UK
CLIMATE
RESILIENCE
PROGRAMME

What gaps will remain at the end of the programme?

What opportunties are there to strengthen connections and build synergies?

Where has the programme made progress?

How can we have the greatest impact?

UK Climate Resilience Programme Assembly 2021

Living with climate uncertainty

CLANDAGE

Place based: Staffordshire, Cumbria

Heritage focus

Outer Hebrides rather than Orkney

Would love to know more about rainwater management in the past if that's something you research - Ruth Quinn

Floods, droughts, storms

Happy to catch up later Ruth - I'll drop you an email (Neil)

Creative workshops- poetry, craft, storytelling

Developing a tool box

engaging with communities

All: A MAGIC finding : engagement works better with a positive focus - make your neighbourhood nicer, rather than stop the flooding threat! Does this link to your findings?

Learning from the past

Scenarios for the future

Using archives

CLANDAGE: BUILDING CLIMATE RESILIENCE THROUGH COMMUNITY, LANDSCAPES AND CULTURAL HERITAGE

RISKY CITIES

Place based: Hull

Timeline approach

Coastal and estuary

Working with young people

Using archives

Working with communities

Theatre performance

Flood management

RISKY CITIES: LIVING WITH WATER IN AN UNCERTAIN FUTURE CLIMATE

FOLK PAGEANTRY

Place based: Manchester

Rsearch led by social practice artist-researchers.

Theatre and music performance

Artivism

Embedding/ transfering creative methods approaching to other orgs and in local policy.

Developing a tool box

Working with schools

climate & social justice framework

Social deprivation

Working with communities

COMMUNITY CLIMATE RESILIENCE THROUGH FOLK PAGEAN

Governing adaptation

The underlying question: How authorities and researchers better engage communities to enhance the co-benefits of green infrastructure?

Not just Hull but getting the views of national and regional stakeholders

Capacity Building in the community through creating a community interest companies, work educational associatio

Capacity Building with decision makers and implementors through sharing learning, discussions and guidance

Generally Good images and themes for MAGIC

Action Research

Act

Reflect

Place based: Hull

Capacity building

Maybe 'engaging communities' rather than 'working with'?

Working with communities

Flood

Mental Health

Depending on your audience, 'pluvial flood management'

Evaluation of the co-production process

CLIMACARE: GOVERNING THE CLIMATE ADAPTATION OF CARE SETTINGS

MAGIC: MOBIL... ...ATION – GOV...
INFRAST... ...ROUGH CO-PR...

Soft and hard adaptation measures

Capacity building

CLIMAC...

How transferable are findings to other countries or other parts of the UK?

Potential link to Met Office project on hazard to risk - project likely to focus on overheating in buildings (Laura Dawkins & Dan Bernie)

Potential

Building design & adaptation

Developing guidance

...rheating in b...

Heat and heatwaves

Older people

Care homes

Health and wellbeing

Cost-benefit evaluation

Embedded researchers

Dr Charles Rougé, University of Sheffield with Anglian Water Plc

Data management

Water resource infrastructure

Developing forecasts

Developing a (Python) tool box

Long term planning

Private Sector

TOWARDS FORECAST-BASED CLIMATE RESILIENCE AND ADAPTATION IN THE WATER SECTOR

Daniel Godoy Shimizu, UCL, with Department for Education

net zero

Overheating in buildings

GOV.UK

Wo...

not really working 'in' schools as such, but we are looking at how to make sure results can engage & be relevant at different scales (i.e. being relevant & available to schools)

Data management

Heat and heatwaves

Mitigation and adap...

informing policy

SCHOOL BUILDINGS ADAPTATION, RESIL... AND IMPACTS ON DECARBONISATION IN A CHANGING CLIMATE

Dr Caitlin Douglas, King's College London, with Space4Climate
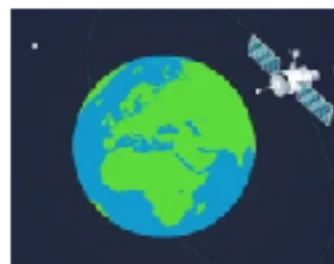
Earth observation data

Resilient supply chains

Working with stakeholders

Developing user relevant climate services

Data management

ENABLING SUSTAINABLE FOOD SYSTEMS

Possible link to eFlag which is a demo climate service focussed on droughts and water supplies (Chris Counsell)

looking at phosphorus sustainability - in a recent stakeholder workshop, recycling from waste streams and storage/transport constraints were discussed as a major challenge. Bryan Spears - FREEDOM BCCR and RePhoKus Team, UKCEH.

CLIMATE STRESS TESTING THE UK FOOD SUPPLY CHAIN USING EARTH OBSERVATION

Embedded researchers

Paul O'Hare, Manchester Metropolitan University, Manchester Climate Change Agency

Identifying best practice in urban resilience and adaptation

Place based: Manchester

Strategy development

Capacity building

Paul, MAGIC (L.Sharp@Sheffield.ac.uk) would love to hear about whether / how Manchester is working with communities.

Policy development

Partnership working

action plan

Link with the Met Office City Packs

ADAPTATION & RESILIENCE: PLANNING & ACTION FOR MANCHESTER

Charlotte Brown, University of Manchester, Bristol City Council

Tyrone - Link with the Met Office urban climate services (City Packs and Heat Service) - we're already working closely with Charlotte!

OpenCLIM metrics for heat stress/heat impacts using UKCP18 data

Place based: Bristol

Strategy development

Heat and heatwaves

Working with stakeholders

Developing tools and guidance

action plan

Links with MO Heat Pack, collaboration ongoing (Lizzie Fuller)

DEVELOPING AN URBAN HEAT RESILIENCE PLAN FOR BRISTOL

Dr Liz Lewis, Newcastle University, Environment Agency

Emergency response

Flood management
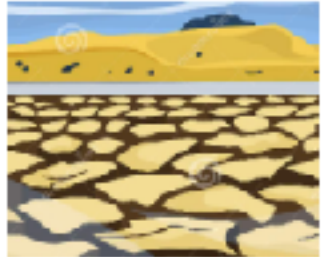
Drought management

Developing forecasts

Strategy development

Data management

Wow - ICASP are creating a game for engaged members of the public, environment agency people and LAs to explore flood incidence response e.sharp@shef.ac.uk

If these management or response were systematically recorded, epidemiologist could utilise to do experimental study to evaluate these actions! (ai.milojevic@lshtm.ac.uk)

ADAPTING ENVIRONMENT AGENCY INCIDENT RESPONSE FOR CLIMATE RESILIENCE

Integrated assessment

Link to event set based impacts and risk (DB@MO)

Climate s...

