



## **Course module: Land Use - Environment Interactions** **(Dr Andy Evans, Module Co-ordinator)**

This course deals principally with the relationships between land management and water quality. A Case Study approach will be used for much of the course and areas covered include the impacts of conventional and organic farming, pollutants and agrochemicals on water quality and biodiversity. Field visits and laboratory work will be an integral component of the course.

The module will be useful to students concerned with the protection and management of water resources from the effects of agriculture, forestry, flooding, urban and domestic wastes.

### Week 1. **Introduction**

Introduction and overview of the module (Andy Evans)

### Week 2. **Management of pesticide use** Effects of pesticides on non-target organisms.

Strategies to minimise pesticide damage to wildlife and game (Andy Evans).

### Week 3. **Sources, delivery and impacts of pollutants**

Sources of potential pollutants in fresh and coastal waters, linking these with impacts, possible remediation actions.

Afternoon – possible laboratory tour and some analytical background to measuring pollutants (Tony Edwards)

### Week 4. **Specific case studies - legislation, issues and management**

Discussion of some recent examples involving nutrients, microbiological agents and pesticides. (Tony Edwards).

### Week 5. **Biodiversity, farmland landscape and management** (Davy McCracken)

### Week 6. **Case studies on water pollution** (Amanda Sordes)

### Week 7. **Land use/water interactions and the water framework directive** (Linda May, CEH) **Energy and food security** (Dr David Lumsdon, Macaulay Institute)

### Week 8. **Organic farming Assessing the contribution of organic farming to sustainable land use** (Valentini Pappa)

### Week 9. **Climate and its effects on crops** Impacts of climate on crops and their pests (Andy Evans)

### Week 10 **Land Use Futures** (Prof. Mark Rounsevell) Guest lecture from Prof. Rounsevell from the Centre for the study of Environmental Change and Sustainability (CECS).

### Week 11 POSTER and ORAL SESSION - impact of land use on biological conservation or water quality. Each student selects a land use/water pollution issue, presents the problem and proposes cost effective mitigation strategies, giving appropriate examples. (Andy Evans)

### **Key References**

- Haygarth, P.M. and Jarvis, S.C. (2003).** Agriculture, hydrology and water quality. 614.77:631 Agr.
- William F. Ritter, Adel Shirmohammadi (2003).** Agricultural nonpoint source pollution : watershed management and hydrology
- Ward, A.D. and Trimble, S.W. (2004).** Environmental Hydrology. 2<sup>nd</sup> edition. Lewis Publishers.
- Harrison, R. M. (1996)** Pollution : causes, effects and control. Royal Society of Chemistry.
- Solbe, J.F.L.G. (1986).** Effects of Land Use on Fresh waters. Ellis Horwood. 568pp. IN DARWIN
- O'Neill, P. (1998).** Environmental Chemistry. Blackie. 278pp 3rd Edition.
- Kiely, G. (1996).** Environmental Engineering. McGraw-Hill
- Wild, A. (1993).** Soils and the Environment - an Introduction. Cambridge University Press.

# Assessments

## A. ESSAY

**With reference to a named pollutant or pollutant group of your choice discuss :**

1. The effect of specific land use practices on the dispersal of these pollutants to ground, surface and coastal waters;
2. The impacts of the pollutant on water quality and/or ecosystem function;
3. Cost effective measures for mitigating the impacts of these land use practices either at source or in the receiving water.

**Illustrate your work, where possible, with specific case studies or examples.**

Possible pollutants/pollutant groups to consider are:

Sediment, nitrates, phosphates, ammonium, chlorinated hydrocarbons, organophosphate insecticides, synthetic pyrethroid insecticides, pathogenic bacteria, toxic metals, organic matter, acidity, alkalinity, salinity, thermal pollution, oestrogenic compounds, arsenic, aluminium.

Possible Land Use Practices include forestry, arable farming, livestock farming, drainage, urbanisation, mining, sewage treatment, industry (eg paper making, dyeing, metalworking, oil refining, retailing), road construction, airport construction etc.

The essay forms 50% of the **continuous** assessment of the module.

## B. POSTER PRESENTATION

**Prepare a poster presentation to communicate the main points of the essay. Emphasis should be on getting your message across to decision makers and land users who have the power to act on your recommendations. Provide an A4 version for circulation in the group, and an abstract of your poster covering no more than a single A4 page. These should be submitted electronically on the Monday morning before the presentation.**

In composing your poster, please make full use of photographs, tables and figures (diagrams) and try to minimise the number of words. A picture or chart is much more effective than a paragraph of text. Your poster should include the title and your name across the top, a short introduction, an explanation of the case with the aid of illustrations, and two or three short and convincing conclusions. You will find that Powerpoint is a useful tool for preparing legible, well laid out sections to the poster.

Your poster presentation will be marked on four points: (1) technical content; (2) quality of text and graphics; (3) verbal explanation; (4) the abstract.

The poster and presentation forms 50% of the **continuous** assessment of the module.