Adapting to **Climate Change**

Adaptation Training Workshops for Planners

Report on workshops held in February and April 2013

Adaptation Scotland
supporting climate change resilience

Research contractor:
Caitlin Hamlet contributed to delivering the workshops and this report

Sniffer's project managers for this contract:
Joseph Hagg
Anna Beswick

TAYplan project lead:
Pam Ewen, TAYplan

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Sniffer, Greenside House, 25 Greenside Place, Edinburgh, EH1 3AA, Scotland, UK
T: 0131 557 2140 **E:** info@sniffer.org.uk **W:** ww.sniffer.org.uk **:** @SnifferScotland

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Registered Office: Edinburgh Quay, 133 Fountainbridge, Edinburgh, EH3 9AG.

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Introduction

> *The land use planning system is a priority area for adaptation action, because it is a primary mechanism for determining how vulnerability to climate change can be managed, particularly in towns and cities. Land use planning decisions can directly help to increase resilience to climate risks, but can also lock future generations into a development pathway that increases vulnerability or one that will be very costly to maintain or reverse.*
>
> HOW WELL IS SCOTLAND PREPARING FOR CLIMATE CHANGE?
> ADAPTATION SUB-COMMITTEE, 2011

The planning system in Scotland has a vital role to play in how we adapt to climate change. Good progress has been made through including adaptation in the National Planning Framework and Scottish Planning Policy – as well as increasing recognition of adaptation's importance throughout the planning system. However, it remains an emerging area for planners who are trying to understand the challenges posed by a changing climate – and the role of the planning system in addressing these challenges.

Adaptation Scotland provides advice and support to help organisations, businesses and communities in Scotland prepare for, and build resilience to, the impacts of climate change. It has identified a need to support planners with climate change adaptation[1] - and is working with partners to deliver a range of projects under its current work programme.

TAYplan Strategic Development Planning Authority has been recognised as an exemplar of strategic development planning – with a leading approach to including climate change[2]. TAYplan is currently reviewing the Strategic Development Plan and has identified climate change adaptation as a key area of focus.

Adaptation Scotland and TAYplan identified the need for training workshops to enhance planners understanding of climate change adaptation – and explore how this could be integrated into the development planning process. Together with partners from the Key Agencies Group[3] and Perth & Kinross Council, we held two workshops in February and April 2013. This report is a summary of those workshops.

[1] Adapting to climate change: A review of support for planners in Scotland, Sniffer 2013
[2] Award for Spatial Strategies and Silver Jubilee Cup, RTPI Awards 2011
[3] SEPA, SNH, Historic Scotland, and A+DS from the climate sub-group of Key Agencies Group

The Workshops

Planning the Workshops

A group was formed to develop and deliver the workshops, with members from Adaptation Scotland, TAYplan, Perth & Kinross Council, Historic Scotland, SNH, SEPA, and A+DS[4]. Further support was provided by Caitlin Hamlett in a consultancy role for Sniffer (Adaptation Scotland).

An initial brief outlined the following training requirements:

- An introduction to climate change adaptation and the role of development planning in building climate resilience
- An overview of the adaptation considerations that are included as part of the TAYplan Strategic Development Plan and relevant information from research commissioned to assess climate vulnerabilities for the region
- Presentations and / or workshop activities that would allow participants to explore how the adaptation considerations included within TAYplan could flow through to Local Development Plans

To cover all this, the group proposed two separate ½ day workshops. The first providing an introduction to climate change adaptation, laying a foundation for the second workshop to focus on the role of planning and suggestions for planning policy.

[4] Adaptation Scotland (Joseph Hagg and Anna Beswick), TAYplan (Pam Ewen, Nick Smith and Lorna Sim), Perth & Kinross Council (Graham Esson), Historic Scotland (Ewan Hyslop and Virginia Sharp), Scottish Natural Heritage (Mary Christie), Scottish Environment Protection Agency (Katherine Lakeman) and Architecture + Design Scotland (Eric Dawson)

The Participants

The workshops were well attended by those in the TAYplan stakeholder network[5], with representatives from the four local authorities in the TAYplan region (Fife, Dundee, Angus and Perth and Kinross), Scottish Water, Tactran, Forestry Commission Scotland, SEPA, SNH, A+DS, Historic Scotland, Transport Scotland, NHS Tayside, University of Dundee and University of Abertay.

Outline of the Workshops

The workshops were each held over a ½ day and were primarily focussed on participatory sessions, with active contributions from participants. This was felt to be an important emphasis, as there is no off-the-shelf solution for climate change adaptation and planning – and the diverse experience of workshop participants would be invaluable in developing the topic.

The first workshop began with an introductory presentation on climate change adaptation by Adaptation Scotland. This laid out some of the key concepts of climate change adaptation, followed by an introduction to how the climate of the TAYplan area is projected to change over the coming century. The workshop sessions worked through looking at climate impacts and a potential vision for adaptation – more detail provided in the following section. This was followed by a short presentation on how Perth & Kinross has been addressing climate change adaptation in its development plan and through community engagement. The workshop concluded with feedback from each of the workshop groups.

Workshop 1 – 13th February (09:00 – 12:30)

- Presentation: Introduction to Climate Change Adaptation (Joseph Hagg – Adaptation Scotland)
- Workshop Sessions: The Challenge / The Vision / The Journey
- Presentation: Case Study for Perth & Kinross Council (Graham Esson – P&KC)
- Discussion: Feedback from the Workshop Sessions

The second workshop was held two months after the first, with a focus this time on the role of planning and trying to draw out suggestions on what could be used in development plans. A short presentation summarising the first workshop was given by Adaptation Scotland.

Workshop 2 – 22nd April (13:15 – 16:30)

- Presentation: Review of Workshop 1 (Joseph Hagg – Adaptation Scotland)
- Workshop Session: Local Development Plans – Issues and Policy Formulation
- Workshop Session: Strategic Development Plans – Issues and Policy Formulation
- Discussion: Summary and Next Steps

[5] 36 attended on 13thFebruary and 28 on 22nd April.