David Sexton - would love to know how easy it was to use UKCP18 data and if it could be improved, and if this could be more seamlessly integrated over time?

Socio-economic scenarios

Changes in hazards

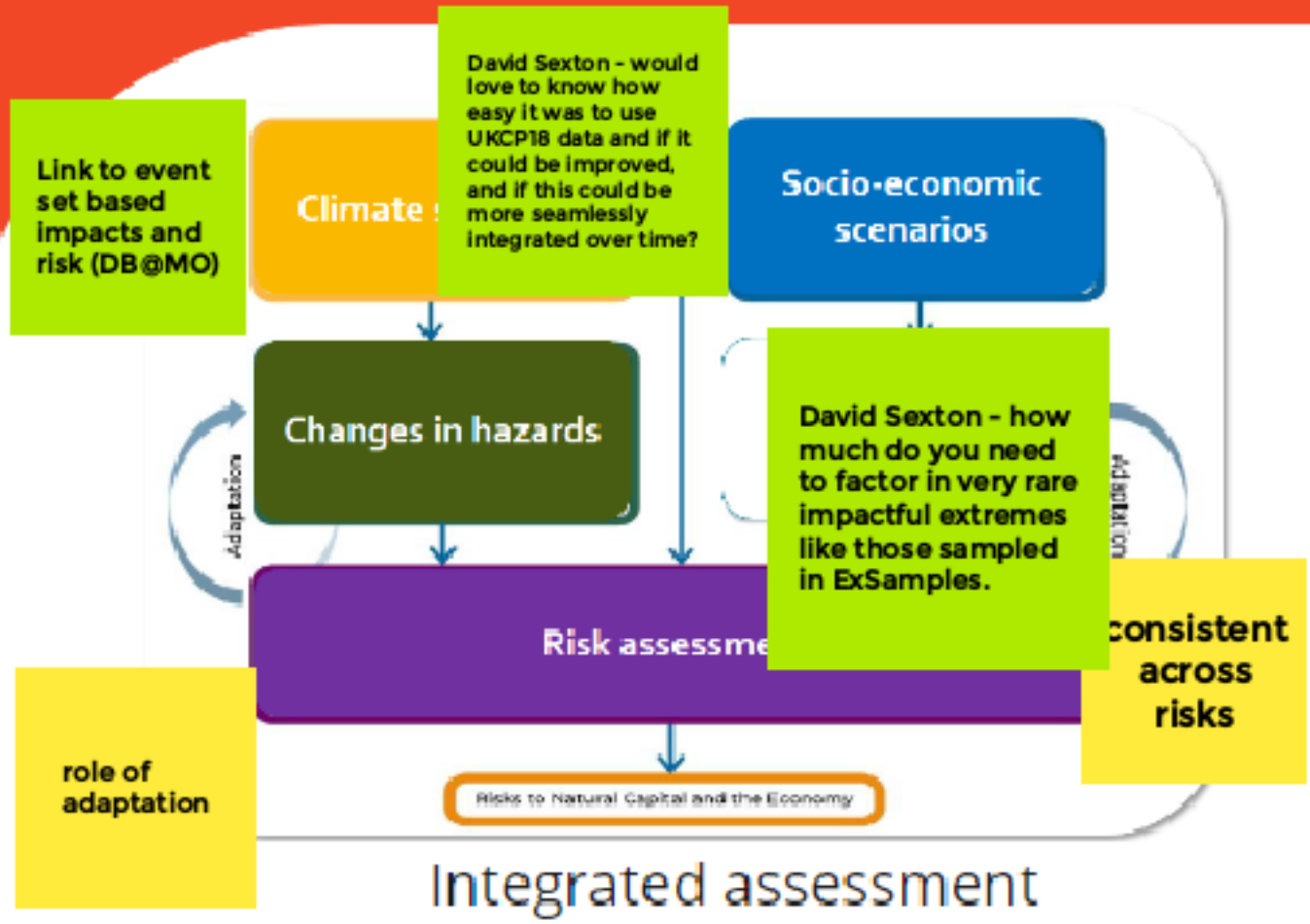David Sexton - how much do you need to factor in very rare impactful extremes like those sampled in ExSamples.

Risk assessme...

consistent across risks

role of adaptation

Risks to Natural Capital and the Economy

Strategy development

Writing city policy on resilience and adaptation

Place based: Clyde Estuary & Norfolk Broads

UK wide as well as case studies

United Kingdom

London

multi-sectoral

interactions between sectors and adaptation options

eFLaG outputs primarily focussed on droughts, and demo case studies are in context of public water supplies but outputs are relevant to other sectors (Chris Counsell)

Working with stakeholders

Welcome

eFLaG is engaging with UK water sector and there is strong appetite for updated evidence and tools (Chris Counsell)

To inform CCRA4 and NAP

Data management

open platform to data, models

OPEN CLIMATE IMPACT FRAMEWORK

Present and future hazards

SEARCH

Coastal and estuary

Do we understand the mechanics/drivers of compound hazards, do models represent relevant bio-geophysical systems ... with adequate skill? Marie Ekstrom Cardiff Uni, ekstromm@cardiff.ac.uk

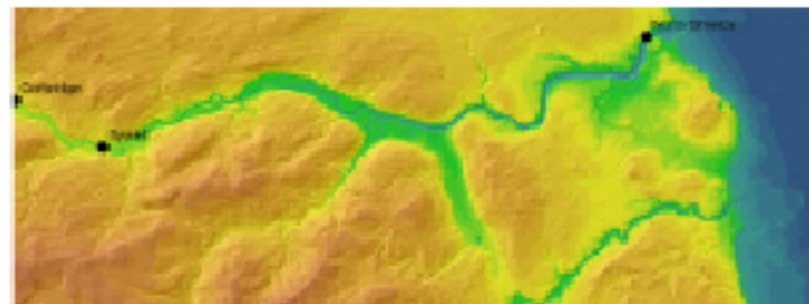Compound hazard

Place based:
14 UK estuary systems

Data mapping

Data management

Informing policy

STORMY WEATHER

I'd like to know what type of storms you're considering and what tools are being developed – Oscar Martínez-Alvarado

Cyclones, fronts and thunderstorms, separately and concurrently

James Cooper: Which hazards are you considering?

