system.

Prevention plans.

Determine the main fitosanitary problems that affect plants in your area.

EDUCATIONAL UNIT 2: PESTS

CONCEPTS.

Animal parasites.

Factors that influence in the development of parasites.

Defensive methods.

Preventing methods.

Crops associations.

Physical methods.

Vegetable insecticides.

Other methods.

PROCEDURES

Analysis of the different animal parasites.

Identification of the different fighting methods.

Analysis of vegetable insecticides.

ATTITUDES

Knowledge of the different vegetable parasites.

Value of the fighting methods that can be used.

Interest on the knowledge and application of the cultural techniques and the protective broth.

EDUCATIONAL ACTIVITIES- LEARNING

Group work on the facing pests.

Description of the main types of parasites.

Working methods to minimise pests.

EVALUATION ACTIVITIES

Propose pests controlling techniques.

Prevention plans.

Know the plants that can be used for its insecticide effects.

EDUCATIONAL UNIT 3: ILLNESSES

CONCEPTS.

Fungus parasites.

Fighting methods.

Preventing methods.

Plant treatments.

Vitalising broth.

Homeopathic methods.

PROCEDURES

Analysis of the different types of fungus and bacteria parasites.

Identification of the different fighting methods.

Analysis of the vegetable fungicides.

ATTITUDES

Knowledge of the different vegetal organic parasites.

Value of the different fighting methods that can be used.

Interest on the knowledge and application of cultural techniques and protected broth.

EDUCATIONAL ACTIVITIES- LEARNING

Group work on the better fighting and controlling methods.

Description of the principal types of parasites.

Working methods to minimise its increase.

EVALUATION ACTIVITIES

Propose techniques to control illnesses.

Prevention plans.

Know the plants that can be used for their fungicide and bactericide effects.

EDUCATIONAL UNIT 4: WEEDS

CONCEPTS

Weed plants.

Plants as indicators.

Function of weeds in the ecosystem.

Controlling techniques of weeds.

PROCEDURES

Analysis of the different types of weeds.

Analysis and identification of the different fighting methods.

ATTITUDES

Knowledge of the different types of weeds.

Value of the fighting methods that can be used.

Interest on the knowledge and application of the cultural techniques and protected broth.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the better control of weeds.

Description of the different types of weeds.

Working methods to minimise its increase.

EVALUATION ACTIVITIES

Propose controlling methods.

Prevention plans.

Use of cultural methods.

Use of other methods for prevention and control.

BIBLIOGRAPHY

1. Bello. La biofumigación como alternativa a la desinfección de suelos. Horticultura. Agosto 1997.
2. Zaragoza, S. Moya y G. Martínez. Efectos de las coberturas orgánicas a base de cortezas de pino y restos de poda en un huerto de frutales. Soc. Esp. De Malherbología 283.290
3. Francis Chabossou. "Santé des cultures. Ed. Flammarion. 26 rue Jacob, 75006 Paris France.
4. Francis Chabossou."Fisiología y resistencia de la planta". Ed. Asociación Vida Sana. Clot 39, 08018 Barcelona
5. G. Kennedy y M.E. Whalon. Managing pest resistance to Bacillus Thurigiensis. Endotoxins: constraints and incentives to implementation. Journal of Economic Entomology 88.
6. J. Tello. La competición microbiana del suelo. Horticultura 69/81.
7. J. Vochele y J. Faure. "Los enemigos de los cultivos" Ed. Aedos. Consejo de Ciento, 391. 08009 Barcelona.
8. John Jeavons. "Como cultivar más hortalizas en menos espacio" Ecology action of the Midpeninsula. 2225 El Camino Real, California 94306 United States of America
9. M. Pastor. El no laboreo del olivar. Realidades y expectativas. Agricultura 851/852.
10. Otto Schmid. Silvia Henggeler "Ravageur et maladies au jardin: les solutions biologiques". Terre Vivante, 6 rue Saulnier 75009 Paris (France).
11. Paul Debach. "Lucha ecológica contra los enemigos de las plantas". Ed. Mundiprensa. Castelló, 37. 28001 Madrid.

Work questionnaire

- When do you say that a system is on equilibrium?
- Enumerate the most important types of equilibrium in your region.
- What actions can be taken to equilibrate a system?
- Name two effects that you consider the most important related to the use of pesticides in the environment and explain why.
- What is a parasite?
- What differences there is between endoparasites and ectoparasites?
- Explain he internal and external factors that can influenciate in the development of the parasite insect.
- What preventing methods would you use against a pests of greenfly in vegetables? And in fruit trees?
- Enumerate the most important parasites in your area.
- Enumerate the different fighting methods in ecological agriculture.
- Describe the physical methods to fight parasites.
- What difference there is between pests and illnesses when talking about plants?
- Describe the differences between the pests and illnesses damages in plants.
- Explain what a fungus is and the infection mechanisms.
- Which are the ideal ambiental conditions for the developing of fungus?
- Why there are not healing methods against viral illnesses?
- Compare the fighting methods in conventional and ecological agriculture.
- What two fighting methods are there to detect a fungus attack in a crop?
- Which is the function of vitalising broth in plants?
- What relationship there is between crops associations and the fights of pests? Name two examples and explain.
- Of all the studies methods, which one is more interesting? Explain why.
- What are weed plants?
- Can grass weed represent a positive role? Reasons to the answer.
- Which are the effects that grass weed produce related to the crops?
- What method you think is the best to equilibrate the effect produced for grass weed?
- Name the most common grass weed in your area.
- How can the crop capacity can be improved to fight against grass weed?
- **Why in ecological agriculture they are no extinction when talking about pests, illnesses and grass weed?**

MODULE 8

Introduction to ecological stockbreeding

1. 1.- Introduction.
2. Curricular elements of the module.
3. Programme:
    3.1 Educational units.
    3.2 Curricular elements of each educational unit.

Bibliography.

Evaluation questionnaires.

- **INTRODUCTION TO ECOLOGICAL AGRICULTURE**

1. INTRODUCTION

It cannot be a rational agriculture without animals, because stockbreeding is a complement of agriculture. It is a symbiosis where the two of them are beneficiated. The stockbreeding is beneficiated for the produced aliments in agriculture and this receives the organic material necessary to receive the system equilibrium. The ecological stockbreeding should be considered a complement of agriculture. This means that the cattle have to be adapted to the production possibilities of the slot and do not overpass it. Two important elements in ecological agriculture: alimentation that requires very important norms and the cattle sanitary problems.

The student should be able to know all the functioning mechanisms of stockbreeding so as to planify agriculture in relation to the stockbreeding and viceversa. Among the contents of this module we will find conceptual, procedurentals and attitudinal capacities to deep in ecological agriculture.

Main aim of the module:

- *Understand the functioning of the cattle system and all the variables that intervene in it, above all the ones related to alimentation and zoosanitary defence.*

Through this module the students will be able of:

- *Analyse and know the main basic elements that intervene in ecological stockbreeding.*
- *Know the elemental physiology of the most important cattle.*
- *Understand the basic principals of stockbreeding alimentation.*
- *Determine the basic principals of the management of cattle.*
- *Analyse the problematic that carries out the use of zoosanitary techniques.*

2. CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
• Analyse and know the principal basic elements that intervene in ecological stockbreeding.	• Understand the importance of extensive stockbreeding. • Evaluate its advantages. • Value the importance of the meat and the quality stockbreeding derives products.
• Know the elemental physiology of the most important cattle.	• Know the morphological and physiological aspects of the digestive system. • Know the morphological and physiological aspects of the reproductive system. • Know the morphological and physiological aspects of the endocrine system.
• Understand the basic principals of stockbreeding.	• Understand the importance of associate agriculture and stockbreeding. • Need to produce its own alimentation.
• Determine the basic principals of stockbreeding.	• Importance of the grazing. • Need to respect the biological cycles of animals. • Determine the basic cares depending on the group of animals.
• Analyse the problematic that carries out the use of zoosanitary techniques.	• Influences of the management of zoosanity. • Know the preventing techniques. • Homeopathic principles. • Other techniques.
• Ecological production.	• Main types of productions. • Quality importance. • Determine the type of production to choose.

3. EDUCATIONAL UNIT.

Educational unit 1:

Agroecological bases of stockbreeding

The ecological stockbreeding has a high efficiency in the use of natural resources and is a good complementation with the different natural ecosystems. This influenciates in an important way not only in the conservation of a rich biodiversity of the domestic species but of the wild especies, vegetables and animals. Complementing them with agriculture the material cycle is closed obtaining that the agrostockbreeding sector can be self sufficient from a material and energetic point of view. The student needs to know the importance of the ecological breeding of animals and its repercussions in the ecosystems.

Educational unit 2:

Introduction to morphology and animal physiology.

The stockbreeding is an activity joined to the available working hand. This is important due to the fact t that taking this into account is easier to respect the animal's normal cycle. It is necessary to know the morphology and physiology of the cattle working with. The student should connect with the animals, know how they are and how they function all the time, how they respond to stimuli and everyday activities. It also needs to know that an intensification of production carries out irreversible changes in their behaviour and in the animal physiology.

Educational unit 3:

Alimentation and management of animals.

The alimentation and management are extremely related to what is considered as the well being of the animal. The cattle alimentation is fundamental in the associations of agriculture with the stockbreeding because this provides the necessary primary material to breed the cattle.

The student should become in contact with the alimentation techniques of the cattle taking into account its repercussion in the farms economy and also know the basic techniques in the management of the cattle in an extensive or semistabulated regime.

Educational unit 4:

The animal health.

Some problems of health and infertility are related to the intensification of production. In the measure that the biological cycles of animals are respected and the management is the most adequate a better well being in the animals carries out more resistance to illnesses and sanitary problems.

Animals are exposed to parasites and illnesses. Students should know which are the main problems that affect cattle, know the causing agents and the most probable causes, as well as the remedies that can be applied from the prevention point of view once the animal has been affected.

Educational unit 5:

Ecological stockbreeding production.

Once the stockbreeding is managed using the ecological techniques we arrive to production. This is the wide area where the different stockbreeding production depending on the cattle. If the biological cycle of the animal has been respected and the alimentation has been followed using ecological products then we are in conditions that it is a quality production.