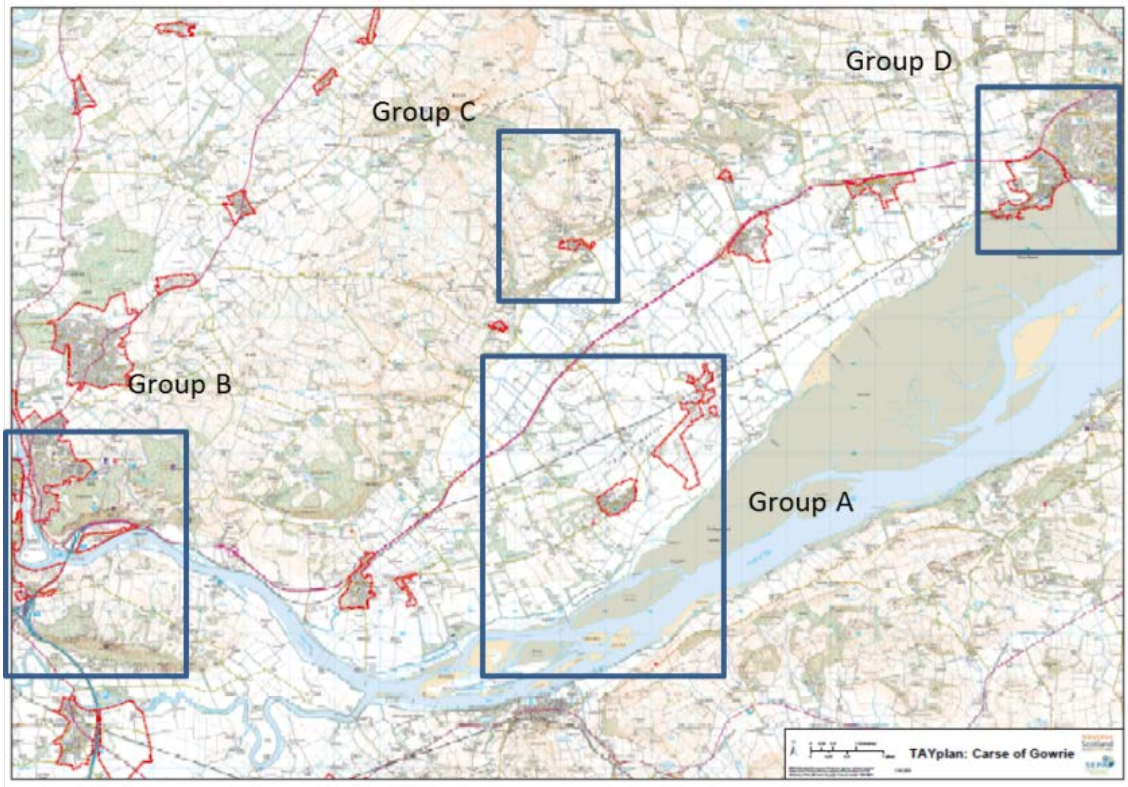
The Workshop Sessions

The main focus of both workshops was on the participatory activities – which were designed to stimulate discussion around the key elements of climate change adaptation, while considering the role of the planning system in addressing challenges.

The Focus Areas

To focus the workshop sessions it was decided to look at smaller areas within the TAYplan. This was considered useful as it allowed for discussion of climate change adaptation at a scale that participants could consider local impacts and what adaptation measures might look like in specific locations. The participants were divided into four groups that covered the areas (shown below): (a) the Carse of Gowrie around Errol - coastal and low-lying rural; (b) Perth - urban and peri-urban; (c) the Braes of the Carse – rural and upland; and (d) Invergowrie – urban, peri-urban and coastal.

These groups were used for discussion throughout workshop 1 and for the first session of workshop 2. Only in the final session, discussing strategic development issues, were the groups merged to look at wider strategic issues for the TAYplan region.



Materials

Each group was provided with a set of maps and some photos relevant to their focus area. They were also given copies of a climate projections information sheet drawn from the introductory presentation. This provided groups with a set of resources that would allow participants to familiarise themselves with the area – and try to understand potential climate impacts.

Maps provided included:

- A1 OS map of the wider area – from Perth to Invergowrie – including the Carse of Gowrie
- A1 aerial photography map of the wider area (as above)
- A1 OS map of the group's focus area - with some key features annotated
- A1 aerial map of the focus area - with additional layers relating to planning (e.g. flood risk, settlements, prime agricultural land, new housing allocations etc.)
- A selection of other maps showing topography, historic sea level and land cover.

The selection of materials was more than most groups would be expected to use – they were given the choice to determine what was most useful to them and focus on that.

Workshop One – 13th February 2013

The first workshop was aimed at providing participants with a practical introduction to many of the issues that need to be considered for climate change adaptation. With limited time available, and for many participants this being an introduction to the subject, the activities in the session were kept simple – with participants encouraged to be creative and make-do with partial information.

Part One: The Challenge

The introductory presentation gave a broad overview of projected changes in climate for the region. Participants were also given a hand-out of key climate information (see Annex). The aim of this activity was to get participants to discuss what these changes might mean at the local scale of their focus area.

Each group had an A1 OS map of their focus area, as well as a range of other resources (photography and maps), to familiarise themselves with the area and provide a focal point for discussion.

The impacts of climate change are likely to felt across a wide range of built, natural, and human systems. To focus the discussion in the limited amount of time available, each group was asked to select and discuss 3-4 headings from this list:

Agriculture	Forests and woodlands	Transport and travel
Hydrology and water resources	Aquatic ecosystems	Infrastructure
Biodiversity	Coastal resources and ecosystems	Flood/Storm-water Management
Landscapes	Built and historic environment	Health
Communities	Emergency and rescue services	Recreation
Energy	Local economy	

For each of the selected headings, the group was invited to think of possible direct and indirect impacts from climate change that might occur in the area by 2050. These impacts might be perceived as positive and/or negative. It was recognised that this was a workshop activity and these impacts would need to be considered with only limited / partial information available.

