ClimateXChange

Centre of Expertise on Climate Change

Annual Report 2012-13

EXECUTIVE SUMMARY

In this second year in operation ClimateXChange has built strongly on the foundations laid in year one. The Centre is now well established and effective at providing high quality outputs to support policy development in the Scottish Government.

Our objective is to be "a world-renowned centre of expertise to deliver objective, independent, integrated and authoritative evidence to support the Scottish Government (and implementation partners) in relation to its activities on climate change mitigation, adaptation and transition to a low carbon economy, and to provide insights in terms of the management of risk and uncertainty in relation to the significance of climate change impacts."

To achieve this we have evolved a three-layer operational framework comprising

- a call-down service for Scottish Government policy teams;
- near-term (3-12 months) research work planned with Scottish Government policy teams and organised into three interlinked workstreams: Adaptation; Mitigation; and Significance, Risk and Uncertainty; and
- proactive support through intelligence and professional opinion on medium-term and over-the-horizon issues.

Altogether ClimateXChange has responded to and completed 22 requests for research or summary reports from April 2012 to March 2013. Additionally six pieces of work have been commissioned in response to requirements jointly developed with policy teams and other key stakeholders. Particular highlights include:

- Multiple call-down requests addressing renewable energy and the benefits and barriers associated with its uptake.
- Reports on peatland restoration and work on woodland expansion that have directly informed the development of GHG mitigation policy.
- Recognition of work on Adaptation Indicators in international collaboration.

As a Centre of Expertise, we will be judged on the policy impact of our work. To this end, we have worked with RESAS and the member Institutions on a comprehensive review of our work and the value generated from our outputs. The outcome of this exercise has been to refocus and simplify the management and delivery of our planned research work around specific near-term policy questions, improving the impact of our outputs whilst reducing expenditure on planned research by some £1m in 2013-14.

We will continue to review the balance between planned and commissioned work, strengthening engagement with Scottish Government policy teams and ensuring our work is focussed on those policy areas where we can have the greatest impact.

EXTERNAL CONTEXT

The primary policy drivers of CXC work for 2012-13 were the development of the draft Scottish Adaptation Programme and the evidence requirements underpinning the Second Report on Proposals and Policies (RPP2) and associated low carbon transition policies.

The span of Scottish Government sectors served by ClimateXChange has increased since 2011-12. We have delivered evidence and research work for agriculture, energy, forestry, transport, environment, tourism, low carbon behaviours and planning policy teams, as well as housing and energy analysts, economists, and the Climate Challenge Fund team.

This evidence has been provided in a range of formats - as discussions, secondments and written briefings. We provided a member of staff on secondment to the Scottish Government Climate Change Legislation Team during the drafting of the Scottish Adaptation Programme, putting our Centre at the heart of policy development.

We have increasingly delivered work that directly feeds into policy formulation work, specifically work on Common Agricultural Policy reform, the Heat Vision for Scotland, RPP2 and Woodland Expansion (WEAG).

Changes in policy priorities have been flagged through the ongoing engagement between the CXC Directorate and our Steering Group. This process has also provided suggestions for policy engagements around emerging topics such as resource efficiency, CAP reform and NPF3.

Emerging topics this year have included:

- economic analysis of the benefits of community owned renewable energy;
- extensive work on peatland restoration in response to RPP2 policy needs; and
- forestry expansion arising from the WEAG report and carbon accounting for land use.

Beyond the Scottish Government, ClimateXChange has established effective links with Adaptation Scotland, The Committee on Climate Change (including the Adaptation Sub-Committee), UKCIP, UKERC and LWEC. The list of HEIs engaged to undertake responses has expanded to include individuals in Edinburgh Napier University, University of Strathclyde, University of Edinburgh, University of Aberdeen, Heriot Watt University and the University of Salford.

We have hosted a number of workshops with key stakeholders such as Scottish Natural Heritage, Forestry Commission Scotland and Historic Scotland to share current understanding of policy-related issues and the underpinning science. These workshops have helped to shape further research by ClimateXChange in the areas of adaptation for protected sites and native woodlands.

These links are important in ensuring that work is co-ordinated and data put to use across all delivery organisations.

INTERNAL CONTEXT

ClimateXChange has been successful in forging effective partnerships and cross-institutional working involving MRPs and HEIs. This has been demonstrated through both adaptation and mitigation work.