The student should no the different productions of the most important cattle in his/her areas, valuing the quality conditions and taking them into account when facing the market.

MODULE 8:

INTRODUCTION TO ECOLOGICAL STOCKBREEDING

EDUCATIONAL UNIT 1: AGROECOLOGICAL BASES OF STOCKBREEDING.

EDUCATIONAL UNIT 2: INTRODUCTION TO THE ANIMAL MORPHOLOGICAL AND FISIOLOGICAL.

EDUCATIONAL UNIT 3: ALIMENTATION AND MANAGEMENT OF ANIMALS.

EDUCATIONAL UNIT 4: ANIMAL HEALTH.

EDUCATIONAL UNIT 5: ECOLOGICAL STOCKBREEDING PRODUCTION.

EDUCATIONAL UNIT 1: AGROECOLOGICAL BASES OF STOCKBREEDING

CONCEPTS.

Stockbreeding and biodiversity.

Stockbreeding systems.

Extensive stockbreeding.

Seasonal migration.

Mountain systems.

Meadow.

PROCEDURES

Analysis of the different stockbreeding systems.

Identification of the advantages of the different systems.

Analysis of the biodiversity in the stockbreeding systems.

ATTITUDES

Knowledge of the different stockbreeding systems.

Value of each of them.

Importance of the extensive stockbreeding.

Determination of what the ecological stockbreeding is possible.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the problematic of the actual stockbreeding.

Make a collection of newspaper articles on the stockbreeding problems.

Describe the main stockbreeding types.

Compare the ecological and the conventional models and see the differences.

EVALUATION ACTIVITIES

Propose the advantages of the ecological stockbreeding system.

Elaborate a model of ecological stockbreeding.

EDUCATIONAL UNIT 2: INTRODUCTION TO THE ANIMAL MORPHOLOGY AND PHYSIOLOGY.

CONCEPTS.

Basic structure of an animal.

Digestive system.

Specific characteristics of the digestive system in ruminants.

Reproductive system.

The reproduction in different types of animals.

The endocrine organs.

The metabolism.

PROCEDURES

Analysis of the different types of digestive systems.

Identification of the specificity of the ruminants digestive system.

Compare the reproduction of the different types of animals.

General study of the animal metabolism.

ATTITUDES

Knowledge of the different types of digestive systems.

Value the differences between them.

Importance of the animal reproduction.

Importance of the metabolic regulation.

EDUCATIONAL ACTIVITIES- LEARNING

Group work on the different digestive and reproductive systems in animals.

Know the components of each of them.

Relation of the endocrine regulation and reproduction.

Characteristics of the animal's metabolism.

EVALUATION ACTIVITIES

Describe the functioning of the ruminant's digestive system.

Explain the differences between the reproductive systems of the most important cattle.

Explain the importance of the hormones.

EDUCATIONAL UNIT 3: ALIMENTATION AND MANAGEMENT OF ANIMALS

CONCEPTS.

Ruminants alimentation.

Alimentation in other types of animals.

The farm and the alimentation of animals.

Activities related to the management of ruminants.

Activities related to the management of other types of animals.

Stabulation systems for the different types of animals.

PROCEDURES

Analysis of the different types of alimentation.

Identification of the advantages of find the alimentation in their own farm.

Compare the activities related to the management of animals.

Study of the different Stabulation systems.

ATTITUDES

Knowledge of the different alimentation systems.

Importance on the adequate management of stockbreeding.

Determination of the different Stabulation systems for each type of stockbreeding.

EDUCATIONAL ACTIVITIES- LEARNING

Debate in the problem of animal alimentation.

Relation between the animal's alimentation and health.

Aspects to take into account in the relation with the management of the cattle.

Description of the different Stabulation systems.

EVALUATION ACTIVITIES

Determine the animal's basic cares.

Explain the conditions that animal alimentation should have in ecological stockbreeding.

Relate the alimentation, the management and the health of animals.

EDUCATIONAL UNIT 4: ANIMAL HEALTH

Concept of animal health.

General aspects of the animal health.

Aspects that influents in health.

Infectionated illnesses.

Other types of illnesses.

Parasites and parasitary illnesses.

Importance on the prevention.

Control of animal illnesses.

Alternative treatments on ecological stockbreeding.

PROCEDURES

Analysis of the different types of animal illnesses.

Identification of the most frequent illnesses synthoms.

Study of the different types of parasites.

Analysis of the preventing and controlling systems in animals.

ATTITUDES

Knowledge of the different types of illnesses.

Importance on the prevention of illnesses.

Determination of the treatment systems of ill animals.

EDUCATIONAL ACTIVITIES- LEARNING

Debate in the health problem in ecological cattle.

Knowledge of the infectious agents and synthoms in illnesses.

Aspects to take into account in relation with the prevention and control of illnesses.

Description of the different types of parasites in animals.

EVALUATION ACTIVITIES

Determine the basic preventing cares of animals.

Explain the most important factors that intervene in animal's health.

Explain which are the fighting methods against illnesses used in ecological agriculture.

EDUCATIONAL UNIT 5: ECOLOGICAL STOCKBREEDING PRODUCTION.

CONCEPTS.

Ecological stockbreeding products.

Milk production.

Meat production.

Eggs production.

Honey production.

Other productions.

Production and quality.

Production and markets.

PROCEDURES.

Analysis of the different types of ecological productions.

Study of the different production systems.

Identification of the advantages of the ecological productions in the market.

Comparison of the quality aspects between the ecological and non-ecological products.

ATTITUDES

Knowledge of the different types of ecological production.

Importance of the market in the production.

Determination of the different production destinies.

EDUCATIONAL ACTIVITIES- LEARNING

Description of the main production systems in ecological stockbreeding.

Debate on the quality importance problem of the ecological products.

Relationship between quality, market and prices.

EVALUATION ACTIVITIES

Determine the rentability base in ecological productions.

Explain the conditions that animal alimentation in ecological stockbreeding should have.

Determine the type of production to choose.

BIBLIOGRAPHY

1. W.H. Parker. Manejo de los animales: salud y enfermedad.
2. F. Blake. The handbook of organic husbandry. Crowood Press.
3. Nicolas Lampkin. Agricultura ecológica. Ed. Mundiprensa.
4. F. Deerberg. Füterung von Legehennen. Bioland 1/89: 10 12.
5. M. Beteta. Conservación y selección del ganado vacuno extensivo en la Dehesa. Su influencia en Hispanoamérica. Ed. Agrícola Española.
6. Daza El Ganado ovino en el ecosistema de la dehesa. Ed. Agrícola Española.
7. E. Diéguez. Cria del cerdo ibérico. Mundo Ganadero.
8. J. M. Elías, L.V. Elías y J. Grande. Cuadernos de la trashumancia, 4. Ed. ICONA.
9. L.J. García Barreto. Razas Vacunas: orígenes y aptitudes. Junta de Extremadura.
10. J.E. Hernández Bermejo. La Biodiversidad como recurso: su papel en el marco de una agricultura sostenible. Ed. Agrícola Española.
11. C.G. Hernández. Ecología y Fisiología de la Dehesa. Ed. Agrícola Española.
12. R. Jarrige. Ruminan nutrition. Recommended, allowances and feed tables. INRA-John Libbey, London.
13. MAPA. Anuario Estadístico. Ministerio de Agricultura, Pesca y Alimentación. Madrid.
14. Susana Sanz. Flora de interés apícola de La Rioja. Consejería de Agricultura y Alimentación. Gobierno de La Rioja.
15. Vera. Alimentación y pastoreo del ganado ovino. Servicio de Publicaciones. Univ. Córdoba.

Work questionnaire

- Explain the importance that stockbreeding systems are as a complement to agriculture.
- Describe what is biodiversity stockbreeding.
- Enumerate which are the most important factors that oppose the biodiverisity stockbreeding.
- Enumerate which are the characteristics of extensive stockbreeding.
- Explain briefly the problems that intensive stockbreeding carry out for animals and the environment.
- What is seasonal migration and what importance it has.
- What differences are there between the mountain stockbreeding system and the meadow one?
- What aspects need to be taken into account when creating cattle system?
- What is the importance of alimentation in the cattle system?
- Main differences between a conventional and an ecological stockbreeding system.
- Enumerate the general parts in an animal digestive system.
- Describe briefly the ruminant's digestive system.
- Differences between the ruminants and non-ruminant's digestive systems.
- What specific characteristics have the rabbit's digestive system?
- Describe the basic parts of an animal reproductive system.
- What is known as metabolism?
- Explain how the functioning of the ruminants reproductive system is regulated.
- What importance do the endocrine organs have in relation to the digestive and reproductive systems?
- Describe the general functioning of an endocrine organ.
- Which are the alimentation characteristics in the ruminants.
- Explain what is an alimentation portion in stockbreeding.
- Which are the general characteristics in the non-ruminant's alimentation?
- Describe a stabulation system for birds in ecological production.
- Describe a stabulation system for rabbits in ecological production.

- What general conditions are required in a stabulation system for ecological stockbreeding?
- Enumerate the principal activities in the management of ruminants.
- Enumerate the principal activities in the management of birds.
- What is known as animal health in ecological stockbreeding?
- Explain what alimentation and management aspects influenciate the animal health.
- Describe the differences between parasitarian and infectious illnesses.
- Enumerate various prevention methods of illnesses in animals.
- Describe briefly the control of illnesses methods in ecological stockbreeding.
- What are known as alternative methods?
- What is known as quality production?
- Relate the concepts: production, quality and price.
- Determine which are the most important problems that ecological stockbreeding faces.

MODULE 9

Food conservation and transformation

1. Introduction.
2. Curricular elements of the module.
3. Programme:
    3.1 Educational units.
    3.2 Curricular elements of each educational unit.

Bibliography.

Evaluation questionnaires.

- **FOOD CONSERVATION AND TRANSFORMATION**

1. INTRODUCTION

When the ecological crops were formally recognised by the European Union and for some Member States, the reglamentary definition adopted, excluded the use of synthesis chemical products and it was only related to the crop phase. The principle that is necessary to apply is the one to prolongate in the transformed products the use of synthesis chemical products that needs the ecological crop.

