

CONSULTATION

Response Document



Draft Scottish National Adaptation Plan (2024 – 2029)

Actions today, for a climate resilient future.

31st January 2024

Introduction to CIEEM

The Chartered Institute of Ecology and Environmental Management (CIEEM), as the leading membership organisation supporting professional ecologists and environmental managers in the United Kingdom and Ireland, welcomes the opportunity to comment on this consultation.

CIEEM was established in 1991 and has over 7,000 members drawn from local authorities, government agencies, industry, environmental consultancy, teaching/research, and voluntary environmental organisations. The Chartered Institute has led the way in defining and raising the standards of ecological and environmental management practice with regard to biodiversity protection and enhancement. It promotes knowledge sharing through events and publications, skills development through its comprehensive training and development programme and best practice through the dissemination of technical guidance for the profession and related disciplines.

CIEEM is a member of:

- Scottish Environment Link
- Wildlife and Countryside Link
- Northern Ireland Environment Link
- Wales Environment Link
- Environmental Policy Forum
- IUCN – The World Conservation Union
- Professional Associations Research Network
- Society for the Environment
- UN Decade on Ecosystem Restoration 2021-2030 Network
- Greener UK
- Irish Forum on Natural Capital (working group member)
- National Biodiversity Forum (Ireland)
- The Environmental Science Association of Ireland

CIEEM has approximately 750 members in Scotland who are drawn from across the private consultancy sector, NGOs, government and SNCOs, local authorities, academia and industry. They are practising ecologists and environmental managers, many of whom regularly provide input to and advice on land management for the benefit of protected species and biodiversity in general.

This response was coordinated by Members of our [Scotland Policy Group](#).

We welcome the opportunity to participate in this consultation. We strongly support the plan but its impact will depend on its detailed implementation. We would be happy to provide further information in the areas of our expertise such as biodiversity, ecosystem services, natural capital and nature-based solutions. Please contact Jason Reeves (CIEEM Head of Policy) at JasonReeves@cieem.net with any queries.

Lived and local experience - public consultation questions:

1. *What do you think the current effects of climate change are on people in Scotland?*

There are a range of climate-related events which have increased in severity and frequency — including flooding, wildfire, coastal surges — with subsequent increase in damage to infrastructure, including transport (i.e. road, rail, ferries and ports), property and livelihoods. Settlements on, or near, coasts and floodplains are especially impacted by the combination of sea level rise and increasing storm intensity, contributing to erosion, subsidence, and flooding.

All of these are contributing to adverse outcomes for health¹, both from increasing risk to physical health of extreme events (including from overheating), but also to mental health, particularly anxiety over threats to homes, livelihoods, and wider eco-anxiety. The impacts of Climate Change are not confined to developing nations; research from the Environmental Agency has found that experience of the damage caused by extreme weather increases the chance of facing mental health problems².

2. *The next Scottish National Adaptation Plan will cover the period of September 2024 to 2029. What effects, if any, do you expect climate change will have on people in Scotland over the next five years?*

Referring to our answer to Q1, we expect all climate-related impacts to continue to increase in frequency and severity, and that these will have an increasingly detrimental effect on the people of Scotland.

Specifically, we anticipate that Scotland's mild climate will become more extreme, with an increase in the severity and frequency of flooding in winter (impacting properties, infrastructure and agriculture), *and* of periods of drought and heatwaves in summer (causing severe problems for water quality and supply)³.

Beyond that, it is difficult to comment on what effects we expect to see in the next five years, though we do need to plan for climate adaptation in the short, medium and long-term.

Part of the difficulty of predicting the impacts of climate change are that these will be dependent on location, local demographics, severity of events, preceding events and cumulative impacts, ecosystem health and resilience, and a host of other, often interrelated, factors.

¹ World Health Organization on Climate Change (2023): <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>

² Environment Agency (2020): <https://www.gov.uk/government/news/prepare-for-flooding-to-reduce-impacts-on-mental-health>

³ Scotland's Environment (2024): <https://www.environment.gov.scot/our-environment/climate/changing-climate/>

3. What actions, if any, would you be willing and able to take to adapt to climate change? You may wish to consider the action you could take a) in your community and b) around your home and/or business.

CIEEM as a professional body cannot answer on behalf of individual members. However, we know that many of our members have already taken many actions to adapt to climate change, as they are well aware of the future projections and their likely impacts.

We note that members of the public are perhaps better able to contribute to mitigation measures than adaptation ones, except in relation to some small-scale domestic actions. Mitigation is important and can reduce the need for the most extreme forms of climate change adaptation, such as the abandonment of settlements. Reducing material consumption and increasing reuse of products and packaging is an example of climate mitigation in the context of the Circular Economy, which is something that members of the public can engage with as consumers. Carbon offsetting through peatland restoration is a form of mitigation that can also play its part in climate change adaptation through reducing peak flows and flood risk⁴.

