Welsh Carbon Budgets – Call for Evidence Response

Organisation

Soil Association

Question 1: Does the Paris Agreement mean that Welsh emissions targets should keep open a deeper reduction in emissions than 80% by 2050? Are there implications for nearer-term targets?

4. Yes, we agree that meeting the commitments within the Paris Agreement means adopting a deeper reduction in emissions than 80% by 2050, and a corresponding change in nearer-term targets, including for reasons of avoiding lock-in to high carbon investment. To achieve these reductions, the agriculture sector must be included. Targets to reduce Welsh GHG emissions should incorporate a strong emphasis on food and farming. Until recently, farming has been the elephant in the room when it comes to climate change. We also note that some calculations of the contribution of farming to GHG emissions (such as the calculation that farming is responsible for 10% of the EU's overall emissions) often ignore emissions from animal feed production outside of the EU, the manufacture of nitrogen fertiliser or other agro-chemicals, and the transport of agricultural products. It also excludes the emissions related to land use change (for example, ploughing up forest or grassland for crops) or losses of soil carbon. A new report from IFOAM EU estimates that altogether, one-third of global GHG emissions could be linked to the farming and food industries – production, processing, distribution and consumption. We would like to see the emissions reductions targets adopted by Wales in the near- and long-term take into account a full assessment of food and farming related emissions.

If tackling climate change is to be a top priority for food and farming policy, emissions targets in the short and long term set out in climate change policy and by the CCC must be fully reflected in future agriculture policy too. The Soil Association has called for a commitment to zero-carbon farming by around 2050 and proposed some solutions to help achieve that goal.

Organic farming methods can help to deliver this goal and therefore should be more strongly supported by the Government. Evidence shows that organic farms generally emit fewer greenhouse gases, use less energy and store greater amounts of carbon in soils per hectare than non-organic farms; the IFOAM EU report estimates that conversion to 50% of EU land under organic farming by 2030 would equate to a 23% cut in agricultural GHG emissions through increased soil carbon sequestration and reduced application of manufactured nitrogen fertilisers.

Question 2: Do you think that leaving the EU has an impact on the targets or how they can be met?

Yes, leaving the EU will have a considerable impact in particular on how the targets can be met and in relation to the overall political priority attached to cutting greenhouse gas emissions and the need for agriculture to contribute its fair share. It is vital that climate policy and targets set in Wales or at UK level are not undermined by other areas of Government especially in the light of Brexit. For example, trade deals must be 'climate proofed' so that they do not erode the chances of carbon budgets being met, and they do not simply export emissions overseas.

However, the significant focus on the development of a new UK agriculture policy is an opportunity – as long as there is commitment from the highest levels in Government to ensuring this is compatible with the UK's climate commitments domestically and globally. This compatibility between climate and agricultural policy must extend to the devolved nations too. For decades, the EU Common Agricultural Policy (CAP) has helped provide stability for many farm communities, and it has contributed increasingly to the conservation and protection of the environment. However, as most of its budget pays landowners simply for the area they farm, it has also smothered efforts to tackle climate change and this has not been a priority in policy design. In preparing to leave the EU, the UK has an opportunity to set in place policies that help our farming communities mitigate and adapt to climate change, and this opportunity must not be squandered.

Question 3: In the area(s) of your expertise, what are the opportunities and challenges in reducing Welsh emissions in the nearer term (e.g. to 2030)?

Achieving climate-friendly farming will depend on the innovation of farmers to adopt sustainable practices and deploy new methods and technologies which make the most of natural processes without the need for costly and environmentally damaging inputs. Organic farming provides a model for sustainable food security, and helps mitigate climate change. Often claims of 'food security' are used to support more intensive, industrialised agriculture but that approach ignores the need for a stable climate, clean air and water, healthy soils and restore biodiversity.

Healthy soils are a key climate mitigation tool. Healthy soil acts as a carbon sink by drawing carbon down into the soil to store it. Improving soil health is therefore a critical way to tackle climate change. Recognising the ability of soil to sequester carbon and its contribution to climate mitigation, the UK signed onto the French government's the 4 per 1000 soil carbon initiative at the UN Climate Change Convention in Paris. This

initiative aims to increase soil organic carbon by 0.4% each year. This goal to increase soil carbon sequestration must be a key policy in UK agriculture policy to help reduce GHG emissions. The UK has committed to managing all England's sustainably and to tackling degradation threats by 2030. Wales has an opportunity by leading the way on soil protection and climate change by taking action and introducing policies that the rest of the UK may emulate.

For farming systems, one opportunity lies in planting many more trees – as agroforestry schemes on farms and as woodlands and forests. As the CCC has recognised, agroforestry can help mitigate climate change by sequestering carbon. In maritime climates such as the UK, the widespread adoption of agroforestry would result in estimated average emissions reduction of 0.51 tonnes CO2 per hectare per year. The CCC has calculated that, if agroforestry were expanded to cover just 2.3% of agricultural land by 2050, accompanied by woodland creation averaging 30,000 hectares per year, this would reduce greenhouse gas emissions by 16 million tonnes of CO2e annually in 2050. We view this as a conservative estimate and look forward to the forthcoming updated emission inventory, and note that it is important for policy making in the meantime to fully consider the potential contribution of agroforestry.