The student should learn to work with techniques that help in the food conservation and transformation without using synthesis chemical products. This means a different focus of the problems and the solutions. The final result will be a quality product that will only have natural principles found in animals or plants.

General aim of the module:

- *Know the transformation, conservation and packaging methods following the ecological agriculture techniques, as well as the quality criteria of food produced following those techniques.*

Through this module the students will be able of:

- *Understand the principal food alterations.*
- *Determine the food conservation methods.*
- *Understand the different types of fermentation.*
- *Understand the food quality criteria.*
- *Understand the sensitivity crystallisation methods.*

2. CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
• Know the principal food alterations.	• Identify the principal food alterations. • Know in what conditions is each of them produced.
• Determine the methods of food conservation.	• Practical application of the conservation techniques. • Analysis of each of them.
• Know the principal types of fermentation.	• Describe the action form of each type of fermentation: lactic, alcoholic and acetic.
• Know the food quality criteria.	• Determine which are the quality criteria applied to food. • Describe the techniques that are applied to food to determine their quality.
• Know the sensitivity crystallisation methods.	• Determine the application form. • Interpret the results.

3.1 EDUCATIONAL UNITS.

Educational unit 1:

Food alteration

The food technology has as its main aim the preparation food to increase their conservation. When these techniques are not applied or are not applied correctly alterations in the food are produced that made not appropriate for consumption. This didactical unit pretends that the student knows the most important alterations that are produced in food and which are the principal causes. This will allow that measures are taken to avoid these alterations or if the food is not suitable for human consumption.

Educational unit 2:

Food conservation methods

Vitality is a main characteristic in the food conservation processes. This vitality is built with a bunch of characteristics. The loss of this vitality is the main responsible of the problems with food conservation. To guarantee to the maximum the good conservation the food should be of good quality.

The student should know how these quality criteria are contained in food during the production and before the problems arrives to conservation. In this sense the production and conservation techniques are very related. The student should recognise them and know how to apply them.

Educational unit 3:

Food quality criteria

Nowadays the alimentation science mistakes quality and quantity and gives the food the name of quality in function to the quantity and the equilibrium between the different nutrient known and the lack of pathogen germs existent in those aliments.

The student should know which are the quality criteria and take them into account when talking about ecological food not only in the production phase but also in the transformation and conservation. This module will help the student with all these important questions.

Educational unit 4:

Sensitivity crystallisation method.

This is a method discovered by the German E. Pfeiffer so as to explain that the different crystallisation of an aliment influents in the quality of it. The method is very used nowadays. Through this normative module the student will know the general terms of this method, how it is applied and how to interpret the result images.

MODULE 9:
FOOD CONSERVATION AND TRANSFORMATION

EDUCATIONAL UNIT 1: FOOD ALTERATIONS

EDUCATIONAL UNIT 2: FOOD CONSERVATIONS METHODS

EDUCATIONAL UNIT 3: FOOD QUALITY CRITERIA

EDUCATIONAL UNIT 4: SENSITIBITY METHODS OF CHRYSTALISATION

EDUCATIONAL UNIT 1: FOOD ALTERATIONS

CONCEPTS

Introduction of the “ecological chain”, “cold chain”.

Food alterations.

Microbial alterations.

Lipid oxidation.

“Encimathic browning”.

PROCEDURES

Analysis of the different types of alterations.

Identification of the different types of alterations.

Deduction of the importance of these alterations.

ATTITUDES

Knowledge of the different types of alterations.

Value of the different methods that can be used of its knowledge.

Interest for the knowledge and application of the detention techniques.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the food conservation problematic using a newspaper article.

Description of the principal types of alterations.

Working methods to avoid them.

EVALUATION ACTIVITIES

Propose food control techniques.

Confetionate prevention plans of the food problems.

Identify the most common food alterations.

Use other methods of prevention and control.

EDUCATIONAL UNIT 2: FOOD CONSERVATION METHODS

CONCEPTS

Food conservation methods.

Antiseptics and natural conservants.

Food fermentation.

Lactic fermentation.

Alcoholic fermentation.

Other fermentation.

PROCEDURES

Analysis of the different conservation methods.

Identification of the different natural conservants.

Identification of the different fermentation types.

ATTITUDES

Knowledge of the different conservation methods.

Value the different methods that can be used to conserve food.

Interest for the knowledge and application of the food fermentation.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the problematic of conservants use.

Description of the principal types of fermentation that are used on the transformation and conservation of food.

Working methods to conserve food.

EVALUATION ACTIVITIES

Know the natural conservants that can be used in ecological agriculture.

Confectionate conservation plans.

Use of other control and conservation methods for ecological food.

EDUCATIONAL UNIT 3: FOOD QUALITY CRITERIA

CONCEPTS.

Food quality criteria.

Food evaluation criteria.

Other quality criteria.

PROCEDURES

Analysis of the different quality criteria.

Identification of the different quality criteria in ecological agriculture.

ATTITUDES

Knowledge on the different quality criteria.

Value the different criteria that are use to determine the quality of ecological food.

Interest on the necessity to produce quality.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the problematic of the food quality.

Description of the food quality criteria.

Steps to follow to obtain quality food.

EVALUATION ACTIVITIES

Enumerate the quality criteria applied to food.

Determine how it can be applied to food.

EDUCATIONAL UNIT 4: SENSITIBITY CRISTALISATION METHOD

CONCEPTS.

How to measure the food quality.

The sensitivity crystal method.

Other methods.

PROCEDURES

Analysis of the different techniques used to measure the quality of food.

Use of the sensitivity crystallisation method.

ATTITUDES

Knowledge of the sensitivity crystallisation method.

Value the importance to measure the quality of food to know how to measure all the aliments.

Interests on the necessity to know the measure techniques of quality.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the consume and quality of food from the consuming data and type of alimentation.

Description of the sensitivity crystallisation method.

EVALUATION ACTIVITIES

Know how to apply and interpret the obtained results in the sensitivity crystallisation method.

BIBLIOGRAPHY

1. C. Aubert. “La fermentación, una técnica para conservar los alimentos aumentando su valor nutritivo”. Ed. MAPA. Servicio de Extensión Agraria. 1987.
2. C. Aubert. “Les aliments fermentés traditionnels”. Ed. Terre Vivante.
3. M.C. Brison. “Qualité et conservation des aliments”. Ed. Educatel.
4. D. Knorr. “Quality of ecologically grown foods”. Foods Sci. Tecnol.
5. D. Lairon. “Efectos de las fertilizaciones orgánicas y minerales sobre el valor nutritivo de las producciones agrícolas. Ed. MAPA. Servicio de Extensión Agraria. 1985.
6. M.C. Linder. Nutrición, aspectos bioquímicos, metabólicos y clínicos. Ed. EUNSA.
7. D. Nash. “Análisis tesigráfico”. Ed. MAPA. Servicio de Extensión Agraria.

Work questionnaire

- What is and why the food degradation is produced?
- Why quality faces quantity when talking about food?
- Which are the most common food alterations?
- What is known as “encimatic brownish”?
- What factors need to be taken into account when conserving food?
- What is the UHT?
- What is known as liofilisation?
- Enumerate the conservants and the natural conservation techniques.
- What is known as fermentation?
- Enumerate the types of fermentation used with food.
- What factors need to be taken into account with fermentation?
- Enumerate the food quality criteria.
- What is known as nutritive quality?
- How can be the quality of food measure?
- Describe the sensitivity crystal method.
- What advantages and disadvantages present the conservation methods related too high and low temperatures?
- What is known as lactic fermentation and what interest it has in the food conservation?
- Of all the food conservation methods that you know. Which one would you choose? Why?
- When doing the alcoholic fermentation. What factors need to be taken into account?
- Which are your criteria when talking about food quality?
- Explain your opinion on the quality- price relation.

MODULE 10

Agricultural integration and sustainability

1. 1.- Introduction.
2. Curricular elements of the module.
3. Programme:
    3.1 Educational units.
    3.2 Curricular elements of each educational unit.

Bibliography.

Evaluation questionnaires.

- **AGRICULTURAL INTEGRATION AND SUSTAINABILITY**

1. INTRODUCTION

The critical situation that we have reached through conventional agriculture (excedents production, costs increase, price liberalisation, help diminution, rural areas abandonment etc.) together with the environmental problems (fertility loss, pollution and soil erosion, biodiversity loss etc.) have carried out the apparition of a modality group of alternative agriculture: sustainable agriculture, integrated agriculture, ecological agriculture etc.

This allows the developing of agriculture together with an increase in the products quality, a reduction of the unitary costs, make the production processes more effective, and avoid the increase of problems in the conservation of the environment.

The student should learn to work with techniques that allow the conservation and the improvement of the environment without using synthesis chemical products. This means a different problem and solution focusing.

General aim of the module:

- *Understand which are the methods that must be used in conventional agriculture so as these can be integrated in the environment and be sustainable when using techniques that respect the environment and which increase the economic rentability.*

Through this module the student will be able of:

- *Know the different actions of agriculture on the environment.*
- *Know how to put into practice less aggressive techniques with the environment and at the same time profitable.*
- *Know how to integrate the agrarian actions in an environmental frame.*
- *Determine which are the parameters which sustainability is based on.*
- *Reduce the agricultural pollution sources.*
- *Potentate agricultural biodiversity as a pillar of the agrosystem stability.*

2. CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
• Know the different agricultural actions taken on the environment.	• Identify the different actions. • Determine the positive and negative influence of each of them.
• Put into practice less aggressive techniques with the environment and more profitable.	• Correct the adverse influence practice on the environment. • Choose actions that have a positive influence on the environment.
• Know to integrate the agrarian actions in an environmental frame.	• Determine the integration processes of the agricultural activities with the environment. • Carry out integration actions.
• Determine which are the parameters of sustainability.	• Define the parameters that integrate sustainability. • Explain why those parameters are important in the agrarian sustainability.
• Reduce the agricultural pollution sources.	•
• Potentate the agricultural biodiversity as a pillar of the agrosystem stability.	• Introduce the diverse elements in the system. • Explain the influence that diversity has on the system. • Understand the importance that diversity has from the genetic point of view.