At the end of its first year and in the light of feedback from RESAS, ClimateXChange reviewed its work and governance. The review recommended that:

- the planned research component of ClimateXChange should be streamlined to give key members greater allocations of time;
- the Centre should comprise smaller, more flexible research teams to meet specific policy issues, with capacity to draw on a wider pool of expertise when needed;
- planned research needs to meet policy demands more explicitly, and should consider bringing in other disciplines/research expertise; and
- the cross-institutional nature of the Centre and its responsive work on call-down requests were strengths to be built upon.

As we start the third year of ClimateXChange's operations we will be a smaller operation both in terms of total budget and the number of key individuals involved. The work funded will be more specifically tied to policy relevant outputs. The work to re-align ClimateXChange started in the summer of 2012 and will continue well into 2013. In future, the planned work will comprise two workstreams – Adaptation and Mitigation – with more flexible research teams drawn together to tackle specific policy challenges. The work on the current Significance, Risk and Uncertainty (SRU) workstream will be merged into projects within the other two workstreams. The former co-ordinator of SRU will remain a member of the Directorate.

The call-down component of ClimateXChange has been well received by policy teams. Additional commissioning funds provided by RESAS in 2013-14 will enhance this component.

To raise the level of awareness of how policy is developed and implemented the ClimateXChange Secretariat held a series of workshops for CXC researchers. The feedback from the over 50 attendees has been positive.

In future, ClimateXChange intends to develop more and different ways of sharing ideas, knowledge and data with policy teams, acknowledging that traditional briefing papers summarising research outputs are not always the most effective approach. Round table events , acting as a sounding board and providing technical oversight of work undertaken by other (third) parties for policy teams are all examples of this richer approach to sharing knowledge between CXC expertise and policy teams.

OUTPUTS AND OUTCOMES

Supporting Policy and Practice:

Stakeholder Engagement

1. RACCE Committee evidence on RPP2:

Three members of ClimateXChange, Robin Matthews, JHI, Andy Kerr, University of Edinburgh and Pete Smith, University of Aberdeen, gave evidence to the Scottish Parliament Rural Affairs, ClimateChange and Environment Committee.

2. Shaping our Energy Future event, November 2012:

ClimateXChange (SRUC, JHI and the Secretariat) provided four easily digestible summary briefs for this event. Stakeholders were from the Scottish Government, industry, government agencies, the third sector and communities. ClimateXChange collaborated with Edinburgh Centre for Carbon Innovation in staging the event.

3. Perceptions of Transport Disruption:

We were requested by Transport Scotland (TS) to help them understand road users' perceptions of extreme weather related disruptions on Scottish trunk roads. We conducted a focus group meeting with TS and experts from the trunk roads operating companies, and developed questions for their annual survey of road users, conducted by MORI.

4. Adaptation indicators:

CXC has developed an approach to the design of Adaptation Indicator Cards which involved producing mock-ups of the cards and engaging with a wide range of potential users to ensure the indicator data sources, analysis and presentation are in line with their needs. Dialogue and co-design with Adaptation Programme Leads has been a feature of this work

5. Peatland workshop with SNH:

We held a workshop to identify the full range of climate change related issues linked with managing peatlands in Scotland. This prioritised issues that can be supported by ClimateXChange-funded research. Policy contact: Mary Christie (SNH).

6. Workshop on adaptation in the built environment:

We held a workshop in February 2013 with 12 experts and practitioners in the built environment. The workshop report sets out conditions for enabling adaptation in the built environment. Policy contact: Jim McGonigle

Policy relevant outputs

1. Review of Potential Measures for RPP2 – Agriculture:

This ClimateXChange report gives advice on mitigation measures beyond the measures included in RPP1 that can provide GHG mitigation at a low (or negative) cost in the agriculture sector. SG policy contact: Antje Branding.

2. Report containing advice on good practice under the Climate Challenge Fund: Food Growing:

This report has been used to inform the CCF Grants Panel on the elements of projects that make them more likely to deliver effective outcomes. Report delivered by JHI. Policy Contact: Judith Young.

3. Report containing advice on good practice under the Climate Challenge Fund: Cycling:

This report has been used to inform the CCF Grants Panel on the elements of projects that make them more likely to deliver effective outcomes. Report delivered by Edinburgh Napier University. Policy Contact: Judith Young.