Finally, the group was asked to identify the 2 or 3 impacts that they considered to be the most significant risk for their area – and approximately when they thought these would occur (e.g. 2020, 2050, 2080)

Part Two: The Vision

The aim of this activity was to move beyond a discussion of potential climate impacts – to creating a vision of what a 'climate ready' adapting place might look like in 2050. Participants were encouraged to be creative when developing their visions – thinking of a broad range of transformative changes that could conceivably take place (i.e. they didn't have to be the most likely – just possible).

It was also recognised that these were general visions for the area – and not limited to measures that development planning could implement. The role of planning in delivering adaptation was the focus of later workshop sessions.

To create these visions, participants were encouraged to draw on the OS maps for their area to highlight changes – and to provide annotations.

Part Three: Preparation for the Journey

This was intended as a short activity to begin identifying ways that the planning system could contribute to climate change adaptation. This brought the discussion back into focus for planning - and provide a link to the second workshop.

Each group was asked to consider how planning could help deliver the vision created for their focus area – either directly or indirectly. The output of this activity was a list of suggestions.

Workshop Two – 22nd April 2013

The second workshop built upon the discussions and issues identified in the first workshop – with intention to have participants identify key issues and suggest policy priorities for local and strategic development planning.

Part One: Local Development Plans – Issues and Policy Formulation

The first session focused on Local Development Plans. The purpose was to discuss the issues raised during the previous workshop (in February), with a focus on those that could be addressed through the Local Development Plan. For this session, participants returned to the same groups as the previous workshop – allowing them to draw upon the conclusions of that work. The focus on a local area was appropriate for considering the types of issues that might be considered in a local development plan.

The discussion was aimed at agreeing the key/main issues that the group would expect to be raised at the Main Issues Report stage of the plan. There were two facilitators in each group for this session – with at least one having experience writing and/or critiquing development plan policy. The groups worked collaboratively towards drawing out what the key principles of a policy response should be, without an expectation that a precisely worded policy would be agreed.

Part Two: Strategic Development Plans – Issues and Policy Formulation

This second session had a similar structure to the first – although with focus on issues relating to the Strategic Development Plan. To encourage discussion at a strategic level, the four groups were merged into two larger groups and the focus was no longer on the specific locations used in previous sessions. The key aspect of this session was to draw out strategic issues (i.e. cross-boundary and/or large-scale), leaving the local detail to the Local Development Plans.

As with the previous session, a facilitated discussion aimed to agree some key/main issues that might be raised at the Main Issues Report stage of the plan.

The Use of Workshop Outputs

The workshop sessions produced a range of outputs – with most recording in the first workshop on the annotated maps, with flipcharts also used to record outputs in both workshops (see Annex). It is important to recognise that the outputs were 'workshopped' and not the product of a full evaluation process. As such, they should be treated with caution and contain ideas that, on reflection, the participants might not necessarily support.

The discussions that took place throughout the two workshops – and in particular, some of the high-level suggestions provided by the working groups provide valuable material for consideration. TAYplan staff where involved throughout – and will use the workshops to inform the background in the drafting of main issues report for the next TAYplan Strategic Development Plan.

Feedback and Reflections on the Workshops

The two workshops were the first of their kind to be run for planners in Scotland – and they were considered a pilot that might be replicated in other regions or with local authorities. This section outlines the main learning points from running the workshops and issues to consider when replicating the process.

Workshop One: 13th February 2013

This section was compiled by the consultant who organised and helped deliver the first workshop - and was finished prior to the delivery of the second workshop. As it was based on fairly extensive feedback with participants and facilitators, it is presented here to provide insight into reception of the workshop.

General

The workshop was well received and demonstrated that there is a clear need amongst local authorities, key agencies and stakeholders for information and further training on climate change adaptation both generally and in a planning context. It provided an opportunity to explore adaptation in practice, including the difference between adaptation and mitigation and how they work together, and for participants to think "outside the box" beyond their own area of expertise.

> *"It was a very useful morning and helped focus the mind on adapting to climate change."*

> *"Good start to get us thinking. Looking forward to the workshop on 22/4 about what planning can actually start to do."*

The workshop sessions generated a lot of discussion amongst all participants who were very keen to engage, and enabled them to think afresh about climate change adaptation and options in a "planning for real" context by focusing on specific areas within the TAYplan region. A wide range of participants attended the workshop, although it would have been advantageous to have more planners participating and potentially local authority representatives with a climate change remit.

Participants reported that the presentations and activities provided a good basis for the second workshop by increasing awareness and understanding of adaptation, and most found the workshop activities very useful or useful. Further training was requested on the role of planning in adaptation and mainstreaming adaptation into planning policy in particular.

> *"The visioning activity was enjoyable and generated a lot of interesting discussion."*

> *"The workshops were very interesting and successfully enabled multi-disciplinary discussions to develop."*

Timing of Workshop

Two half day workshops worked well to stimulate, captivate and entice participation without losing focus. There is potential to run both workshops over the course of a single day, although this would be a very intensive workshop. It was also suggested that the first workshop could be extended to a full day to provide a more in-depth introduction to adaptation (e.g. impacts and risk assessment). There are advantages and disadvantages to all of these options.

> *"The workshop was well organised and worked well as a half day. "*

Both the facilitators and the participants found the timing of the workshop and length of workshop sessions to be about right, although more time was needed for discussion at the end. Some also felt that more time could have been given at the start of the group sessions to look at the maps and other materials. If the time allowed for the group sessions was increased, it was suggested that participants could look at a different type of scenario (e.g. from urban to countryside) or consider how the area could support adaptation in other areas.