Scaling of storm impacts with temperature for different storm types

Storms

Flood management

I don't understand this, European scale in terms of processes, information exchange, impact?

Utilising UKCP18 so focus is on UK and Europe

James Cooper: What's in the toolbox?

European scale

Developing a tool box

Data management

STORYLINE(S)

Phase 1 UKRI Projects
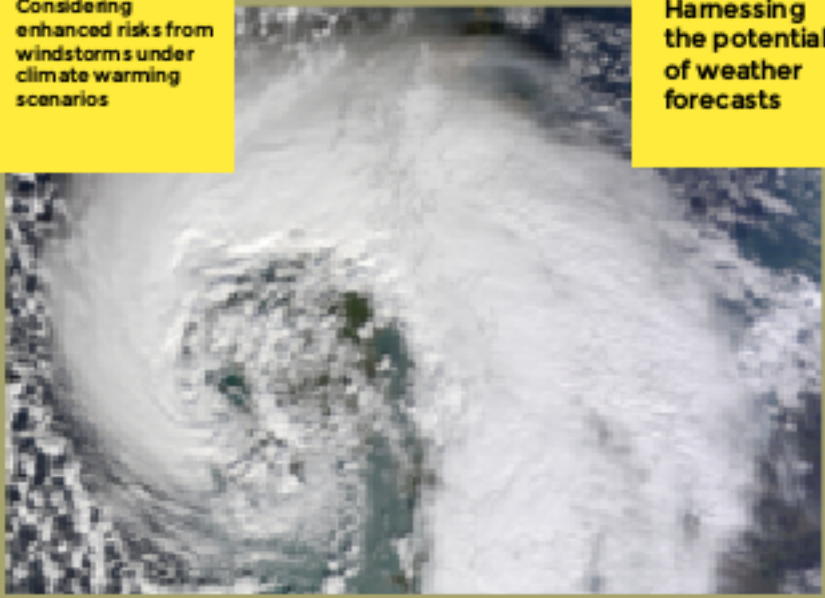
Considering enhanced risks from windstorms under climate warming scenarios

Harnessing the potential of weather forecasts

A prototype real-time sting jet precursor tool for forecasters

Building UK climate resilience through bridging the qualitative-quantitative data divide

Adaptation learning mechanisms

Bioclimatic risk indicators

Nigel Arnell - would like to hear what indicators/scenarios you used.

Decision time frames - lock-in

Impacts and responses in 'good' and 'bad' years

Richard Chandler: I'd like to join the chat with David S. We're extending UKCP with EuroCORDEX simulations and calculating indices there, would be good to cross-check. (why is this sticky note so big?!)

CREWS-UK: Characterising and adapting to climate risks in the UK wine sector

We aimed to calculate indicators relevant to adaptation and resilience, rather than impacts.

under development, might benefit from using these in the pathway modelling component. Ian Townend

David Sexton - would love to talk about how using UKCP data went and how we could improve this and include this if there is another UKCP

eFLaG providing drought metric indicators and exploring drought resilience of public water supplies (Chris Counsell)

Perhaps revise title to something like: Assessing Coastal Resilience to Flood and Erosion Hazards in the face of climate change

The scope is limited to using existing data sets gathered in the initial project. Using the portal to examine future pathways will need a projection capability. From today's presentation it is clear that this would benefit from

Coastal resilience sea-level rise: making the most of natural systems

David Sexton - would love to talk about how using UKCP data went and how we could improve this and include this if there is another UKCP

James Cooper: Link to erosion hazards project on erosion - is this considered?

Nigel Arnell - would like to know what scenarios/indicators you used

CROP ... and pre... s of climate ... yields

Should land-use decisions be adaptive to climate change? This project asked: 'If so, how would we evaluate and optimise ... ve design of ... land systems.' -

David Sexton - would love to talk about how using UKCP data went and how we could improve this and include this if there is another UKCP

... ing resilient and ... r management – integrated & interactive tools

Climate pig: smart systems approaches for climate resilient livestock production

Phase 1 UKRI Projects p2

FREEDOM -BCCR: Forecasting risk of environmental exacerbation of dissolved organic matter

- Supporting future investment decisions in water industry infrastructure
- Forecasting impacts on water quality relevant to work we did on algal blooms and new research on catchment-scale digital twins (Peter Hunter, Stirling)
- Building climate resilience industry network
- Inform climate risk assessment approach
- Developing adaptation through integrated catchment management

Delivering resilience to climate impacts on UK freshwater quality: towards national-scale cyanobacterial bloom monitoring and foreca

- Prototype operational service for monitoring climate impacts on water quality – see https://www.ao4ukwater.stir.ac.uk/
- Algal blooms also noted as important driver in DOC production in Freedom BCCR – early warning would be very useful – Bryan Spears UKCEH
- Building resilience in the water industry through improved provision of actionable intelligence
- Working towards the development of digital twins for the water industry and regulators by combining wireless sensor networks, satellite data and models
- Latest work now looking at forecasting tools
- Incorporating citizen science into monitoring programmes

Unlocking the potential of surface water flood nowcasting for emergency services in a changing climate