4. Report containing advice on good practice under the Climate Challenge Fund: Energy efficiency in Refurbished Community Buildings:

This report has been used to inform the CCF Grants Panel judges on the elements of projects that make them more likely to deliver effective outcomes. Report delivered by University of Edinburgh. Policy Contact: Judith Young.

5. Implications of proposed CAP reforms for climate change action in Scotland:

The policy briefing analyses the opportunities and possible impacts of CAP reform on climate change adaptation and mitigation effort in agriculture. Report delivered by A Wreford and V. Eory of SRUC. Policy contact: Carole Stewart

6. Flexible Adaptation Pathways report:

This report defines the FAP approach and assessed its applicability in Scotland. It has been used by the team drafting the Scottish Adaptation Programme and has now been taken up by SNH as an approach they wish to trial for native woodlands adaptive management. Report delivered by S Martin (RBGE) and A Moss (University of Dundee). Policy contact: Fiona Page.

7. Principles and Features of a Good Adaptation Strategy:

This note summarises best practice for developing national adaptation strategies. The team drafting the Scottish Adaptation Programme (SAP) has used the note as a checklist against which to assess the draft SAP as it has evolved. Report delivered by S Martin and A Moss. Policy contact: Fiona Page.

8. Impact on tourism of wind farm development in Scotland:

This report reviews published research into wind farm impacts on tourism to demonstrate what the evidence base is. The Scottish Government has used this with their stakeholders and has asked for further work to be done to develop a robust methodology for assessing impacts in Scotland. Report delivered by Liz Dinnie, JHI. Policy contact: Sue Kearns/Richard Walsh.

9. Energy efficiency in the housing sector:

The report charts data availability and need for/costs of gathering additional data on household energy consumption and energy efficiency behaviours. Report delivered by Heriot Watt University. Policy contact: Ganka Mueller

10. Advice on the inclusion of precision farming in RPP2:

The report summarises the current scientific knowledge about the GHG mitigation effectiveness and financial costs of precision farming techniques. It also gave an estimate of the possible GHG savings in Scotland. Report delivered by SRUC. Policy contact: Emma Close (who has since left post).

11. Development of monitoring methodology for the Scottish Adaptation Programme:

The Indicators workstrand developed a template for monitoring implementation of the Scottish Adaptation Programme. The aim is for this to form the basis of annual reporting against the Programme. The work has been welcomed by the policy lead and we have built a strong relationship with the policy team. However, it is too early to say whether the template will be used by policy teams to assess progress against the Programme once it is published. Template designed by A Moss and S Martin. Policy contact: Alistair Macintosh.

12. Examples of 'no-regret', 'low-regret' and 'win-win' adaptation actions:

The paper sets out how adaptation actions can create greater benefit. It was produced for the team drafting the Scottish Adaptation Programme by S Martin. Policy contact: Jody Fleck (since left post).

13. Health impacts from wind turbines:

Report to inform planning guidance and renewables policy. The report reviewed the scientific literature on health impacts of wind turbines and the planning measures used internationally. Report commissioned from University of Strathclyde and University of Salford. Policy Contacts: Sue Kearns and Simon Bonsall.

14. Marine energy economic impacts:

This paper reviews the economic impacts of temporary expenditures related to marine energy developments in Pentland Firth and Orkney Waters area 2010 – 2020. Delivered by the Fraser of Allender Institute, University of Strathclyde. Policy Contact: Energy Team

15. Agricultural GHG mitigation and climate policy in Scotland:

CXC researchers Vera Eory, SRUC, and Iain Brown, JHI, gave presentations to a Scottish Government seminar on CAP Reform, Agriculture and Climate Change in March 2013. Further input was provided to develop questions for tracking potential mitigation measure uptake for the EU Farm Structure and Methods Survey. This was circulated to farmers in March 2013 (Eileen Wall, SRUC). SG Policy contact: Antje Branding and Emma Close.

Impact on policy

1. Peatland restoration:

The reports that ClimateXChange produced as inputs to RPP2, and subsequently, have had a direct impact on policy. ClimateXChange's figures for the abatement potential of peatland restoration in Scotland were used in RPP2 and have directly helped set the parameters for peatland restoration strategy in Scotland.

2. Secondment – SG Adaptation team:

The ClimateXChange Knowledge Manager (Ragne Low) spent 3 months on secondment in the Scottish Government Climate Change Legislation Team working on the draft Scottish Adaptation Programme.

