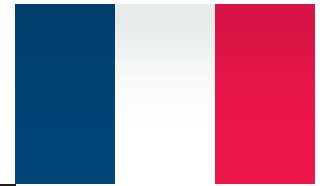


# A new land dividend

The opportunity of alternative proteins in Europe

“green alliance...”

## Country profiles



Here we present the ten European detailed country profiles from Green Alliance's report *A new land dividend* (May 2024).

The report analyses the potential for alternative proteins to substitute meat and dairy production and release land for other purposes, specifically for increasing food self-sufficiency, nature restoration and climate change mitigation.

The countries profiled are: Denmark, Germany, Spain, France, Italy, the Netherlands, Poland, Romania, Sweden and the UK.

We present two scenarios of alternative protein development for each country: 'low intervention', where alternative proteins displace a sixth of meat and dairy demand by 2050, and 'high innovation', where alternative proteins displace two thirds of meat and dairy by 2050.

Use of the land freed up in each scenario is equally distributed between onshoring more food production for greater self-sufficiency, expanding semi-natural habitat and expanding agroecological/organic farming, which we refer to as our 'shared dividends' approach.

For each scenario, we quantified the expansion of organic farming and semi-natural habitat, and then estimated what the consequences could be for food self-sufficiency, overseas land use and the potential demand for engineered carbon removals to reach net zero, in terms of emissions across each country's economy by 2050.

# Denmark



Denmark is a small country that uses most of its farmland to produce exports. Under our ‘low intervention’ scenario, even by 2050, Denmark could not meet the EU’s 2030 target to farm 25 per cent of its land organically without increasing land use overseas. But ‘high innovation’ could see Denmark meet that target by 2050 whilst becoming more self-sufficient and cutting overseas land use by 20 per cent.

	2023	‘Low intervention’ in 2050	‘High innovation’ in 2050
<b>Farmed land use</b> 	<p>28% semi-natural habitat, including forestry</p> <p>59% farmed</p>	<p>16% of farmed area released</p> <p>Yield increases and waste reduction free up some land from export and food for human consumption</p>	<p>27% of farmed area released</p>
Percentage of farmland that is organic	12%	17%	25%
Self-sufficiency	71% food footprint located in Denmark	74% food footprint located in Denmark	90% food footprint located in Denmark
Overseas land use	<p>1m hectares</p>	<p>1.6m hectares</p>	<p>0.8m hectares</p>
Percentage of country semi-natural habitat including forestry	28%	35%	40%
Engineered carbon removal needed to reach net zero		13MtCO <sub>2</sub> e per year by 2050	11MtCO <sub>2</sub> e per year by 2050

# Germany



Germany relies on overseas land for nearly half its food supply. Our ‘high innovation’ scenario would see 81 per cent of Germany’s food footprint located within its borders, whilst farming 32 per cent of land organically, cutting overseas land use by three quarters and halving demand for engineered carbon removal to reach net zero by 2050.

	2023	‘Low intervention’ in 2050	‘High innovation’ in 2050
<b>Farmed land use</b> 	<p>43% semi-natural habitat, including forestry</p> <p>47% farmed</p>	<p>22% of farmed area released</p> <p>Yield increases and waste reduction free up some land from export and food for human consumption</p>	<p>43% of farmed area released</p>
Percentage of farmland that is organic	10%	18%	32%
Self-sufficiency	55% food footprint located in Germany	63% food footprint located in Germany	81% food footprint located in Germany
Overseas land use	<p>13m hectares</p>	<p>9m hectares</p>	<p>3m hectares</p>
Percentage of country semi-natural habitat including forestry	43%	48%	55%
Engineered carbon removal needed to reach net zero		52MtCO <sub>2</sub> e per year by 2050	23MtCO <sub>2</sub> e per year by 2050

# Spain



Spain is among the most self-sufficient of the ten countries we studied, but our 'high innovation' scenario would allow it to end reliance on overseas land use, farm 38 per cent of its land organically and reach net negative carbon emissions across its economy by 2050.