3.1 EDUCATIONAL UNITS

Educational unit 1:

Ambiental impact on agriculture

Agriculture is a very wide, complex and diverse activity; to the vegetal and animal productions, very varied in themselves, need to add the civil work, and industrial transformation. The vegetable production will be positive to the environment if this is concentrated in its recyclable production, because it tends to maximise the oxygen productive processes and carbon dioxide fixers, impeding the liberation of this last gas that is one of the most important planetarium alterations. However, agriculture, as it is practised in the developed countries, is considered as an activity that pollutes the air and the water, deteriorate the soils and impoverish the biodiversity.

The student should get familiarised with all these processes that ocassionate a very important environmental impact as their actions will be the less possible impacting.

Educational unit 2:

Reduction methods of the environmental agricultural impact

This chapter describes the traditional and new agroambiental practices and actions that are considered satisfactory from a environmental point of view with the conservation of the environment. There are not practices of a romantic or utopic agriculture but actions that characterise a modern and professional agriculture in the environmental frame that need to work in the actual and future agrarian activity.

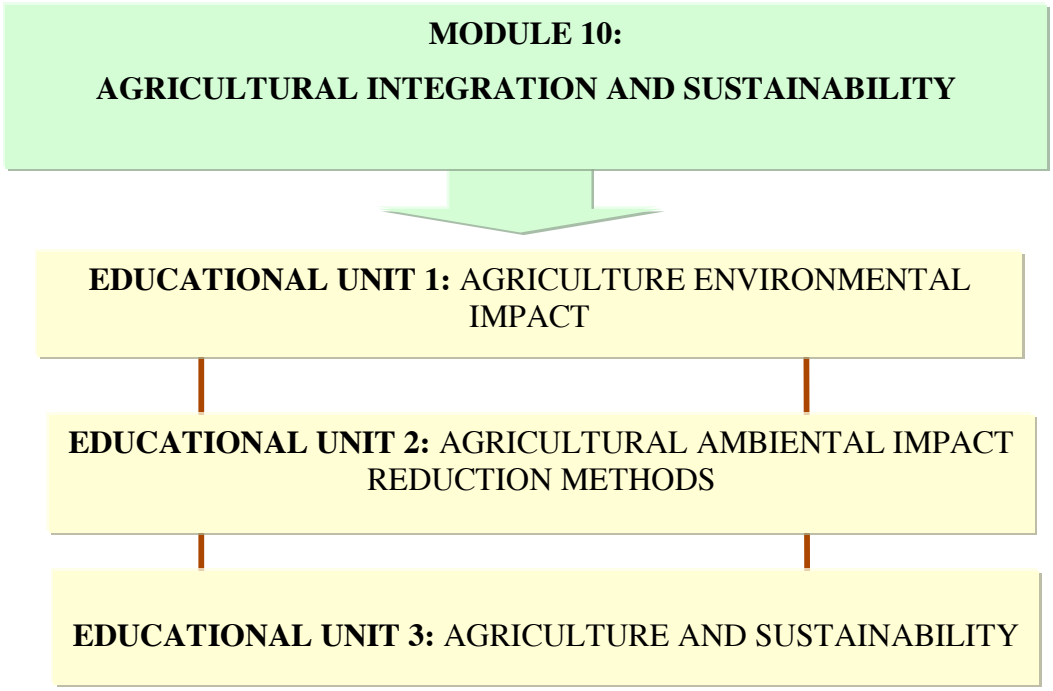
The student should know these processes that can be covered in three categories: the good agricole practices, aim to correct the possible negative effects; the traditional agricultural practices that are considered to be adapted to the environmental conditions; and the restoration and conservation actions and the improvement of the agrarian landscape and the ecosystems.

Educational unit 3:

Agriculture and sustainability

To recognise the generated problems of productivist agriculture joined to the global increasing problem of the world population. The concept of environmental agriculture is the result of how to go on increasing the production to satisfy the need of food in an increasing population, conserving the used resources for this production.

The student should know which are the specific strategies through which the main aims can be reached in sustainable agriculture. Applying the techniques of the ecological agriculture the aims of the sustainable agriculture can be easily reached.


MODULE 10:
AGRICULTURAL INTEGRATION AND SUSTAINABILITY
EDUCATIONAL UNIT 1: AGRICULTURE ENVIRONMENTAL IMPACT
EDUCATIONAL UNIT 2: AGRICULTURAL AMBIENTAL IMPACT REDUCTION METHODS
EDUCATIONAL UNIT 3: AGRICULTURE AND SUSTAINABILITY

EDUCATIONAL UNIT 1: REDUCTION METHODS OF THE AMBIENTAL IMPACT IN AGRICULTURE

CONCEPTS.

Introduction.

Natural resources sources.

Effluents receptor.

Activity support.

Agricultural Ambiental impact causes.

PROCEDURES

Analysis of the agriculture as a natural resources source.

Analysis of the environment as effluents receptor.

Study of the main causes of the Ambiental impact originated by agriculture.

ATTITUDES

Knowledge of the main activities and agrarian resources.

Value the importance of measuring the Ambiental impact on agrarian activities.

Determine the causes that originate the main environmental impacts.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the importance of the Ambiental impact on agriculture.

Description of the causes impacts occurred in the environment.

Determine the capacity that the environment has to minimise the impacts produced by agriculture.

Know how the ecological agriculture has little impact on the environment.

EVALUATION ACTIVITIES

Interpret the different Ambiental impacts originated by agriculture.

Enumerate the beneficial effects that the application of these methods of ecological agriculture has on the environment.

Make a study in the most important Ambiental impacts on your region.

EDUCATIONAL UNIT 2: AGRICULTURAL AMBIENTAL IMPACT

CONCEPTS.

Rational use of consumption and agricultural resources.

Conserve the soil as basic agrarian resource.

Efficiency use of the water.

Optimise the energy use.

Rational and care use of fitosanitary products.

Conserve the ecological diversity and the agricole and cattle genetic resources.

Adopt ambientally integrated cultivate systems.

Reduce the agrarian origin pollution:

- Limit the atmosphere emissions.
- Reduce the production of solid waste.
- Minimise the production of liquid affluent.

Conserve and improve the environment, the agrarian landscapes, the ecosystems, the ecological processes and the traditional rural infrastructures.

Maintain good conditions in the farmer and the population security and hygiene.

PROCEDURES

Analysis of the methods that need to put into practice to minimise the negative Ambiental impact.

Study of the sues and optimisation of resources.

Know which are the most damaged ecosystems aspects with the environmental impact of agriculture.

Analysis of the methods to conserve the soil.

ATTITUDES

Value the importance of a correct use of the agrarian resources to minimise the negative Ambiental impact.

Sensibilisation to the means that should be use to decrease pollution.

Put into practice integrated pollution means.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the importance to conserve the agrarian landscape.

Description on the means that can be put into practice to conserve the agrarian landscape.

Determine how ecological agriculture is a kind of integrated activity in the traditional agricultural landscape.

Describe how ecological agriculture limits to the maximum the Ambiental impact that agriculture produces.

Know how the practice of ecological agriculture emphasises in a positive way the farmer's health.

EVALUATION ACTIVITIES

Describe the means that can be used to minimise the impacts that agriculture has on the environment.

Relate the working methods put into practice with the minimising effects in the Ambiental impact.

Carry out a study on how ecological agriculture integrates in the traditional agricultural landscape and at the same time influents in a positive way the farmer's health and security.

EDUCATIONAL UNIT 3: AGRICULTURE AND SUSTAINABILITY

CONCEPTS.

Agriculture and sustainability.

Sustainable agriculture.

Sustainable agriculture attributes.

Strategies to implement agricultural sustainability.

- Election of the spaced, cultives and production places.
- Diversification.
- Management: soil.
- Management of water.
- Efficiency use of the impute.

PROCEDURES

Analysis of the sustainability concept.

Study of how the techniques can be applied.

Knowledge of the advantages that carry out.

Know how the problems disappear.

ATTITUDES

Value the importance of a correct use of the sustainability concept.

Sensibilisation to the sustainable agrarian technical use.

Put into practice these techniques.

EDUCATIONAL ACTIVITIES- LEARNING

Debate the importance of the agricultural sustainability.

Relate the working methods put into practice with the effects with the agricultural sustainability.

Describe how the ecological agriculture plays with the sustainability principles.

BIBLIOGRAPHY

1. Rafael M. Jiménez Díaz, Jaime Lamo de Espinosa. Agricultura sostenible. Ed. Mundiprensa.
2. Colegio Oficial de Ingenieros Agrónomos de centro y Canarias. Manual de prácticas y actuaciones agroambientales.
3. D. Gómez Orea. Evaluación del impacto ambiental de proyectos agrarios. Ministerio de Agricultura, Pesca y Alimentación.
4. D. Gómez Orea. Evaluación del impacto ambiental. Ed. Agrícola Española.
5. M.J. Jones. Sustainable agriculture: an explanation on the concept. Ed. Crop Proteection and Sustainable Agriculture. Ciba symposium 177, Wiley, Chichester.
6. World Bank. Development and the Environment. World Development Report 1992. Oxford University Press, New York.

Work questionnaire

- Determine why agriculture can be considered as one of the natural resources sources.
- Differences between natural ecosystem and agrosystem.
- Which are the impacts derived from the emission of polluting agricultural agents.
- Differences on the polluting agents' emission between ecological and conventional agriculture.
- Explain how the ecological agriculture potentates the soil activity.
- Describe how ecological agriculture fights against soil erosion.
- Give examples on how ecological agriculture potentate's biodoversity and explain why.
- How is optimised in ecological agriculture the use of energy.
- What is known in ecological agriculture as the rational use of fertilisers?
- Differences between the agrarian pollution that is produced in conventional agriculture and the one that ecological agriculture can produce.
- Explain why in ecological agriculture the emission of solid waste is reduced.
- What is known as an ambientally integrated crop?
- Explain how ecological agriculture influents in the positive form on the farmer and consumer's health.
- What is known as sustainability in agriculture?
- Which are the most important characteristics in sustainable agriculture?
- Why can the ecological agriculture be considered as a model of sustainable agriculture?
- In relation to sustainability what advantages do the ecological agriculture has over the conventional one.