Information and Materials

Most participants and all of the facilitators found the level of information provided about right, although some reported that they would have liked additional information in advance of the workshop. One of the facilitators commented that the pre-workshop scoping paper was helpful and that it was a useful follow up for participants to access this paper if they wished. There may be merit in providing some additional information to delegates in advance of the workshop.

> *"I would have liked a bit more detail in advance of the activity in the break out session. This would have prepared me and I would have been able to provide much more input."*

The presentation at the start set the context, and provided simple, graspable, big headline messages to help focus the workshop discussion, without getting too technical. The second case study presentation provided a good example of adaptation in practice within a local authority. The materials were also well received and although some groups made more use of the additional maps and images than others, all felt it was useful to have them for reference. It was suggested that the DEFRA Future Worlds images could be a good device or technique for each group to build-up and illustrate their own (possibly 3D) story points.

There were advantages in taking a location-specific approach for the workshop sessions in terms of relevance for the participants. However, facilitators reported that more generic and hypothetical examples of the different scenarios would work equally well. This would have the advantage of being able to use the same material across different authorities and allow for the creation of scenarios where a wide range of adaptation options could be introduced for discussion. It would also mean that participants are less likely to feel confined by their local knowledge, or lack of it.

The Workshop Sessions

Part One: The Challenge

The facilitators found that more time was needed at the beginning for groups to familiarise themselves with the area, and the information, maps and photos available. The output from each group for this activity demonstrates the high level of engagement and discussion around this activity, including the identification of a wide range of potential impacts (see Annex 2).

The relatively low number of requests for further training in climate impact risk assessment indicates that the need for further work to identify the full range of impacts could be emphasised more. A facilitator suggested that time could be allowed for the group to think about what sort of additional information they would need in order to adequately assess the climate change risks to the area, and where they would get this from.

The selection of headings to provide a focus for discussion of impacts worked well, although the range of headings tended to reflect the interests and specialisms of participants. This is an important consideration when selecting the range of participants within each group to ensure a good spread of shared knowledge.

Facilitators also found that there was a tendency to jump past discussion of impacts and start focusing in almost immediately on how these should be dealt with. To prevent this, a few written examples of impacts could be provided to participants as a reference point and keep the focus of the group on impacts.

Part Two: The Vision

There was slight confusion initially over what was meant by vision (e.g. ways of working, multiple land uses, diversity, flexibility, community engagement etc., or specific "drawable" things on the map like the possible location of water storage reservoirs, tree planting, visitor car parks, new crops, catchments to improve water holding in vegetation, areas prone to landslide etc.), however this activity generated the most discussion and very creative outputs.

It has been suggested that the vision activity could be broken down to make it clearer what is expected, for example a) 'things that are happening anyway'… to consider how they contribute to adaptation? and b) 'more blue sky / radical thinking' as result of possible future changed lifestyles or climate change so almost scoping possible scenarios. The discussions tended to focus on barriers to adaptation and deliverability instead of thinking "outside the box".

One suggestion is to use generic rather than a real area as participants seemed a bit constrained by not knowing enough local detail. Participants could also be encouraged to think about how planning could address barriers and limitation, so they could be "parked". Also, the need to think about the area in the wider context (e.g. how the area could support adaptation in other areas) could have been emphasised in the introduction to encourage participants to think along those lines as well.

Part 1 focused on just a few categories of impact and some of the facilitators found that they were re-treading ground to establish the range of impacts in Part 2. A possible solution would be to provide details of relevant likely impacts specific to the area (either real or hypothetical) which would need to be addressed by the vision.

Part Three: The Journey

There was a surprising level of output from each of the groups for the limited time (10 minutes) allocated to this activity. These were however quite general and most participants are keen to attend the second workshop and receive further training on the role of planning in adaptation. If the workshop was spread over a full day, the morning session could focus on Parts 1 and 2 (allowing more time for activities and discussion) and the afternoon could focus on Part 3.

Lessons from Workshop One

As a pilot the first workshop was very successful in terms of engaging participants on climate change adaptation and providing a good basis for more focused activity on specific adaptation planning actions. A general observation was that the workshop would benefit from being widened out to include planners working in different areas, and to include stakeholders with a climate change remit which would bring a broader climate knowledge base to the activities.

In order to replicate the first workshop with other local authorities it is suggested that:

- The first workshop should be developed as a full day with Parts 1 and 2 in the morning session and Part 3 in the afternoon session. If the workshop is run as a half day, extra time should be allowed to ensure adequate time for discussion.
- Delegates are provided with some background information in advance of the workshop outlining the scope and content of the workshop sessions along with the climate fact sheet.
- The course could be run generic maps, images and visual aids which could be utilised with any planning authority – these would need to be developed
- Provide some examples of impacts (visual such as DEFRA's Future Worlds images or written onto a map or image)
- Allow a minimum of 1 hour 40 minutes for workshop sessions to ensure adequate time for groups to familiarise themselves with maps and materials.
- Ensure that participants within each group have a diverse range of interests and expertise, including planners and those with a remit for climate change
- Review the facilitators briefing note to incorporate suggestions for workshop activities (e.g. time to consider the sort of information required to assess impacts, breaking down the visioning activity, encouraging "blue sky" thinking, range of considerations for the vision etc.)

Workshop Two: 22nd April 2013

The second workshop built upon the outputs of the first – this time with the focus on identification of issues and policy formulation for development planning. The overall structure worked well. The participants returning to the same groups as the first workshop to discuss local development planning issues – which was an appropriate scale to identify issues at local-level. Likewise, the merging of groups to discuss broader strategic development plan issues in the second session of the workshop worked well to move focus onto issues of strategic importance.