Towards a microbial process-based understanding of the resilience of UK peatland systems

- Carbon sequestration
- Interdisciplinary research
- Links to our work on catchment-scale digital twins which includes impact of peatland restoration on downstream waters (Peter Hunter, Stirling)

RESIL-RISK: understanding UK perceptions of climate risk and resilience

- Supporting Climate Risk Communication
- Title fine – but also citizen empowerment and engagment
- undersrtanding how best to communicate in climate services to different stakeholders (Lizzie Fuller)
- It would be interesting to know how the communities views regarding risk and resilience differ from local authorities and other stakeholders – Ruth Quinn

FUTURE-DRAINAGE: ensemble climate change rainfall estimates for sustainable drainage

- Jams Cooper: Link to erosion hazards project on rainfall projections
- For users, the subtitle of this project could better be described as: "New rainfall uplifts to assess surface water and sewer flooding impact for the UK water industry and flood risk community"
- We're starting to think about a city-focused surface flooding climate service. It would be useful to chat about the work you did here – Tyrone Dunbar (Met Office)

IMPRES: Impacts and risk assessment to better inform resilience planning

- Link to Met Office project on using open-source risk assessment frameworks to explore climate uncertainty and risk – will be looking at heat stress (Laura Dawkins & Dan Bernie)
- David Sexton – would you be interested in the kind of ultra-extreme H++ samples that are produced in the ExSamples project.
- Nigel Arnell – would like to find out what indicators/scenarios you have used.

Erosion hazards in ri... making critical infra...

- River and slope erosion
- Asset-scale hazard and risk assessments
- Economic damage
- Decision-support tool e.g. https://tinyurl.com/cbyz98hs
- UKCP18 forecasts of rainfall events
- Damage to bridges, roads, buildings, electricity transmission assets
- James Cooper (james.cooper@liverpool.ac.uk)
- Suggest use convective-permitting model output from Future Drainage to get best estimates of high-intensity, short duration rainfall impacts that can affect erosion rates. M Dale

Met Office Work Packages

Improving climate hazard information

Statistical approaches

Connections to CREWS-UK

Potential connection with our project on climate info for UK decision making - would bee good to discuss. Rachel Brisley, JBA

Dealing with model bias?

Hazard event set simulation

Potential for connection with work on sting jets (Oscar Martinez-Alvarado)

Variability and Weather Regimes

Simulations

UNSEEN and UKCP18

Improved characterisation of the hazard

Improved modelling: but also meaningful tests for model validation (particularly on extreme behaviour and causality of extreme events). Marie Ekstrom Cardiff Uni, ekstromm@cardiff.ac.uk

Multiple Connections to RESILRiSK

Potential connection with our project on climate info for UK decision making - would bee good to discuss. Rachel Brisley, JBA

We developed a web-based platform for visualising impacts of climate on algal blooms (UKLO) - see https://www.eo4ukwater.stir.ac.uk/. Peter Hunter, Stirling

eFLaG providing drought visualisation tools -can we link such tools across projects (Chris Counsell)

Communicating climate risk

Visualisation of information

Improved modelling

cascading uncertainty and risk

Large return periods

eFLaG exploring how water resources planning guidance could be updated (Chris Counsell)

Potentially needed if the ideas in the Coastal Resilience Model are to be adopted by for instance Defra/EA. Ian Townend

David Sexton - how much would very rare extremes as sampled by ExSamples be useful here?

Potential

Developing guidance

Capability building

Data management

From Climate Hazard to Climate Risk

Manchester vulnerability framework takes a holistic look at risk beyond climate (demographics, urbanisation etc.)

Link with eFLaG drought metrics? (Chris Counsell)

working with stakeholders with industrial knowledge

quantitative estimates of risk including some estimate of uncertainty

methodologies around multiple hazards and risk

Developing forecasts

increased potato blight

Reduced crop yield/ productivity

Livestock thermal heat stress

High temperatures

Compound events

Agriculture & livestock impacts

Hazard event set methodologies

Machine Learning techniques for estimating vulnerability curves/impact functions

Decision making framework - how robust are adaptation decisions to which climate data source is used in estimate risk?

Building qualitative scenario narratives

Using scenarios to explore uncertainty

Uncertainty budgets for risk projections in different sectors. Transport, Health, energy etc

Climate/Land/River Model (nly benefit from making use of these for pathway modelling Jim Freeman)

Constructing quantitative indicator projections out to 2100

Could compliment eFLaG by providing evidence on how demand for water may evolve (Chris Counsell)

STORYLINE(S)

Heat stress risk - possibly working with Df Education, Df Housing and/or Ministry of Justice

open-source risk assessment frameworks

Socio-economic challenges FOR ADAPTION

Socio-economic scenarios

COLD WEATHER	HOT WEATHER	HEAVY RAINFALL	DROUGHTS
Energy demand Reduction of winter demand for heating	Energy demand Increase of summer demand for cooling	Flooding Increased risk of river flooding	Agriculture Uncertain changes to crop growth
Transport Reduction of snow and ice road disruption	Transport Increase of disruption due to heat	Transport Increase of disruption due to flooding	Water Risk to water supplies
Health Increased disruption	Health Increased stress	Water Increased disruptions to urban drainage systems	Property Increased risk subsidence

Connections with CREWS-UK - practice in good and bad years

embedding information on cliamte risk within climate services - helping inform decision making around risk (Lizzie Fuller)

Potential link to eFLaG (Chris Counsell)

Met Office Work Packages

Climate Services Pilots

- co-produced
- upscaling
- decision support
- UKCP18 probabilistic projections
- Extreme heat
- Monitoring needs?
- exploring uncertainty
- bespoke
- Surface flooding
- develop parameter schemes for urban canopy model in RCM? Marie Ekstrom (ekstromm@cardiff.ac.uk)

Developing useful tools and datasets

Undertaking new applied research

identifying areas for additional research

Developing urban climate s...

