European MSc Agroecology

120 ECTS

2 year MSc Programme

- Overview of semesters and modules -

Semester 1: NMBU, Norway

The course in the first autumn semester, 'Agroecology: Action learning in farming and food systems' (PAE302; http://www.nmbu.no/course/pae302 is set up according to two important system levels: the farming system and the food system. Three main themes will be:

Production ***Ecology*** ***People***

The course consists of experience with real-life cases, lectures, literature seminars, workshops and other activities. Depending on the nature of the activities, they are carried out individually, in groups or in plenary. For the most part, at least one day each week will be kept free of plenary class activity. The two first weeks consist of introductory topics and preparation for a subsequent involvement in real-life cases. Then the courses are thematically and practically structured according to a stepwise process of participatory systems inquiry. The last period consists of oral presentations by students, writing of reports, evaluations and an oral exam.

Case projects

The basis for experiential learning in the course is work in groups of about five students in open-ended cases where the local communities participate in a government-supported project to foster organic farming and food systems locally. The case project encompasses about half of the workload. The students will write for their clients a *group report* containing description, analysis and suggestions for improving the situation. The students will also write an individual *learner document*, which is supposed to contain description and reflection on the experiences from the casework and their links to relevant theory. The experiences to be dealt with are those related to the structure and functioning of the farming and food systems ('content') as well as those related to the methodology of participatory systems inquiry and action learning ('process').

Lectures, literature seminars and workshops

Lectures will be given to provide context and methodology for the casework and to address specific topics on demand as identified by the students. Lectures usually last for about one or two hours. They will often be followed by individual and group work (one to two hours), including a plenary discussion concerning key questions and the relevance of the lecture for the case project. The classroom sessions will normally take place between 9 a.m. and 4 p.m. There will also be a number of student-led literature seminars focused on relevant theory on farming and food systems and on methodology for systems inquiry. In teacher-facilitated workshops in class, the student groups will practice application of selected concepts and methods in their casework.

Plenary reflections

Plenary reflection sessions will take place every week. The main purpose is to link experiences to relevant theory and to enhance group and individual learning.

U1. Agroecology: Action learning in farming and food systems

Course contents:

The course consists of two interlinked parts: a group-based real-life project work and an individual reflection on the project work. The real-life project work includes description, analysis and redesign of farming and food systems. Lectures and seminars deal with agroecology, ecological (organic) agriculture, local and global food systems, systems thinking, learning, action research methodology, interview techniques, visionary thinking, creative problem solving, group dynamics, facilitation, agroecosystems structure and functioning from farm to global scales, sustainability in production, environmental, economic and social perspectives, ecological principles of farming and food systems design, systems ecology, food distribution, consumer issues on food, and food security. Students write one group report for their farmer clients and one for their food system clients. They also write an individual report where they reflect on agroecological issues of the project work as well as their own learning while preparing the group reports.

Learning outcomes:

After completing the course, the students should know how to: - Describe and analyse farming and food systems, - link theoretical knowledge and concrete action, - acquire knowledge about their own learning. Further, the students should acquire: - Knowledge of structure and functioning of conventional and alternative (e.g., organic and local) farming and food systems, - knowledge of links between disciplinary (sub-system) knowledge and systemic (holistic) approaches, - experience with methods for systems analysis and improvement, including assessment of sustainability within a methodology of participatory action research, - the ability to handle complexity and change, - the ability to link theory to real-life situations, - the ability to communicate and facilitate, - the ability to learn autonomously and life long, - experience in dealing with attitudes as part of the agroecosystem and the learning community. Through real-life case studies with focus on change processes, attitudes of both students and actors in the farming and food systems will be made explicit. The students will learn how to deal critically and constructively with attitudes and value-based choices as important system elements. Desirable attitudes of the students: open-minded, critical, spirited, determined, approachable, exploring and communicative.