It was apparent throughout discussions, at local and strategic scale, that participants felt limited by an incomplete information/understanding of potential impacts, risks, and adaptation options. It was not always clear what was a plausible impact/risk that needed addressing – or the feasibility of proposed options. Although this caused some frustration, it was to be expected given that the workshops were a first attempt at considering climate change adaptation in this context. An option might be to include more participants with 'expertise on climate change' in the workshops – although who these might be and the impact on group dynamic are not entirely clear.

The workshop was intended to have participants identify key issues and suggest policy priorities for both local and strategic development plans. Accepting some of the limitations already discussed, the workshop sessions provided a useful forum to explore issues relating to climate change adaptation that development planning might need to consider. The group discussions were quite effective at identifying some of the key issues, while moving on to formulation of policy suggestions was a challenge for all groups within the context of the workshop. However, common themes did emerge and many ideas were proposed that will be useful for those working on development plans to further consider.

Conclusions

The workshops provided an effective forum to introduce a diverse group of participants to climate change adaptation – and to develop ideas on the role of development planning has in addressing the challenges posed by a changing climate. It is important to recognise that discussions were limited by incomplete information/understanding of potential impacts, risks and adaptation options. However, a benefit of recognising this was that participants became aware of the need for further work on climate change adaptation across a broad range of issues.

The workshops did provide a useful resource for those working on development plans. They were able to engage a diverse group of stakeholders on climate change adaptation and the issues and suggestions arising from the sessions will be used to inform on-going work on the development plans.

Annex 1: Outputs from Workshop One – 13th February 2013

This annex provides workshop outputs. These were generated through discussion and with accompanying annotation on maps. It is important to recognise that the outputs were 'workshopped' and not the product of a full evaluation process. As such, they should be **treated with caution** and contain ideas that even participants would not necessarily support.

Group A (Errol)

Part One: The Challenge

The village of Errol lies within an important agricultural area and traditionally this has been a mainstay of the local economy. It was felt that climate change will bring increased pressures on areas of prime agricultural land in England and overseas which could increase the value of agriculture in Carse of Gowrie. The retention of agriculture (albeit changed product) should therefore be a primary aim of planning, and indeed presented an opportunity. This would mean limiting new development such as housing. The special landscape and cultural and natural heritage assets provide potential for increased tourism, so this should be safeguarded also.

Agriculture:

- Changes in the weather – unpredictable whilst there may be some confidence in long term general trends, it may be difficult to predict short term variations and extreme events which could negatively impact
- Changing crops – soft fruits to? New products suited to changed climate. Potential high value.
- Global agricultural markets are likely to influence what is produced (i.e. if climate change in another part of the world means a particular crop cannot be grown there, it could shift to Scotland)
- Diversification of agricultural land
- Impact on biodiversity and habitats
- Coastal protection, impacts on sea beds / mudbanks - protecting agricultural land at coast may have negative impact by increasing scouring in the estuary with negative consequences for the current wetland areas, and for adjacent areas.
- Loss of agriculture on sea fringe
- Minimising flood risk
- Different modes / requirements for agricultural transport arising from changes in agricultural practice for example may require grain silos, which will impact on landscape; or road/rail/sea network may need to be improved to transport produce
-

Landscape:

- Visual impact of changing agriculture on landscape e.g. polytunnels, loss of field boundaries, agricultural infrastructure etc
- Pressures on water resources, soils
- Renewable energy – turbines / solar / CHP / biomass cultivation
- Ecological / green networks – protect and enhance
- Historic environment loss of the unique character and 'sense of place'
- Transport / infrastructure changes e.g. new / re-established rail halt and associated infrastructure (e.g. park and ride)
- Protection and enhancement of cultural heritage (built development, archaeology, designed landscapes)
- Possible threats from increased agriculture, improved drainage etc.
- Transport and travel
- Erosion of railway embankments and consequent protection of mainline rail network
- Drainage networks and impact on transport infrastructure improvement of drainage and irrigation will need to be fitted around other infrastructure.
- Changing weather patterns and impact on transport infrastructure / networks
-

Management of stormwater and flooding

- Impact on drainage from sea level rise / increased surface water run-off sea level rise will reduce flow and dispersal of drainage water
- Expansion of flood risk areas creation of zones of no development and agricultural risk
- POW commissioners who is responsible for maintenance of drainage systems (farmers, landowners, local authority, SEPA, etc.???)
- Drainage works impacting on biodiversity / ecosystems
- Irrigation / reservoir / storage of water
- Ground water abstraction
- Resilience- flood mitigation
- SUDS – retrofit
- Maintenance of domestic drainage systems
- Retrofit energy efficiency and generation

Part Two: The Vision

The groups Vision for 2050 was illustrated visually on the map with a key and included:

- Urban drainage and SUDS
- POW maintenance
- Building maintenance / retrofit little new development, so emphasis should be on existing buildings
- New and expanded reservoirs for summer irrigation
- Enhanced drainage for extreme rainfall events and increased winter precipitation
- Managed retreat of coastal fringe
- Green networks and buffer strips
- Cultural / built heritage / setting policies required to protect identify of the area.
- National cycle network increased tourism
- Protection of the railway and a new station low carbon travel
- Potential development with zero carbon generating technology, for biofuel crops and associated industrial infrastructure (located on former airfield?)
- Renewable energy / solar farms
- Building maintenance to increase resilience
- Reuse of buildings in the town and restricted infill development new development restricted to historic settlements with existing infrastructure (drainage, sewerage etc.) and often on highest ground.

