

## ***Climate, Land-Use and Ecosystem Services (CLUES)***

### **A new Master of Sciences programme offered by AgroParisTech / Paris-Saclay University**

Terrestrial ecosystems are a core component of the climate system and a key provider of services to human societies via their production of biomass for food and fuels or their regulation of environmental resources. As the demand for these services is rapidly growing, these ecosystems have been manipulated and managed to an unprecedented extent, via changes in land occupation and use worldwide, in particular for agricultural and forestry purposes.

Facing up to the current ecological challenges thus requires a careful understanding of ecosystem processes and services to design and implement management strategies that enhance ecosystem services in a changing global environment. The economic sectors targeted include agriculture and forestry but also the agri-food sector, energy and the bio-economy in general, while the programme will also be relevant to policy-making in the area of environmental regulation and natural resources management, from local to global scales.



The overarching objective of this MSc programme is to provide students with the scientific knowledge, know-how and skills necessary to understand the functioning of terrestrial ecosystems in response to major

drivers such as climate change, land-use change patterns and ecosystem management technologies. Graduates from this programme will possess in-depth knowledge of biosphere-climate interactions, acquire methods to assess ecosystem services, and be fully aware of the panel of technological options available in terms of land-use planning management to promote the sustainable development in rural and semi-urban areas.



Courses will promote integrated approaches through a multi-disciplinary curriculum combining natural sciences (climatology, bioclimatology, soil science, ecology), social and economic sciences and advanced courses in data management, analysis and modelling. The capacities of students to synthesize and integrate information from a range of sources and knowledge from these different disciplines will be fostered through the development of projects related to climate and ecosystems in case-study areas, based on state-of-the-art methodologies to involve local stakeholders and proponents.

#### ***Job market***

Graduates from this MSc will be fully equipped to gain positions in research & development bodies focusing on climate and environmental issues at local to global scales.

Opportunities are also expected with local authorities and national agencies overseeing natural resources and the environment in general (eg ADEME in France, or Water Boards). The expertise of MSc graduates will also be relevant to international agencies or institutes (such as the CGIAR), given the international background and scopes of this programme..

Private companies providing environmental services or consultancies should also provide career opportunities, as well as the agricultural and forestry sectors.



### **Course structure and pedagogy**

The duration of the MSc is 1 year, comprising a semester of core and elective courses, and a 6-month internship. The first semester is organized into 3 core modules on:

1. Biosphere-climate interactions at local to global scales
2. Global agronomy, land-use planning and modelling
3. The assessment of ecosystem services

Other compulsory courses include an introduction to climate systems, the response of ecosystems to global changes, and a course on the social, policy and economic aspects of climate change mitigation. Elective courses include among others *Numerical modelling*, *Urban agriculture*, *Natural resources*, *food security and poverty alleviation*, or *Soil organic matter management*.

Overall, the pedagogy combines face-to-face lectures with hands-on approaches involving practicals, field trips and individual projects

running through the first semester. The international background of the is fostered by a series of seminars given by world-renown scientists and practitioners on topics relevant to the scope of the Msc. Language classes will also be offered (in French and English).

### **Partnership**

Courses will be taught by professors from various institutes and Universities taking part to UPSay: Polytechnique ParisTech, AgroParisTech, UVSQ, INRA, CIRED, CEA, CNRS.

International experts (eg, Alain Vidal CGIAR) will contribute lectures, case-studies or individual coaching to the students.

### **Application and practical details**

Applications are invited from both French and international students to foster a global approach to the topics covered by the MSc. Courses will be taught in english (with a B2 proficiency as a pre-requisite). Applicants should hold a Bachelor degree and have subsequently validated 2 semesters at Master's level. Classes will be held in Paris (AgroParisTech Claude Bernard location), and student accomodation is available.

### **Contact persons**

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