CIEEM has an Action 2030 group⁵ which is driving action for CIEEM to achieve net zero carbon emissions by 2030 in all of its operations and activities. In addition, we provide information and advice to members on how they can help to address the climate emergency and biodiversity crisis through their professional work, and build relationships and share knowledge with other relevant climate emergency and biodiversity crisis working groups.

4. What factor(s), if any, would prevent you from taking action to adapt to climate change and become more climate-resilient?

We are answering this question as a professional body, but one which is privy to the barriers to climate adaptation faced by both our members and the communities with which some of our members engage as part of their work.

The following factors are likely to be important:

- cost and availability of resources;
- availability of knowledge of, or clear guidance on, what the best and most appropriate actions are;
- availability of support for implementation.

Note that a consultation like this is likely to produce a statistically biased result for this question as not everyone will be able to respond. It would be more effective to ask bodies such as SNIFFER to carry out a small project to identify these factors using a representative sample or to ask grant awarding bodies such as SMEEF about the barriers they are aware of.

⁴ Peatland Catchments and Natural Flood Management Report to the IUCN UK Peatland Programme's Commission of Inquiry on Peatlands Update.

<https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2019-11/COI%20Peatlands%20and%20NFM.pdf>

⁵ CIEEM Action 2030: <https://cieem.net/i-am/action-2030/>

5. What action(s) do you think the Scottish Government should prioritise in order to build greater resilience to the impacts of climate change?

Listed below are some key actions that Scottish Government should prioritise:

- Work with communities, including communities of interest, to raise awareness and suggest actions that they might wish to take.
- Support businesses that are truly sustainable, and new businesses that have sustainability as a core part of their message and aim.
- Support land management and planning decisions that prioritise adaptation. Note that many third sector bodies which own land, such as The Scottish Wildlife Trust, The National Trust for Scotland, The Royal Society for the Protection of Birds, The John Muir Trust and the Woodland Trust, are already taking action as are other private and public landowners and their experience should be used to inform the actions that can contribute significantly to building greater resilience.
- Planning has a critical role in determining where developments are situated so they are resilient to long-term climatic changes. Planning processes will have to be adaptive, and this can be supported by ensuring that all chief planning officers (now mandatory for all Scottish councils) have adequate training in carbon literacy, and a basic awareness of nature based solutions to Climate Change adaptation. Opportunities to learn from best practice should be facilitated, for example from the Climate Ready Clyde project⁶.

Outcome 1: Nature Connects - Public Consultation Questions:

6. Which of the following actions should the Scottish Government prioritise? Please highlight all that apply.

- i. More trees and green spaces in built-up places for flood resilience and cooling***
- ii. More joined up natural habitats (“nature networks”)***
- iii. Managing pests and diseases which will be more prevalent with climate change***
- iv. Restoring forests and peatland***
- v. Reinforcing natural coastal barriers such as dunes***
- vi. Other***

These actions are equally important. They are all part of the matrix of tools for adaptation, along with Nature-based Solutions, such as river restoration / flood plain management and reconnection and, in some cases, technological and engineering solutions. Decisions about which actions to prioritise are inherently linked to place and localities. For example, a coastal community will prioritise reinforcing natural coastal

⁶ Climate Ready Clyde: <https://climatereadyclide.org.uk/>

barriers over restoring forest and peatland, but an upland community will be the opposite. ‘Hard’ defences should be the last line of defence in making us more resilient to climate change and its associated effects on flooding and air quality.

(i) *More trees and green spaces in built-up places for flood resilience and cooling*

Blue and green infrastructure are not an added benefit but an integrated requirement for future planning and development. A focus on Nature-based Solutions for managing issues such as air quality, cooling flooding in many of our towns and cities should be the norm. There are many innovative ways to green urban spaces and these can include (along with the usual green walls, rain gardens, etc.) lamp post green towers, which some councils are doing in England. Although trees and green spaces are important in built-up places, increased flood resilience is dependent as much on habitat management upstream, such as restoring long-term straightened watercourses to natural meandering rivers and linking these with the adjacent floodplains.

There are already several case studies of the benefits of Green Infrastructure in action in both rural and urban areas, including the Eddleston Water project⁷, which is a great example of the effectiveness of natural flood management techniques and habitat restoration measures at a catchment scale in reducing flood risk and adapting to climate change. Also, the Green Infrastructure Strategic Intervention (GISI), which was delivered by NatureScot between 2016 and 2023, created and improved multifunctional green infrastructure on a major scale in Scotland’s towns and cities. Recognising the intersection between climate change and socio-economic deprivation, the project focused on areas of multiple deprivation and demonstrated the role of blue-green infrastructure in addressing access to good quality greenspace, as well as flooding, pollution and many other factors⁸.