- coastal risk for MOD bases
- marine workshop for user engagement
- storm surges
- sea level projections
- future weather patterns
- extreme water levels

Coastal pilot service

- forward and backward attribution
- Accessible datasets
- Does the project include identifying missing climate information? Rachel Brisley, JBA Consulting
- future weather patterns
- Link to understanding heat risk within cities? MO Heat Service (Lizzie Fuller)
- Undertaking new applied research

Impro... K H... Sector'... Res...

Co-developing needs and options for address for the transport and energy sector

What are the impacts of extreme weather on the UK transport sector?

Does the project identify the need for new climate science or derived products or more accessibility of existing science? Rachel Brisley, JBA

- co-development
- capturing user requirements

Working with stakeholders

This will be key to establishing Stakeholder weightings in the method being used in the Coastal Resilience Model. Ian Townend

An approach for many projects - shared good practice

learning from prototypes

- Hydrological modelling uncertainty
- Water industry engagement
- Demo service
- Public water supply risks
- Decision support
- Climate model biases
- Exploring how climate change modelling in water resources planning can be improved
- Enhanced use of climate models in user modelling
- Visualisation tools
- Evolution and spatial coherence of droughts
- focus on end user needs/stakeholder engagement

FLaG: Enhanced Future Flows and Groundwate...

Understanding the enablers and barriers to accelerat... climate service uptake

- developing standards for the delivery of climate services
- Testing a methodology for valuing climate services on three case studies (long range, seasonal forecasting and historic climate services
- organising climate service provisioning in the UK
- Developing series a working drafts of a new standard for those providing and using climate services

ISO 14090:2019
Adaptation to climate change — Principles, and guidelines

Climate services, standards and values

- Pull-through
- Resilience
- GFCS
- Trust
- Engagement
- Roles
- Ownership
- Adaptation
- Framework
- Interactions

- user climate information needs
- Importance of derived products for users
- climate information gaps
- soliciting perceived limitations in climate information production
- projection development strategies
- Climate information limitations
- Need for new products or revisions/refinements of existing products?
- Bringing together users and providers to ensure climate science supports uk decision making re. climate risks
- OpenCLIM aims to inform CCRA as well as sector specific stakeholders
- In answer to question above - it is both. If any climate service providers in this forum have not been contacted about this project, and would like to be, please email us: murray.dale@jbaconsulting.com
- eFlag has focus on how to use climate change evidence to inform longer term water resources planning (Chris Counsell)

Facilitating the delivery and use of climate service...

- Embedding climate services in decision making
- increasing reach of climate services
- Would love to get your students to talk to my MSc students on our Cities & Climate Change module next term [Chris Brierley - c.brierley@ucl.ac.uk]
- Great! Our teams are urban instavservices @metoffice.gov.uk. Other teams are working on this tool
- ity Packs (MO rban Factsheets) - ow to upscale whilst still being bespoke to a City
- 7 Cities so far – how do we make UK wide?

Upscaling of climate serv...

- Knowledge exchange
- Community
- UK National amework for Climate Services
- Coordination
- Ethics and codes of conduct
- Stocktake
- Signposting

- Who decides?
- IMPROVEMENT
- SATISFACTION
- QUALITY ASSURANCE
- GUARANTEE
- STANDARD
- CUSTOMER
- BUSINESS

...e infor... K deci...

Missing projects

ExSamples - for 3 extreme winters from UKCP Global, we have run roughly 1000-1500 member ensembles sampling uncertainty for each winter using climateprediction.net ~ from citizen ~s

Did this to see if UKCP Global extremes were just rare events, or whether they were due to ocean conditions and if sampled more thoroughly could be more extreme

ExSamples purpose - to produce data for extremes that are multivariate, spatially coherent, more extreme so good for impacts studies of high impact low likelihood (HILL extremes) like H++ scenarios.

ExSamples - Data will be made available on CEDA and the JASMIN workspace for UK region.

Coastal resilience project - sea-level rise tool and also looking at surges

The Met Office Coastal Pilot Service has started looking at this (Rachel Perks)

ExSamples - will you be repeating this for summers?

ExSamples-Link to improving climate hazard information-currently working on winter rainfall extremes attributions-would be interested in chat (Daniel Cotterill-Met Office)

ExSamples - I would be interested in having a chat as working on historical severe UK winters Neil Macdonald (Liverpool)

ExSamples - I'd be interested in having a chat about historic winter severity (Neil Macdonald - Liverpool)

Could be applied more widely

Better understanding of simulated extreme

Would be keen to know if this is looking at extreme drought events? (Chris Counsell)

Nigel Arnell - leading project on high impact 'worst case' scenarios. Keen to discuss more widely.

I'd like to hear how people have been successful with conversations at local authority level around rethinking "growth & development"? In a Mcr context that's the current barrier to adaption changes. Thoughts? Jenna A.

UKCORDEX - supplementing UKCP projections with EuroCORDEX high-resolution simulations. [Richard Chandler, Chris Brierley, Clair Barnes]

UKCORDEX - data will be made available on CEDA & Jasmin, and accessible through the existing UKCP18 interface

Creating a subset of alternate RCM outputs from the EuroCORDEX ensembles that is in a similar format to UKCP18 regional files.

considering spread in both and thinking about relationships between various ensembles and models.

Nigel Arnell - trying to synthesis across all the studies which have used climate projections to calculate indicators - all comments/inputs welcome!

David Sexton - Nigel's suggestion of synthesing across projects to understand how climate projections used would be very useful.

