RESAD – Resources, Agricultural Systems and Development

Coursework Objectives

The "Green Revolution" and development assistance aiming to promote forms of "modern agriculture" (inputs, selected varieties, mechanisation, etc.) have done little to benefit poor smallholder farmers in developing countries. The goals of food security and economic and social development have not been attained (and do not seem likely to be attained anytime soon). At the same time, the modes of managing milieus and natural resources that have been promoted have all too often turned out to be ecologically unsustainable: multiple forms of pollution, erosion (of soil, biodiversity), dependency on non-renewable or dwindling resources (phosphates or petrol, etc.).
The current results are that, among other things, (i) the majority of the 850 million undernourished men and women on the planet are farmers (and their families) who live in developing countries, and (ii) in these same regions, environmental damages and the ripple effects on human health have been numerous and are sometimes irreversible.

Yet, among these rural populations – the poorest in the world – many peasant communities have developed agricultural systems that are both effective and sustainable, despite sometimes strong environmental constraints. These agricultural systems are, among other things, extremely diverse and often very far from the immobilism sometimes attributed to them: smallholder farms in the Red River Valley that feed a population of more than 1,000 inhabitants per square kilometre and large Brazilian plantations farming thousands of hectares able to compete with the agricultural systems of developed countries are both "developing country agricultural systems"!

This broad "duality" is therefore what characterises developing country agricultural systems. While many show remarkable ability to adapt to their environments, they are not very competitive and this inability to compete is weakening them even further every day. The ecological and social consequences of the most economically efficient systems are often problematic: degradation of resources and ecosystems, poverty, rural exodus, unemployment, etc.

The RESAD course of study aims to train agronomists to:

- understand and assess agricultural systems taking into account their technical, ecologic, economic and social dimensions;
- propose and support changes for and with farmers that aim to improve the economic sustainability of the most ecologically efficient agricultural systems and the ecologic and social sustainability of the most economically competitive agricultural systems; and
- define and manage development projects and programmes.

General Course Organisation

The RESAD coursework is devoted to the study of agricultural and rural development dynamics in Mediterranean and tropical zones. It provides the knowledge, methods and tools to *(i)* analyse and assess agriculture on the regional scale, and *(ii)* identify and lead interventions that support or guide agriculture towards economic, ecologic and socially sustainable development.

The skill areas developed in the RESAD coursework focus specifically on technical agricultural production systems viewed on the scale of individual farms and on territorial scale as well as in the context of the systems' interactions with the surrounding ecological, economic and social

environment. The coursework is organised in several multidisciplinary teaching units (UE, or “unités d’enseignements”):

1. AGRARIAN SYSTEMS AND AGRICULTURAL DEVELOPMENT (UE R1) – Using the comparative agriculture approach, the aim is to analyse and understand an agricultural system. That is to say, identify the various types of farms and the problems each one faces, and understand their interactions and how they contribute to sustainable development.

   This sequence includes an initial field internship of a limited duration (2 weeks) to diagnose the diversity and dynamics of agricultural systems on the scale of a small region.

2. DESIGNING AND SUPPORTING CHANGES ON FARMS (UE R2) – The aim is to design and support technical and/or organisational changes on farms; in particular changes that foster synergy between cropping and animal rearing activities so as to limit the use of industrial inputs. To accomplish this, the following are covered successively: *(i)* analysing the technical functions of a farm, modelling the farm, and assessing it; *(ii)* producing an ex ante simulation of changes to measure their impacts in a systemic manner; and *(iii)* designing and implementing (individual and collective) advice for farms.

   Particular attention is paid to the methods, tools and know-how for interactions with farmers.

3. AGRO-ECOSYSTEMS, ECOLOGICAL INTENSIFICATION AND NATURAL RESOURCE MANAGEMENT (UE R3) – Based on knowledge of how biophysical milieus are organised and operate in tropical and Mediterranean regions, the aim is to (i) propose methods by which to diagnose and assess agro-ecosystems in these regions; (ii) study the interactions that exist between the conditions in the milieu and farming modes (including the social dimensions relating to natural resource management), and (iii) analyse the effectiveness and sustainability of the technical systems in ecologically intensive agricultural production.

4. APPROACHES, METHODS AND TOOLS FOR INTERVENTIONS WITH GROUPS (UE R4) – The aim is to design and lead interventions and/or projects that help farmers move towards sustainable development. Centred on (i) intervention methods and tools (project advice, territorial governance, empowerment, etc.) and (ii) intervention postures in regard to groups. This sequence combines classes and case studies supervised by researchers and agricultural development professionals so as to best illustrate professional practices and intervention professions. Individual work will allow the students to study in depth the question of co-elaboration of agricultural and rural development interventions.