	2023	'Low intervention' in 2050	'High innovation' in 2050
<b>Farmed land use</b> 	<p>45% semi-natural habitat, including forestry</p> <p>50% farmed</p>	<p>22% of farmed area released</p> <p>Yield increases and waste reduction free up some land from export and food for human consumption</p>	<p>46% of farmed area released</p>
Percentage of farmland that is organic	10%	19%	38%
Self-sufficiency	85% food footprint located in Spain	93% food footprint located in Spain	100% food footprint located in Spain
Overseas land use	<p>4m hectares</p>	<p>2m hectares</p>	No demand for overseas land
Percentage of country semi-natural habitat including forestry	45%	50%	58%
Engineered carbon removal needed to reach net zero		24MtCO <sub>2</sub> e per year by 2050	-8MtCO <sub>2</sub> e per year by 2050

# France



By 2050, our 'high innovation' alternative protein scenario would offer France the opportunity to farm 37 per cent of its land organically whilst eliminating overseas land use, becoming fully self-sufficient and substantially surpassing net zero across its economy by 2050.

	2023	'Low intervention' in 2050	'High innovation' in 2050
<b>Farmed land use</b> 	<p>43% semi-natural habitat, including forestry</p> <p>52% farmed</p>	<p>25% of farmed area released</p> <p>Yield increases and waste reduction free up some land from export and food for human consumption</p>	<p>50% of farmed area released</p>
Percentage of farmland that is organic	9%	16%	37%
Self-sufficiency	75% food footprint located in France	81% food footprint located in France	100% food footprint located in France
Overseas land use	<p>9m hectares</p>	<p>6m hectares</p>	No demand for overseas land
Percentage of country semi-natural habitat including forestry	43%	50%	59%
Engineered carbon removal needed to reach net zero		2MtCO <sub>2</sub> e per year by 2050	-46MtCO <sub>2</sub> e per year by 2050

# Italy



Italy currently relies on overseas land for more than half of its food supply. Our 'high innovation' alternative protein scenario could see Italy nearly double its self-sufficiency in food production whilst farming 43 per cent of land farmed organically and expanding semi-natural habitats to reduce demand for engineered carbon removal by a quarter.

	2023	'Low intervention' in 2050	'High innovation' in 2050
<b>Farmed land use</b> 	<p>51% semi-natural habitat, including forestry</p> <p>41% farmed</p>	<p>23% of farmed area released</p> <p>Yield increases and waste reduction free up some land from export and food for human consumption</p>	<p>43% of farmed area released</p>
Percentage of farmland that is organic	17%	16%	43%
Self-sufficiency	43% food footprint located in Italy	51% food footprint located in Italy	79% food footprint located in Italy
Overseas land use	<p>15m hectares</p>	<p>10m hectares</p>	<p>2m hectares</p>
Percentage of country semi-natural habitat including forestry	51%	57%	63%
Engineered carbon removal needed to reach net zero		51MtCO <sub>2</sub> e per year by 2050	38MtCO <sub>2</sub> e per year by 2050

# Netherlands



The Netherlands is a small country which uses most of its farmland to produce exports. As a result, the Netherlands relies on overseas land for much of its domestic food supply, and to feed the livestock it exports. Even under our ‘high innovation’ alternative protein scenario, it could only achieve the EU’s target to farm 25 per cent of land organically if it reduced production.

	2023	‘Low intervention’ in 2050	‘High innovation’ in 2050
<b>Farmed land use</b> 		<p>Yield increases and waste reduction free up some land from export and food for human consumption</p>	
Percentage of farmland that is organic	4%	7%	13%
Self-sufficiency	13% food footprint located in the Netherlands	14% food footprint located in the Netherlands	29% food footprint located in the Netherlands
Overseas land use	 11m hectares	 14m hectares (Increase due to biomass demand for BECCS)	 8m hectares
Percentage of country semi-natural habitat including forestry	23%	27%	29%
Engineered carbon removal needed to reach net zero		43MtCO <sub>2</sub> e per year by 2050	41MtCO <sub>2</sub> e per year by 2050



# Poland



Poland is already among the most self-sufficient of the countries we studied. By 2050, our ‘high innovation’ alternative protein scenario could see Poland avoid needing any land overseas for food production, whilst farming 24 per cent of its land organically and reaching net zero. Failure to green Poland’s power sector could drive substantially greater demand for negative emissions than assumed here.