(ii) *More joined up natural habitats (“nature networks”)*

There needs to be a National Nature Network to ensure that nature networks designated by local authorities link across boundaries and make ecological sense. A National Nature Network would join up sites for nature and link ecological processes across landscapes⁹. Protected areas would form the core of Scotland’s Nature network which then, by restoring and creating new habitats, will connect these areas together. An ecological network can be regarded as a ‘coherent system of natural and/or semi-natural landscape elements that is configured and managed with the objective of maintaining or restoring ecological functions’, where the focus is on conserving biodiversity at the ecosystem, landscape or regional scale. It needs clear national priorities,

⁷ <https://tweedforum.org/our-work/projects/the-eddleston-water-project/>

⁸ <https://www.nature.scot/funding-and-projects/green-infrastructure-strategic-intervention>

⁹ Scottish Environment LINK Nature Networks Discussion Paper (2020).

<https://www.scotlink.org/wpcontent/uploads/2020/03/Nature-Networks-Briefing-FINAL-2.pdf>

addressing both the climate and biodiversity crises, that are 'laid over' and integrated with regional priorities and local priorities. Two good examples to highlight are the Clyde Climate Forest and the Glasgow City Region Climate Adaptation Strategy, that both cover eight councils along the catchment of the Clyde (ecological relevant area); and the Central Scotland Green Network. Maximising the value of nature networks for climate adaptation and ecological resilience requires spatial planning and co-ordinated action across the planning and land use sectors.

(iii) *Managing pests and diseases which will be more prevalent with climate change*

There will be an increasing risk of pests and diseases with climate change. Therefore the objective should be to build resilient, healthy and fully functioning ecosystems and improve biosecurity to prevent spread of pests and diseases.

The pressure of Invasive Non-native Species (INNS) on biodiversity is intensifying across terrestrial, marine and freshwater environments in the island of Britain¹⁰, and this is likely to worsen as climate change proceeds and conditions for establishment and spread of species introduced by people become increasingly favourable^{11,12}. The likelihood of non-native species establishment and of invasion both increase as a warmer climate favours a wider range of species, and niches become vacant through climate-driven species and habitat disruption. We are already seeing range expansion and a rise in species numbers thriving outside their native environments. Many species will move northwards as temperatures rise¹³. In the marine environment the spread of marine INNS will continue to increase, particularly with warmer seas. Pacific oysters present a threat in Scotland if spread from oyster farms or transportation and become invasive. This is already a significant issue in Southeast England and should be monitored closely. ScotLINK have produced a report on INNS in Scotland — A Plan for Effective Action, due to be launched in May 2024, that will present ten INNS Response Principles that should be applied in all INNS initiatives, and indicate how best practice can be defined, adopted and applied.

(iv) *Restoring forests and peatland*

Restoring disturbed and degraded peatlands is an emerging priority in efforts to mitigate climate change. A recent review has been published on the response of degraded and restored peatlands to fire, drought and flood¹⁴. It highlighted that degraded sites can generally be restored in a way that allows for net carbon sequestration. However, biodiversity, hydrological regime, and peat soil structure are not always fully

¹⁰ JNCC Biodiversity Indicators (2021) <https://jncc.gov.uk/our-work/ukbi-b6-invasive-species/>

¹¹ <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1749-4877.2010.00193.x>

¹² <https://assets.publishing.service.gov.uk/media/57a08b57ed915d3cfd000c86/CABI-Climate-change-Invasives.pdf>

¹³ Kelly, R., Leach, K., Cameron, A., Maggs, C.A., Reid, N. (2014). Combining global climate and regional landscape models to improve prediction of invasion risk. *Diversity and Distributions*, 2014; 20, 884-894.

¹⁴ Loisel, J., Gallego-Sala, A. Ecological resilience of restored peatlands to climate change. *Commun Earth Environ* 3, 208 (2022). <https://doi.org/10.1038/s43247-022-00547-x>

restored, even after a decade of restoration efforts. This weakens ecosystem resilience to future disturbances.

As outlined in a recent joint CIEEM-ICF position paper¹⁵, we urgently need to prioritise helping private landowners to bring more existing woodlands into sustainable management by increasing the pace, breadth and scale of ambition in policy, legislation and financial incentives. A recent inquiry led by the Royal Society of Edinburgh states that there is a financially viable market for commercial forestry planting in Scotland¹⁶. Hence public funding can be redirected into support for the planting of native trees and improved management and restoration of existing native woodlands, especially Caledonian pine and mid latitude rainforest ecosystems, to the benefit of climate mitigation (through carbon sequestration and reduction in carbon loss) and biodiversity gain.