5. SUSTAINABLE DEVELOPMENT REFERENCE SYSTEMS, INDICATORS, AND ASSESSMENT (UE R5) – The aim is to develop the capacity to integrate the issues specific to agricultural production and agrifood issues. The teaching provides a shared reference system to (i) understand the stakes behind quality approaches and certification, (ii) understand the challenges involved in sustainable natural resource management and environmental assessment principles, and (iii) report on and assess interventions in the overall framework of sustainable development.

6. PROFESSIONAL PRACTICE / GROUP INTERNSHIP (UE R6) – The methods and tools acquired during the year will be put into practice during a second field internship abroad in a tropical or Mediterranean area. Conducted in a professional context – that is to say, in response to a request from a company, NGO or research institution – this group internship gives rise to the production of a written report submitted to the party commissioning the study.

RESAD Teaching Staff

Name	***Position and Field of Expertise***
Isabelle MICHEL *Lecturer*	Head of RESAD Coursework *Agronomics: farms, agroforestry*
Sébastien BAINVILLE *Lecturer*	Co-Head of RESAD Coursework *Agronomics: comparative agriculture, agricultural development*
Claire AUBRON *Lecturer*	*Animal husbandry: comparative agriculture, agricultural development*
Stéphane de TOURDONNET *Lecturer*	*Agronomics: cultivated plots, territorial agronomics, conservation agriculture*
Claire MARSDEN *Lecturer*	*Biology and ecology of soil, agro-environmental modelling, remote sensing*
Charles-Henri MOULIN *Engineer with GREF*	*Animal husbandry: farms, stock farming systems*
Olivier PHILIPPON *Research Engineer*	*Agro-ecology, soil science*
Elisabeth RASSE-MERCAT *Research Engineer*	*Agro-economy: comparative agriculture, project management*
Fabien ZECCHINO *Professor of English*	*Head of Languages* *English teaching*
Mireille ALAUZEN *Training Assistant*	*Pedagogic Assistant RESAD*
Evelyne PANNETIER *Training Assistant*	*Administrative Assistant – Master Students*
Gisèle ANDRE *Training Assistant*	*Public relations, orientation and guidance of foreign students*

Associate Researchers

- Jean-Marc BARBIER, agronomist, INRA – UMR INNOVATION
- Guy FAURE, economics and management, CIRAD – UMR INNOVATION
- Pierre-Yves LE GAL, agronomist, CIRAD – UMR INNOVATION
- Jean-Claude MOURET, agronomist INRA – UMR INNOVATION
- Christophe SOULARD, geographer INRA – UMR INNOVATION

UE R1

AGRARIAN SYSTEMS AND DEVELOPMENT

ECTS CREDITS: 9

Keywords: agrarian history, agrarian systems, economic development, agricultural policy

Course Goals:

Analyse the conditions that allowed or did not allow the agricultural sector to contribute to economic development in various historical and geographic contexts.

Agriculture is approached in all its complexity:

- Technical: ecosystems cultivated, cropping and stock farming systems, production systems;
- Social: types of farms, how access to resources is managed;
- Economic: price relationships, agricultural policy.

General Organisation and Programme:

The relationships between agriculture and development are addressed through a historical approach covering the following major geographic zones:

- Europe and the USA;
- Africa;
- Latin America; and
- East and Southeast Asia.

The last part of the UE focuses on today's major agricultural challenges: trade liberalisation, land investment, world hunger, etc.

The UE begins with a group internship in the field: two weeks on the diagnostic analysis of an agrarian system in a region of southern France.

The following 5 weeks alternate classes and individual reading.

Assessment in the Module:

1 – Internship report by groups of 4 to 5 students; and

2 – Individual written examination covering the content of the course and readings.

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UE R2

DESIGNING AND SUPPORTING CHANGES ON FARMS

ECTS CREDITS: 5

Keywords: technical production system, mixed crop-livestock systems, modelling, assessment, design, ex ante simulation, decision assistance, advice

Course Goals:

The aim is to train students in how to design and support technical and/or organisational changes on farms based on in-depth analysis of existing situations. We focus in particular on changes that foster greater synergy among crop and animal husbandry activities on the farm so as to limit the use of industrial inputs.

This goal can be broken down as follows:

- know how to analyse and depict the technical operation of a farm by examining in depth the current or potential interactions between crop and animal farming activities;
- model and assess the existing situation, then perform an ex ante simulation of the introduction of changes to measure their impacts in a systemic manner;
- know the different farm advice methods;
- acquire basic mastery of digital tools to support and build advice systems; and
- acquire technical skills, methods, tools and know-how when it comes to interacting with farmers.

General Organisation and Programme:

The UE covers a period of 4 weeks and is structured in 2 modules.

1 – **Module 1:** *Introduction to implementing technical decision assistance approaches (3 weeks)*

2 – **Module 2** – *Mobilisation of tools and introduction to elaborating advice systems (1 week)*

Teaching Methods and Evaluation:

Conceptual work alternates with field application on land near Montpellier with a panel of farmers who integrate agriculture and stock farming more or less closely. Supervised practicums focus on specific case studies in tropical regions.