	2023	‘Low intervention’ in 2050	‘High innovation’ in 2050
<b>Farmed land use</b> 		<p>Yield increases and waste reduction free up some land from export and food for human consumption</p>	
Percentage of farmland that is organic	4%	10%	24%
Self-sufficiency	86% food footprint located in Poland	94% food footprint located in Poland	100% food footprint located in Poland
Overseas land use	 2m hectares	 1m hectares	No demand for overseas land
Percentage of country semi-natural habitat including forestry	43%	48%	55%
Engineered carbon removal needed to reach net zero		8MtCO <sub>2</sub> e per year by 2050	-11MtCO <sub>2</sub> e per year by 2050

# Romania



Romania is one of the most self-sufficient of the countries studied, but like Spain and Poland, our ‘high innovation’ alternative protein scenario offers it the opportunity to onshore all food production, eliminate overseas land use, farm 41 per cent of its land organically and achieve net negative carbon emissions across its economy by 2050.

	2023	‘Low intervention’ in 2050	‘High innovation’ in 2050
<b>Farmed land use</b> 	<p>42% semi-natural habitat, including forestry</p> <p>55% farmed</p>	<p>21% of farmed area released</p> <p>Yield increases and waste reduction free up some land from export and food for human consumption</p>	<p>47% of farmed area released</p>
Percentage of farmland that is organic	4%	17%	41%
Self-sufficiency	85% food footprint located in Romania	100% food footprint located in Romania	100% food footprint located in Romania
Overseas land use	<p>2m hectares</p>	No demand for overseas land	No demand for overseas land
Percentage of country semi-natural habitat including forestry	42%	49%	63%
Engineered carbon removal needed to reach net zero		-9MtCO <sub>2</sub> e per year by 2050	-34MtCO <sub>2</sub> e per year by 2050

# Sweden



Sweden farms just seven per cent of its land area and relies on land overseas to provide half its food supply. Whilst Sweden will not struggle to reach net zero carbon emissions, given its substantial forest cover, it could bring 87 per cent of its food supply onshore under our 'high innovation' alternative protein scenario.

	2023	'Low intervention' in 2050	'High innovation' in 2050
<b>Farmed land use</b> 	<p>75% semi-natural habitat, including forestry</p> <p>7% farmed</p> <p>Other, including urban</p>	<p>24% of farmed area released</p> <p>Yield increases and waste reduction free up some land from export and food for human consumption</p>	<p>53% of farmed area released</p>
Percentage of farmland that is organic	20%	28%	41%
Self-sufficiency	50% food footprint located in Sweden	53% food footprint located in Sweden	87% food footprint located in Sweden
Overseas land use	<p>3m hectares</p>	<p>2.4m hectares</p>	<p>0.3m hectares</p>
Percentage of country semi-natural habitat including forestry	75%	76%	77%
Engineered carbon removal needed to reach net zero		-13MtCO <sub>2</sub> e per year by 2050	-17MtCO <sub>2</sub> e per year by 2050

# United Kingdom



The UK is exceptional in how much of its land is used to graze livestock and how little of its land is semi-natural habitat. Our 'high innovation' scenario creates space to more than double coverage of semi-natural habitat, to increase self-sufficiency by a third, reduce overseas land use by two thirds, and farm 39 per cent of its land organically by 2050.

	2023	'Low intervention' in 2050	'High innovation' in 2050
<b>Farmed land use</b> 	<p>22% semi-natural habitat, including forestry</p> <p>69% farmed</p>	<p>21% of farmed area released</p> <p>Yield increases and waste reduction free up some land from export and food for human consumption</p>	<p>57% of farmed area released</p>
Percentage of farmland that is organic	3%	16%	39%
Self-sufficiency	47% food footprint located in the UK	48% food footprint located in the UK	64% food footprint located in the UK
Overseas land use	<p>18m hectares</p>	<p>21m hectares (Increase due to biomass demand for BECCS)</p>	<p>6m hectares</p>
Percentage of country semi-natural habitat including forestry	22%	31%	48%
Engineered carbon removal needed to reach net zero		73MtCO <sub>2</sub> e per year by 2050	32MtCO <sub>2</sub> e per year by 2050

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## **Green Alliance**

Green Alliance is an independent think tank and charity focused on ambitious leadership for the environment. Since 1979, we have been working with the most influential leaders in business, NGOs and politics to accelerate political action and create transformative policy for a green and prosperous UK.

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