Important considerations include awareness-raising campaigns around tree pests and diseases, support around tree species choice, targets related to riparian tree planting, and links to the Riverwoods project.

(v) Reinforcing natural coastal barriers such as dunes

Reinforcing natural coastal barriers such as dunes will be very important in mitigating the effects of flooding on both people and nature. This should be enforced in planning decisions at the local and regional level.

More interesting questions, which we would like to have seen in the consultation, would be: (i) which of these should have priority for funding, (ii) how do existing policies and strategies currently address the above actions, and (iii) where might the gaps be?

The consultation would also benefit from considering who should lead on certain actions: for some of these, it would be in the land manager's interest to carry out the work while, for others, the responsibility should lie with the relevant Local Authority or other public body that manages land.

7. When you consider your local natural space e.g. park, canal, woodland or beach, what would you like to see improved in terms of blue and green space in your local area? Note: to avoid duplication, data from separate consultations on the Scottish Biodiversity Strategy, Water and Wastewater Services and the Flood Resilience Strategy will be used to complement responses to the above noted questions.

¹⁵ Management of Existing UK Woodlands: An Opportunity for Green Prosperity (Aug 2023). <https://cieem.net/resource/icf-and-cieem-position-paper-management-of-existing-uk-woodlands-anopportunity-for-green-prosperity-aug-2023>

¹⁶ <https://rse.org.uk/expert-advice/inquiries/tree-planting-inquiry/>

As a professional organisation, this is not a question that we can answer in particular terms. However, all communities should have access to good quality blue and green space within their 20 minute neighbourhood.

In some areas, there is still a lack of green and blue space. Nature-based solutions should be at the forefront of any new development and redesign of the urban environment. They are integral to both local climate adaptation and to the objectives of the Scottish Biodiversity Strategy and Scotland's Forestry Strategy 2019-2029, creating multifunctional green and blue spaces that serve nature and people.

Outcome 2: Communities - Public Consultation Questions:

8. For Scotland to adapt to the impacts of climate change, lots of different groups, such as individuals, communities, businesses and public bodies, will need to work together and support each other. How could others support you (or your organisation) to adapt to climate change over the next five years?

You might want to think about some of the groups listed below and the roles that they could take:

- ***Central and local government***
- ***Other public bodies, such as NHS Boards or enterprise agencies***
- ***Small and large businesses***
- ***Third sector organisations***
- ***Communities***

While we recognise that everyone has a role to play in climate adaptation — indeed, local community groups and organisations are already making progress on working together through place-based networks, and we have referred to our own Action 2030 campaign¹⁷ — we would like to have seen the consultation include the question: "How could the Scottish Government and other decision-makers support you to adapt?". This implicit absence of acknowledgment of the Scottish Government's power and decision-making authority seems to rest on the assumption that all communities want responsibility for local action, but this is not necessarily the case everywhere. Communities are not homogeneous, and some may respond to say that they think the Scottish Government should be completely responsible for funding and supporting communities at regional and local levels.

The Scottish Government can support adaptation by increasing the capacity of local councils to deliver on NPF4 and other legislation. CIEEM's survey Local Planning Authority (LPA) staff in 2022¹⁸ highlighted a variety of areas in which support is needed, including the need for clear, consistent guidance, and provision of in-house expertise, including on ecology and climate change.

¹⁷ <https://cieem.net/i-am/action-2030/>

¹⁸ <https://cieem.net/survey-of-scottish-local-planning-authority-capacity-highlights-risk-to-delivery-of-npf4/>

9. In what way(s) could the plan help different groups across Scotland and/or its regions to collaborate on climate adaptation?

Please offer suggestions that could support collaboration on climate adaptation. For example, the plan could describe how different groups should work together and support each other. Or the plan could define geographic areas, roles and responsibilities for responding to climate change risks. Please offer suggestions that could support collaboration on climate adaptation.

You might want to think about collaboration between some of the groups listed below:

- **Central and local government**
- **Other public bodies, such as NHS Boards or enterprise agencies**
- **Small and large businesses**
- **Third sector organisations**
- **Communities**

Many organisations and communities are already collaborating at least at the catchment scale, and there are existing regional collaborations, several of which are name-checked in the consultation document. Rather than reinvent the wheel, the emphasis should be on how we learn from existing projects and properly resource them, as many struggle with securing long-term funding.