3. Heat vision for Scotland:

The Directorate and Secretariat engaged with the Renewables Routemap team and brought in expertise from the University of Edinburgh to support the policy team developing the vision. Following this input, we drafted the framework for Scotland 'heat scenarios for Scotland', which will directly impact on the content of the Heat Generation Policy Statement due for publication at the end of this year.

4. Clubroot disease in Scotland:

We have provided predictions for increased risk of clubroot disease in oilseed rape under predicted climate change scenarios. Delivered by JHI.

5. Extreme Weather Summit, Scottish Parliament:

ClimateXChange produced material for the ministerial briefings. Delivered by JHI.

6. Climate Change Risk Assessment:

CXC has been invited to participate in the Defra working group that will steward the next CCRA (alongside Adaptation Scotland and the Scottish Government).

7. EQIA Report on RPP2 Policies

The Scottish Government engaged ClimateXChange to deliver a full climate justice impact assessment of RPP2, and an initial equalities impact assessment (gender) of the Renewables Routemap.

8. Scottish Adaptation Programme Stakeholder Workshops

Members of ClimateXChange have through the SAP workshops contributed ideas for Policies and Proposals for inclusion in the SAP and concrete proposals for how the SAP should be monitored.

Benefits to other stakeholders

1. LWEC Climate Change Report Card for Biodiversity

The LWEC report card will be launched in early May. CXC are among a range of stakeholders involved in producing and endorsing the card. The work is led by Natural England and involves other Scottish stakeholders including SNH and Adaptation Scotland.

2. Climate Adaptation video clips for forestry

CXC has influenced and supported Forestry Commission and Forest Research policy and communication of climate change adaptation to forestry stakeholders, and facilitated and accelerated this process. The first in a series of on-line video clips on adaptation in forestry are about to go live with further videos to follow in the coming year. This work will benefit foresters within and beyond FCS / FE, as it will be promoted through ICF (Institute of Chartered Foresters) and other industry bodies.

3. CXC collaboration with BSBEC

CXC is through JHI contributing genetic resources and genomic tools to the Cell Wall Lignin (CWL) Consortium (part of BBSRC), which aims to improve the processability (and value) of surplus straw from broad-acre cereal production. The BBSRC Sustainable Bio-energy Centre (BSBEC) (£24m 5 yr project spanning six research consortia and fourteen industrial associates) aims to establish economically, environmentally and socially sustainable replacements for traditional fossil fuels to reducing carbon emissions.

4. Review of SNH Climate Change work

Professor Pete Smith was on the panel which reviewed SNH's work in the climate change area.

Collaboration and Multidisciplinary Working

Collaborations

1. Joint Presentations on ClimateXChange and ecosystem-based adaptation

A session at the first European Climate Adaptation Conference, Hamburg was dedicated to Scotland's co-ordinated approach to adaptation, with participants from amongst others Adaptation Scotland, RSPB, local authorities and SNH. The CXC presentation was given by JHI and the University of Edinburgh.

2. International collaboration on science-policy interface for adaptation decision making:

ClimateXChange collaborated on climate impact/risk assessments with the US, Canada, rest of UK, Australia. The collaboration was initiated by UKCIP, but ClimateXChange has taken this forward and established a network that discusses issues such as adaptation indicators and shares information and best practice. (Suzanne Martin, Anna Moss, Ragne Low). Delivered by RBGE, University of Dundee and ClimateXChange Secretariat.

3. Climate Justice Conference:

CXC delivered the conference 'Socially Just Adaptation in Scotland' with Joseph Rowntree Foundation and Sniffer (Adaptation Scotland). This raised the awareness of justice and equality issues around adaptation in the Scottish Government and a wider stakeholder group. ClimateXChange provided a keynote speaker and panellists.

4. University of Aberdeen Centre for Sustainable International Development.

The Centre participated as panellist in panel discussion on climate justice at an event addressing the awareness of climate justice issues for international development organisations and NGOs.

5. Joint presentation on ClimateXChange

Nordic Adaptation Conference 28/8/12 International collaboration on science-policy interface for adaptation decision making.

6. Adaptive Capacity in Native Woodlands workshop:

ClimateXChange hosted a workshop in August 2012 where multiple perspectives on good practice for adaptive management in woodlands were consulted through allowing all views on adaptation strategies to be

aired and taken into account. Participants included FCS, SNH, Defra, CEH, FR, JHI, independent experts and CXC Secretariat.