There are major near-term opportunities to cut emissions via more concerted efforts to reduce the use of nitrogen fertiliser. This was illustrated recently by researchers studying the environmental footprint of a loaf of bread, which found that manufactured nitrogen fertiliser alone accounted for a staggering 43% of a loaf's total emissions. Whilst the contribution of fossil fuels to climate change is widely understood, there is less public and stakeholder awareness that nitrous oxide is a potent greenhouse gas (GHG) and that this accounts for around a third of the UK agricultural sector's total emissions. As the CCC has noted, the majority of these emissions arise from the estimated 900,000 tonnes of nitrogen fertiliser that is applied annually on British farmland, the manufacture of which is alone responsible for an estimated 6 million tonnes of CO2, equivalent to around 1% of the UK's emissions total. We note the CCC has estimated that measures aimed at reducing N2O emissions from agriculture – through increased the use of leguminous crops and the reduction of untimely or the excessive application of fertilisers – could deliver an annual emissions reduction of 2.7 million tonnes of CO2e by 2030. We would urge the CCC to be bold in making recommendations regarding the extent to which adoption of such practices can be widely adopted.

Question 4: What is required by 2030 to prepare for the 2050 target for an emissions reduction of at least 80% on 1990 levels, recognising that this may require that emissions in some areas are reduced close to zero? Is there any impact of the need to go beyond 80%, either in 2050 or subsequently?

In the agriculture sector, to meet the 2050 target and nearer term climate objectives, we have proposed that the UK's new UK agricultural framework should include a strategy to increase the adoption of organic farming to achieve at least 10% of UK farmland to be managed organically – alongside market based measures to ensure that conversion rates do not run ahead of market demand. Achieving 10% of farmland under organic production would help reduce the emissions from the agriculture sector and to sequester carbon into the soil.

Government recognition and support for sustainable agricultural practices - especially those that help meet carbon budgets - should also inform priorities and budget allocation for research, innovation and farming advisory services. There are many opportunities for knowledge sharing among farmer networks and these should be actively promoted and encouraged. The Soil Association is calling for Government to allocate 10% of the current R&D budget for innovative agriculture projects led by farmers themselves. A significant proportion of such projects can and should be dedicated to finding ways to cut greenhouse gas emissions.

In order to help climate-proof the agricultural sector and encourage new entrants to organic farming, research institutions and universities – particularly agricultural colleges – should be encouraged to offer courses in organic and agroecological farming practices, as part of a wider focus on what climate change means for the future of farming and how the sector can play its part in cutting GHG emissions and adapting to the impacts of climate change. Increasing R&D funding into innovative farm-driven projects would help to identify methods by which farming practices can help tackle climate change and field-test techniques that could help farmers adapt to growing in a changing climate.

Question 5: What are the respective roles of UK Government, Welsh Government, the wider public sector, business, third sector and individual or household behaviour in delivering emissions reductions between now and 2030? And, separately, between 2030 and 2050?

Each and every actor, whether government, business, civil society, or the general public have an important role to play in helping to meet our climate goals. Each action, however small, can help to reduce our emissions. However, as the CCC's most recent progress report has illustrated, a voluntary approach to emission reduction in the agricultural sector is no longer a valid approach. Government needs to take a strong position and drive forward climate goals. Wales has an opportunity to lead by example and to go faster and further than the UK overall.

Public procurement should be given more recognition as a powerful tool that can be used to tackle climate change and reduce emissions from agriculture and the food system. The UK public sector serves some 3.5 million meals each weekday across settings as varied as schools, nurseries, care homes, hospitals and

prisons. While this accounts for little over 1% of the total food retail and catering market, its influence is significant. Food in schools and public institutions sets norms for the public and consumers, signals values, and gives integrity to government priorities and policies. To illustrate the potential scale of this impact, the current UK organic market is worth over £2 billion, so if the public sector went organic, it would approximately double that market.

As food consumers, we also have a part to play. Dietary change and the reduction of food waste is essential, if we are to secure a sustainable, climate-friendly food system. That includes less but better quality meat and dairy products – particularly moving away from intensively farmed animals fed on cereals – and instead switching to grass-fed beef and lamb, and to more plant-based diets, with more fruit, vegetables and wholegrains. Government policy can help achieve this behavioural shift and campaigns such as Eating Better has been strongly supporting policy revisions. Not only would this be good for efforts to tackle climate change, it would be good for our health too.

Question 6: As a business, as a Public Sector Body, or as a citizen, how do emissions targets affect your planning and decision-making?

18. Emissions targets are important for ensuring organisations involved in the agriculture and food sector consider the climate impact of their practises and adjust their approach to reduce and mitigate their emissions. Near-term as well as longer term targets are important to help producers alter their practices in order to mitigate risk. Gathering data through farm sensors and soil testing can inform farming practices to make them more environmentally sensitive and climate-friendly. Additionally, creating transparent open-source models that producers are able to access can help with future planning and more precise farming practices. Not only can these practices help reduce GHG emissions from farming and help mitigate climate change, but they can also prove a cost-effective measure of farmers by reducing unnecessary and costly inputs and increasing yields.