Regional Land Use Partnerships have a role here and should be empowered to make decisions on priorities and resourcing at a regional and local level. Land use frameworks can play a key role in identifying connectivity bottlenecks and facilitate integration of multiple ecosystem services. They should connect directly to levers of funding and finance in order to stimulate action and delivery. We need to see how Regional Land Use Partnerships are going to be properly supported and financed.

Effective and efficient collaboration between central and local government requires a clear understanding of which aspects of Net Zero each is responsible for, and how action should be coordinated between the two. In their recommendation, the UK CCC¹⁹ observe that communication of the clear distinction of responsibilities will lead to a better understanding of the roles and responsibilities across local government, and facilitate the sharing of best practice.

Small and large businesses are crucial in both reducing emissions and adapting to climate change. There is a compelling business case to take immediate action on climate change. Companies demonstrating action and leadership on climate can improve their reputation and position with customers, suppliers, investors and regulators, as well as reduce their exposure to climate risks. Businesses currently operating unsustainably in relation to biodiversity and climate are likely to be adversely impacted. Support should be provided to allow a just transition to a sustainable business model. However, any business in receipt of public funds, either

¹⁹<https://www.theccc.org.uk/wp-content/uploads/2022/12/Progress-in-reducing-emissions-in-Scotland-2022-Report-to-Parliament.pdf>

through procurement of a product or service or through the giving of grants or loans, should be required by Government to demonstrate that they are working towards circular, sustainable supply chains and in a way that addresses the biodiversity and nature crises.

More workplaces should be encouraged to support their employees to take action on climate adaptation. This could include fixed days off work to deliver action for nature and climate adaptation in the local area. Although there may be challenges to transitioning, there are significant opportunities to support a range of long-term jobs in the environmental sector addressing both the climate and biodiversity crises and help deliver a just transition²⁰.

Outcome 3: Public Services and Infrastructure - Public Consultation Questions:

10. *Scotland's net zero targets are part of global efforts to limit global temperature rise to 1.5°C. At the same time, the Climate Change Committee's advice is to adapt now to a minimum global temperature rise of between 1.5 and 2°C for the period 2050 – 2100, and to consider the risks of up to a 4°C warming scenario. Should the Scottish Government adopt the Climate Change Committee's advice to "adapt to 2°C and assess the risks for 4°C"?*

Strongly Agree / Agree / Don't know / Disagree / Strongly Disagree

Please share detail on your answer:

The current projections suggest that, even if current global targets and ambitions are met, warming of between 2°C and 5°C will have occurred by 2100²¹, and some parts of the world have already seen large increases. Risk appraisal must therefore consider the worst case scenario.

11. *Some decisions, for example those in relation to long-term planning or infrastructure investment, may require greater consideration of future climate conditions. Would further guidance on the appropriate future climate scenario(s) to consider when you (or your organisation) are making plans and investment decisions be useful?*

Y / N

12. *If yes, what sort of information or advice would be useful for you or your organisation when considering future climate scenarios in long-term planning or investments?*

²⁰ <https://greenjobsfornature.org/>

²¹ <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/Technical-Report-The-Third-Climate-Change-Risk-Assessment.pdf>

Our members are involved in projects that may take centuries to reach fruition, such as restoring ancient woodland. Many civil engineering projects involve equally long time scales, and we need to be planning now for conditions then. In fact, the most recent predictions of sea level rise²² suggest that action will need to be taken sooner than was thought.

Coastal settlements in the UK have been under threat from sea level rise for years by this stage²³. It is important to plan for abandonment of these as soon as possible so as to manage the transition as identification of a risk will lead to impacts on property values and insurance rates. In conjunction, other actions will also need to be taken, such as rebuilding coastal defences further inland and seeking Nature-based Solutions.

Unfortunately, it is by no means clear how exactly our climate will change as this will depend on such factors as the strength of the Atlantic Meridional Overturning Circulation.

How we adapt to climate change will, itself, change with the climate, and we must try to anticipate this with research and proactive advice. In the specific case of woodlands restoration, there needs to be guidance about the appropriate provenance/genotypes(s) to be planted. Traditionally we have assumed that a local provenance would be best. However, as the climate changes, it may be better to include genotypes from warmer and drier locations.

13. Climate change makes extreme weather more likely in Scotland. When weather events disrupt one part of our infrastructure (e.g. energy, telecoms, transport networks), the impacts can quickly “cascade” out to disrupt other infrastructure networks or vital services. For example, an interruption in electricity will quickly affect businesses, hospitals and transport. Would an assessment of “cascading” risks from weather-related disruptions to infrastructure help you or your organisation to adapt? Note: to avoid duplication, data from separate consultations on the Water and Wastewater Services and the Flood Resilience Strategy will be used to complement responses to the above noted questions.