Semester 2: Partner Universities

Semester 2: Students can choose among different universities

Goal: To deepen their knowledge in different topics/subjects
Semester focus: Detailed information in specific disciplines that are needed to expand prior knowledge on systems evaluation and design and to become confident professionals. The students will gain specific knowledge, tools and methods depending on the courses offered at the different universities.

Please contact the programme coordinator to get more information about the following options as modules at these universities can vary from year to year.

- **University of Hohenheim, Stuttgart, Germany**
- **University of Kassel-Witzenhausen, Germany**
- **University of Natural Resources and Life Sciences, Vienna, Austria**
- **University of Wisconsin, Madison, USA**
- **University of Florida, Gainesville, USA**
- **Florida International University, Miami, USA**
- **Iowa State University, Ames, USA**
- **ESALQ, Sao Paulo, Brazil (courses in Portuguese)**
- **University of Chapingo, Mexico (courses in Spanish)**
- **NMBU, University of Life Science, Norway**
- **ISARA Lyon, France (courses in French or English)**

Semester 3: ISARA (FESIA), France

Semester 3: All students enrol at ISARA, Lyon, France

Goal: Learn project management and expand on application of agroecological science in real-world situations. The students will learn to put together theoretical knowledge and past experiences to work in farming and food systems.

Courses at ISARA, France will start with a field trip to a selected region in France. Students will visit different stakeholders to analyse specific question on landscape and agricultural management such as constraints and potentials of the prevailing cropping and livestock production systems, or landscape and biodiversity management systems. In the second module, students will gain applied knowledge on different agroecological cropping practices such as conservation tillage, direct seeding, intercropping, cover crops, and biological control.
The third module deals with the world ecosystems and their prevailing agricultural systems, but also with influencing factors such as economy, politics, land tenure or social issues. Students will learn which resource conservation techniques are feasible in the different agroecosystems, but also what role indigenous knowledge of farmers plays in traditional and modern agriculture.
The fourth module deals with the management of agroecosystems and implication from policies and nature conservation. Topics dealt with are for example agri-environmental measures, international conventions impacting agriculture, protected areas and agriculture, and ecological corridors in agricultural landscapes.
In the project management module, students will deal with different real -life projects. In groups they will analyse a demand from an external client or a research project during the whole semester. The objectives are to use different methodological and project management tools, and to apply disciplinary knowledge acquired in previous courses.

Agriculture and landscape management in a particular agricultural region	4 ECTS
Agroecological cropping practices	7 ECTS
World ecosystems and agricultural use	5 ECTS
Management of agroecosystems: implications from policies and nature conservation	6 ECTS
Group project management	8 ECTS

Module 1. Agriculture and landscape management in a particular agricultural region
Number of credits: 4 ECTS
Name of module coordinator: M. Moraine/A. Wezel

Students will start this semester with a one week excursion and group studies in a selected region in France characterised by different environmental and agricultural production issues. Before this, they will get introductory lectures to the area and will be prepared with methodological tools (landscape analysis, agricultural production systems analysis, interviews) to carry out a group work. At the beginning of the field trip they will meet different stakeholders to understand the agricultural, economic and environmental characteristics of this area. After this, they will visit and inquire in different groups other stakeholder to analyse specific question such as constraints and potentials of the prevailing cropping and livestock production systems or landscape management system. Other topics will be the role of rural tourism, potential conflict issues such as nature conservation or water

contamination, and rural development policy. A general feedback will be given by the groups of students in presenting their findings and analyses and discussed with the teaching staff.

Module 2. Agroecological cropping practices
Number of credits: 7 ECTS
Name of module coordinator: A. Ferrer

This course will deal with different agroecological practices in cropping systems. As most of these practices are based on valorising and optimizing ecosystem services, it will begin with an introduction to these services. Then, various lectures will deal more specifically on how ecosystem services regulate and support soil biota as well as on non-soil functional species groups including insects or plants. To deepen the knowledge gained in these lectures, a field visit and fieldwork will be carried out through soil quality assessments and the identification of beneficial soil, insect or plant biota. The field experience will be linked to different lectures about agroecological cropping practices such as intercropping, cover cropping, conservation agriculture (no tillage and permanent cover), sustainable crop rotations and biological pest control. Students will understand the role of agroecological cropping practices and learn about state of the art materials and agroecological innovations. This module is based on lectures, field visit and a seminar. For the seminar, students will conduct a literature study on topics related to the module and present their findings to colleagues and professors.