Question 7: In your area(s) of expertise, what specific circumstances need to be considered when setting targets and budgets for Wales and how could these be reflected in the targets?

19. For Wales to achieve its climate goals, agricultural practices will have to change dramatically. Isolated islands of good practice and innovation are simply not enough to achieve the changes required. Wales has an opportunity to show leadership by reorienting its farming and food system dramatically in order to mitigate and adapt to the realities of climate change.

Question 8: The power and industry sectors in Wales are dominated by a small number of large emitters. What are the key challenges and opportunities that this presents in setting the levels of carbon budgets and how should the process of setting them reflect these?

20. No response

Question 9: What evidence should the Committee draw on in assessing impacts on sustainable management of natural resources, as assessed in the state of natural resources report?

In assessing the impact of climate change and of mitigation efforts, the committee we must continue to rely on science and data. It is essential to base decisions on independently verified and peer-reviewed science that is rigorous and unbiased. One role of civil society to act as a watch-dog and to continue to stress the importance of scientific rigour. Citizen science may also offer a contribution. Farmers can provide vital real-world evidence and key data points to help build out a fuller picture of climate impacts and of the efficacy of measures introduced to cut greenhouse gas emissions. Transparent data which is made public through open source platforms allows for greater public confidence.

Question 10: What evidence regarding future trends as identified and analysed in the future trends report should the Committee draw on in assessing the impacts of the targets?

No response

Organisation

Soil Association

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01173145133

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Public procurement should be given more recognition as a powerful tool that can be used to tackle climate change and reduce emissions from agriculture and the food system. The UK public sector serves some 3.5 million meals each weekday across settings as varied as schools, nurseries, care homes, hospitals and prisons. While this accounts for little over 1% of the total food retail and catering market, its influence is significant. Food in schools and public institutions sets norms for the public and consumers, signals values, and gives integrity to government priorities and policies. To illustrate the potential scale of this impact, the current UK organic market is worth over £2 billion, so if the public sector went organic, it would approximately double that market.

As food consumers, we also have a part to play. Dietary change and the reduction of food waste is essential, if we are to secure a sustainable, climate-friendly food system. That includes less but better quality meat and

dairy products – particularly moving away from intensively farmed animals fed on cereals – and instead switching to grass-fed beef and lamb, and to more plant-based diets, with more fruit, vegetables and wholegrains. Government policy can help achieve this behavioural shift and campaigns such as Eating Better has been strongly supporting policy revisions. Not only would this be good for efforts to tackle climate change, it would be good for our health too.

Question 6: As a business, as a Public Sector Body, or as a citizen, how do emissions targets affect your planning and decision-making?

18. Emissions targets are important for ensuring organisations involved in the agriculture and food sector consider the climate impact of their practises and adjust their approach to reduce and mitigate their emissions. Near-term as well as longer term targets are important to help producers alter their practices in order to mitigate risk. Gathering data through farm sensors and soil testing can inform farming practices to make them more environmentally sensitive and climate-friendly. Additionally, creating transparent open-source models that producers are able to access can help with future planning and more precise farming practices. Not only can these practices help reduce GHG emissions from farming and help mitigate climate change, but they can also prove a cost-effective measure of farmers by reducing unnecessary and costly inputs and increasing yields.

Question 7: In your area(s) of expertise, what specific circumstances need to be considered when setting targets and budgets for Wales and how could these be reflected in the targets?

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Question 8: The power and industry sectors in Wales are dominated by a small number of large emitters. What are the key challenges and opportunities that this presents in setting the levels of carbon budgets and how should the process of setting them reflect these?

20. No response

Question 9: What evidence should the Committee draw on in assessing impacts on sustainable management of natural resources, as assessed in the state of natural resources report?

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No response

Organisation

Soil Association

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Question 1: Does the Paris Agreement mean that Welsh emissions targets should keep open a deeper reduction in emissions than 80% by 2050? Are there implications for nearer-term targets?

4. Yes, we agree that meeting the commitments within the

Paris Agreement means adopting a deeper reduction in emissions than 80% by 2050, and a corresponding change in nearer-term targets, including for reasons of avoiding lock-in to high carbon investment. To achieve these reductions, the agriculture sector must be included. Targets to reduce Welsh GHG emissions should incorporate a strong emphasis on food and farming. Until recently, farming has been the elephant in the room when it comes to climate change. We also note that some calculations of the contribution of farming to GHG emissions (such as the calculation that farming is responsible for 10% of the EU's overall emissions) often ignore emissions from animal feed production outside of the EU, the manufacture of nitrogen fertiliser or other agro-chemicals, and the transport of agricultural products. It also excludes the emissions related to land use change (for example, ploughing up forest or grassland for crops) or losses of soil carbon. A new report from IFOAM EU estimates that altogether, one-third of global GHG emissions could be linked to the farming and food industries – production, processing, distribution and consumption. We would like to see the emissions reductions targets adopted by Wales in the near- and long-term take into account a full assessment of food and farming related emissions.