Agreed - our audience will want to try and understand how to interpret evidence across the studies (Chris Counsell)

PART 1: Reviewing themes across the projects

- Review **own projec**t, revise it/add to it using post-its **(10 mins)**
- Look at **others' projects** and add comments and connections **(20 mins)**

Breakout 1:

1. In your group, share reflections on the work of the programme to date.
2. Based on this conversation, capture anything 'surprising', 'new' or 'interesting' on the next Jamboard slide.
3. In plenary, we will ask for clarification of what is written and discuss what is emerging on the board - no need to formally report back but be ready to share what came up in your conversations!
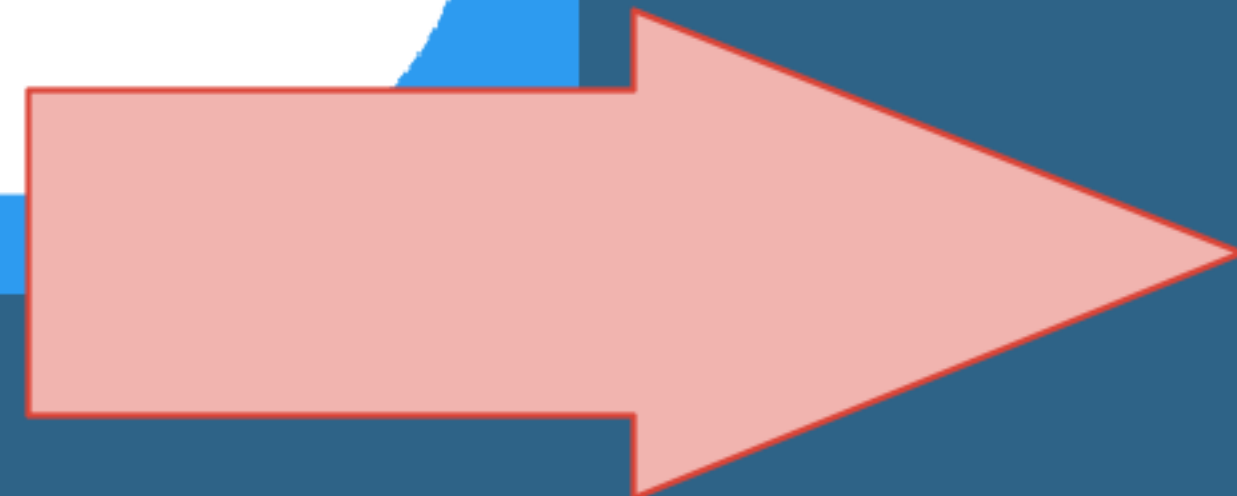
New?

- Approach using infographics and other tools, not just journal paper
- Challenge to make whole greater than the sum of the parts - are links too tenuous?
- time limits how much people can engage with the programme
- Huge diversity of projects across disciplines.
- UKCRP, been reassuring to hear everyone has been suffering from similar challenges during COVID. From the programme perspective, useful to hear where the materials we have been building can feed into other
- Re extremes, challenge of public understanding on what this means.
- Stronger focus on legacy
- Focus on end user needs in a lot of projects
- Useful to link people not just based on parallels, but people able to complement in terms of skills - e.g. bring in expertise in comms to help
- A lot of overlap on work on extremes. Lots of methods, tools, work packages. Post it notes useful, could get a group together to work on extremes. Share what everyone is doing. Specific sessions where there is commons ground.
- Inclusion of skills based outputs not just new science findings or data
- Can the Champ team do more to link similar projects together?
- It is hard to influence policy because policy makers want what they want, and we have promised to provide what we have promised. How do we make a productive research model?
- Breadth and depth of work is more than other projects have achieved. End-to-end nature of projects is great. Better collaboration between social and physical sciences
- Apetite for more events like this? As a means of ensuring those conenctions are made and utilised

Interesting?

- Nigel Arnell - great diversity of ways of using UKCP18 - strength or weakness?
- Balance between using a range or info and make your choices, with guidance, or specific info with a narrow purpose.
- Really great emphasis on communication
- desire to keep the community together after the end of the programme
- The amount of capcacity building being done, would be nice to do a mapping exercise on the manuals and guidance development, who is being guided and who
- Opportunity to look at aspects from multiple approaches - e.g. different approaches to risk indicators or farming impacts
- Understanding risk - one thing become clear is we've all done things differently. People have used different products for different purposese so difficult to synthesise and compare.
- ppl have written different models in different wats. Decision makers need info as easy access so they can make decisions
- DS: First time I've really seen full breadth of people from providers to end users in one forum in such numbers. We should really make the most of that.
- Lots cross over, there is a need to capture aspects in 'wider learning' papers. Marie Ekstrom
- Importance of stakeholder engagement for so many projects (but also a lot of challenges) - OVERLOAD
- also mapping of user engagement in different projects - make the most of approaches being made
- supported process might be helpful. That said something organised through the Programme Board to stakeholder reps would be helpful ie ppl who are part of the project, policy makers. Not just about end of the
- Are people ready to adapt? More awareness of resistance
- How many projects aim to provide end-user services. Lessons that could be drawn across projects as to how this is being developed, format, scope etc.
- Might be useful to map: Capacity building of whom, through what process?

Surprising?

- the huge amount and diversity of work going on across the programme
- Huge number of projects, but potentially fragmented? We should think about pulling this all together so we are able to demonstrate value / ROI
- The amount that's happening
- How many projects there were!
- Related to the above, a lot of projects covering similar ground with nuanced differences - need to build the links better
- Do we have a project to synthasise the outputs of all projects?
- Some of the connections have a come bit late - something to improve in later programmes
- Some of the benefits of online working during pandemic
- There's more overlap than we thought - how do we make sure users don't feel overwhelmed and are clear on what we are providing?
- Not surprising but reassuring to see how much cross cutting work is going on!
- blocks created in Phase 1 open up a lot of new opportunities to deliver new ways of doing things and end-products aimed at users. I am not clear how the community will continue to develop such opportunities as the programme comes to
- The quick turnaround in calls, making it hard for academics that want to contribute but have high teaching loads. Sets it up for those who are already working in the area.
- DS: Surprised about order of climate hazards, adaptation strategies and climate services messed my brain. Climate Services should be in middle bringing providers and users together, making information relevant, applying standards.
- accessable timeline of deliverables? - interim as well as final
- could we have a notice board for the group to informally chat and catch up over particular topics?
- How to really user needs - ... know we arent quite getting it; more interdisciplinary approaches needed perhaps?
- Community engagement area feels like it will remain a gap - need a platform to share best practice (knowledge and processes)

Breakout 2:

