

## Ecosystem Management and Policies

Course title - Intitulé du cours	Ecosystem Management and Policies
Level / Semester - Niveau /semestre	M2 / S2
School - Composante	Ecole d'Economie de Toulouse
Teacher - Enseignant responsable	Marion DESQUILBET —François SALANIE
Other teacher(s) - Autre(s) enseignant(s)	Bård HARSTAD
Other teacher(s) - Autre(s) enseignant(s)	Laurence HUC (toxicology)
Other teacher(s) - Autre(s) enseignant(s)	Pierre LEBAILLY (epidemiology)
Other teacher(s) - Autre(s) enseignant(s)	Denis COUVET
Other teacher(s) - Autre(s) enseignant(s)	
Lecture Hours - Volume Horaire CM	30
TA Hours - Volume horaire TD	0
TP Hours - Volume horaire TP	0
Course Language - Langue du cours	English
TA and/or TP Language - Langue des TD et/ou TP	

### Teaching staff contacts - Coordonnées de l'équipe pédagogique:

Marion DESQUILBET: MS 206. Meeting on appointment, please mail to [marion.desquilbet@inra.fr](mailto:marion.desquilbet@inra.fr)

François SALANIE: MS216. Meeting on appointment, please mail to [francois.salanie@inra.fr](mailto:francois.salanie@inra.fr)

### Course Objectives - Objectifs du cours :

The rapid growth of human activities in the past fifty years has had profound effects on other species and on ecosystems, on which our own survival depends. Policies for environmental management are increasingly concerned by such biological and ecological issues, as witnessed for instance by new laws on biodiversity adopted by many countries (including France), or the debates on GMOs, pesticides and antibiotic resistance. This class aims at providing the students with a set of tools to analyze the numerous issues that arise when economic activities involve living beings. The goal is to identify the sources of externalities and discuss the appropriateness of alternative policy instruments in a number of qualitatively different settings, such as the management of forests, livestock, fisheries, and ecosystems, and the use of pesticides, medical drugs, and genetically modified crops. To this end, ecology models will be introduced into otherwise standard economics models, and examples of successful and unsuccessful policies will be discussed. At the end of the class, students should be able to gather resources and data on ecological/economic issues, to analyze them, and to provide advices about policy design.

### Prerequisites – Pré-requis :

There are no prerequisites. We like rigor and enthusiasm.

## **Practical information about the sessions - Modalités pratiques de gestion du cours :**

Be on time. Participate. Be active.

## **Grading system - Modalités d'évaluation :**

20% of the grade is determined by attendance and participation; 50% of the grade will be determined by an individual term paper that aims at evaluating real policy in the light of the course material, and 30% by a final written exam.

1) Participation and attendance: be on time, participate.

2) For the term paper your mission is to:

- Choose a real regulatory policy (or law) related to an ecological or biological issue: for example, a policy against deforestation in Brazil, against over-fishing in Iceland, for protecting wetlands in Great Britain, for protecting ecosystems against invasive species, for regulating the use of genetically modified crops, for managing antibiotic prescription practices, etc...

- Write a report on this policy, as if you were the advisor in charge of evaluating the policy: first a summary of the situation, then a diagnosis of the policy, finally some suggestions for reform.

In particular, in the report you need to accurately identify the sources of economic and ecological/biological issues:

- for the economic issues this means identifying the externalities and the sources of these externalities: this should be quite straightforward since you are already familiar with this concept

for the ecological/biological issues this means describing in what ways there is mismanagement of the ecological/biological resource at hand (the forest, the stock of fish, an invaded ecosystem, the biodiversity in a given ecosystem, ...), and the reasons for this mismanagement; for instance, is it because property rights are not well defined? is it because information about the population is missing? is it because the reproductive season is disrupted by human activity? is it because the habitats are becoming too fragmented? etc.