Module 3. World agroecosystems and agricultural use
Number of credits: 5 ECTS
Name of module coordinator: A. Wezel

In this module, students will learn in lectures and in a seminar the basic characteristics of the world's agroecosystems (climate, soils, vegetation) and their prevailing agricultural systems. This includes the presentation of different cropping and livestock husbandry systems and their interactions in the Tropics and Subtropics, but also in Temperate and Mediterranean Europe (e.g. agropastoral land use in the Sahel, shifting cultivation and tropical forest use, rangeland systems in France). In addition a critical analysis of influencing factors such as economy, politics, land tenure or social issues will also be provided. More in-depth studies on different agronomic innovations such as agroforestry will be additionally presented. Finally, students will learn which resource conservation techniques are feasible in the different agroecosystems, but also what role indigenous knowledge of farmers plays in traditional and modern agriculture.

Module 4. Management of agroecosystems: implications from policies and nature conservation
Number of credits: 6 ECTS
Name of module coordinator: A. Wezel

Management of agroecosystems is the central question for sustainable agriculture. In this module, implications from polices and nature conservation will be presented and analysed. It will be started an overview about the main present agricultural policies in Europe which are directly connected with agriculture, and how they impact on the management of agroecosystems. A special focus will be on agro-environment measures. A second topic with lectures and discussions will be biodiversity and agrobiodiversity, and its management in agroecosystems. In a third step, different options for global agroecosystems/environmental management such as international conventions (e.g. Convention on Biological Diversity, Ramsar-Convention, Convention to Combat Desertification) and international and national

attempts for nature and resource conservation will be presented. In addition, a course and an exercise on ecological corridors will be provided. Finally, students will have to use the acquired knowledge to develop a topic related to agroecosystems management, and present it in a poster session to the other students.

Module 5. Group project management
Number of credits: 8 ECTS
Name of module coordinator: A. Wezel

In this module, students will deal with different real-life projects. In groups they will analyse a demand from an external client (technical institutes, regional agricultural departments, research centres, associations, private companies) or from a research project at ISARA during the whole third semester. The objectives are to use different methodological and project management tools (defining leadership, time schedule, deliverables), and to apply disciplinary knowledge acquired in previous courses (semester 1 and 2). In addition a self-evaluation process of the students is implemented (contribution to the team work, assessment of the function in the group). The self-evaluation can be carried out either during an interview with the module coordinator or with a written document. The principle group work will be a literature review, field work or surveys in order to qualitatively and quantitatively analyse collected data, and discussion of their findings in group presentations with the external or internal clients.

Semester 4: Master Thesis

Number of credits: 30 ECTS

The Master's thesis is made during the 4th and last semester of the MSc Agroecology.

It consists of

- 6 months research work on a topic with a research center, company, university or organization in the related field.
- a written report
- an oral defence

All students registered for the double degree programme carry out their master thesis under the supervision of one supervisor from NMBU and one supervisor from ISARA (or FESIA).

ISARA-Lyon will provide offers of Master's theses, but students can also find other opportunities if they wish.

The subject is proposed by the students and agreed upon by the supervisors.

The **objectives of the Master's thesis** are as follow:

- Independent realisation of a research project on a topic related to agroecology.
- Ability to apply theories, concepts and methods acquired during the study programme, to document the application and reflexion of research methods, as well as to develop research questions and hypotheses and reflect on them within an international research context.
- Ability to present and explain the planning and progress of the thesis and the methods used for the research.
- Ability to present and defend the work of the thesis in a master thesis defence.