MODULE 11

National and European legislation

1. Introduction.
2. Curricular elements of the module.
3. Programme:
    - 3.1 Educational units.
    - 3.2 Curricular elements of each educational units.

Bibliography.

Evaluation questionnaires.

- **NATIONAL AND EUROPEAN LEGISLATION**

1. INTRODUCTION

After two years of discussion with the Member States and the representants of the movement for ecological agriculture, the Council of the European Union finally passed the Reglamentary n.2092/91 on the ecological agricultural production and its indication with the agrarian and alimentary products. Though afterwards new legislation has been passed that modify or amplify this one, there are still norms that need to be developed concerning ecological stockbreeding.

The public and private organisms certify that the ecological agricultural products in the EU need to cover at least the communitarian reglamentation. According to what the reglament says, each Member State has established a control system that is applied for one or more of the public authorities of controlled designed or for some private control organisms authorised to carry it out. The student should know the different reglaments that refer not only to the agricultural and stockbreeding production but also to the transformation and canning norms of the ecological products in order to implement them.

General aim of the module:

- *Know on a basic form the reglaments that the ecological production follows not only in the national level but the European one.*

Though this module the students will be able of:

- *Know the basic reglamentation.*
- *Know the needed requisites to install them in an ecological production.*
- *Apply the normative in particular cases.*
- *Know the role of the Regulatory Councils or the Control companies that want the norm to be applied.*
- *Understand the importance of the reglamentation to avoid abuses and protect the ecological products.*

2. CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
Know the basic reglamentation.	• Know the reglament numbers applied to ecological agriculture. • Agriculture. • Stockbreeding. • Food transformation. • Food conservation. • Commercialisation.
Know the necessary requisites to get installed in ecological production.	• Giving the data of a farm determine the requisites that this should reunite to be transformed in ecological.
Apply the normative in particular cases.	• From particular cases and problems apply the normative to solve them.
Know the role of the Regulatory Councils or Control companies that help in the application of the norms.	• Know the composition of the Regulatory Council. • Determine the functions of the Regulatory Council. • Specify which is the importance of the Regulatory Council.
Understand the importance of the reglamentation to avoid abuses and protect the ecological products.	• Determine the importance of the guarantee references. • Determine how reglamentation can protect from abuses.

4- EDUCATIONAL UNITS.

Educational unit 1:

Ecological agriculture reglaments

In this educational unit students become familiar with the different norms that regulate the ecological activity. These norms have a European origin inside the Union and are concrete inside each country through national norms that cannot contradict the European ones.

Educational unit 2:

Production normative

This unit talks about the production processed not only agricultural but also stockbreeding, as well as the recollection of wild fruits. This unit initiates a process of restructuring establishing the norms to transform an conventional slot into ecological, how to reach the aim and how to maintain it afterwards. Also the different products that will be used are established.

Educational unit 3:

Conservation, elaboration and packaging norms

Techniques that are used to the conservation, elaboration and packaging of ecological products, as well as the norms that need to be followed to carry out these processes. The student should know them to apply them in the different cases.

Educational unit 4:

The Regulatory Council and its functions

The organism and organisms that certify and control. This is a very important unit to the person that wishes to work in ecological agriculture as the Regulatory Council is the one that certifies the ecological productions. Without this the products cannot reach then market with the ecological tag. How the inscription is made, the obligations, the labelling control measures and the direct selling regulations.

MODULE 11:

NATIONAL AND EUROPEAN LEGISLATION

EDUCATIONAL UNIT 1: ECOLOGICAL AGRICULTURE REGLAMENTS

EDUCATIONAL UNIT 2: PRODUCTION NORMS

EDUCATIONAL UNIT 3: ELABORATION, CONSERVATION AND PACKING NORMS.

EDUCATIONAL UNIT 4: THE REGULATORY COUNCIL AND ITS FUNCTIONS.

EDUCATIONAL UNIT 1: ECOLOGICAL AGRICULTURE NORMS

CONCEPTS.

Ecological agriculture regulation.

EU regulations.

Basic norms of IFOAM.

Regulation (EU) of the council of 24 June 1991 on the ecological agricultural production and its indicators in agrarian and food products.

Regulation (EU) n.207/93 of the Commission of the 29 of January 1993 where the contents of the annexe 6 are defined.

European disposition on the imports to third countries.

Regulation (EU) n. 529/95 of the Commission on the 9 March 1995 on the prorogation with respect to imports of determined 3rd countries in the application deadline of the paragraph 1 of the article 11 of the Reglament (EU) n. 209/91.

Regulation (EU) n. 3457/92 of the Commission of the 30th of November 1992 where the applicable norms to control certificate are established to the European imports from 3rd countries.

Regulation (EU) of the Council that complement the animal productions, the regulation (EU) n. 209/91 on the ecological stockbreeding production and its indication of agrarian and alimentary products.

Relation on the union dispositions on the ecological agricultural production and its indication in the agrarian and food products.

Specific regulations in each country.

PROCEDURES

Analysis of the different regulations.

Synthesis of them.

Know the advantages that regulations carry out.

Know the problems that appear when application.

ATTITUDES

Value the importance of a correct application of the norms.

Sensibilisation to the knowledge of the norms.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the importance of reglamentation in ecological agriculture.

Advantages and disadvantages that the application of the normative present.

Determine the aspects where the norm presents the most inconvenient when applying it.

EVALUATION ACTIVITIES

Knowledge of the most important normative in ecological agriculture.

Determine how the normative influents in the development of ecological agriculture.

EDUCATIONAL UNIT 2: PRODUCTION NORMATIVES

CONCEPTS.

Norms for the restructuring of agricultural farms and cattle.

Norms for the agricultural production.

Norms for the recollection of plants and wild fruits.

Norms for the cattle production.

Norms for apiculture and apiculture products.

PROCEDURES

Analysis of the different norms.

Synthesis of them.

Know the advantages that carry out the normative.

Know that problems disappear with their application.

ATTITUDES

Value the importance of applying correctly the reglamentation.

Sensibilisation to the reglamentation knowledge.

EDUCATIONAL ACTIVITIES- LEARNING

Debate in the importance of reglamentation in ecological agriculture.

Advantages and disadvantages when applying the normative.

Determine the aspects that represent more inconvenient when applying the normative.

EVALUATION ACTIVITIES

Knowledge of the most important normative in agriculture and stockbreeding production.

Determine how the normative influents the developing of agriculture and ecological stockbreeding.

EDUCATIONAL UNIT 3: ELABORATION, COSERVATION AND PACKAGING NORMATIVES

CONCEPTS.

Techniques and products employed in storing.

Norms for the elaboration and packaging.

- Cereal, leguminous crop, tubercles and derivatives.
- Flours and derivatives.
- Vegetables, fruits and derivatives.
- Natural sweeteners and derivatives.
- Condiments and species.
- Edible fats.
- Milk and derivatives.
- Eggs and derivatives.
- Meat and derivatives.
- Alimentary preparations under specific formula.
- Ice creams.
- Stimulant aliments and derivatives.
- Refreshing and alcoholic drinks.

PROCEDURES

Analysis of the different techniques and norms.

Know the advantages that the normative carries out.

Know the problems that disappear with its application.

ATTITUDES

Value the importance of applying the normative correctly.

Sensibilisation to the knowledge of the normative.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the importance of the normative, in the processes of conservation, elaboration and packaging.

Determine how the normative influents the developing of the transformation, conservation and packaging companies of ecological products.

BIBLIOGRAPHY

1. Reglamento (CEE) 2092/91 sobre la producción agrícola y su indicación en los productos agrarios y alimenticios y reglamentos posteriores que lo concretan y lo especifican.
2. Información del consejo regulador sobre la utilización de la denominación de agricultura o ganadería ecológica.
3. Juana Labrador, Luis López, Jose Luis Reyes, Antonio Guiberteau. Guía de productos utilizables en agricultura y ganadería ecológicas. Ed. Junta de Extremadura.

Work questionnaire

- What is the importance of regulation in ecological agriculture?
- Explain the need of reglamentation.
- What importance do stamps have in ecological agriculture?
- Explain what is the role of the Regulatory Council or the certification companies.
- Determine what is the process to join the ecological farmer's scheme.
- What norms need to be taken into account when packaging ecological products?
- What requisites need the animal ecological farms?
- What general requisites are needed to transform ecological products?
- What need to be taken into account when packaging ecological products?
- What are the basic norms to produce agricultural ecological products?
- What are the basic norms to produce stockbreeding ecological products?
- What requisites do plants and wild fruits need to be considered ecological?
- What normative is valid for ecological apiculture?
- What are the main problems that present the use of seeds in ecological agriculture?
- Fill in the documentation of the Regulatory Council to join the ecological farmer's scheme.

MODULE 12

Socioeconomic aspects in agroecology

1. Introduction.
2. Curricular elements of the module.
3. Programme:
    - 3.1 Educational units.
    - 3.2 Curricular elements of each educational unit.

Bibliography.

Evaluation questionnaire.

- **SOCIOECONOMIC ASPECTS OF AGROECOLOGY**

1. INTRODUCTION

The belief that ecological agriculture is not viable from an economic point of view has been one the principal aspects that have limit in the past the expansion of the agrarian system. However, the readjustments in the relation cost- price in agriculture have obliged farmers to rethink the agrarian practices and contemplate the use of options of low consumption. The over prices of the ecological products have made that some agriculture to rethink the possibility to change into ecological agriculture. At the same time a big number of farmers have risked and changed into ecological agriculture to keep alive and even successfully.

The student should understand the economic problematic that affects conventional and ecological agriculture, because this one makes it viable or not.