For the entire UE: practicum report + practical work / course = 50%; group work report / individual work = 50%.

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UE R3

AGRO-ECOSYSTEMS, ECOLOGIC INTENSIFICATION AND NATURAL RESOURCE MANAGEMENT

ECTS CREDITS: 6

Keywords: agro-ecosystem, ecological intensification, natural resources, environment, soil cover, bio-indicators, soil fertility, modelling, remote sensing, GIS

Course Goals:

- Enrich students' knowledge of the nature, organisation and operation of agro-ecosystems in hot regions. Introduce students to the problems inherent in farming these regions. Insist on the interactions between the conditions in the area and farming modes, notably in terms of the impacts that practices have on natural resources.
- Propose methods to diagnose and assess these agro-ecosystems. The methods proposed favour direct observation at the various levels of organisation within the milieu.
- Provide methodological elements to take into account the social dimension of natural resource management.
- Analyse the effectiveness and agro-ecological relevance of technical systems targeting the ecological intensification of agricultural production: associated crops, crop and livestock associations, agroforestry, conservation agriculture.

General Organisation and Programme:

The UE (teaching unit) is subdivided into 3 modules:

1 – diversity and specificities of tropical, arid and Mediterranean milieus;

2 – agro-ecosystems in tropical, arid and Mediterranean milieus: analysis and assessment methods; and

3 – ecologic intensification of agricultural production and social management of natural resources and the environment.

Assessment in the Module:

Case study (group work analysing documents + GIS and remote sensing, 40%); supervised practicum report (30%); individual written examination (30%).

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UE R4

APPROACHES, METHODS AND TOOLS FOR INTERVENTION WITH GROUPS

ECTS CREDITS: 4

Keywords: project management, intervention with groups, advice, territorial governance, empowerment

Course Goals:

Provide students with the theoretical and methodological capacities needed to support processes of technical and organisational change in rural milieus and intervene in support of sustainable development—that is to say development that is economically viable, ecologically effective, and socially equitable.

General Organisation and Programme:

The course is centred on intervention methods and tools (projects, advice, territorial governance, empowerment, etc.) and intervention postures in regard to groups.

The training, which alternates between theoretical and methodological coursework and hands-on practice in real situations, is divided into two modules:

1. Implementing agricultural and rural development projects; and
2. Postures and tools for interventions with groups (2 weeks). Three possible entry points for intervention with groups are analysed:
   - advice systems and actor support;
   - territorial governance; and
   - actors' empowerment, notably for the poorest.

Finally, individual work will allow the students to study even further the question of co-construction through the use of a guide allowing them to analyse and discuss the co-construction situations presented in the various interventions.

Assessment in the Module:

Based on an examination (project management) and the submission of individual work.

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UE R5

SUSTAINABLE DEVELOPMENT REFERENCE SYSTEMS, INDICATORS AND ASSESSMENT

ECTS CREDITS: 4

Keywords: **sustainable development, standards, reference systems, quality, fair trade, certification, multidisciplinarity, environment, life cycle analysis (LCA), assessment**

Course Goals:

Four weeks of training cover the links between agriculture, agrifood and sustainable development reference systems. The aim is to develop the capacity to integrate both the issues specific to agricultural production and agrifood issues. The teaching provides a shared reference system through which students can:

- understand quality process and product certification challenges and issues;
- understand the challenges and principles of environmental assessment; and
- report on and assess interventions in the overall framework of sustainable development.

General Organisation and Programme:

The UE is structured in four independent modules lasting one week each:

- sustainable development reference systems;
- quality processes and product certification;
- sustainable development and the environment; and
- assessing development sustainability.

Assessment in the Module:

Individual written evaluation.

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UE R6

PROFESSIONAL PRACTICE: GROUP INTERNSHIP IN RESPONSE TO A REQUEST

ECTS CREDITS: 2

Keywords: training-action, farms and territories

Course Goals:

- Test the theoretical and methodological learning acquired during the year's coursework through professional hands-on practice.
- Acquire the skills to respond to a professional request for services.
- Acquire operational skills to analyse field situations.
- Solidify the know-how from the group work based on the interaction of different survey and analysis groups.

General Organisation and Programme:

The UE is structured by a group internship elaborated in partnership with a professional organisation or a research/development project. The UE is organised in various stages:

- demand analysis; bibliographic research and synthesis;
- framing the issues and elaborating the working method;
- conducting field observations and interviewing farmers and other resource people;
- data processing and analysis; and
- submission of an oral report to the commissioning party and various actors involved; production of a written summary report.

At each of these stages, the necessary theoretical knowledge will be provided. The field work and analysis are supported and supervised closely by the teachers.

This UE is conducted in preference in the field in a developing country (2 weeks).

Assessment in the Module:

- Individual evaluation / involvement in the work.
- Assessment by group based on the output from the study (summary sheets, oral and written reports).

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