Part Three: The Journey

Ways in which the planning system could assist adaptation:

Directly:

- Awareness raising / education
- Better community engagement
- SPP / NPF3 e.g. provide recognition and policy framework for national coastal flood management and green networks
- Local community planning partnerships

Indirectly:

- Could work smarter with building control
- Budgets? Who pays for this?
- Improved drainage
- New rail halt

Group B (Perth)

Part One: The Challenge

Management of stormwater and flooding

- Holistic approach – catchment management
- Increased frequency of flooding
- Intensity of rain and coastal issues
- Drainage systems – need to change design? More intensive? Longer duration?
- Increased pollution
- Asset / industrial resilience – links to pollution? Risk assessment
- Flood routing – surface water management plans
- Managed retreat
- Upstream impacts – ability to influence? Protecting Perth
- Erosion through City – engineered hard measures? Something multi-purpose – another use combined. Green top- connecting to green networks (new and existing)
- Perthshire – water resources / use of water
- Energy opportunities - tidal generation. More water – storage – generation - hydro
- Urban runoff – local flooding / SUDS
- Align planning and Building Standards solutions

Built and historic environment

- Flood risk – links to travel and transport / local economy
- More pests leading to building decay
- Impact of snow and ice on historic environment
- Extremes of weather
- Concentration on existing settlements rather than new
- Impact on Inshes – golf course / flood storage
- Impact on city centre – flood defences are they enough? Height – spatial i.e. agricultural areas
- Retrofitting of new builds – utilizing existing building assets – renewable energy / heat etc
- For new builds orientation of buildings, relief etc, think naturally rather than always infrastructure
- Masterplanning
- Awareness of the impact of one development on another
- Consider legislation / building standards – working together to ensure renewable / retrofitting solutions for historic environment

Transport and travel / infrastructure

- Pollution – traffic dispersal to avoid zones of negative air / water quality and hotspots – heat impact
- Greater need for public transport
- Greater pressure on local routes e.g. from flooding – traffic dispersal with multiple route options
- Change of working styles (i.e. homeworking) so greater pressure on local routes
- New infrastructure – permeable surfaces
- Climatic pressures – potholes etc. – road surface heat melt
- Location of housing sites – closer to existing networks / avoiding floodplains
- Fuel prices? Impact on travel plans
- Increased connectivity / network linking local services with national – public transport
- Economy driving changes in transport needs
- River transport – water taxis / industry
- Electric charging infrastructure
- Railway and roads – landslides / engineering
- Sustainable travel – cycle and walking (active travel) – health

Most significant impacts were identified along with level of risk on a chart with a timeline including river flooding, intensity of rain, landslides / flooding, need to design new buildings and places to be climate ready (2020), increased need for active travel (2015), need to retrofit existing building stock (2015).

Part Two: The Vision

The group created a very visual Vision for 2050 which included the following elements:

- Trees to stabilize areas at risk of erosion and landslide
- Managed retreat and expansion of the river to allow it to flow
- Increased biodiversity and tourism
- River channels for energy
- Hydro scheme
- Surface water management
- Liming wall as stabilization to prevent landslip onto road
- Micro-hydro power / mill lade
- New / upgraded flood defences
- Green areas
- More local neighbourhoods with increased home working
- Public transport hubs
- Energy efficiency measures / heat
- Renewables / location for wind turbine
- Combined heat and power opportunity upstream
- Manage existing tree planting
- Permeable surfaces
- SUDS
- Retrofitting
- Management of cars in cities
- Costs and how can it be funded?
- Water transport and tourism?

Part Three: The Journey

Ways in which the planning system could assist adaptation:

- Holistic approach – catchment management
- Links to travel and transport / local economy
- Concentration on existing settlements rather than new
- Flood storage
- Retrofitting of new builds – utilizing existing building assets – renewable energy / heat etc
- For new builds orientation of buildings, relief etc, think natural rather than always infrastructure
- Masterplanning
- Awareness of the impact of one development on another
- Consider legislation / building standards – working together to ensure renewable / retrofitting solutions for historic environment
- Traffic dispersal to avoid zones of negative air / water quality and hotspots – heat impact
- Traffic dispersal with multiple route options
- Permeable surfaces
- Locate new development closer to existing networks / avoiding floodplains
- Consider impact of fuel prices on travel plans
- Increased connectivity / network linking local services with national – public transport
- River transport – water taxis / industry
- Electric charging infrastructure
- Engineered solutions
- Sustainable travel – cycle and walking (active travel) – health

Group C (Braes of the Carse)

Part One: The Challenge

Built and historic environment

- Keep buildings cool
- Risk of damp
- Risk of heave, erosion and subsidence
- Increased development potential
- Physical weathering
- Community infrastructure (e.g. power) small hydro

Most significant impacts identified were overheating of buildings and physical weathering.

Hydrology and water resources / management of stormwater flooding

- Summer water usage may be limited
- Drainage overload
- Flash flooding from intense rainfall
- More water to manage (winter)
- Where will H20 come from and go to?

Most significant impacts identified were limited water in summer and drainage overload.

Landscapes

- Increase in arable land
- New crop types e.g. grapes
- More houses on slopes
- Heather turning to grass
- Trees and grassland only
- Increased erosion
- Increased visitor pressure
- Winter storage reservoir
- Water irrigation measures
- Windfarms
- No grouse

Most significant impacts identified were an increase in arable land and changes in vegetation.

Infrastructure

- Increased leaks
- Risk of landslips on roads
- Drainage overload leading to flooding
- More potholes – hot / cold and wet
- Power infrastructure opportunities e.g. microrenewables, small-scale hydro
- Water supply- impact of drought shortages and extreme events
- Increased health risks linked to increased temperature- pressure on health services
- Increased precipitation on power lines

Most significant impacts identified were risk of landslips on roads, opportunities for micro-renewables and increased health risks.