General aim of the module:

- *Compare the conventional and ecological productive systems to extract some consequences respecting the rentability and establish which are the differences in this area and why they are produced.*

Through thus module the students should be able of:

- *Understanding the importance of rentability.*
- *Know the aspects in which rentability is based.*
- *Prevent the financial and rentability problems.*
- *Know the main market activities and design strategies to access them.*
- *Determine the characteristics of the ecological products that make them more competitive to the consumer.*

2. CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
• Understand the importance of rentability.	• When do we say that a system is profitable? • What happens when a system is not profitable? • Make a profitability plan for a farm.
• Know the aspects in which profitability is based on.	• Define profitability. • Determine the aspects to take into account when calculating the profitability of a slot. • Establish what the profitability of a farm depends on.
• Know how to prevent the financial and profitability problems.	• Determine the importance of making a real profitability. • Make financial budgets of a farm. • Determine the strong points and the weak points. • Prepare a plan to improve the weak points.
• Know the market areas and designed strategies to access them.	• Define what is the market. • Determine the different types of commercialisation areas that exist. • Propose which would be the type of channel more appropriate for agriculture. • Which is the potential market for this type of agriculture.
• Determine the characteristics of the ecological products that make them more competitive in the market.	• Describe the characteristics of the ecological products. • Determine which are the parameters that define quality. • Point the advantages that the consumer of these products has. • Compare their characteristics with the non-ecological products.

2. EDUCATIONAL UNITS

Educational unit 1:

Rentability in ecological agriculture

In the ecological system, the harvest is normally bigger than the conventional ones. However, for the system to work successfully, solid agricultural practices are needed. The comparison between the efficiency of the different slots is surrounded by difficulties; the varieties vary in its production potentiality and the interval between the ecological farms productions varies as well as in the conventional farms.

The student should get in contact with the contability and rentability agricultural world to catch the importance that this chapter has in relation to the maintenance of an ecological agricultural production farm.

Educational unit 2:

The ecological products market.

The consumers interest for the saturated fat levels, sugar and salt in the food, together with the additive risks and pests waste, have estimulated the demand of healthy products and has carried out significant changes in the food sector, including the active promotion of non-additive food. The increasing conscious of the medioambiental damages joined to the uses of modern agricultural techniques has been related at least in the consumer's head with the use of agrochemical products.

The student should know not only the markets he/she can work with but also the channels that can use in distribution.

Educational unit 3:

Characteristics of the ecological products.

Nowadays, science in alimentation mistakes quality with quantity and gives food a quality rank in function to the quantity and the equilibrium between the different known nutrients, and for the lack, or practically lack of existent pathogen germs in those aliments. The importance of the quantitative and microbiological analysis is not forgotten, but these ones are not the only ones looked for in the quality of aliments.

MODULE 12:

SOCIOECONOMIC ASPECTS OF AGROECOLOGY

EDUCATIONAL UNIT 1: PROFITABILITY OF THE ECOLOGICAL AGRICULTURE

EDUCATIONAL UNIT 2: THE ECOLOGICAL PRODUCTS MARKET.

EDUCATIONAL UNIT 3: ECOLOGICAL PRODUCTS CHARACTERISTICS.

EDUCATIONAL UNIT 1: PROFITABILITY OF THE BIOLOGICAL AGRICULTURE

CONCEPTS.

Productivity and economy.

Crops profitability.

Ecological products price.

- Crops prices.

Variable costs.

Gross margins.

Fix costs.

- Working hand.
- Other fixes costs.

Social costs and other external costs.

PROCEDURES

Analysis of the productivity and the crops profitability.

Know the prices that make the crops more expensive.

Distinguish between fix and social costs.

ATTITUDES

Value the importance of the productivity in the economy.

Sensibilisation of the ecological production with good prices.

Importance of the compatibility in the agrarian companies.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the importance of producing good prices.

Advantages that the use of production plans and budgets represent.

Making of balances and budgets.

EVALUATION ACTIVITIES

Determine how the use of ecological methods influents in the profitability of the final product.

Advantages that the ecological production represent related to profitability.

Making of balances and budgets.

EDUCTIONAL UNIT 2: THE BIOLOGICAL PRODUCTS MARKET.

CONCEPTS.

Commercialisation of ecological products.

- Initial conditionings.
- General situation.
- Spanish production flux.
- Marketing elements “bio”.
- Stopping of consumption of “bio” products.
- Differential characteristics of the “bio” products.

The markets.

The distribution channels.

A new market mentality.

PROCEDURES

Analysis of the situation of the ecological products nowadays.

Analysis of the different markets that the ecological products aim.

Study of the distribution channels used by ecological products.

ATTITUDES

How to reach the consumer through information.

Sensibilisation towards the ecological products markets.

Give importance to the new conception of markets.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the situation of the ecological products facing the conventional ones.

How the marketing can be used to open new markets.

Revise the commercialisation channels determining their advantages and inconveniences.

EVALUATION ACTIVITIES

Design strategies to access the market.

Design new commercialisation channels that can be more efficient that the ones used.

Determine the influence that the market has against the ecological production.

BIBLIOGRAPHY

1. Claud Aubert. La fermentación, una técnica para conservar los alimentos aumentando su valor nutritivo. Ed. M.A.P.A.
2. D. Lairon et al. Teneurs en nitrates des productions maraichéres obtenues par les methodes de l'agriculture biologique. Sci. Aliments.
3. E. Ahrens,et, al. Significance of fertilization for the post-harvest condition of vegetables, especialy spinach.Ed. Lockeretz.
4. E. Termine. et al. Influence des techniques de fertilisation organique et minérale sur la valeur nutritionelle des légumes. Sci. Aliments.
5. H. Hansen. Comparison of chemical composition and taste of biodynamically and conventionally grown vegetables. Qual. Plant. Foods Hum. Nutr. 30.
6. M.C. Brison, Theveniaud. Qualité et conservation des aliments. Ed. Educatel.
7. Max Leglise. Les méthodes biologiques.

Work questionnaire

- What is known as profitability?
- When do we say that a system is profitable?
- What aspects need to be taken into account when qualifying the profitability of an agricultural or stockbreeding company?
- What factors depend on a farm's profitability?
- Explain how the budget needs to be done in an ecological agricultural rotation.
- Which are the strong and the weak points of an agricultural farm and a stockbreeding farm?
- Importance of the market when commercialises the products.
- Explain which is the mentality of the farmer facing the market.
- What types of commercialisation channels are used in ecological agriculture?
- What role do the local markets play? Which are their advantages and inconveniences?
- Which general requisites do the ecological consumer have?
- What aspects need to be improved in the production and commercialisation of ecological products to reach the consumers better?
- Which are the quality parameters that need to be applied to ecological products?
- How can the quality of the ecological products be measured?
- What relationship is there between consumed products and health?
- Explain the relationship between ecological product and price.
- General differences between the quality of ecological and non- ecological products.

MODULO E13

Working education and orientation

1. 1.- I Introduction.
2. Curricular elements of the module.
3. Programme:
    - 3.1 Educational units.
    - 3.2 Curricular elements of each educational unit.

Bibliography.

Evaluation questionnaires.

13. WORKING EDUCATION AND ORIENTATION

1. INTRODUCTION

The education designed in this module and manifests in the 5 terminal capacities pretends that the future worker or entrepreneur get sensibilised on the importance to do the work in a secure way, understand the economical reality, empresarial and working of the agricultural sector and acquires the knowledge and abilities to look for or invent an own working post.

The first terminal capacity pretends to sensibilities through the security and hygiene norms of the working environment.

The terminal capacities 2 and 3 pretend that the students will be able to orientate themselves in the Working Market identifying their own characteristics and interests, analysing the educational and working offer, knowing and applying the techniques of job search and the strategies to find job.

They are complemented the terminal capacity 4 that interprets the rights and duties of the entrepreneurs and workers.

The terminal capacity 5 refers to the knowledge and use of the new technologies of the information and knowledge that pretends to give the student a new working vision and above all in the permanent education.

General aim of the module:

- *Allow the students to work on a responsible way, knowing the mechanisms of professional insertion, basic working legislation and rights and obligations that derive from the working relations acquiring knowledge and activities needed to work on secured conditions and adopting a professional and maturity identity motivating future learning.*

Through this module the students will be able of:

- *Detect the common situations in the working areas that can affect health and apply the protection and prevention measures.*
- *Analyse the insertion and professional development options in the sector adopting a flexibilitation attitude of opening and creativity.*
- *Applying strategies and procedures that facilitate the working insertion and the autojob.*
- *Interpret the legal frame, distinguishing rights and obligations that derive form working relationships.*
- *Enter in contact with the new information technologies in a basic level but effective to be able to use them.*

2. CURRICULAR ELEMENTS OF THE MODULE

TERMINAL CAPACITIES	*EVALUATION CRITERIA*
• Detect the risk situations in the working environment that can affect health and apply the corresponding protection and prevention measures.	• Identify the working situations and the existent factor risks. • Adopt the measures to protect and prevent in case of risk.
• Analyse the insertion and professional development options adopting a flexing opened and creativity attitude.	• Identify and evaluate the capacities and knowledge of professional value. • Identify the educational offer and the working demand referred to their interests.
• Apply the strategies and procedures that facilitate the working and self-employment insertion.	• Identify the different contracts that exist. • Dominate the active searching for job techniques. • Identify and compliment the needed documents, according to the legislation to become an own worker.
• Interpret the legal frame, distinguishing the rights and obligations that derive form the working relationships.	• Know the basic sources of information of the Working Law distinguish between the rights and obligations.
• Enter into contact with the new technologies of information in a basic but effective level.	• Manage the basic computer functions. • Search and extract the basic information through the Internet. • Use the e-mail.

2. EDUCATIONAL UNITS

Educational unit 1:

Work health

The three units designed in this block of work health pretend that the students acquire the knowledge and develop the needed attitudes to work in healthy conditions and prevent the possible risks derived from the working situations in the sector.

Educational unit 2:

Working legislation and relations

This unit is designed so as the students know the basic social legislation and obligations that derive from the work relations.

Educational unit 3:

Social working orientation and insertion

This orientation and insertion block pretends that the students, once finished the educational action, know how to orientate themselves in the job market and look actively for a job. It will insist in the generation of flexibility actions, changes adaptability, and continuos education.