Y / N. Please share your reasons:

These are really important as the outcomes are difficult to anticipate and often unexpected. The Scottish Government should also consider tipping points and the potential for multiple vulnerabilities to align and precipitate catastrophe²⁴. Note that there may also be interactions with mitigation measures, some of which may already be known or can be pre-empted, and others not. For example, electric vehicles are heavier than fossil fueled ones so can cause more damage to infrastructure such as bridges that might already be

²²<https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/summaries/marine-climate-change-projections>

²³<https://theconversation.com/the-uks-first-climate-refugees-why-more-defences-may-not-save-this-village-from-rising-sea-levels-197206>

²⁴ <https://royalsocietypublishing.org/doi/10.1098/rstb.1990.0090>

weakened by flooding. In this example, infrastructure that encourages active travel and public transport usage would work alongside a shift to electric vehicles whilst reducing the numbers of cars in circulation, thereby reducing the risk to infrastructure already weakened by flooding.

Additionally, if we want businesses to adapt, they need to fully understand how cascading risks will impact on them, their productivity and business continuity.

Outcome 4: Economy, Business and Industry - Public Consultation Questions:

14. The Climate Change Committee suggests more Scottish businesses should be assessing and responding to climate risks. What, if any, are the barriers to businesses accessing advice and support on climate risks?

It may be that, until a business is either impacted severely by climate change, or there is a mandatory requirement to undertake adaptation measures, there is insufficient incentive to seek advice and support on responding to climate risks. A compounding issue may arise from the risk-averse insurance industry pulling out from areas and industries that are seen as particularly at-risk from climate change²⁵. Conversely, this same threat has the potential to act as a driver of business engagement with adaptation if there is clear advice on how they can act and assure industry of their viability. Awareness raising of anticipated impacts of climate change and cascading events on businesses could help build incentive to prepare.

15. Climate change is projected to increase disruption of international and domestic supply chains. How do you anticipate disruption to domestic and/or international supply chains caused by climate change will affect Scottish business, industry and consumers?

It may be necessary to produce more food, timber and other biologically-based raw materials in Scotland, in addition to building Scotland's circular economy. Increase in homegrown materials has the potential to bring about conflict with other uses of land, such as for housing or ecological restoration, if not carefully planned for and managed²⁶.

16. What, if any, should the role of government be in supporting more resilient supply chains?

Support the growth of Scotland's circular economy, including its bioeconomy; Scotland could be a forerunner on innovation in this sector which uses 'bioarisings', i.e. biologically-sourced 'waste', such as manure,

²⁵ <https://www.bbc.com/future/article/20240311-why-climate-change-is-making-the-us-uninsurable>

²⁶ https://www.landcommission.gov.scot/news-events/blog/land-use-in-scotland-is-changing-rapidly-the-time-to-act-is-now?p_slug=blog

cardboard, and animal carcasses, to produce goods and fuels which would formerly have relied on virgin materials, including petroleum²⁷.

17. Farming, fishing and forestry sectors are particularly exposed to impacts of climate change. How should farming, fishing and forestry businesses be supported to adapt to climate change?

Businesses in these sectors can be very entrepreneurial, but sharing innovations across businesses, particularly farms may require a cost-effective extension service, with a focus on adaptation to climate change, underpinned by appropriate research and development.

There is already evidence of the impact of extreme weather events on Scottish agriculture²⁸. CIEEM strongly supports payments to farmers to support climate change mitigation, adaptation and integrated land management to increase resilience. A significant proportion of Scotland's land is covered in agriculture; hence we need a sea change in how this is assessed, resourced and managed. Central to adaptation should be a focus on soils. They are not only a finite resource that is integral to food production, but healthy soils provide protection against extreme climate-related events, including both heavy rainfall and drought. Soils are at particular risk from erosion during flooding, a threat that will increase with climate change. Assistance for farmers should promote, protect or improve soil health and quality. There is scope to include and strengthen soil protection requirements as part of existing cross-compliance requirements on farmers and through revised Tier 1 requirements as part of new rural support.

There are also advantages to both businesses and communities of more local food production and processing, for example, crofts, allotments, and community farms and orchards supplying through farmers's markets and farm shops²⁹. Limiting factors can be the provision of local markets and abattoirs as well as a lack of flexibility in veterinary inspections, which are, of course, essential.

As recommended by the Climate Emergency Response Group³⁰, we would like to see the Farm Advisory Service be upscaled and refocused on climate mitigation, adaptation and nature. CIEEM creates industry standard guidance for assessments of biodiversity and has developed guidance on Farm Advice alongside a competency framework for Farm Advisors³¹. We are interested in discussing how we can support the delivery of the Advisory Service so as to ensure that farmers receive advice that is professional, objective and evidence-based from advisors who are competent to deliver this.

