

Energy biomass and agriculture

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The production and provision of food and fiber is central to the well being of humans. From the ample sufficiency of these commodities in the developed world, we can forget the historical importance that food and fiber have played in human social and political development. The effect of agricultural cultivation on human political and social development was explosive. Today more than 75% of the land area of Europe is cultivated for crop, grassland or forestry production and humans appropriate about 40% of the solar radiation incident on the Earth's surface for their own use. In rich, demographically stable countries the effects of agriculture and forestry on biodiversity and the cycles of carbon, nutrients and water are critical social and political issues, rarely out of the news. Land cultivation is one of the most influential human practices for the dynamics of the terrestrial landscape and thereby the atmospheric, biogeochemical and water cycles of the Earth System. European agriculture since World War 2 has been based on a policy of ensuring food security in whole European continent. The reason and nature of the change is brought about by developments in the international energy market which is moving from being a buyer's to being a seller's market with the Europe of the future dependent on two sources of supply for non-coal fossil fuels. The two major suppliers will be the Middle East and Russia. Thus, the most fundamental question for European agriculture is whether it should transfer its reason for existence from being a provider of food security to becoming one of the providers of indigenous energy security. If this is the case then a major research effort is required, some elements of which are given below. The main research issues needed for the development of biofuels in the Nordic and Baltic countries are to:

- Improve and upscale the technological basis of the conversion of biomass to liquid fuels.
- Examine the social and economic impacts of and incentives to bioenergy production in the Nordic and Baltic countries. Such objectives will be achieved by:
 - Breeding and screening of crop species selected for high quality and high yields of biological production at low levels of external input.
 - Developing new sustainable and multifunctional agronomic energy production systems.
 - Improving the technological conversion of biomass to liquid fuels.
 - Analyzing bioenergy production, distribution and utilization systems.
 - Assessing greenhouse gas emissions associated with bioenergy production.