Educational unit 4:

New information technologies

Answers to the need of education, recycling or reconversion of the disperse collectives that need to adapt to the changes that affect the different working posts. It is needed the use of a free methodology of space and time conditionings of traditional education, that will stop the education in most of the students. An important opportunity is offered to a wide collective that needs the education with a flexible educational methodology, personalised, based in multimedia didactic materials and which promotes the need for opportunities.

The student should get familiarised with the computer as a very important working method nowadays and as a permanent educational method that permits to acquire knowledge on the innovations that will be discovered and incorporating them to the ecological agricultural world.

MODULE 13:
WORKING EDUCATION AND ORIENTATION

EDUCATIONAL UNIT 1: WORKING HEALTH.

EDUCATIONAL UNIT 2: WORKING LEGISLATION AND RELATIONS.

EDUCATIONAL UNIT 3: WORKING ORIENTATION AND INSERTION.

EDUCATIONAL UNIT 4: NEW INFORMATION TECHNOLOGIES.

EDUCATIONAL UNIT 1: WORKING HEALTH

CONCEPTS.

The jobs and health.

- Concept of health (WHO).
- Legal dispositions referred to the protection and improvement of job health.
- European normative.

Professional risks and their materialisation.

- Professional risk concept.
- Risk classification:
    - Physical risks.
    - Mechanical risks.
    - Chemical risks.
    - Electrical risks.
    - Fire risks.
    - Psychological and social character risks.

Risks materialisation.

- Work accidents.
- Professional illnesses.
- Insatisfaction.

PROCEDURES

Analysis of the different risk factors that affect work health, identification of the risks in a concrete context related to the agricultural sector.

Quantitative value of the risks. Dangerously grade.

Verification of the Community Normative and the legislation of the corresponding country.

ATTITUDES

Respect for the personal and collective health.

Interest to improve the working conditions and to reduce the risk factors.

Preoccupation to obtain physical, psyquical and social well being and equilibrium in the labour activities.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the worker responsibility to fulfil the norms in the Security and Labour Health areas.

Invitation of a professional to talk on the subject.

EVALUATION ACTIVITIES

The module should be finished with a motivating workload, making sure that the students are sensibilised enough to develop the professional activities, respecting the Security and Labour Health norms.

EDUCATIONAL UNIT 2: LABOUR LEGISLATION AND RELATIONS

CONCEPTS.

Labour law.

- Definition and area of application.
- Sources of Labour Law.
- The International Institutions. International Labour Organisation (ILO). The European Union.

The work contract.

- Concept and characteristics.
- Work contract subjects.
- Contents of the work contract.
- Contract modalities.
- Modification, suspension and extinction of the work contract.

PROCEDURES

Analysis of the hierarchy order and application of the different sources of Labour Law.

Interpretation of a work contract.

Identification of the aim, characteristics and conditions of the different working modalities.

ATTITUDES

Fight against the situation that affect the rights and duties covered in the normative in labour material.

Value of the Labour Law as an instrument of social peace.

Fight against any discrimination to access the labour market.

EDUCATIONAL ACTIVITIES- LEARNING

Work on the official models, analysing the different parts and solving the possible doubts.

EVALUATION ACTIVITIES

In case of supposedly fictitious compliment different working contracts in their official models.

EDUCATIONAL UNIT 3: ORIENTATION AND LABOUR INSERTION

CONCEPTS.

The labour market.

- The working market in Spain, Portugal, France, Italy, Holland and Greece.
- The working market in the rest of the European Union.

Professional auto- orientation resources.

The professional project elaboration.

The process of taking decisions.

Superation of the social and professional discriminatory habits.

PROCEDURES

Analysis and value of the alternatives.

Elaboration of the models for self-help.

Design of an action plan.

ATTITUDES

Consciousness of the own personal values and interests.

Active search on of the information sources.

Disposition to flexibility and polyvalence.

Interest on the continuous education.

EDUCATIONAL ACTIVITIES- LEARNING

Elaboration of a professional project in the ecological agricultural sector.

EVALUATION ACTIVITIES

Presentation of a project justifying each of the phases.

EDUCATIONAL UNIT 4: THE NEW INFORMATION TECHNOLOGIES

CONCEPTS.

Know the basic functioning of a computer.

Manage one or two data sheet programmes.

Keep the information in the computer.

Use the e-mail to change information, consult problems or doubts etc.

Use the Internet navigator to look for information, and use it etc.

PROCEDURES.

Analysis on the importance of the computer and the new technologies.

Value the access and changes of information.

The use of the computer.

ATTITUDES

Opening to new technologies.

Use the new technologies as a work instrument.

Importance to continuous information.

EDUCATIONAL ACTIVITIES- LEARNING

Debate on the need to use the new technologies in the agrarian sector.

Invitation to a professional to talk on the subject.

EVALUATION ACTIVITIES

The module should be finished making sure that the students are prepared to use the computer in a professional use.

UNIDAD DE FORMACIÓN 2: LEGISLACIÓN Y RELACIONES LABORALES

CONCEPTOS.

El Derecho Laboral.

- Definición y ámbito de aplicación.
- Fuentes del Derecho Laboral.
- Las Instituciones Internacionales. Organización Internacional del Trabajo (O.I.T.). La Unión Europea.

El contrato de trabajo.

- Concepto y características.
- Sujetos del contrato de trabajo.
- Contenido del contrato de trabajo.
- Modalidades de contratos.
- Modificación, suspensión y extinción del contrato de trabajo.

PROCEDIMIENTOS.

Análisis del orden jerárquico y aplicación de las distintas fuentes del Derecho Laboral.

Interpretación de un contrato de trabajo.

Identificación de la finalidad, características y condiciones de las distintas modalidades de trabajo.

ACTITUDES.

Rechazo ante situaciones que atenten contra los derechos y deberes recogidos en la normativa vigente en materia laboral.

Valorización del Derecho Laboral como instrumento de paz social.

Rechazo de cualquier discriminación en el acceso al empleo.

ACTIVIDADES DE ENSEÑANZA-APRENDIZAJE.

Trabajo sobre modelos oficiales de contrato, analizando los apartados y resolviendo las dudas que puedan surgir.

ACTIVIDADES DE EVALUACIÓN.

Ante supuestos ficticios cumplimentar diferentes contratos de trabajo en sus modelos oficiales.

UNIDAD DE FORMACIÓN 3: ORTIENTACIÓN E INSERCIÓN LABORAL

CONCEPTOS.

El mercado de trabajo.

- El mercado de trabajo en España, Portugal, Francia, Italia, Holanda y Grecia.
- El mercado de trabajo en el resto de la Unión Europea.

Recursos de autoorientación profesional

La elaboración del proyecto profesional.

El proceso de toma de decisiones

Superación de hábitos sociales y profesionales discriminatorios.

PROCEDIMIENTOS.

Análisis y valoración de alternativas.

Elaboración de modelos para la autoayuda.

Diseño de un plan de acción.

ACTITUDES.

Conciencia de los propios valores personales, destrezas e intereses.

Búsqueda activa de fuentes de información.

Disposición para la flexibilidad y la polivalencia.

Interés por la formación continua.

ACTIVIDADES DE ENSEÑANZA-APRENDIZAJE.

Elaboración de un proyecto profesional en el sector de la agricultura ecológica

ACTIVIDADES DE EVALUACIÓN.

Presentación del proyecto justificando cada una de sus fases.

UNIDAD DE FORMACIÓN 4: NUEVAS TECNOLOGÍAS DE LA INFORMACIÓN

CONCEPTOS.

Conocer el funcionamiento básico del ordenador.

Manejar uno o dos programas de base de datos.

Guardar información en el ordenador.

Utilizar el correo electrónico para intercambiar información, consultar problemas o dudas, etc.

Emplear el navegador de internet para buscar información, sacarla y utilizarla, etc.

PROCEDIMIENTOS.

Análisis de la importancia del ordenador y de las nuevas tecnologías.

Valoración del acceso e intercambios a la información.

Utilización del ordenador.

ACTITUDES.

Apertura ante las nuevas tecnologías.

Confianza en la utilización de las nuevas tecnologías como instrumento de trabajo.

Importancia de cara a la formación continua.

ACTIVIDADES DE ENSEÑANZA-APRENDIZAJE.

Debate sobre la necesidad de la utilización de las nuevas tecnologías en el sector agrario.

Invitación a un profesional para hablar de esta materia.

ACTIVIDADES DE EVALUACIÓN.

Debe finalizar el MODULE con una carga motivadora, comprobando que al final de la misma los destinatarios están suficientemente preparados para utilizar el ordenador con fines profesionales.

BIBLIOGRAPHY

1. M. Bestratem. Seguridad en el Trabajo. Madrid. INST.
2. Gil y Molina del Amo: Seguridad e Higiene en el Trabajo. Ed. Everest.
3. I. Fernández Pinedo. Condiciones de trabajo y salud. Madrid. INST.
4. M. Alonso Olea. Derecho del Trabajo. Universidad de Madrid.
5. E. De la Paz Fuentes, J.L. Salido Banús. Aplicación práctica de la normativa laboral. Ed. Gestión 2000.
6. Mª. T. Cornejo Álvarez. Guía para encontrar un trabajo, un empleo o una ocupación. Ed. Oikos-Tau.
7. C. de la Fuente. Guía de mi primer empleo. Ed. Temas de hoy.
8. Ministerio de Trabajo y Seguridad Social. Creación de pequeñas y medianas empresas e inserción laboral. INEM.
9. Mike Gray, Noel Hodson, Gil Gordon. El teletrabajo. Ed. Fundación universidad-Empresa.

Work questionnaire

- You think that the education in the security area is efficient to avoid work accidents? Reason the answer.
- Identify the professional risks that the professional activity presents.
- Indicate which are the fighting techniques for the prevention of professional damages.
- Which are the general norms of acting in an accident?
- Enumerate the phases in a decision taking process.
- What content do the professional project should have?
- Which are the most used looking for job methods?
- Enumerate the main points in the elaboration of a company's plan.

EDUCATIONAL ITINERARY OF THE PRACTICES

Practical subject 1.

Doing a plant collection

General aim.

Know the principal crop plants and weeds that can be found in their work's areas.

Specific aims.