7. Collate and display information about demonstration sites:

CXC is collaborating with SNH, RSPB, Scotland Environment Link, Tweed Forum, Cheviot Futures, also with wider teams within JHI, SRUC and Forestry Commission. These collaborations are developing a web-based interactive map showing examples of adaptive land management in Scotland. Providing a single map showing examples of adaptive land management will enable stakeholders to see what is going on in Scotland, and determine whether there are any examples of action they can benefit/learn from.

8. Risk-based assessment for notifiable features on designated natural heritage sites
9. We have worked closely with SNH to develop an approach for assessing the risk posed by climate change to all notifiable features on all sites in Scotland that have been designated as being of national or international importance for their natural heritage. We have developed a simple methodology to combine data on sensitivity, adaptive capacity and exposure to projected climate change, thereby providing an objective risk score for each feature. This information will then be used to assess options for climate change adaptation action to conserve these features. This project was undertaken by JHI, University of Edinburgh, University of St Andrews, University of Dundee, University of Glasgow and RBGE working as members of the Significance, Risk & Uncertainty and Adaptation Workstreams.Quantifying uncertainties in agricultural GHG mitigation .

We have investigated the effect of various sources of uncertainty involved in calculating the mitigation benefits of apparently cost-effective changes in agricultural practise. We have developed an approach to reduce key uncertainties through expert elicitation, to be piloted with SRUC experts in April 2013 and implemented subsequently with external experts. This project involves JHI, SRUC and BioSS staff working as members of the Mitigation and Significance, Risk & Uncertainty Workstreams.

5. PROGRESS REPORTS ON ACTIVITIES

Adaptation

The Adaptation Workstream has delivered a series of call-down projects to provide structured advice for the Scottish Adaptation Programme. These include briefings on: features of a good adaptation strategy; examples of no-regrets options; flexible adaptation pathways; and appropriate language for communication.

Extensive engagement with the Scottish Government and stakeholders has been used to help develop a draft set of indicators and data sources for the forestry, agriculture and biodiversity sectors and to develop a strategy for communicating indicators (once fully developed). This has produced a standard template for 'indicator cards' and for indicator web pages. Dialogue has ensured synergy between the CXC indicators, the Scottish Adaptation Programme, and groups such as the UK Adaptation Sub-Committee and Adaptation Scotland.

ClimateXChange provided guidance and feedback to several sectors regarding the content and methodology to use for the annual monitoring of the Scottish Adaptation Programme.

An interim report on the assessment of climate change risks to protected conservation areas (biodiversity and earth science) has been provided to SNH (collaboration with SRU). The report identifies sites that have the highest risk in both present and future; these sites will now be assessed in more detail including adaptation options.

Analysis of national-level crop yields identified important sensitivities to seasonal weather and inter-annual climate variability. Sensitivity to soil wetness in some crops was identified as increasing with implications for food security. Results have been presented to the Scottish Government and stakeholders in the context of the poor yields and weather of 2012.

Scenario-based options for land use change including policy objectives for woodland expansion were evaluated against climate change projections. The magnitude of summer drying provides a key variable which influences direct and indirect influences on geographic potential for woodland expansion. Information requirements have been used in discussions regarding the development of new climate projections data with UKCIP and the Environment Agency.

An assessment of potential synergies and trade-offs between adaptation and mitigation options has been produced, with particular emphasis on issues for the agriculture and forestry sectors. A direct outcome has been additional funding for woodland expansion research (from Forestry Commission Scotland).

A series of adaptation demonstration projects has been initiated. Workshops have been held for the agriculture, forestry and flood management sectors, to promote adaptation best practice to policy, industry and planners. In conjunction with policy advisors, video footage has been produced to raise awareness for both forestry and flood management. A briefing note has been published to transfer lessons learned through forestry to other sectors.

Key relationships with forestry policy leads have underpinned the collaborative development of an Adaptation Toolbox to provide decision support tools and guidance for industry.

Adaptive forest management for native woodland has been explored between the forestry and nature conservation (biodiversity) sectors. An issues paper has been produced and an action plan developed.

A workshop was held with the Emergency Services sector (and associated stakeholders) and used to produce a summary note of their key information requirements.