If tackling climate change is to be a top priority for food and farming policy, emissions targets in the short and long term set out in climate change policy and by the CCC must be fully reflected in future agriculture policy too. The Soil Association has called for a commitment to zero-carbon farming by around 2050 and proposed some solutions to help achieve that goal.

Organic farming methods can help to deliver this goal and therefore should be more

strongly supported by the Government. Evidence shows that organic farms generally emit fewer greenhouse gases, use less energy and store greater amounts of carbon in soils per hectare than non-organic farms; the IFOAM EU report estimates that conversion to 50% of EU land under organic farming by 2030 would equate to a 23% cut in agricultural GHG emissions through increased soil carbon sequestration and reduced application of manufactured nitrogen fertilisers.

Question 2: Do you think that leaving the EU has an impact on the targets or how they can be met?

Yes, leaving the EU will have a considerable impact in particular on how the targets can be met and in relation to the overall political priority attached to cutting greenhouse gas emissions and the need for agriculture to contribute its fair share. It is vital that climate policy and targets set in Wales or at UK level are not undermined by other areas of Government especially in the light of Brexit. For example, trade deals must be 'climate proofed' so that they do not erode the chances of carbon budgets being met, and they do not simply export emissions overseas.

However, the significant focus on the development of a new UK agriculture policy is an opportunity – as long as there is commitment from the highest levels in Government to ensuring this is compatible with the UK's climate commitments domestically and globally. This compatibility between climate and agricultural policy must extend to the devolved nations too. For decades, the EU Common Agricultural Policy (CAP) has helped provide stability for many farm communities, and it has contributed increasingly to the conservation and protection of the environment. However, as most of its budget pays landowners simply for the

area they farm, it has also smothered efforts to tackle climate change and this has not been a priority in policy design. In preparing to leave the EU, the UK has an opportunity to set in place policies that help our farming communities mitigate and adapt to climate change, and this opportunity must not be squandered.

Question 3: In the area(s) of your expertise, what are the opportunities and challenges in reducing Welsh emissions in the nearer term (e.g. to 2030)?

Achieving climate-friendly farming will depend on the innovation of farmers to adopt sustainable practices and deploy new methods and technologies which make the most of natural processes without the need for costly and environmentally damaging inputs. Organic farming provides a model for sustainable food security, and helps mitigate climate change. Often claims of 'food security' are used to support more intensive, industrialised agriculture but that approach ignores the need for a stable climate, clean air and water, healthy soils and restore biodiversity.

Healthy soils are a key climate mitigation tool. Healthy soil acts as a carbon sink by drawing carbon down into the soil to store it. Improving soil health is therefore a critical way to tackle climate change. Recognising the ability of soil to sequester carbon and its contribution to climate mitigation, the UK signed onto the French government's the 4 per 1000 soil carbon initiative at the UN Climate Change Convention in Paris. This initiative aims to increase soil organic carbon by 0.4% each year. This goal to increase soil carbon sequestration must be a key policy in UK agriculture policy to help reduce GHG emissions. The UK has committed to managing all England's sustainably and to tackling degradation threats

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For farming systems, one opportunity lies in planting many more trees – as agroforestry schemes on farms and as woodlands and forests. As the CCC has recognised, agroforestry can help mitigate climate change by sequestering carbon. In maritime climates such as the UK, the widespread adoption of agroforestry would result in estimated average emissions reduction of 0.51 tonnes CO2 per hectare per year. The CCC has calculated that, if agroforestry were expanded to cover just 2.3% of agricultural land by 2050, accompanied by woodland creation averaging 30,000 hectares per year, this would reduce greenhouse gas emissions by 16 million tonnes of CO2e annually in 2050. We view this as a conservative estimate and look forward to the forthcoming updated emission inventory, and note that it is important for policy making in the meantime to fully consider the potential contribution of agroforestry.

There are major near-term opportunities to cut emissions via more concerted efforts to reduce the use of nitrogen fertiliser. This was illustrated recently by researchers studying the environmental footprint of a loaf of bread, which found that manufactured nitrogen fertiliser alone accounted for a staggering 43% of a loaf's total emissions. Whilst the contribution of fossil fuels to climate change is widely understood, there is less public and stakeholder awareness that nitrous oxide is a potent greenhouse gas (GHG) and that this accounts for around a third of the UK agricultural sector's total emissions. As the CCC has noted, the majority of these emissions arise from the

estimated 900,000 tonnes of nitrogen fertiliser that is applied annually on British farmland, the manufacture of which is alone responsible for an estimated 6 million tonnes of CO2, equivalent to around 1% of the UK's emissions total. We note the CCC has estimated that measures aimed at reducing N2O emissions from agriculture – through increased the use of leguminous crops and the reduction of untimely or the excessive application of fertilisers – could deliver an annual emissions reduction of 2.7 million tonnes of CO2e by 2030. We would urge the CCC to be bold in making recommendations regarding the extent to which adoption of such practices can be widely adopted.