²⁷<https://scottishscience.org.uk/sites/default/files/article-attachments/SSAC%20Report%20-%20Towards%20a%20Circular%20Economy%20-%20Scotlands%20Bioresource%20Flows.pdf>

²⁸ <https://www.wwf.org.uk/our-reports/impact-extreme-weather-events-scottish-agriculture>

²⁹<https://www.nature.scot/professional-advice/social-and-economic-benefits-nature/food-and-drink/local-produce>

³⁰ https://cerg.scot/wp-content/uploads/2021/09/CERG_Report_Final_Sept_2021.pdf

³¹ <https://cieem.net/resource/farm-environment-adviser-competency-framework/>

There also needs to be a plan for a just transition for users of land and sea whose legitimate actions adversely affect biodiversity and are going to be impacted by, or forced to adapt to, climate change. Since the Kunming-Montreal Global Biodiversity Framework, there has been a growing international movement towards businesses and the global economy becoming 'Nature-positive'³². In our response to the IUCN's 'Measuring Nature-Positive' consultation³³, we highlight the potential to leverage nature-positive contributions from businesses that have large land holdings by incentivising them to invest in the Natural Capital of their land using a reverse tax system whereby gains in natural and biodiversity value could be offset against other taxes, and losses could be taxed. Increase in Natural Capital of land holdings can contribute to climate adaptation through the provision of ecosystem services.

18. *Scottish businesses will face challenges as a result of climate change impacts. However, climate change will also present business and innovation opportunities. What, if any, do you think are the business and innovation opportunities arising from climate change in Scotland?*

Innovation in design and materiality can contribute to resilience and help create opportunities around “build back better” or “build better before”.

Funding of innovative adaptation measures needs to be ramped up, and we need the information to back-up proposals to funders and investors. A CCC-commissioned report³⁴ from an Independent Expert Advisory Group points out that, as climate change costs are no longer hypothetical, adaptation finance is needed to prepare the UK for the impending impacts. While observing the potential for multiple business opportunities, the report notes that there is a significant gap between concepts and proven solutions. It recommends that dedicated innovation finance be used to support emerging financial structures, which often involve partnerships between public, private and third sector actors.

Referring specifically to agricultural businesses, including crofters, the main opportunity is in the chance to make changes to a farm, holding, or croft, that lead to a more secure future. Crucial to this is support in the form of a Farm Advisory Service with a focus on climate adaptation, and a farm payment scheme which appropriately values actions that benefit both biodiversity and climate resilience. As with recent significant investment in carbon offsetting via tree planting schemes in Scottish upland estates, there is the opportunity for businesses to invest in semi-natural grassland management and native tree planting on agricultural land to offset and mitigate for climate and biodiversity impacts. The Integrating Trees Network, a farmer led initiative supported by Scottish Forestry is a great example of knowledge exchange³⁵.

³²<https://www.iucn.org/our-work/biodiversity/nature-positive#:~:text=IUCN%20is%20producing%20guidance%20to,tar gets%20for%20species%20and%20ecosystems.>

³³ <https://cieem.net/resource/cieem-response-to-the-iucn-consultation-on-measuring-nature-positive/>

³⁴ <https://www.theccc.org.uk/publication/case-studies-in-adaptation-finance-expert-advisory-group/>

³⁵ <https://forestry.gov.scot/support-regulations/farm-woodlands/integrating-trees-network>

19. What, if any, support would be required to encourage businesses in Scotland to take advantage of innovation opportunities arising from climate change? Note: to avoid duplication, data from separate consultations on the Scottish Biodiversity Strategy, Water and Wastewater Services and the Flood Resilience Strategy will be used to complement responses to the above noted questions.

Time-limited funding can support a just transition and innovation. Such funding may have to accept the risk of supporting as-yet unproven innovations (please refer to our answer to Q18), but should lead to subsequent profitability without the need for direct support.

Outcome 5: International Action - Public Consultation Questions:

20. How could the Scottish Government support communities impacted by climate change across the world?

The Scottish Government should engage with the many third sector organisations who already support communities abroad. Some CIEEM members also work or are based abroad, including members of our UK Overseas Territories Special Interest Group³⁶ who actively engage with calls for evidence³⁷ and public outreach^{38 39}.

Consider also that this should not be a one way process; there will be lessons we can learn from communities abroad that have already had to adapt to climate change.

21. Scotland is known for its excellence in climate change research. Are there international adaptation focussed research opportunities which Scottish-based academic work should focus on?

