

CCRA3 Glossary

This glossary draws primarily on the IPCC 5th Assessment Report (AR5) Core Concepts (IPCC, 2014a), and the IPCC Glossary (IPCC, 2014b) and the IPCC Special Report on Global Warming of 1.5 °C (SR1.5) (IPCC, 2018), but with additions on the new elements introduced in CCRA3. It has been reviewed and agreed by the CCRA3 technical team, peer reviewers and Government stakeholders.

Adaptation

The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects. Source: IPCC, AR5. This includes: Incremental adaptation - Adaptation actions where the central aim is to maintain the essence and integrity of a system or process at a given scale. Transformational adaptation - Adaptation that changes the fundamental attributes of a system in response to climate and its effects. Source: IPCC AR5.

Adaptation Pathway

A generic term that involves the analysis of adaptation options over time to changing risk levels. This term has been applied in a number of different ways, which include: i) Adaptation roadmaps or pathway frameworks, which consider portfolios of adaptation that change over time, to allow analysis of the timing and sequencing of adaptation and identify priorities; ii) Adaptive management, which is an iterative cycle of monitoring, research, evaluation and learning, i.e. a process, that is used to improve future management strategies (also called iterative risk management); iii) Dynamic adaptation route-maps, which focus on decision making under uncertainty and identify adaptation tipping points (or turning points), the point at which a particular action is no longer adequate for meeting the plan's objectives, that act as triggers for a change in adaptation. Source: CCRA3 Technical Team.

Adaptive capacity

The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences. Source: IPCC AR5.

Attribution

See *detection and attribution*.

Autonomous adaptation

IPCC AR5 defined this as adaptation in response to experienced climate and its effects, without planning explicitly or consciously focused on addressing climate change (spontaneous adaptation). However, CCRA3 does not use the term autonomous adaptation. Instead, it considers two elements: reactive adaptation, i.e. a response to the changing climate experienced rather than a pro-active planned approach, as well as non-governmental planned adaptation (i.e. anticipatory adaptation undertaken by other organisations, e.g. private sector). Source: CCRA3 Technical Team.

Cascading impacts

Cascading impacts occur when impacts in one or more parts of an interconnected system may trigger impacts in other parts of the system. For CCRA3, interdependencies, cascading risks and cross-cutting risks were considered for each risk and opportunity. Example: Particular risks create cascading impacts across different sectors. For example, a flood can cause direct damages to buildings, but also have knock-on effects on people's mental health, on business continuity and on supply chains. Source: CCRA3 Technical Team.

Climate

Climate in a narrow sense is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization. The relevant quantities are most often surface variables such as temperature, precipitation and wind. Climate in a wider sense is the state, including a statistical description, of the climate system. Source: IPCC AR5.

Climate change

A change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external processes such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use. Source: IPCC AR5.

Co-benefits

The positive effects that a policy or measure aimed at one objective might have on other objectives, thereby increasing the total benefits for society. Co-benefits are often subject to uncertainty and depend on local circumstances and implementation practices, among other factors. Source: IPCC AR5.

Confidence

A measure of the degree of belief in a finding based on the type, amount, quality, and consistency of evidence and on the degree of agreement. Confidence is expressed qualitatively as high, medium or low according to a defined set of criteria (number of sources of independent evidence, quality of analysis and methods, agreement among studies and experts) in the CCRA3 Method Chapter. Source: CCRA3 Technical Team.

Detection and attribution

Detection of change is defined as the process of demonstrating that climate or a system affected by climate has changed in some defined statistical sense, without providing a reason for that change. An identified change is detected in observations if its likelihood of occurrence by chance due to internal variability alone is determined to be small, for example, <10%. **Attribution** is defined as the process of evaluating the relative contributions of multiple causal factors to a change or event with a formal assessment of confidence. Source: IPCC SR1.5.

Ecosystem

An ecosystem is a functional unit consisting of living organisms, their non-living environment and the interactions within and between them. The components included in a given ecosystem and its spatial boundaries depend on the purpose for which the ecosystem is defined: in some cases they are relatively sharp, while in others they are diffuse. Ecosystem boundaries can change over time. Ecosystems are nested within other ecosystems and their scale can range from very small to the entire biosphere. In the current era, most ecosystems either contain people as key organisms, or are influenced by the effects of human activities in their environment. Source: IPCC AR5.