Question 4: What is required by 2030 to prepare for the 2050 target for an emissions reduction of at least 80% on 1990 levels, recognising that this may require that emissions in some areas are reduced close to zero? Is there any impact of the need to go beyond 80%, either in 2050 or subsequently?

In the agriculture sector, to meet the 2050 target and nearer term climate objectives, we have proposed that the UK's new UK agricultural framework should include a strategy to increase the adoption of organic farming to achieve at least 10% of UK farmland to be managed organically – alongside market based measures to ensure that conversion rates do not run ahead of market demand. Achieving 10% of farmland under organic production would help reduce the emissions from the agriculture sector and to sequester carbon into the soil.

Government recognition and support for sustainable agricultural practices - especially those that help meet carbon budgets - should also inform priorities and budget allocation for research, innovation and farming advisory services.

There are many opportunities for knowledge sharing among farmer networks and these should be actively promoted and encouraged. The Soil Association is calling for Government to allocate 10% of the current R&D budget for innovative agriculture projects led by farmers themselves. A significant proportion of such projects can and should be dedicated to finding ways to cut greenhouse gas emissions.

In order to help climate-proof the agricultural sector and encourage new entrants to organic farming, research institutions and universities – particularly agricultural colleges – should be encouraged to offer courses in organic and agroecological farming practices, as part of a wider focus on what climate change means for the future of farming and how the sector can play its part in cutting GHG emissions and adapting to the impacts of climate change. Increasing R&D funding into innovative farm-driven projects would help to identify methods by which farming practices can help tackle climate change and field-test techniques that could help farmers adapt to growing in a changing climate.

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No response

Organisation

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Email

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01173145133

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Leaving the EU will not have a direct impact on Wales' targets but it could indirectly impact how efficiently and effectively targets can be achieved. A significant number of EU funding programmes such as Horizon 2020 and ERDF for example, continue to support decarbonisation in Wales. Leaving the EU is likely to mean that such funding would cease to be available. It is therefore essential to understand how European funding is currently contributing to reducing emissions in Wales, and to consider how this could be replaced in future, either through like-for-like funding or other means.

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There are major near-term opportunities to cut emissions via more concerted efforts to reduce the use of nitrogen fertiliser. This was illustrated recently by researchers studying the environmental footprint of a loaf of bread, which found that manufactured nitrogen fertiliser alone accounted for a staggering 43% of a loaf's total emissions. Whilst the contribution of fossil fuels to climate change is widely understood, there is less public and stakeholder awareness that nitrous oxide is a potent greenhouse gas (GHG) and that this accounts for around a third of the UK agricultural sector's total emissions. As the CCC has noted, the majority of these emissions arise from the estimated 900,000 tonnes of nitrogen fertiliser that is applied annually on British farmland, the manufacture of which is alone responsible for an estimated 6 million tonnes of CO2, equivalent to around 1% of the UK's emissions total. We note the CCC has estimated that measures aimed at reducing N2O emissions from agriculture – through increased the use of leguminous crops and the reduction of untimely or the excessive application of fertilisers – could deliver an annual emissions reduction of 2.7 million tonnes of CO2e by 2030. We would urge the CCC to be bold in making recommendations regarding the extent to which adoption of such practices can be widely adopted.

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In the agriculture sector, to meet the 2050 target and nearer term climate objectives, we have proposed that the UK's new UK agricultural framework should include a strategy to increase the adoption of organic farming to achieve at least 10% of UK farmland to be managed organically – alongside market based measures to ensure that conversion rates do not run ahead of market demand. Achieving 10% of farmland under organic

production would help reduce the emissions from the agriculture sector and to sequester carbon into the soil.

Government recognition and support for sustainable agricultural practices - especially those that help meet carbon budgets - should also inform priorities and budget allocation for research, innovation and farming advisory services. There are many opportunities for knowledge sharing among farmer networks and these should be actively promoted and encouraged. The Soil Association is calling for Government to allocate 10% of the current R&D budget for innovative agriculture projects led by farmers themselves. A significant proportion of such projects can and should be dedicated to finding ways to cut greenhouse gas emissions.

In order to help climate-proof the agricultural sector and encourage new entrants to organic farming, research institutions and universities – particularly agricultural colleges – should be encouraged to offer courses in organic and agroecological farming practices, as part of a wider focus on what climate change means for the future of farming and how the sector can play its part in cutting GHG emissions and adapting to the impacts of climate change. Increasing R&D funding into innovative farm-driven projects would help to identify methods by which farming practices can help tackle climate change and field-test techniques that could help farmers adapt to growing in a changing climate.

Question 5: What are the respective roles of UK Government, Welsh Government, the wider public sector, business, third sector and individual or household behaviour in delivering emissions reductions between now and 2030? And, separately, between 2030 and 2050?