1. In your group, discuss what opportunities you see to strengthen connections and build synergies:
   - between individual projects in the programme
   - at the programme level
   - beyond the programme
2. Capture your thoughts on the 3 jamboards (one for each level)
3. In plenary, we will ask for clarification of what is written and discuss what is emerging on the board
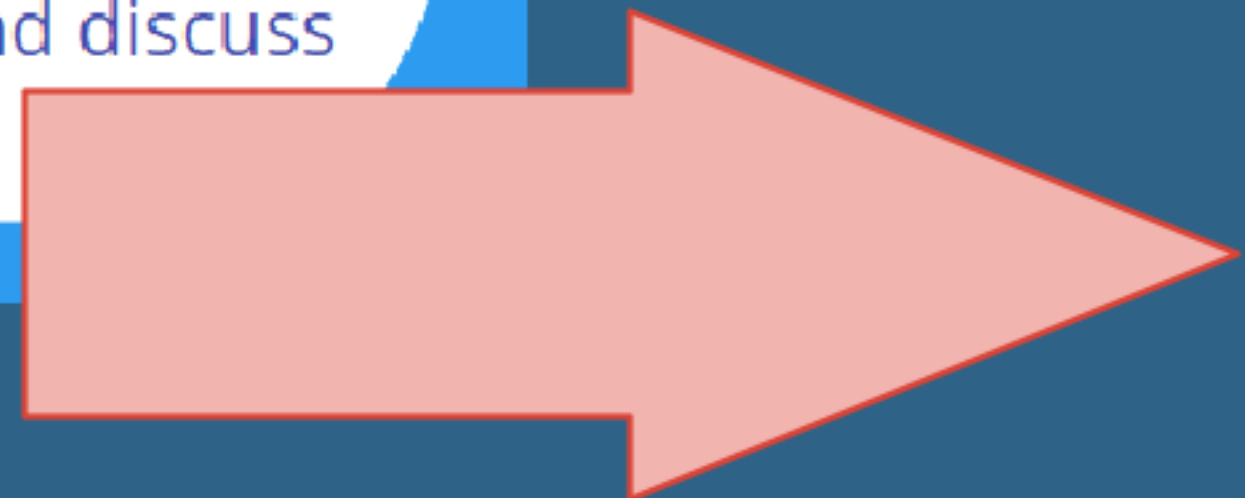
How do we maximise the impact of the programme in the final stage? How do we build synergy at different scales to effect relevant change?

Between individual projects...

Could group PIs, CoIs on projects together for focus groups relating to flooding, stakeholder engagement re climate change risks, natural environment, agriculture.

Challenge of joining time poor people together? How to do this effectively when people have many projects.

What is learned in individual projects need to be fed back to the wider programme.

What's the enabling mechanism to make use of the potential links? There is a huge opportunity but not sure of how to do this

Consider mapping the projects in terms of audiences.

Think about who might use the outputs from the Programme and then work back from that. We are thinking about this from a "capability" perspective. Is this right? MH

Could the champions organise focus groups, taking a strategic overview?

Is this where the Champion team come in?

Lessons from regional case studies e.g. barriers to adaptation. Would be good to share information from case studies.

Cross cutting themes as well as sector themes

how can we co-evolve mutual learning? (sharing the story behind the story)

Finding out what projects even exist is hard. I first discovered that a colleague was running a project on this scheme by us both attending an external extent

Subject specific workshops

Common issues highlighted in multiple proje identify theme around which focused discus could be conve

Cross-cutting themes could be: post-processing (e.g. bias adjustment), communicating results, co-production, using scenarios...

Establish a set of themes for projects to 'identify' under and for the programme and projects to review these over time e.g. sectors, timescales

Draw out common elements between projects. Would be good for flooding guys to hear from the building guys.

How do we preserve links once the funding stops?

Is there actually a value in connecting complex projects? A Venn diagram showing project relationships and commonalities would be useful

is anyone from this prgramme engaged in planning reforms? really critical to climate resilience delivery

How do we maximise the impact of the programme in the final stage? How do we build synergy at different scales to effect relevant change?

Across the programme...

Easy win would be more accessible information on stakeholders and outputs of each project

Need a mech for feeding back from individual projects across the programme

Establish a set of themes for projects to 'identify' under and for the programme and projects to review these sector

putting PIs in touch, focus groups on themes

the commenting no other people's projects - to spark a conversation

What are different groupings? e.g. similar stakeholders, similar tools, similar outcomes

projects to share events coming up and who might be interested in them e.g. the marine workshop

How do we provide "time" for researchers to engage in synthesis? How can we fund this? Budget really helps

The above is important especially for consultants involved

Could split the programme into sections eg. providers of weather data / impact scientists, climate services, end users. Have an assembly where the groups talk to the other groups. Get groups sharing knowledge

language. Need science translators eg explaining what uncertainty means to ppl who say ' just give me a number'. A massive opportunity to turn met/ climate sci into language that ecision makers in Y 'ater/ Network Rail nderstand. Clim Info

Does the climate services group have a role to facilitate and act as science translators.

Role of Champions really valuable – gives immediacy and connection. Problem is it's only a short term thing!

JKCR gives a timely understanding of what's going on – but the notion of a programme is in tself a barrier to progress

Is there still too much of a "closed shop". What is the pathway into our main networks?

engage with plannign reforms, map stakeholders for policy and practice better - policy is not uniform, not just one govt dept or agency but many each wiht different ideas and needs

diversity of potential outputs – 4 page glossy, some very academic – some want specific information and other more general.

we need to hire knowledge synthesis effort? E.g. like the impacts synthesis?

Central comms channels for UKCR are very useful for this for bringing together the community

Keep tweeting – very useful for finding out about different outputs across the programme.

Synthesis paper needed! Needs policy relevance showing what was found out and why its useful (forget project labels)

to make an impact, we need to have an ongoing dialogue about what the stakeholders/users want to achieve or what decisions they want to make

Think about who might use the outputs from the Programme and then work back from that. We are thinking about this from a "capability" perspective. Is this right? MH

How do we maximise the impact of the programme in the final stage? How do we build synergy at different scales to effect relevant change?