AT UK level, policy issues have been discussed with the Climate Change Committee (Adaptation sub-committee), LWEC and UK-EOF. Our profile of work in CXC has been featured at two international adaptation conferences in Helsinki and Hamburg.

Assessment of current climate change and variability has been highlighted as a major area of interest by policy teams and agencies, but we are presently restricted because the Met Office will not make key datasets available.

The website is being developed to display outcomes for all sectors and increase knowledge exchange amongst the CXC consortium and its main policy customer. Interactive content to visualise adaptation case studies for agriculture and forestry has been published.

Progress with workstrands

Baseline and System Characterisation

April- September status: Green
October – March status: Green

Scenario Analysis

April- September status: Amber
October – March status: Amber

Land use scenarios have been produced but analysis of adaptation options delayed because staff resources have been limited due to other commitments. Incorporation of behavioural issues into the analysis is awaiting

new recruitment. This workstrand originally included work that was not policy relevant and this has not been continued.

Trade-Offs

April- September status: Amber
October – March status: Amber

Staff resources have been limited due to other commitments. Work on community resilience and agricultural trade-off analysis will now report in 2013.

Decision Support

April- September status: Green
October – March status: Green

Mitigation

Distributional Impacts and Equity

This workstrand is developing a framework that enables consistent assessment of climate justice issues in climate change policy-making, appraisal and evaluation. It aims to improve the selection of appropriate policy options and mitigating measures and to recognise situations where supplementary policy may be required.

The work undertakes a top-down synthesis of theoretical climate justice and impact assessment models revised for the Scottish context, which is validated and refined by applying the framework to Scottish Government environmental policies and proposals. These elements - modelling, validation and refinement - have proceeded in parallel.

The approach has been used to provide a full climate justice impact assessment of RPP2, an initial equalities impact assessment (gender) of the Renewables Routemap, which will now be provided annually, and a full climate justice impact assessment of the Scottish Adaptation Programme is currently in process.

Work has been done on disaggregation of household account in the 2007 Scotland SAM, which was presented at a CXC seminar and stimulated interests from the SG (Office of the Chief Economic Adviser). A SAM multiplier analysis was done based on the disaggregated SAM to compare total energy consumption of rural and urban households, and the paper was accepted by AES conference. Three CXC call down reports were submitted to SG (an interim report on the economic impacts of community renewables; a report on the impact of wind turbines on tourism; and a brief on public attitudes towards renewable energy) and received good responses from the SG. Other publications include a working report on household energy poverty and vulnerability in rural Scotland, and a presentation at CXC economist seminar on rural economic impacts of alternative farm-based renewable energy sectors: A regional CGE analysis allowing for uncertainty.

April- September status: Green
October – March status:Green

System-wide modelling

The System Wide Modelling work has been collaborating closely on modelling benefits of community renewables in collaboration with JHI. We have delivered two call-down reports and have developed the economic models to improve their ability separate ETS and non-ETS industries in the models.

In April 2012 a paper addressing the potential issues around a carbon tax for Scotland was published by the Fraser of Allander Institute.

April- September status: Green
October – March status: Green

Land-use peatlands

Development of the WISE Peatlands decision support tool has resulted in a fully functional draft version. This GIS-based tool gives site scores of suitability for peatland restoration but can equally be used for other assessments. It contains 13 GIS layers, including e.g. current land use categories, soil carbon content, and degradation indicators. Work has progressed to enhance the tool involving the RSPB and SNH, respectively, to test modelling approaches based on aerial or multispectral image analysis to detect drainage grips and proxy site condition. Three CXC policy briefings were completed (Potential abatement from peatland restoration, Carbon Savings from peat restoration and AFOLU accounting: implications for implementing peatland restoration – costs and benefits), which informed RPP2. The tool was presented at two international conferences. Other publications included a study of SRDP uptake for lowland raised bog restoration and a scoping study of evaluation of water quality improvements.

April- September status: Green
October – March status: Green

Woodland expansion

The Scottish Government has set itself the goal of planting 10,000 ha per year in trees to achieve an increase of 100,000 ha forest cover by 2022 to contribute to meeting net GHG emission reduction targets. The Woodland Expansion Advisory Group (WEAG) were tasked to initiate this work and their Final Report in June 2012 contained 24 recommendations. Subsequent discussions with Jo Ellis, Senior Policy Advisor at the Forest Commission Scotland, identified several questions arising from this report, which included identifying what types of land use conversion to woodland are beneficial in terms of net Global Warming Potential (GWP), the opportunity costs of planting trees, and identifying the full range of ecosystem services that woodlands provide. The current project aims at addressing these questions by modelling GHG emissions and C sequestration following land use change to woodland under various scenarios, comparing economic costs and returns of current land uses compared to planting trees under three scenarios, and qualitatively analysing the impact of land use change to woodland on a range of ecosystem services.