The second part represents the element of this course which is meant to give you an edge in the competition for jobs in companies and organizations that evaluate economic and ecological consequences of human activities. Since this is likely the first time you are getting acquainted with ecological/biological issues, we will clearly not expect you to fully master these concepts. Instead, view it as an opportunity to combine insights about the economic consequences of human activities with some insights about their ecological/biological consequences. The report should refer to relevant theory and to any relevant data that you'll find on the Internet. The report should include at least 10 pages written by you (this excludes for example tables or graphs that you reproduce from other sources), and a bibliography. You may also propose a modelling of the situation, but only if it is useful to your report.

3) The final exam: This will be a short exam (two hours), with mathematical problems that will resemble problems solved during the course.

## **Bibliography/references - Bibliographie/références :**

A useful and simple reference is: Perman, R., Y. Ma, M. Common, M. Maddison, and J. Mc Gilvray (2011), *Natural Resource and Environmental Economics*, 4th edition, Addison Wesley, Harlow. (Chapters 14, 17, 18). Additional references will be provided on the course moodle.

### **Session planning - Planification des séances :**

The class will take place from January 2019 to March 2019. The class is organized by theme:

François SALANIÉ, with participation of Bård HARSTAD (15h):

Environment and Biodiversity:

S. Polasky, C. Costello, and A. Solow. 2004, *The Economics of Biodiversity*, volume 3 of *The Handbook of Environmental Economics*, editors: K. G. Maler and J. Vincent, series editors: K. Arrow and M. Intriligator. North Holland, Amsterdam, 2004.

R.N. Stavins, 2011, The problem of the commons: still unsettled after 100 years, *American Economic Review*, Vol. 101, No.1, pp. 81-108.

Fisheries:

C. Costello, S.D. Gaines, and J. Lynham, 2008, Can catch shares prevent fisheries collapse?, *Science* 321, 1678.

C.A. Grainger and D.P. Parker, 2013, The political economy of fishery reform, *Annual Review of Resource Economics*, 5:369-386.

EU report, Facts and Figures on the common fisheries policy, 2018.

FAO report, 2016, The state of world fisheries and aquaculture.

Epidemiology and antibiotics:

P.Y. Geoffard and T. Philipson, 1996, Rational epidemics and their public control, *International Economic Review*, Vol. 37, No.3, pp. 603-624.

P.Y. Geoffard and T. Philipson, 1997, Disease eradication: private versus public vaccination, *American Economic Review*, Vol. 87, No.1, pp. 222-230.

A. Munro, 1997, Economics and biological evolution, *Environmental Economics*, 9, pp. 429-449.

O'Neill, J., 2016. Tackling drug-resistant infections globally: final report and recommendations, *Review on antimicrobial resistance*. H M Government/Wellcome Trust, London.

Herrmann, M., Gaudet, G., 2009. The economic dynamics of antibiotic efficacy under open access. *Journal of Environmental Economics and Management* 57, 334-350.

Marion DESQUILBET, with participation of Denis COUVET, Laurence HUC and Pierre LEBAILLY (15h):

- Issues and challenges for sustainable food systems

- The land sparing / land sharing debate: should we intensify agriculture to save land? How informative are sustainability standards on this issue? A multidisciplinary perspective in ecology, economics and science and technology studies
- Pesticide regulation: authorization procedures, taxation, effects of a ban on pesticides (the example of the European and French ban on neonicotinoids)
- The bio-economics of chemical versus biological or agroecological pest control
- Pesticide resistance, genetically modified crops
- The challenge of measuring the impacts of pesticides on human health and the environment: a toxicological and epidemiological perspective

FAO, 2018. The state of food security and nutrition in the world. United Nations.

United Nations, Population Division. World Population Prospects 2019.

High Level Panel of Experts on Food Security and Nutrition, 2017. Nutrition and Food Systems. Committee on World Food Security.

Foley, J.A., Ramankutty, N., Brauman, K.A., Cassidy, E.S., et al., 2011. Solutions for a cultivated planet. *Nature* 478, 337-342

Steffen, W., Richardson, K., Rockstrom, J., Cornell, S.E., et al., 2015. Planetary boundaries: Guiding human development on a changing planet. *Science* 347, 11.