Beyond the programme...

Create 5 minute videos of findings

More use of video channels - e.g. in form of video panel discussion of PIs on synthesis topics

good signposting - not necessarily a book!

Lots of good stuff has come out. Need a mechanism to fund how to take this forward.

Synthesis or lessons that can be drawn across projects with more regional focused case studies e.g. different cities.

Learn from experience of previous major initiatives e.g. NERC PURE programme

Brainstorm key synthesis topics amongst wider group

Mainstreaming of embedding climate scientists/ researchers in city planning activities to ensure impact - extending work in Hull, Bristol and Manchester et al to other cities

Need to look way beyond journal papers - but still need them for scientific audience and credibility

Tools for PIs such as slide packs for the programme and other projects

Provide a map of all outputs and what's useful for different audiences - signposting

Project ambassadors?

Are we saying we've done well, or trying to get something different going in the future? (need a different way of doing science!)

Think about launch point for future programmes

If introducing themes... continue these as working groups after the end of the programme, based on user need

Might be particular barriers for non-academic partners when funding finishes - how do we maintain diversity?

All research UK-focused. Explicitly capture lessons for other countries (where they exist)

Fund opportunities that imact real people i.e. work being done in Manchester

really understand the diversity of policy and practice needs - policy is not a monlithic thing. cliamte policy is delivered through so many different policy areas - spatial planning and via planning authorities is probably the most important

Who does the encouraging? The CCC, other government bodies? Can this programme demonstrate giving the ports value in relation to what they are offering, there'd be a reason for them to contribute

Need some sort of forum with funders to take things forward. Govt, national rail, ports industry.. groups potentially in a position to take ideas and progress them forward. (similar to the funding of the YHCC?)

Important to get the timing right to meet needs e.g. a call from local government for a resilience plan

Make use of policy suggestions in the CCRA report

Political actors need to be more accountable

Empower civil servants for reporting and action

Climate equivalent of RMetSoc/ICE and other institutions or societies - a framework community for climate resilience

How do we synthesis results to influence / target the next NAP

Think about who might use the outputs from the Programme and then work back from that. We are thinking about this from a "capability" perspective. Is this right? MH

Focus on user groups /end user

...ogue between producers and users is really important. Create an avenue for additional users to approach people to found out best way to navigate between available data.

Target industry bodies

Provide some training on what sort of content works for specific audiences

Learning opportunities from communicators about how we can frame outputs for policy makers

Mechanisms for maximising impact

Legend
- **new idea** (pink)
- **plus** (yellow)
- **minus** (orange)
- **interesting** (green)

Written outputs

- encyclopedia of resilience?
- I think there is space for book and journal article with overview of lessons learned, examples etc. sharing learning with academic sector on the processes and experiences is important
- **policy briefs**
- need to move beyond policy and influence practice - policy brief the first step
- **practice briefs**
- media outputs, editorial pieces, public communication
- Targeted synthesis for trade organizations
- Outputs by sector - use those from CCRA - natural environment, people/health, business, international
- **programme book**
- Testimonials and case studies of impact at the practitioner level, both to inform others in the sector but also those in the NAP process.
- **journal articles**
- case studies of how services/data can be applied

Events

- bringing together the actors across the chain or web (researchers, decision-makers, funders, climate service providers, etc.) to network and share knowledge. Could be done under a national framework for climate
- **resilience community engagement events**
- sdseswsrws
- **internal assemblies**
- podcasts
- **Festival of resilience**
- +1
- **expert webinars/ workshops**
- Local events based on 'place' involving stakeholders from the community (like the Climateurope festivals but on a smaller scale) - focus is on inclusivity and engagement, not technical details
- Engagement with trade events/publications. UKCR involved in some in agriculture and probably others, but these have been well received. - can reach those not focused on resilience day-to-day.
- **external conferences**
- In Clandage we have used poetry to engage with communities, most of those attending didn't engage with 'science'
- we also did a walking tour and doing 'making' events at present

Other outputs

- infographics
- Interactive data portals
- We're working with ESRI to use ArcGIS storymaps for our urban climate services, happy to speak with anyone else interested in this - Tyrone (Met Office)
- storyboards
- **TV, engaging with popular tv outputs**
- ArcGIS StoryMaps - https://www.esri.com/en-us/arcgis/products/arcgis-storymaps/overview
- New bespoke easy to use website aimed at general audience so that they can easily find solutions
- **animations**
- Single point of reference on UKCR website directing to the data products from the Programme. Maybe with meta-data on how they were used and how they might further be exploited.
- Social media content
- Findings presentation that can be used in education - undergraduate/masters - potentially schools highlighting fidnings appro[rilate to audiences.
- **"Bite-size" videos**
- Open access models/data to continue to maximise use in academic studies, future projects as well as stakeholders who may want more technical data.
- some sort of 'wiki' for resilience? could make it easier up load information and ideas?
- england is putting together a story map of climate and heritage with case studies illustrating projects and examples. its a nice way to give people access to projects and outputs at different scales that are linked
- contextual events from past

Other ideas

- Working groups on different topics (e.g. co-production) so someone is taking ownership for legacy? Can have varying degrees of ongoing commitment and can link to other funding streams in future.
- Documentary film on climate adaptation!
- Better sharing of information throughout the programme would be great, rather than waiting for an event like this.
- A podcast series?
- Looking for nice positive 'stories' which we can push in the media to celebrate climate adaptation and its wonderfulness for so much!
- +1
- that this is a goverment problem and that goverment needs to solve it. However, at a deeper level there is a need to develop a stronger individual responsibility for understanding risk and doing what they
- the proposal of a resilience network that cuts across disciplines is an excellent one - how can this be established? it would be a good think for CCC and UKRI to develop together?
- **interpro collabor**
- Engage with a network of teachers? E.g. Geographical Association.
- Develop resources for the national curriculum. Probably needs to be led by people in education/ teachers.