LCAT User Guide
and technical information

February 2024

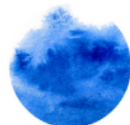**LCAT**
LOCAL CLIMATE
ADAPTATION TOOL

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Who is the tool for?

Anyone working with and for their local community.

- ✓ **Local decision-makers.** The tool has been designed with, and is created for, decision-makers at a local level.

- ✓ **Local organisations** such as local authorities, NHS, emergency services or voluntary sector.

- ✓ **Across disciplines & hierarchies.** From housing to health, to transport and more. The tool is for both junior and senior staff. As well as anyone who wants to understand future local climate and its associated health impacts.

- ✓ **Multi-agency, collaborative working** on climate adaptation, providing a single starting point and common language that encourages alignment of approach.

A simple step-by-step process for users

Select a geographical area

View the local climate model

Explore the routes to health impacts of climate change and who is most vulnerable

Recommendations for action

Why focus on Climate Adaptation?

LCAT offers you data and evidence to not only understand, but plan for the current and future climate. In turn, ensuring communities are resilient for a future climate and risks to health and wellbeing are reduced.

Benefits of adaptation include:

✓ Making communities stronger in the face of change

✓ Making the places we live more resilient, healthier, safer and greener

✓ Strengthening our systems and services & reducing damage

✓ Saving money by investing in adapting now

What can I do with the results?

The results will help you to:

- ✓ Understand your area's future climate

- ✓ Understand the likely hazards, risks and opportunities to your local area and local communities

- ✓ Explore what the evidence suggests you could do to reduce risks and maximise opportunities

- ✓ Understand who is most vulnerable to allow for a targeted and just approach

Common questions

Q: Is the tool hard to use or time consuming?

No. LCAT is easy and quick to use, providing data & evidence within very few clicks.

Q: Do I need to input any data or information?

No. Just by clicking on your local area, the tool provides you with everything you need.

Q: The impacts to health and wellbeing are presented in a climate impact pathway , what is this?

The impacts to human health and wellbeing from our changing climate are complex. We have created these pathways to help you to visualise the complex relationships involved and see where multiple disciplines and sectors have a role to play.

Common questions

Q: How important is it to use the tool in partnership with others in my area?
While the tool can be used by any individuals, at any time, a multi-agency, collaborative approach to climate adaptation is best practice. Maladaptation can be avoided, with benefits to many people, sectors and systems.

Q: Why does LCAT focus on different sectors?
The health and wellbeing impacts of climate change are complex and wide ranging. They cross-cut multiple sectors from healthcare, to housing, to infrastructure. The tool aims to help professionals from across organisations and sectors play a part in building resilient and healthy communities.

Technical Information

<u>Q: What are GWLs?</u>

Climate change is often referred to in terms of Global Warming Levels (GWLs) which the difference between future temperatures and those from pre-industrial levels.

The Paris Agreement aims to restrict the increase in global average temperature to less than 2C above pre–industrial levels (GWL of 2C), and to pursue a target of limiting the increase to 1.5C (GWL of 1.5C). As a result of this agreement, UN member states have defined their own Nationally Determined Contributions (NDCs) to reduce their usage of fossil fuels and thus the emissions of greenhouse gases.

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Q: What are RCPs?

Climate models represent complex physical processes that govern our atmosphere and oceans. They are used to predict the Earth's climate in future decades based on different scenarios, known as Representative Concentration Pathways (RCPs).

Different RCPs span a wide range of plausible future scenarios and specify different concentrations of greenhouse gases that will result in different changes to our climate in future decades. Technically, they result in different levels of radiative forcing which means that Earth receives more incoming energy from sunlight than it radiates to space, leading to warming and other climate impacts.

There are four RCPs:
(i) RCP 2.6 represents a pathway where greenhouse gas emissions are strongly reduced
(ii) RCP 8.5 is a pathway where greenhouse gas emissions continue to grow unmitigated
(iii) & (iv) RCP 4.5 and 6.0 are two medium pathways, with varying levels of mitigation.

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Technical Information

Q: What are RCPs? (Continued)

The United National Environment Programme suggest that RCP6.0 aligns with current existing global policies and is expected to lead to a global warming level of 2.8C in 2100.

LCAT presents results for RCP6.0 and RCP8.5, which is often referred to as a worst-case scenario.

Technical Information

<u>Why are clouds important?</u>

Clouds play an important role in our climate as they can both shade the Earth and also trap heat.

Which one of these happens in practice will depend on how high they are, the type of cloud and how reflective they are, and whether it is day or night.

Cloudiness or cloud cover refers to the extent to which the atmosphere is covered by cloud and is estimated in fractions or percent, i.e. 'overcast might refer to near 100% cloudiness while 'clear' might be something closer to 0% cloudiness.

How clouds themselves will respond to increased temperatures and other factors associated with climate change will result in feedback that needs to be considered within climate predictions.

Modelling clouds, and potential feedback, is very complex as clouds occur on much smaller scales than other factors used in models to predict the climate and requires extremely fine-scale physics.

Technical Information

What climate data sources are you using?

The current iteration of the tool uses climate data from Chess-scape. This is an ensemble of four different realisations of future climate for each of four different representative concentration pathway scenarios (RCP2.6, RCP4.5, RCP6.0 and RCP8.5). LCAT uses the bias-corrected scenarios for England, Wales and Scotland.

Why is there no climate data for Northern Ireland?

Unfortunately, there is no bias-corrected data available for Northern Ireland, but we will be including a different dataset for Northern Ireland, allowing us to provide climate data for the region soon.

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Is there a methodology to the impact pathway maps?

Yes. We have created causal loop diagrams using the mDPSEEA conceptual framework (Morris et al., 2006). Causal loop diagrams are a way to visually represent a complex system, and the relationships between different factors or variables within that system. mDPSEEA is an analytical framework used to understand the complex interactions between human activities and the environment. By examining each of its 6 components, mDPSEEA helps to assess and understand the dynamics between human actions and their environmental consequences.

What does mDPSEEA stand for?

The abbreviation mDPSEEA stands for each of its 6 components: Modified Drivers, Pressures, States, Exposures, Effects and Actions. The 'modification' to the DPSEEA framework created by the WHO, is the addition of social, economic, demographic, and behavioural contexts.

How have you drawn the maps?
Our team used Kumu. Kumu is a free to use online platform where you can build system maps and personalise them in a variety of ways.

Coming soon...

Want to learn more about Climate Adaptation?

Our Introduction to Climate Change Adaptation launches in spring 2024 on this same website.

It will explain why adaptation is important & how to do it well.

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