Part Two: The Vision

The groups Vision for 2050 included the following elements which were also identified on the map where this was possible:
Considering the area in the context of the wider Carse

- Reservoir management- increased capacity and flow management
- Additional reservoirs
- Areas of new crops
- Protected water storage
- Hydro generation
- Road on pontoons
- Slowed river flow
- Flood impacts on access
- Upgraded SUDS for roads
- Self-sufficient engaged community
- Building adaptation
- Visitor management
- Local communities with more control and influence
- New habitats- species rich grasslands
- Sympathetic tree planting
- Natural shading- riparian woodland
- Development sensitive to vulnerable wildlife
- Multi-benefit land use
- Recognising but not fighting change
- Retaining flexibility and diversity

Part Three: The Journey

Ways in which the planning system could assist adaptation:

- Where to allocate additional housing and relocation of at risk houses and other land uses (except agriculture / forestry)- change the housing in the countryside policy
- Design requirements for new development
- Infrastructure requirements including transport and energy
- Anything to be protected? – to retain flexibility and diversity e.g. heather moorland, peat, water supply (quantity and quality)
- Opportunity to work with local communities to identify needs- raise awareness of climate change impacts
- Using information about climate change and balancing
- Making sure short term decisions don't negate what's needed for long term vision
- Flexible and continual

Group D (Invergowrie)

Part One: The Challenge

Transport and travel / infrastructure

- More closures of roads
- Increased cost of stormwater management
- Impacts on recreation / paths / cycle routes
- Potentially increased maintenance requirement for roads
- Coastal erosion- next to land for rail lines
- Airport may become less viable option for travel
- Airport floods and impacted by coastal change

Most significant impact identified was more closures of roads which would be an imminent impact.

Coastal resources and ecosystems / biodiversity

- Protection of SSSI status
- Balancing defences impact on wildlife and biodiversity
- Impacts on different species of birds
- Pollution of riverside nature park- in groundwater
- Change in coastal dynamics
- Impacts on designated sites from sea level rise / changes in coastal processes
- Hard coastal defences may damage coastal habitats

Most significant impact identified was balancing impact of defences on wildlife and biodiversity.

Management of stormwater and flooding

- Stormwater Dundee West sewer
- Low lying pumping station
- Urban creep
- More agricultural land
- More SUDS systems
- Improve flood warning systems
- Restrictions on where you can build due to limited sewerage capacity
- Increased pumping and wastewater treatment
- Development not on flood plains
- Pluvial flooding
- Storm surge / extreme weather
- Restrictions on location of development due to increased flood risk
- Increased coastal erosion- relocation
- Safeguarding and management of natural floodplains

Part Two: The Vision

The groups Vision for 2050 included the following elements which were identified on the map:

- Tidal power opportunities
- Coastal realignment
- Future laboratory
- New distribution centre
- Communicate virtually
- Greener urban areas with SUDS
- Greener heating
- Protected landfill site
- Increase in tourism (airport)
- Rise in sea level
- Increased use of solar energy
- Greater density housing / use of brownfield
- Railway defended or realigned
- Green networks
- Energy efficient buildings and sites / design / layout
- Local anaerobic digestion leading to heat networks
- Local functions of place- shops, greenspaces, schools- make more local rather than commute
- Uncertainty of many features of usage e.g. transport / fuel

Part Three: The Journey

Ways in which the planning system could assist adaptation:

- Policy- limit risk / provide clarity
- Think ahead- plan!
- Safeguard land for what will be required
- Schedule- phasing – what. Urgency and timeline
- Work with others e.g. Building Standards
- A – Strategic / big picture – incorporate risks over time and space
- B – Planning process- regulatory / policy / standards / enforcement
- C - £ money – link to fiscal stimulus – support other agendas – link with community planning
- D – Political will!!! Ensure and encourage educative role

Annex 2: Outputs from Workshop Two – 22nd April 2013

This annex provides workshop outputs. These were generated through discussion. It is important to recognise that the outputs were 'workshopped' and not the product of a full evaluation process. As such, they should be **treated with caution** and contain ideas that even participants would not necessarily support.

Group A (Errol)	• Tool to raise awareness and community engagement partnership • Protect prime land (enhance existing policy) • Renewables linked to biomass and solar PV • Restrict new development to existing built up areas/brownfield land • Condition to protect/enhance existing drainage systems • Habitat network improvement • Travel plans • Look favourably on tourism development • Follow through to development management (need for hooks)	**Group B (Perth)**	Relocation of business land on flood plain. • Use non-flood risk green belt to allow release of flood plain • SUDS • Flood prevention • Catchment management • Work being done on risk assessment – should be acknowledged in LDP • Stabilisation through planting • Flood management plan for each identified flood plain Transport Issues • Charging points in town centres • Development at sufficient density to support public transport • New development to incorporate features to safeguard against travel infrastructure risks (e.g. landslips/flooding etc.) Offsetting/Net Gain • In terms of off-site development contributions e.g. SUDS, retrofitting, habitat network enhancement • Are there opportunities for policies which can achieve this kind of offsetting, where the value of off-site adaptation measures would outweigh the benefit of on-site measures? Managed Retreat • In identifying housing and business land opportunities, we will identify additional land to allow for managed retreat from flood risk areas. • Presumption against redevelopment of flood plain • Presumption in favour of development on greenbelt where it will promote greater benefit through new change in use of flood risk/plain areas/sequential testing Main Issue: Flood Management • Managed retreat • SUDS • Flood prevention • Catchment

Group C (Braes of the Carse)

Water Management (Built and Natural)
- Flood risk
- Irrigation
- Drainage systems
- Accommodation of moving water
- Mechanism/protection of natural soakaways
- Storage of water
- Links with forestry strategy
- Woodlands – slow the flow – H2O retention

Policy
- Protect existing woodland and support new planting e.g. riparian woodland along water courses
- Protect peat lands and other H2O storage
- Make physical space available for natural flood management features for catchment
- Enable winter storage reservoirs (more to explore)
- Ensure that SUDS are provided within new developments along with other benefits like bio diversity etc. (best practice)

Multiple Benefits
- How do we get multiple benefits out of the same pieces of land?