- Potentate the field observation capacity.
- Learn how to select, cut and pick plants in an adequate form.
- Use the keys and bibliography to classify plants.
- Apply correctly the pressing and plant's conservation techniques.
- Confectionate a herbarium once the plants are dried.
- Interpret the herbarium and know its applications.
- Determine some characteristics of the ground related to the plants that live in it.

Evaluation criteria.

- Analysis of the practical notebook.
- Analysis of the confectioning of a herbarium.
- Use the keys.

Practical subject 2.

Do a qualitative analysis of the soil.

Main aim.

Use an approximate process to know some of an specific soil characteristics.

Specific aims.

- Develop the observation capacity to determine some of the soil capacities and increment the selection and showing capacities.
- Know the qualitative elements of the soil: biotic, abiotic.
- Distinguish the soils for their different characteristics.
- Apply correctly the soil analysis techniques.
- Synthetise the obtained results.

Evaluation criteria.

- Determine correctly the soil parameters with the analytic measures.
- Describe and interpret the soil characteristics in relation to the done analytic:
  - Physical characteristics.
  - Chemical characteristics.
  - Ecological characteristics.
- Know the compensatory treatments that will increase the soil fertility in the long term in the different types of soils.

Practical subject 3.

Restructuring processes.

General aim.

Evaluate which are the main elements to take into account when talking of restructuring of a smallholding or ecological farm.

Specific aims.

- Determine the starting point.
- Know which are the main problems that will appear together with restructuring.
- Know the benefits on short, medium and long term that exists in the ecological farm.
- Establish the necessities of working hand in this process.
- Propose the modification that is consider basic in the production model.
- Specify how much time is needed to obtain the economical profitability of the process.
- Specify the type of cattle that will complement an ecological farm and its needs.

Evaluation criteria.

- Propose and define a system of associations and rotations equilibrated together with the established restructuring plan.
- Design a manuring plan.
- Design a sanitary protection plan.
- Design an alimentation and protection plan for the animals of the farm.
- Organise the space and time, as well as the most appropriate distribution of the agricultural labours through a campaign.

Practical subject 4.

Fabrication of compost.

General aim.

Dominate the working technique of heap compost.

Specific aims.

- Know how to recycle.
- Importance to the incorporation of organic material to the soil in the form of compost.
- Determine the advantages that the compost has in relation with the use of other types of organic material.
- Know the fermentation processes that are carried out during the compost process.
- Know the type of compost that is obtained in function to the duration to the composting process.
- Know the different uses of the different types of compost obtained in the process of the compost done.

Evaluation criteria.

- Know to confectionate a heap compost.
- Correct the errors that can be manifested during the compost process.
- Obtain the compost using different sources of organic material.
- Do a surface compost from the acquired knowledge through the heap compost.
- Develop the selection criteria of the most adequate composts to our needs and of our smallholding.

Practical subject 5.

Protected agriculture.

General aim.

Know the techniques of crops protection using greenhouses.

Specific aims.

- Know the different types of greenhouses, their advantages and inconveniences.
- Know the built methodology of a greenhouse.
- Know the procedural methodology with plants inside the greenhouse.
- Observe the developing of plants in a protected medium and take the consequences with the aim to fill the needs.
- Develop the comparison capacity between plants that develop protection means and the ones that appear in the outside.
- Put in functioning a greenhouse.

Evaluation criteria.

- Greenhouse conditioning.
- Installation of a watering system.
- Organisation of the crops in the greenhouses.
- Do a labour calendar.
- Develop the selection criteria and adequation to the needs of the smallholding and the season.

Practical subject 6.

Organisation of a farm and the seeding activities.

General aim.

Have a global vision on the organisation activities and the activities to do with horticultural crops in each season.

Specific aims.

- Stimulate the initiative and foreseen capacity in a long term when organising and distributing the plantations.
- Develop the organisation qualities when doing the different activities economising the time.
- Establish the comparative procedures in the activities and the results obtained as a consequence of them and comparing them month by month and season by season to improve the distribution and organisation of the farm on the long term.

Evaluation criteria.

- Organisation of the crops in the ground.
- Planification and realisation of bedding.
- Preparation of seeding bedding.
- Different types of seedbeds.
- Transplant and pricking of plants.

Practical subject 7.

Monitoring the crops.

General aim.

Know the management of the diverse crops taking into account the activities to do from seeding or plantation to recollection.

Specific aims.

- Design a specific labour plan for different crops and seasons.
- Organise a general labour plan that helps all the crops.
- Determine the moment of recollection of each crop.
- Capacity of management the time work.

Evaluation criteria.

- Planification of the maintenance and following of different crops labour.
- Application of the different time management techniques. Improve the organisation of the farm agricultural labours.

Practical subject 8.

Crops health.

General aim.

Know and apply the fighting methods against pests and illnesses as preventing and control methods.

Specific aims.

- Respect the natural deprecators understanding its advantages and disadvantages.
- Know the principal deprecators of the area of the most common pests of the crops in our farm.
- Know the important problems causes by:
  - Insects.
  - Fungus.
  - Other parasites.
  - Weeds.
- Establish the preventing strategies of fitosanitary problems considering them on the long term.
- Know the different palliative strategies and of control of the different fitosanitary problems.
- Know the used plants for their properties to fight against the different types of parasites.
- Know the principal types of weeds, their negative and beneficial aspects for each farm.

Evaluation criteria.

- Determine the moment of use of the different prevention and control methods depending of the crops health.
- Preparation of vitalising broth for plants.
- Different types of spuds. Advantages and disadvantages in each case.
- Palliative systems and of control of the principal fitosanitary desequilibriums.

Practical subject 9.
Pruning.

General aim.
Apply the modern techniques to prune the plants.

Specific aims.
- Understand the importance of pruning the fruit production and the maintenance of the tree.
- Know the aims of the pruning, its advantages and inconveniences.
- Know to apply where and how the correctly cuts.
- Use the disinfecting methods and wounds protection.
- Find structures that favorise nutrition and tree fructification in the long term.
- Use the pruning to recuperate damage trees.
- Take into account the influence of the moon when doing the pruning labours.

Evaluation criteria.
- Do cuts in the correct way.
- Use the preventing measures to avoid infections as a consequence of direct pruning.
- Apply the correct pruning to each type of tree.

Practical subject 10.

Grafting.

General aim.

Apply the grafting techniques in plants.

Specific aims.

- Understand the importance of grafting in the fruit production.
- Know the different factors that influents in the exit of the grafting.
- Know how to do the grafting.
- Know the most used grafting methods in fruit trees.
- Value the advantages and disadvantages if the different types of grafting to adequate the selection criteria.
- Know how to prepare sealing pastes.

Evaluation criteria.

- Do different types of grafting.
- Take prevention precautions to avoid problems of infections as consequence of grafting.
- Confectionate and apply sealing pastes.

Practical subject 11.

Ecological stockbreeding.

General aim.

Know the working methods to improve the installations, alimentation and stockbreeding practices.

Specific aims.

- Define the bases of a production system of ecological stockbreeding considering the rentability on the long term.
- Determine the stockbreeding load to support the ecological farm and the type of animals to use to the most the local natural resources.
- Plan the alimentation system and the nutrient origin that cannot be obtained in our farm.
- Organise a preventing and controlling plan of the main illnesses of the chosen animals.
- Value the importance of an adequate distribution of space in the farm.
- Quantify the necessary working hand to carry out all the precise activities.

Evaluation criteria.

- Do the space and time distributions that optimise the agricultural and stockbreeding productions.
- Describe which is the most common alimentation system for animals that you have worked with.
- Specify which are the preventing, protection and control of illnesses measures in your farm.
- Determine the stockbreeding load that is adequate to your necessities, specifying why.
-

Practical subject 12.

Apiculture.

General aim.

Know the working methods and the alimentation and management of beehives.

Specific aims.

- Know the advantages of bees in a farm.
- Determine the number of beehives that are necessary in a farm and their placement.
- Know the different types of beehives in the market and their advantages and inconveniences.
- Propose which would be the alimentation and maintenance labours as well as the preventing and palliative cares of the beehives.
- Know the basic management of bees/beehives.
- Organise a preventing and controlling plan of the main illnesses that can be found in beehives. Importance on medium terms the prevention of illnesses.
- Quantify the working hand needed to carry out all the activities.

Evaluation criteria.

- Describe which is the maintenance system in beehives.
- Establish an activity calendar for months in the maintenance of beehives.
- Establish on the medium term the preventing, protection and control of most common illnesses measures in a beehive to improve a farm's organisation.
- Determine the number of beehives that is more adequate in the farm that we have worked in.
- Confirm that its placement and alimentation is the adequate to obtain healthy bees and beehives, compensating the quantitative benefits in out farm.

Practice subject 13.

Conservation and transformation processes.

General aim.

Enter in contact with the used methods in ecological agriculture to keep and transform the products and value the importance facing the market and the consumer.

Specific aims.

- Understand the simplest techniques of food transformation.
- Know the diverse techniques of food conservation.
- Value the importance that conservation and transformation has from an economical point of view.
- Organisation space/temporal of the farms jobs integration.
- Qualify the needed working hand to present the food in the market and the importance of the guarantee.

Evaluation criteria.

- Describe which are the conservation systems considering the advantages and disadvantages of the farm products.
- Do a simple food transformation.
- Describe the different presentation systems facing the market and the consumer.
- Value the importance of the local markets and the quality markets: considerations in the long term.

Practice subject 14.

Initiation to the new technologies.

General aim.

Understand the importance of the new applied technologies to ecological agriculture and enter in contact with the computers world to understand the functioning of the computers and some working systems that can be applied to the field.

Specific aims.

- Understand the importance of computers and the communication with other farmers and possible clients. Personal treatment guarantee.
- Determine the working areas that can be applied to.
- Value the importance that the educational process has in the interchange process and the resolution of common problems to the different ecological stockbreeding.
- Manage in a basic way the needed programmes to use with the computers to control the production day by day, expenses, costs and evaluation of the prices of different products.
- Value the use of new technologies as a work instrument.

Evaluation criteria.

- Use of basic programmes to manage the data and access to the Internet.
- Capacity to change information with other groups.
- Aptitude to assimilate the information.