



Rural Economy and Land Use Programme



RELU-Biomass

Social, economic and environmental implications of increasing rural land use under energy crops Angela Karp



ROTHAMSTED
RESEARCH



**Centre for
Ecology & Hydrology**

NATURAL ENVIRONMENT RESEARCH COUNCIL

CEH Wallingford - Formerly the Institute of Hydrology

Dedicated Energy crops:

Energy Grasses

Miscanthus (*Miscanthus x giganteus*)

Reed Canary grass (*Phalaris arundinacea*)

Switchgrass (*Panicum virgatum*)

Short rotation coppice (SRC)/ short rotation forestry (SRF)

Willow (*Salix* spp.)

Poplar (*Populus* spp.)

Background

- Land use under biomass crops is expected to expand (from $\leq 3,000$ ha up to at least 350,000ha.)
- Biomass crops are physically different to current arable crops:
 - perennial (7-25 yrs);
 - long harvesting cycles (1-4yrs);
 - winter/spring harvest,
 - dense plantings of tall crops
- These factors have potential implications for
 - visual appearance of landscape
 - hydrology
 - biodiversity
 - tourist income) Impacts on the
 - farm income) rural economy





RELU-Biomass aims:

- **Develop an integrated scientific framework for Sustainability Appraisal (SA) of conversion of land to energy crops**
- **Evaluate the implementation of the SA framework**
- **Update Best Practice Guides for planting short rotation coppice (SRC) willow and miscanthus**
- **Provide the scientific tools for Environmental Impact Assessments (EIAs), Strategic Environmental Assessments (SEAs) or SAs for projects or policies involving increased planting of energy crops**

Basic approach

We will study both SRC willow and miscanthus

We will use two regions as study areas (SW England and E Midlands)

We will utilise existing data & generate new data to fill knowledge gaps

1. GIS-based landscape visualisations within framework of stakeholder and focus groups
2. Landscape character assessments
3. Biodiversity assessments in both crops at 8 sites in each of the 2 regions using FSE protocols
4. Hydrology assessments using a physically based model (JULES)
5. Economic assessment from farm to wider scale

How can our research help understand the implementation difficulties of EU policy and environmental directives?

- **Biomass crops and CAP reform**
- **Biomass crops and the Water Framework Directive**

Biomass crops and CAP reform

- **2005 saw the introduction of the Single Payment Scheme (SPS), ‘cross compliance’ and Entry Level Stewardship (ELS)**
 1. **Decoupling of subsidies from production**
 2. **Emphasis on environmental services provided**
 3. **Prospect of land fallow or used for non-food crops**
 4. **New aid to encourage energy crops (Energy Crops Scheme (ECS))**
 5. **Set aside continues with entitlements calculated on historic basis**

Biomass crops and CAP reform

- 1. Under ECS aid of 45 EURO/ha available (max area in EU = 1.5 Mha)**
- 2. ECS aid is additional to SPS but strict conditions for farmers and processors to fulfill (penalties if not met)**
- 3. Farmers can process crops receiving energy aid (heating/power/biofuels/biogas for own use)**
- 4. Energy crops can still be grown on set-aside (as a non-food crop)**
- 5. Energy crops on set-aside will be eligible for set-aside payment but cannot be entered into ECS**

Two options for farmers - set aside or ECS

How can our research help understand the implementation difficulties?

Energy crops have the potential to provide many environmental benefits, however, this will depend on:

1. Where they are located
 - what they replace (e.g. arable crops/ grassland)
 - what the landscape character of the area is
 - the water availability in the region
2. How they are managed
3. What size of fields/scale of planting is developed

RELU-Biomass will be evaluating different impacts to provide tools for EIAs, SEAs, SAs and will also provide data for updating Best Practice Planting Guides

Biomass crops and the Water Framework Directive (WFD)

- Effects on water quality are likely to be beneficial due to reduced input requirements (except possibly sewage sludge application to SRC)
- There is concern about the amounts of water used by energy crops and the possible implications for stream flow and groundwater recharge
- With WFD concern relates not only to the direct impacts on resource availability, but also to the implications of lower flows for the ecology of water courses
- **RELU-Biomass will use a numerical model to investigate the impact of different planting scenarios on river flows.**

Biomass crops and EU directives

Aids are subject to conditions under the CAP reform. i.e. farmland in good agricultural and environmental condition

RELU-Biomass will examine the sustainability of SRC willow and miscanthus cf. arable crops and grassland by comparing rural economics, social acceptability, landscape character, water use and biodiversity.

The results will underpin policy decisions (e.g. EIAs, SEA, SAs) and help:

1. Farmers to make decisions which reach an optimal balance between meeting CAP conditions and economic viability
2. Locate energy crop plantings in areas where environmental benefits are maximised and potential negative impacts are avoided/minimised (e.g. potential conflict with WFD)
3. Understand and take account of wider social implications

Partner Roles

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