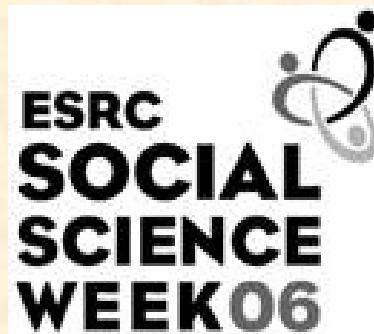




Energy crops running out of steam?

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Progress means change

But some changes are worse than others!

We cannot keep depleting fossil fuels and emitting greenhouse gases

But we can grow our own energy

Energy crops are effectively carbon neutral and have a role to play in meeting energy and environmental objectives



Dedicated Energy crops:

Energy Grasses

Miscanthus (*Miscanthus x giganteus*)

Reed Canary grass (*Phalaris arundinacea*)

Switchgrass (*Panicum virgatum*)

Short rotation coppice (SRC)

Willow (*Salix* spp.)

Poplar (*Populus* spp.)

Land-use under energy crops is predicted to increase:

- In 2003 around 2,000 ha of land was under energy crops (DTI and DEFRA 2004).
- For a target of 6% of UK electricity by 2020, approximately 350,000 ha of land would be required (Renewables Innovation Review, DTI and Carbon Trust 2004).
- Larger expansion has been envisaged e.g. 680,000 ha (the Royal Commission on Environmental Pollution, 2004)
- These equate to 1.9 - 3.7% of total UK agricultural land. Proportions could well be 10 – 20% in some localities.

What effect will this have on our
countryside?

What's different about biomass crops?

- Biomass crops are:
 - perennial (in the ground for 7-25 yrs)
 - long harvesting cycles (1-4yrs)
 - winter/spring harvest
 - comprise dense plantings of tall crops
- Biomass crops are managed differently:
 - Minimal or no nitrate fertilisers
 - Herbicides to keep weeds down during establishment and after cut-back.
 - Typically no insecticides or fungicides

Miscanthus



- Planted as ramets
- Density 15-20,000 per ha
- First year growth up to 2 m
- By third year up to 3.5 m
- Harvested annually in spring
- Planted areas range from 1.62-90 ha (spread across fields)

Harvesting and conversion

Mow and bale



Direct cut and chop



Direct Combustion

Second year growth:
View across the field to
the church (Woburn)



Third year growth: 90ha
spread across fields
(Somerset)



Smaller field at Duchy
College, Cornwall



SRC willow

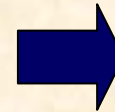


- Planted as cuttings
- Density 10-20,000 per ha
- Cut back after 1 yr
- Allow 3 years growth then harvest in a three year cycle
- First year growth up to 2.5m
- By third year, up to 5 m
- Harvested in winter
- Planted areas range from 3-16 ha (spread across fields)

Harvesting SRC willow – cut and chip



Energy conversion



Co-firing
Gasification
Pyrolysis



SRC willow landscape (grown for cuttings)



Established SRC willow plantation



SRC after cut-back





SRC willow in winter

What we have to bear in mind:

- Large scale land-use change to biomass crops will have wide ranging implications e.g. on
 - visual appearance/character of landscape
 - tourist income
 - farm income
 - water use
 - biodiversity
- Data so far suggest impacts can be positive but this depends on:
 1. Where they are located, e.g.
 - what they replace (e.g. arable crops/ grassland)
 - what the landscape character of the area is
 - the water availability in the region
 2. The size/scale and arrangement of planted fields

Our RELU-Biomass project will:

Examine the implications of increasing land use under willow and miscanthus cf. arable crops and grassland by comparing e.g.

- rural economics
- social acceptability
- landscape character
- water use
- biodiversity

Provide scientific framework for locating energy crops in areas where benefits are optimal

Inform policy decisions and provide tools e.g. for

- Environmental Impact Assessments
- Strategic Environmental Assessments



What would you prefer more of?



More nuclear power stations?



More wind farms?

Or more fields of crops?



Thank you from RELU-Biomass

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