Each and every actor, whether government, business, civil society, or the general public have an important role to play in helping to meet our climate goals. Each action, however small, can help to reduce our emissions. However, as the CCC's most recent progress report has illustrated, a voluntary approach to emission reduction in the agricultural sector is no longer a valid approach. Government needs to take a strong position and drive forward climate goals. Wales has an opportunity to lead by example and to go faster and further than the UK overall.

Public procurement should be given more recognition as a powerful tool that can be used to tackle climate change and reduce emissions from agriculture and the food system. The UK public sector serves some 3.5 million meals each weekday across settings as varied as schools, nurseries, care homes, hospitals and prisons. While this accounts for little over 1% of the total food retail and catering market, its influence is significant. Food in schools and public institutions sets norms for the public and consumers, signals values, and gives integrity to government priorities and policies. To illustrate the potential scale of this impact, the current UK organic market is worth over £2 billion, so if the public sector went organic, it would approximately double that market.

As food consumers, we also have a part to play. Dietary change and the reduction of food waste is essential, if we are to secure a sustainable, climate-friendly food system. That includes less but better quality meat and dairy products – particularly moving away from intensively farmed animals fed on cereals – and instead switching to grass-fed beef and lamb, and to more plant-based diets, with more fruit, vegetables and wholegrains. Government policy can help achieve this behavioural shift and campaigns such as Eating Better has been strongly supporting policy revisions. Not only would this be good for efforts to tackle climate change, it would be good for our health too.

Question 6: As a business, as a Public Sector Body, or as a citizen, how do emissions targets affect your planning and decision-making?

18. Emissions targets are important for ensuring organisations involved in the agriculture and food sector consider the climate impact of their practises and adjust their approach to reduce and mitigate their emissions. Near-term as well as longer term targets are important to help producers alter their practices in order to mitigate risk. Gathering data through farm sensors and soil testing can inform farming practices to make them more environmentally sensitive and climate-friendly. Additionally, creating transparent open-source models that producers are able to access can help with future planning and more precise farming practices. Not only can these practices help reduce GHG emissions from farming and help mitigate climate change, but they can also prove a cost-effective measure of farmers by reducing unnecessary and costly inputs and increasing yields.

Question 7: In your area(s) of expertise, what specific circumstances need to be considered when setting targets and budgets for Wales and how could these be reflected in the targets?

19. For Wales to achieve its climate goals, agricultural practices will have to change dramatically. Isolated islands of good practice and innovation are simply not enough to achieve the changes required. Wales has an opportunity to show leadership by reorienting its farming and food system dramatically in order to mitigate and adapt to the realities of climate change.

Question 8: The power and industry sectors in Wales are dominated by a small number of large emitters. What are the key challenges and opportunities that this presents in setting the levels of carbon budgets and how should the process of setting them reflect these?

20. No response

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In assessing the impact of climate change and of mitigation efforts, the committee we must continue to rely on science and data. It is essential to base decisions on independently verified and peer-reviewed science that is rigorous and unbiased. One role of civil society to act as a watch-dog and to continue to stress the importance of scientific rigour. Citizen science may also offer a contribution. Farmers can provide vital real-world evidence and key data points to help build out a fuller picture of climate impacts and of the efficacy of measures introduced to cut greenhouse gas emissions. Transparent data which is made public through open source platforms allows for greater public confidence.

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Reducing Welsh emissions in the nearer term needs be considered through three lenses: demand, supply and integration:

· Demand: Energy efficiency continues to be the most cost-effective way to reduce emissions in many contexts. Improving energy efficiency should therefore be a central pillar of Wales' emissions reduction strategy and should span domestic, SME, industrial and public sector contexts.

· Supply: Wales can reduce its electricity emissions in the nearer term through a variety of generation technologies that Wales is well-placed to exploit, including offshore wind, and tidal power, in addition to solar, onshore wind and hydro which have seen reasonably good uptake in Wales over the past number of years. Wales can reduce its heat emissions by continuing to accelerate the deployment of heat networks and also potentially by introducing hydrogen for heat and industry. Wales can reduce its transport emissions by accelerating the roll-out of electric and hydrogen vehicles.

· Integration: Carbon capture and storage (CCS), energy storage and demand side management and flexibility will play an increasingly important role in future energy systems. Identifying and implementing the best options presents both a challenge and an opportunity.

Analysis of the relative opportunities presented by some of the above options can be found in the Carbon Trust's Low Carbon R&D Strategy for Wales. This study for the Welsh Government, conducted in 2013, prioritised opportunities in offshore renewables and smart grids – based on quantifying the economic opportunity and mapping the Welsh supply chain capabilities.

One of the key overall challenges facing Wales in reducing its emissions is taking strategic investment decisions that (1) support the achievement of both nearer term and longer term targets; and (2) retain optionality in the face of significant and unavoidable uncertainty. An example of a decision-making approach designed for this context is the Carbon Trust's 'Analysis of Electricity System Flexibility for Great Britain' from 2016, which uses a 'least worst regrets' methodology.

agro-chemicals, and the transport of agricultural products. It also excludes the emissions related to land use change (for example, ploughing up forest or grassland for crops) or losses of soil carbon. A new report from IFOAM EU estimates that altogether, one-third of global GHG emissions could be linked to the farming and food industries – production, processing, distribution and consumption. We would like to see the emissions reductions targets adopted by Wales in the near- and long-term take into account a full assessment of food and farming related emissions.