April- September status: Green
October – March status: Green

Significance, Risk and Uncertainty

Core Modelling

Our cross-cutting expertise in climate science, mathematical modelling and statistics has been used to provide quantitative support to policy-led research, ensuring climate information is appropriately used and associated uncertainties are understood. Collaborations within CXC included: involvement in the initial risk assessment for SNH of designated features on protected sites; undertaking an analysis of the sources of uncertainty in Maximal Abatement Cost Curves; and producing a protocol for sharing indicators with Adaptation working on sectoral report cards. Direct engagements have included responding to a policy team request on climate variability and working with MASTS to inform development of the marine climate adaptation plan.

April- September status: Green
October – March status: Green

Core Perceptions and Communication of Risk and Uncertainty

We have been collaborating with policy staff, stakeholders and other workstrands within CXC. Particular activities include contributing to a survey on perceptions of climate change on the trunk road network for Transport Scotland. A workshop on handling and communicating uncertainty in climate change research and policy-making (Sept 2012) attracted Scottish Government and workstream representatives. Follow-ups include knowledge elicitation and representation with Adaptation and CREW (flood risk), Mitigation (MACC), and Strategic Programme (renewables). Other activities include: analysing terminology in policy and press documents; responding to queries on shale gas and visual/noise impact assessments; and participation in engagement events and exhibitions for various audiences.

April- September status: Green
October – March status: Amber

> *Several factors have delayed the development of the follow-up project from the workshop on uncertainty. We expect this project will be back on track in May, 2013.*

Food security

We have recruited a Post-doc with a quantitative economic background and have collated data to support his modelling work. We met with a range of policy advisors at Saughton House in Dec 2013 to identify key policy priorities and prepared a response mode analysis of the effect of high frequency trading on commodity prices. We also prepared a Food Security

briefing for the National Planning Framework 3. We are contributing to the JPI-FACCE European initiative on Food Security and are modelling Global Food Security issues relevant to Scotland, with a particular emphasis on the inequalities in society.

April- September status: Green
October – March status: Green

Crops and livestock

We have worked collaboratively across institutions, developing our level of engagement with policy teams, summarising our knowledge about effects of climate change and plugging knowledge gaps where necessary. On crops, we have identified an unexpected anomaly in the standard methodology used to combine information across risk factors in assessing the threat posed by potential new diseases and have modelled the suitability of future weather patterns for the fungal pathogen Fusarium. On livestock, we have been developing prototype risk maps for key parasites based on UKCP09 projections which will be updated as additional field and experimental data become available.

April- September status: Green
October – March status: Green

Biodiversity

Following discussions with SNH, we undertook an initial assessment of the risk of climate change impacts on notifiable features of designated sites in Scotland. This involved data collation alongside development and application of an analytical approach in collaboration with Core Modelling and Adaptation. We have developed empirical methods for modelling the spatial and temporal patterns of biodiversity change using data from the British Trust for Ornithology (BTO) Breeding Bird Survey (BBS). Direction and presentation of this modelling has been discussed with SNH. Results will appear in a Natural Heritage Trend Note for species in the Scottish Rural Development Programme priority list.

April- September Status: Green
October – March status: Amber

A slight delay in delivery of the final report of the risk assessment work has been experienced. However, SNH are aware of this problem and are currently happy to wait for the report to be produced. The missing data should be available soon, and then production of the report should follow rapidly on.

Marine

This workstrand consists of two PhD studentships, both developed in discussion with Marine Scotland. One studentship is collating information of how climate change has been incorporated into the design, implementation, management and monitoring of Marine Protected Areas (MPAs) worldwide. We have begun to interpret this information to allow international experiences to inform the Scottish MPA Process. The second studentship, started in October 2012, is in its early stages, and will enable the vulnerability of commercial fish to coastal climate change to be assessed. Additional funding has been secured from Marine Scotland Science to work towards the Clyde 2020 initiative.

April- September status: Green
October – March status: Green