

## Public engagement theme 5

### Can bioenergy support the environment?

In summer 2022, as part of the Supergen Bioenergy Hub public engagement strategy, a media literature review was conducted to explore the public debate around biomass energy in the UK. A number of themes were identified in the review.

The following questions and areas of debate arose on the theme of **bioenergy and ecosystem services**. While there are concerns over the environmental risks posed by using land for bioenergy, there are also opportunities for bioenergy to support the environment. Each question or area of debate is addressed with a short scientific answer or response.

#### **What are ecosystem services?**

The Millennium Ecosystem Assessment defined ecosystem services as the benefits that people obtain from nature. These benefits include clean air, water, opportunities for recreation, and resources for food and energy. Although this definition is the one that is most commonly used others seek to clarify the links between nature and people. For example the IPCC defines ecosystem services as “ecological processes or functions which have value to individual and society”. This definition seeks to capture not only the tangible benefits we receive from ecosystems such as food or clean water, but also recognises the important role the function of ecosystem play in maintaining the planet by regulating climate and water resources.

#### **How are ecosystem services related to biodiversity?**

The relationships between biodiversity - the diversity and abundance of living organisms – and ecosystem service can be considered in several ways. Biodiversity exerts a profound influence on many natural processes, with the structure and function of biological communities being important in the delivery of ecosystem services such as soil nutrient cycling. Biodiversity can also be an ecosystem services in its own right, for example by the genetic diversity of bioenergy crops allowing farmers to select species with the highest yield or best tolerance to the prevailing conditions. Biodiversity also has value in and of itself, for example through the human appreciation of wildlife or natural landscapes.

#### **Can bioenergy support ecosystem services?**

There are several ways in which bioenergy can support ecosystem services. There is considerable evidence that converting agricultural land to grow dedicated bioenergy crops (fast-growing grasses and trees purpose grown for bioenergy) can support a range of ecosystem services, including water quality, soil quality, greater carbon storage

in soils, hazard regulation such as flood mitigation, and provide recreational opportunities. In certain areas active management of forests can support ecosystem services by reducing 'fuel-load' and forest density, reducing the risks of severe wildfire events.

### **Can bioenergy undermine ecosystem services?**

This will depend on the type of bioenergy crop that is used and the land on which it is grown. If the bioenergy is produced from crops that are also used as food, then the risk of impacting ecosystem services is the same as that associated with all such production. If conversion occurs on arable or grassland currently used for agricultural production then in most cases the impact will be either positive or neutral, although this is dependent on the intensity of management activities at the farm scale. The biggest risk lies in conversion of natural system to grow bioenergy crops, however, this is true of all agricultural production and must be something that is avoided.

### **How can policymakers support bioenergy sustainably?**

Policy can be used to incentivise bioenergy crops where they can deliver ecosystem services, such as through a 'payment for ecosystem services' policy, presenting an opportunity for a win-win of bioenergy and greater ecosystem health. The UK government's Committee on Climate Change has recommended this approach. More broadly strict and verifiable sustainability criteria for the use of biomass for energy must be put in place and adhered to. A previous Supergen Report considered these criteria in detail.

### **Summary**

Using land for bioenergy can both support and undermine ecosystem services, depending on the land that is used and the management practice associated with production. Active management of forests can support healthy ecosystems, reducing risk of severe fires, and growing dedicated bioenergy crops on agricultural land can support a range of ecosystem services. Bioenergy can also undermine ecosystems, such as through increased water use, and governance and policy is needed to reduce these risks.