Barnosky, A.D., Matzke, N., Tomiya, S., Wogan, G.O., et al., 2011. Has the Earth's sixth mass extinction already arrived? *Nature* 471, 51-57.

Green, R.E., Cornell, S.J., Scharlemann, J.P.W., Balmford, A., 2005. Farming and the fate of wild nature. *Science* 307, 550-555.

Desquilbet, M., Dorin, B., Couvet, D., 2017. Land Sharing vs Land Sparing to Conserve Biodiversity: How Agricultural Markets Make the Difference. *Environmental Modeling & Assessment* 22, 185-200.

Loconto, A., Desquilbet, M., Moreau, T., Couvet, D., Dorin, B., 2018. The Land sparing – Land sharing controversy: tracing the politics of knowledge. *Land Use Policy*, In Press.

Ray, D.K., Mueller, N.D., West, P.C., Foley, J.A., 2013. Yield Trends Are Insufficient to Double Global Crop Production by 2050. *Plos One* 8, 8.

Grassini, P., Eskridge, K.M., Cassman, K.G., 2013. Distinguishing between yield advances and yield plateaus in historical crop production trends. *Nat. Commun.* 4, 11.

Caswell, J.A., Mojduszka, E.M., 1996. Using informational labeling to influence the market for quality in food products. *American Journal of Agricultural Economics* 78, 1248-1253.

Desquilbet, M., Maigne, E., Monier-Dilhan, S., 2018. Organic Food Retailing and the Conventionalisation Debate. *Ecological Economics* 150, 194-203.

Lemeilleur, S., N'Dao, Y., Ruf, F., 2015. The productivist rationality behind a sustainable certification process: evidence from the Rainforest Alliance in the Ivorian cocoa sector. *International Journal of Sustainable Development* 18, 310-328.

Skevas, T., Lansink, A., Stefanou, S.E., 2013. Designing the emerging EU pesticide policy: A literature review. *Njas-Wageningen Journal of Life Sciences* 64-65, 95-103

Bocker, T., Finger, R., 2016. European Pesticide Tax Schemes in Comparison: An Analysis of Experiences and Developments. *Sustainability* 8.

Bocker, T.G., Finger, R., 2017. A Meta-Analysis on the Elasticity of Demand for Pesticides. *Journal of Agricultural Economics* 68, 518-533.

Finger, R., Mohring, N., Dalhaus, T., Bocker, T., 2017. Revisiting Pesticide Taxation Schemes. *Ecological Economics* 134, 263-266.

- Feder, G., Regev, U., 1975. Biological interactions and environmental effects in economics of pest-control. *Journal of Environmental Economics and Management* 2, 75-91.
- Grogan, K.A., 2014. When ignorance is not bliss: Pest control decisions involving beneficial insects. *Ecological Economics* 107, 104-113.
- Barratt, B.I.P., Moran, V.C., Bigler, F., van Lenteren, J.C., 2018. The status of biological control and recommendations for improving uptake for the future. *Biocontrol* 63, 155-167.
- Gould, F., Brown, Z.S., Kuzma, J., 2018. Wicked evolution: Can we address the sociobiological dilemma of pesticide resistance? *Science* 360, 728-732.
- Ambec, S., Desquilbet, M., 2012. Regulation of a Spatial Externality: Refuges versus Tax for Managing Pest Resistance. *Environmental and Resource Economics* 51, 79-104.
- Desquilbet, M., Bullock, D.S., D'Arcangelo, F.M., 2018. A discussion of the market and policy failures associated with the adoption of herbicide-tolerant crops, TSE Working Paper, Toulouse, France.
- Wilson, C., Tisdell, C., 2001. Why farmers continue to use pesticides despite environmental, health and sustainability costs. *Ecological Economics* 39, 449-462.