

## Public engagement theme 2

### Does bioenergy cause biodiversity loss?

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 biomass energy and its impact on **biodiversity**. Biodiversity typically refers to the number of different species (species richness) and the number of individuals of those species (abundance). This theme is frequently discussed in relation to concerns that demand for bioenergy leads to the harvesting of old-growth forests and the conversion of natural ecosystems to bioenergy plantations. Each question or area of debate is addressed with a short scientific answer or response.

#### **Is demand for bioenergy leading to old-growth forests being cut down in the USA?**

There is no scientific evidence to show that recent bioenergy demand has resulted in the loss of natural or old-growth forests in the USA. Forests are under threat across the world, although recent demand for bioenergy does not appear to have been a cause for these risks. Forest biomass used for bioenergy - often residues such as sawdust, chippings, and small-diameter trees - is of relatively low commercial value compared to other timber uses, and is therefore unlikely to be driving forest harvest operations. Additionally, the forest biomass used for bioenergy represents a relatively small proportion of the harvested forest biomass in the US forests.

#### **Could further demand for bioenergy lead to old-growth forests being cut down?**

No scientific studies or scenarios suggest that future bioenergy demand be met through cutting down old-growth forests to grow bioenergy plantations, which would be expected to be counter-productive from both a carbon and biodiversity perspective. However, there is a risk to biodiversity if future bioenergy demand is not governed by sustainability frameworks that protect natural ecosystems. Scenarios which involve very high bioenergy demand would likely increase the risk of negative side-effects.

## **Could bioenergy lead to biodiversity loss by indirect land-use change?**

There is a concern that high bioenergy demand could lead to an expansion in agricultural land at the expense of natural ecosystems: if biomass is grown on land that would otherwise produce food, it may lead to natural ecosystems converted elsewhere to grow additional food (called indirect land-use change). Agricultural land expansion to meet human consumption has been a leading driver of biodiversity loss, and further expansion poses further risk to biodiversity. There is therefore a need to meet food and biomass demands from land responsibly, without converting further natural ecosystems, and even returning some land to nature. This will be challenging, although land can be freed-up through productivity and yield improvements, and through dietary shifts away from land-intensive meat and dairy foods. Using land for some bioenergy crops also presents greater opportunities for biodiversity than using land for food (see below).

## **Can bioenergy be scaled-up to avoid biodiversity losses?**

Some scientific scenarios expect very high levels of bioenergy will be needed to meet climate targets and it will be challenging to achieve these high levels whilst supporting biodiversity. This will require robust sustainability and governance frameworks, attention to potential indirect land-use changes, and supportive management practices. For example, some dedicated bioenergy crops (fast-growing grasses and trees purpose grown for bioenergy) can provide similar structure to natural ecosystems, added complexity or heterogeneity in a landscape, and require fewer inputs such as pesticides, all of which supports biodiversity relative to other agricultural uses of land. The effect of bioenergy on biodiversity will be context dependent.

## **What species are supported by using land for bioenergy?**

Scientific evidence shows that biodiversity can be supported by dedicated bioenergy crops - fast-growing grasses and trees grown specifically for bioenergy. In the UK there is particularly robust evidence to show that dedicated bioenergy crops support the diversity and abundance of bird species and their abundance. Arthropods (insects), plants, and organisms in the soil have all also been found to be supported by dedicated bioenergy crops.

## **What species are at risk from using land for bioenergy?**

The habitat provided by bioenergy crops may be unsuitable for some species, with concerns raised over the impacts on ground-nesting birds in the UK. There is limited evidence on the impact of bioenergy crops on mammal biodiversity.

### **What is the public perspective?**

The UK Climate Assembly - which involved over 100 citizens deliberating on the best choices and policies to meet climate change targets - found strong support for protecting biodiversity. There was a concern about the land demand of bioenergy, and that increased bioenergy use would lead to plantations which would harm biodiversity. The UK public appear concerned about the biodiversity impact of both imported and domestically sourced biomass feedstocks.

### **Does government bioenergy policy protect biodiversity?**

The UK government policy requires sustainability criteria are met for imported biomass feedstock, ruling out land conversions from highly biodiverse or old-growth forests and requiring forest management standards to minimize harm to ecosystems. According to the UK government's advisory group, the Committee on Climate Change, meeting future biomass from domestic grown biomass and imports could pose biodiversity risks, although land could be freed up to grow bioenergy crops from dietary shifts away from land-intensive meat and dairy foods.

### **Summary**

The effect on biodiversity of using land for bioenergy is context dependent, with the previous land-use, management practices, and bioenergy crop type, all relevant. Bioenergy is land-intensive and there are biodiversity risks of higher bioenergy demand, whilst there are also opportunities to use land for dedicated bioenergy crops and support biodiversity.