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Purely from a technological perspective, going beyond 80% cost effectively is likely to require a step change in the deployment of energy efficiency technologies and of 'conventional' renewable technologies such as wind and solar, but it is also likely to require the deployment of negative emissions technologies, such as bio-CCS for example and other early stage and emerging technologies.

Technology however cannot be the only solution and there is a need to incentivise, support and empower Welsh organisations and citizens - society as a whole - to engage with the decarbonisation agenda. Proactive engagement to all sectors of society will be required to stimulate behavioural and cultural change and empower communities.

that altogether, one-third of global GHG emissions could be linked to the farming and food industries – production, processing, distribution and consumption. We would like to see the emissions reductions targets adopted by Wales in the near- and long-term take into account a full assessment of food and farming related emissions.

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Organic farming methods can help to deliver this goal and therefore should be more strongly supported by the Government. Evidence shows that organic farms generally emit fewer greenhouse gases, use less energy and store greater amounts of carbon in soils per hectare than non-organic farms; the IFOAM EU report estimates that conversion to 50% of EU land under organic farming by 2030 would equate to a 23% cut in agricultural GHG emissions through increased soil carbon sequestration and reduced application of manufactured nitrogen fertilisers.

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Yes, leaving the EU will have a considerable impact in particular on how the targets can be met and in relation to the overall political priority attached to cutting greenhouse gas emissions and the need for agriculture to contribute its fair share. It is vital that climate policy and targets set in Wales or at UK level are not undermined by other areas of Government especially in the light of Brexit. For example, trade

deals must be ‘climate proofed’ so that they do not erode the chances of carbon budgets being met, and they do not simply export emissions overseas.

However, the significant focus on the development of a new UK agriculture policy is an opportunity – as long as there is commitment from the highest levels in Government to ensuring this is compatible with the UK’s climate commitments domestically and globally. This compatibility between climate and agricultural policy must extend to the devolved nations too. For decades, the EU Common Agricultural Policy (CAP) has helped provide stability for many farm communities, and it has contributed increasingly to the conservation and protection of the environment. However, as most of its budget pays landowners simply for the area they farm, it has also smothered efforts to tackle climate change and this has not been a priority in policy design. In preparing to leave the EU, the UK has an opportunity to set in place policies that help our farming communities mitigate and adapt to climate change, and this opportunity must not be squandered.

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Healthy soils are a key climate mitigation tool. Healthy soil acts as a carbon sink by drawing carbon down into the soil to store it. Improving soil health is therefore a critical way to tackle climate change. Recognising the ability of soil to sequester carbon and its contribution to climate mitigation, the UK signed onto the French government's the 4 per 1000 soil carbon initiative at the UN Climate Change Convention in Paris. This initiative aims to increase soil organic carbon by 0.4% each year. This goal to increase soil carbon sequestration must be a key policy in UK agriculture policy to help reduce GHG emissions. The UK has committed to managing all England's sustainably and to tackling degradation threats by 2030. Wales has an opportunity by leading the way on soil protection and climate change by taking action and introducing policies that the rest of the UK may emulate.

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This is a complex question to which the only simple answer is that all these stakeholders and more will have important roles to play. Welsh Government's role will be critical in delivering emissions reduction in Wales, as all stakeholders will require clear legislation, guidance and support in order to make the changes required to play their part in reducing emissions.

The Carbon Trust is working together with the Energy Systems Catapult to develop an approach to map out the respective roles of stakeholders in the energy transition – the "Whole Energy Systems Methodology (WESM)". The future energy transition is going to be far more dependent on a broader set of stakeholders than the old, centralised approach. Understanding these stakeholders, their needs and interactions presents a challenge that is not currently well served by an approach to energy policy grounded in the old, centralised approach. WESM provides a practical solution to this challenge. This approach could be aligned with the Wellbeing of Future Generations' five ways of working: 'long-term', 'prevention', 'integration', 'collaboration' and 'involvement'.

term take into account a full assessment of food and farming related emissions.

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Question 3: In the area(s) of your expertise, what are the opportunities and challenges in reducing Welsh emissions in the nearer term (e.g. to 2030)?

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Question 5: What are the respective roles of UK Government, Welsh Government, the wider public

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Question 6: As a business, as a Public Sector Body, or as a citizen, how do emissions targets affect your planning and decision-making?

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Question 7: In your area(s) of expertise, what specific circumstances need to be considered when setting targets and budgets for Wales and how could these be reflected in the targets?

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Question 8: The power and industry sectors in Wales are dominated by a small number of large emitters. What are the key challenges and opportunities that this presents in setting the levels of carbon budgets and how should the process of setting them reflect these?