Related Policies
- Provide space for nature (habitats, flora and fauna) to adapt
- Encourage joining up of habitats
- Protect from development the continuity and protection of habitants (green networks)

Infrastructure
- Maintenance – how do we maintain infrastructure?
- What do we need to deliver to make appropriate micro-hydro or other micro renewable energy schemes possible?
- How do we get more community benefit and resilience from this?

Related Policies
- Community projects are okay in principle
- If technically possible, encourage micro-hydro and community renewable energy (heat and power)

Community Resilience
- How do we use the development plan process to improve community resilience?
- Solution – MIR
- Projects alongside but outwith
- Providing flora

Resultant Policies
- Physical already covered
- Communities understand communities to ID problems
- Development plans and other services help through process
- Help with technical work
- Support to community driven renewables (heat and power) and other projects

Building Adaptation
- How do we adapt to flash floods?
- How do we accommodate renewable energy?
- How do we retro fit buildings and places for flooding/rainfall, energy conservation and heat?
- How do we design out problems and design in adaptation to new development?
- Lots – buildings standards and permitted development
- Green roves shading

Related Policies
- Retrofitting for adaptation (flood/rain/energy conservation/heat) will be encouraged where the benefits for adaptation outweigh any impact on the qualifying interest (character) of the building or area
- All new development shall incorporate measures to reduce climate change impact (define this more clearly – no fixed solutions)

Reconsider Strategy for Housing Sites
- How do we consider housing in the countryside?
- Development versus prime agricultural land
- Do we accommodate small-scale development here because of nearby prime agricultural land?
- Relocation of homes at risk of flooding
- Protection of water storage

Related Policies
- Allow relocation of properties to settlements to avoid/reduce flood risk
- Retain existing policy for small-scale development e.g. business in area

Group D (Invergowrie)

Design policy – make this the primary policy.
- Each new development proposal required to demonstrate how this hierarchy is delivered
- Each development should meet minimum requirements to achieve items 1-4 below
- Integrated green renewables throughout

Minimise Use
↓
Maximum Efficiency
↓
Re-use Waste Energy (Heat Networks)
↓
Renewable and Low Carbon

Thoughts:
- Each policy is "climate proofed" i.e. not one policy but imbedded throughout
- Strategic Drainage plans for the area (done through flood risk management process)

Main Issues – Coastline:
- Not policy – informative graphic illustrating potential land use e.g. farm land to salt marsh
- Policy which sets out what this land could be used for (temporary uses – need to look at Netherlands as an example)
- Appropriateness of use for the location
- Demonstrate how new development (above certain size) integrates with water management or how it impacts on natural characteristics

Main Issues – Solar:
- What is planning issue – what is building control?
- Should there be a solar farm in the area?
- Links to green infrastructure
- Maximise solar energy and manage overheating
- The need for design guidance (layout etc.) - issue is how guidance is translated to policy and is it fit for purpose in the future
- How would solar issues relate to other uses e.g. need to protect private land?

Main Issues – Heat Networks:
- Landfill/gas
- High density users

Main Issues - national transport route:
- Is there an opportunity to develop CHP?

Main Issues – Energy:
- Is there scope for tidal power (probably not in this geography)

Main Issues – Coastline:
- Should the development plan set out where coasts should re-tread and the implications for current land user (planning to set out if this were to happen what issues would be?)
- Managed re-alignment (e.g. railway line)
- Link to shoreline management plans (e.g. Fife)
- How should we manage sea level rise in this area?
- What area should be defended?
- In what areas should we plan to accommodate rise?

Main Issues - Infrastructure
- Newly upgraded roads – what could be retrofitted – part of green network
- Resilience – drainage etc. (issue – how is water surface managed at catchment level?)
- What should be the role of strategic land allocation – Dundee West and Hutton Institute?
- Is it reasonable to require all new _____to have green roofs (over a certain size)

Examples
- Restricting use of hard surface green roofs.
- SUDS.
- Green networks.

Part Two: Strategic Development Plans

Group A & B (Errol & Perth)	Strategic • Food Security • Co-ordination • Catchment Management (H2O) - Combined SFRA • Re-opening Former Rail Station and Routes – Impact on Drainage • Where does Energy Generation go? • Storage • Waste • Material • Broadband/Connectivity to the Grid • Making places more desirable to live • More business information • Resilience – working from home – business Greenbelts and Trade Offs • E.g. Flood Areas = Greenbelt • Sequential Approach (greenbelt part of sequential approach) • Contribution to adequate and community benefit • Not just greenbelt – could be greenfield • No redevelopment in flood plain • Managed network – surrounding land – level of risk (Part of a risk management process) • Need mapping and scenario testing • Whole system – e.g. coastline – RSPB Forth	**Group C & D (Braes and Invergowrie)**	Spatial Strategy • Relocation issues • Understand strategic areas at risk of flooding • Use SEA • Consider other land uses changed Water Catchments • understanding catchments and impacts • FRMP – link to planning Strategic Vision for Green Networks • Link to flood risk • Local finest strategies • NFM measures Coastal Management • Links to SM Plans Energy • identify strategic heat networks eh Forth Energy – influence strategic growth areas • require LDPs to develop heat networks Policy: Test whether LDP's policy are meeting adaptation needs and are climate resilient Use energy hierarchy to highlight where need to focus attention - develop hierarchy for other aspects eh water management etc Identify adaptation priorities and develop plan for each one. Re-location – de-incentivise developing on vulnerable areas and incentivise others. Community engagement to inform policy. Policy shift to prevent development in vulnerable areas. Green infrastructure – multi functionality to include cc adaptation • link to other cc adaptation issues such as water management • strengthens the need for policy Other Infrastructure • roads e.g. Kingsway retrofitting? • Railway – resilience/re-locate? • Airport – resilience/re-locate

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Sniffer , Greenside House, 25 Greenside Place, Edinburgh, EH1 3AA, Scotland, UK
T: 0131 557 2140 **E:** adaptationscotland@sniffer.org.uk **W:** www.adaptationscotland.org.uk