We have no specific suggestions.

Cross-cutting action

Public Consultation Questions on Private Investment:

22. Both public finance and mechanisms to leverage greater private finance will be required to deliver adaptation action. What do you see as the main barrier to private investment for adaptation action?

³⁶<https://cieem.net/i-am/member-networks/>

³⁷<https://cieem.net/resource/safeguarding-the-environment-in-british-overseas-territories-response/>

³⁸<https://cieem.net/diverse-species-and-ecosystems-across-ukots/>

³⁹<https://cieem.net/tristan-da-cunha-one-of-the-worlds-biggest-wildlife-sanctuaries/>

We consider that public finance and private finance will not necessarily be required to deliver all adaptation actions. For those actions where finance is appropriate and effective, a likely barrier is the requirement for monetary return on investment and the length of time that this can take, if it can be achieved at all. A further risk is the potential for misinterpretation of unclear and indefinite policy, which can be costly both to business and to the intentions of the policy.

We refer to the Government's own Interim principles for Responsible Investment in Natural Capital⁴⁰, with its emphasis on strong commitments around community involvement and empowerment in nature restoration. Note that public value for money may be undermined if the Scottish Government shoulders all of the risk, while private finance takes all the benefits.

23. How can SG support/incentive more private investment? Some potential ways of promoting private investment are provided below.

Blended finance models

Mainstreaming adaptation in existing market codes

Grant funding schemes

Open data platform and industry-led common metrics

As also noted in answer to Q22, private investment is not always the most appropriate way for encouraging adaptation action. The recent boom in private finance can have unintended consequences while policy catches up, including contributing to land value inflation which can undermine community involvement in local land use and management for climate adaptation and other community benefits⁴¹.

Monitoring and Evaluation - Public Consultation

24. The draft Adaptation Plan sets out plans to develop an adaptation monitoring and evaluation framework. Our proposed approach is for annual reports to include a set of quantitative indicators to monitor progress to the Adaptation Plan's objectives. In addition, we propose to publish a baseline at the start and report on progress at the end of the Adaptation Plan to track longer-term outcomes. Do you agree with the proposed approach to monitoring adaptation?

Strongly Agree Agree Disagree Strongly Disagree Don't know

Agree, as what is proposed is better than what we have before, and is needed, but there is relatively little to the approach. As a minimum, we would like to see impact assessments alongside monitoring the progress of

⁴⁰<https://www.gov.scot/publications/interim-principles-for-responsible-investment-in-natural-capital/>

⁴¹<https://www.hutton.ac.uk/news/policy-playing-catch-scotland%E2%80%99s-green-investment-boom>

activity towards the outcomes. Otherwise, it is not evident how the Scottish Government will know if the outcomes are as intended in 5 years time when the next plan is written.

25. Do you have suggestions of data or indicators that could be used to track adaptation outcomes in Scotland? The proposed outcomes and objectives of this draft Plan are set out here.

Impact Assessments

Impact Assessments - Public Consultation Questions:

26. What, if any, impacts do you think this Adaptation Plan will have on groups/individuals who share the aforementioned protected characteristics?

It is difficult to comment on this and other questions in this section due to the lack of detail in the draft National Adaptation Plan.

27. What, if any, measures could be taken to strengthen any positive impacts or lessen any negative impacts in this respect?

Please see our answer to Q26.

28. What, if any, impact do you think this Plan will have on inequality caused by socio-economic disadvantage?

Climate change will inevitably adversely affect groups with a socio-economic disadvantage, whose adaptive capacity is limited by social isolation and lack of social networks, chronic illness (mental and physical), lack of capital to invest in adaptive measures at home, and disenfranchisement, all of which are connected to and compounded by geography, poor housing and over-exposure to risk. The National Adaptation Plan must acknowledge this interconnection and prioritise actions that address both in its implementation, as part of a Just Adaptation.

29. What, if any, measures could be taken to strengthen any positive impacts or lessen any negative impacts in this respect?

Please refer to our answer to question 26 of this consultation.

30. What, if any, impact do you think the Adaptation Plan will have on children's rights and wellbeing?

If the plan does not ensure the well-being of our children and grandchildren it will have failed.

31. *What, if any, measures could be taken to strengthen any positive impacts or lessen any negative impacts in this respect?*

Consider a longer time scale. We should be looking at least a century into the future when planning actions for climate adaptation.

32. *What, if any, impacts do you think the Adaptation Plan will have on Island communities?*

Please refer to our answer to question 26 of this consultation.

33. *What, if any, measures could be taken to strengthen any positive impacts or lessen any negative impacts in this respect?*

Please refer to our answer to question 26 of this consultation.