

## Public engagement theme 3

### Land-use: is the choice between food or fuel?

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 **'food versus fuel'**. This theme is one of the most frequently debated topics of bioenergy, and has been particularly prevalent in the news in 2022, following the Russian invasion of Ukraine, and subsequent disruption to food supply chains. Each question or area of debate is addressed with a short scientific answer or response.

*"There's nothing complicated about the effects of turning crops into biofuel. If food is used to power cars or generate electricity or heat homes, either it must be snatched from human mouths, or ecosystems must be snatched from the planet's surface, as arable lands expand to accommodate the extra demand."*

- George Monbiot, The Guardian (July 2022).

#### **Does using land used for bioenergy take land away from food production?**

Agricultural land area is not static, and the choice of which crop to grow is partly an economic one, influenced by current demand and market prices. The decision of whether land is used for food, biofuel, or something else therefore depends on what the marketable price is for each of these products. In the case of arable crops, such as maize, that can be used for either food or biofuel production, there is a higher potential for competition between the food and fuel sector. This in turn can lead to changes in land use, although other responses such as changes in the intensity of production or changes in trade patterns can also result. For other forms of bioenergy many of these market driven responses are removed. For example, there is less conflict for land when inedible parts of the crop are used for bioenergy. In the case of dedicated bioenergy crops (fast-growing energy grasses and trees ) poor quality agricultural land can be used, with these crops often enhancing the quality of the land and delivering benefits for nature within farming systems.

#### **Does using land for bioenergy increase food prices?**

There has been some research that suggests increased use of maize for ethanol production in the USA has at times contributed to higher food prices, although food prices are influenced by a range of factors, and the influence of bioenergy may be fairly small with a low proportion of land used for biofuels globally. If all else stayed the same, then using agricultural land for bioenergy would reduce the supply of land available to produce food, which could increase food prices. However, agricultural land area is not

static, and a higher food price would incentivise greater use of land to produce food, which could then lower food prices back. The reality is that a number of factors (i.e. weather, supply chain disruptions, cost of fertiliser) including bioenergy will contribute to how land is managed and the price of agricultural commodities such that a simple link cannot be made.

### **Does using land for bioenergy lead to agricultural land expansion elsewhere?**

The global land system is constantly changing. From around 1960 to the early two thousands there was an acceleration in the rate of land use change globally, driven by increasing demand for agricultural commodities coupled to increasing global trade. Over the last twenty years the rate of change has decelerated. However, this global pattern hides regional differences with a loss of agricultural land and increase in forest in the global north, and deforestation and expansion of croplands in the global south. The demand for bioenergy is one of a number of competing demands on land, which collectively incentivise agricultural land expansion. The amount of land used for bioenergy is relatively low globally, and unlikely to be a major driver of patterns of land-use change, although higher future bioenergy could see a greater contribution. This risk can be mitigated through growing bioenergy crops on land less suitable for arable crops, and by reducing the land-intensity of the food production system through improvement in yields and encouraging dietary shifts away from relatively land-intensive meat and dairy foods.

### **Should agricultural land be used for bioenergy?**

Some biomass material can be collected without using agricultural land to grow bioenergy crops, such as residues and thinnings from forestry, by-products of arable crops such as straw, and from urban waste. However, many future energy scenarios predict a high demand for bioenergy, which will require additional biomass resources. It is likely that some agricultural land will be needed to grow bioenergy crops to meet this demand, increasing the risk of conflict between bioenergy and food priorities. Conflicts between food and bioenergy production can be limited by using land less suitable for food production to grow bioenergy crops.

### **Summary**

Global markets shape how land is used, and demand for bioenergy is one of many influencing factors. Bioenergy and food are both competing demands for the use of land, however, this conflict can be limited to an extent through growing bioenergy crops on poorer quality land less suitable for arable crops, using non-arable crop biomass resources, and through reducing the land demand of the food system, such as through improving yields and dietary shifts away from land-intensive meat and dairy foods.