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Organisation

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Energy and carbon targets are often based on energy system models and other analysis that focus on techno-economic considerations, i.e. what are the most cost-effective technological solutions. The real-world consists of people and their rational and irrational needs and fears. These factors become even more relevant and important in the context of high potential disruption and uncertainty, both of which are almost inevitable in the kind of large-scale energy transition facing Wales. Therefore, Wales needs to fully integrate factors surrounding cultural and behavioural change into its thinking, strategy and targets.

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sector and to sequester carbon into the soil.

Government recognition and support for sustainable agricultural practices - especially those that help meet carbon budgets - should also inform priorities and budget allocation for research, innovation and farming advisory services. There are many opportunities for knowledge sharing among farmer networks and these should be actively promoted and encouraged. The Soil Association is calling for Government to allocate 10% of the current R&D budget for innovative agriculture projects led by farmers themselves. A significant proportion of such projects can and should be dedicated to finding ways to cut greenhouse gas emissions.

In order to help climate-proof the agricultural sector and encourage new entrants to organic farming, research institutions and universities – particularly agricultural colleges – should be encouraged to offer courses in organic and agroecological farming practices, as part of a wider focus on what climate change means for the future of farming and how the sector can play its part in cutting GHG emissions and adapting to the impacts of climate change. Increasing R&D funding into innovative farm-driven projects would help to identify methods by which farming practices can help tackle climate change and field-test techniques that could help farmers adapt to growing in a changing climate.

Question 5: What are the respective roles of UK Government, Welsh Government, the wider public sector, business, third sector and individual or household behaviour in delivering emissions reductions between now and 2030? And, separately, between 2030 and 2050?

Each and every actor, whether government,

business, civil society, or the general public have an important role to play in helping to meet our climate goals. Each action, however small, can help to reduce our emissions. However, as the CCC's most recent progress report has illustrated, a voluntary approach to emission reduction in the agricultural sector is no longer a valid approach. Government needs to take a strong position and drive forward climate goals. Wales has an opportunity to lead by example and to go faster and further than the UK overall.

Public procurement should be given more recognition as a powerful tool that can be used to tackle climate change and reduce emissions from agriculture and the food system. The UK public sector serves some 3.5 million meals each weekday across settings as varied as schools, nurseries, care homes, hospitals and prisons. While this accounts for little over 1% of the total food retail and catering market, its influence is significant. Food in schools and public institutions sets norms for the public and consumers, signals values, and gives integrity to government priorities and policies. To illustrate the potential scale of this impact, the current UK organic market is worth over £2 billion, so if the public sector went organic, it would approximately double that market.

As food consumers, we also have a part to play. Dietary change and the reduction of food waste is essential, if we are to secure a sustainable, climate-friendly food system. That includes less but better quality meat and dairy products – particularly moving away from intensively farmed animals fed on cereals – and instead switching to grass-fed beef and lamb, and to more plant-based diets, with more fruit, vegetables and wholegrains. Government policy can help achieve this behavioural shift and

campaigns such as Eating Better has been strongly supporting policy revisions. Not only would this be good for efforts to tackle climate change, it would be good for our health too.

Question 6: As a business, as a Public Sector Body, or as a citizen, how do emissions targets affect your planning and decision-making?

18. Emissions targets are important for ensuring organisations involved in the agriculture and food sector consider the climate impact of their practises and adjust their approach to reduce and mitigate their emissions. Near-term as well as longer term targets are important to help producers alter their practices in order to mitigate risk. Gathering data through farm sensors and soil testing can inform farming practices to make them more environmentally sensitive and climate-friendly. Additionally, creating transparent open-source models that producers are able to access can help with future planning and more precise farming practices. Not only can these practices help reduce GHG emissions from farming and help mitigate climate change, but they can also prove a cost-effective measure of farmers by reducing unnecessary and costly inputs and increasing yields.

Question 7: In your area(s) of expertise, what specific circumstances need to be considered when setting targets and budgets for Wales and how could these be reflected in the targets?

19. For Wales to achieve its climate goals, agricultural practices will have to change dramatically. Isolated islands of good practice and innovation are simply not enough to achieve the changes required. Wales has an opportunity to show leadership by reorienting its farming and food system dramatically in order to mitigate and adapt to the realities of climate change.

Question 8: The power and industry sectors in Wales are dominated by a small number of large emitters. What are the key challenges and opportunities that this presents in setting the levels of carbon budgets and how should the process of setting them reflect these?

20. No response

Question 9: What evidence should the Committee draw on in assessing impacts on sustainable management of natural resources, as assessed in the state of natural resources report?

In assessing the impact of climate change and of mitigation efforts, the committee we must continue to rely on science and data. It is essential to base decisions on independently verified and peer-reviewed science that is rigorous and unbiased. One role of civil society to act as a watch-dog and to continue to stress the importance of scientific rigour. Citizen science may also offer a contribution. Farmers can provide vital real-world evidence and key data points to help build out a fuller picture of climate impacts and of the efficacy of measures introduced to cut greenhouse gas emissions. Transparent data which is made public through open source platforms allows for greater public confidence.

Question 10: What evidence regarding future trends as identified and analysed in the future trends report should the Committee draw on in assessing the impacts of the targets?

No response