Ecosystem services

Ecological processes or functions having monetary or non-monetary value to individuals or society at large. These are frequently classified as (1) supporting services such as productivity or biodiversity maintenance, (2) provisioning services such as food, fiber or fish, (3) regulating services such as climate regulation or carbon sequestration and (4) cultural services such as tourism or spiritual and aesthetic appreciation. Source: IPCC AR5.

Evidence

Data and information used in the scientific process to establish findings. In this report, the degree of evidence reflects the amount, quality and consistency of scientific/technical information on which the Lead Authors are basing their findings. Source: IPCC SR1.5.

Exposure

The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected. Source: IPCC AR5.

Extreme weather event

An extreme weather event is an event that is rare at a particular place and time of year. Definitions of rare vary, but an extreme weather event would normally be as rare as or rarer than the 10th or 90th percentile of a probability density function estimated from observations. By definition, the characteristics of what is called extreme weather may vary from place to place in an absolute sense. When a pattern of extreme weather persists for some time, such as a season, it may be classed as an extreme climate event, especially if it yields an average or total that is itself extreme (e.g., drought or heavy rainfall over a season). Source: IPCC AR5.

Food security

A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Source: FAO (2001) cited in IPCC SR1.5.

Green/Blue-Green infrastructure

The interconnected set of natural and constructed ecological systems, green spaces and other landscape features. It includes planted and indigenous trees, wetlands, parks, green open spaces and original grassland and woodlands, as well as possible building and street-level design interventions that incorporate vegetation. Blue-Green infrastructure uses green infrastructure for water management. Source: IPCC SR 1.5.

Habitat

A place where plants or animals normally live, characterized primarily by its physical features (topography, plant or animal physiognomy, soil characteristics, climate, water quality etc.) and secondarily by the species of plants and animals that live there. Source: Davies et al. (2004) for the European Nature Information System – EUNIS.

Hazard

The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources. In the IPCC, hazard refers to climate-related physical events or trends. Source: IPCC, AR5.

Impacts

Effects on natural and human systems of extreme weather and climate events and of climate change. Impacts generally refer to effects on lives, livelihoods, health status, ecosystems, economic, social, and cultural assets, services (including environmental), and infrastructure due to the interaction of climate changes or hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system. Impacts are also referred to as consequences and outcomes. Source: IPCC AR5.

Interdependencies

The points of interaction among human and physical systems. Climate change not only alters risks (direct and indirect) to individual sectors, but also alters the nature and magnitude of these risks through the interdependencies that emerge from the dynamics of large-scale, highly interconnected complex systems. A risk assessment that does not address such interconnections, and the possible loss or creation of interconnections, could lead to the miscalculation of risks. Furthermore, there are potential missed opportunities for adaptation, for over or under adaptation, or maladaptation. Interdependencies may be divided into six different groups; (1) functional interdependencies, (2) physical interdependencies, (3) geographic interdependencies, (4) economic and financial interdependencies, (5) institutional and policy interdependencies and (6) social interdependencies. For CCRA3, interdependencies, cascading risks and cross-cutting risks were considered for each risk and opportunity. Source: Dawson RJ. Handling Interdependencies in Climate Change Risk Assessment. Climate 2015, 3(4), 1079-1096.

Land cover

Land cover is the observed (bio)physical cover on the earth's surface. Source: Di Gregorio and Jansen (2000) for the Food and Agriculture Organisation (FAO) of the United Nations.

Land use

Land use refers to the total of arrangements, activities and inputs undertaken across certain land cover types (a set of human actions). The term land use is also used in the sense of the social and economic purposes for which land is managed (e.g., grazing, timber extraction, conservation and city dwelling). Source: IPCC SR1.5.

Land-use change

Land-use change involves a change from one land use category to another. Source: IPCC SR1.5.

Likelihood

The chance of a specific outcome occurring, where this might be estimated probabilistically. Source: IPCC AR5.

Lock-in

Early actions or decisions that involve long lifetimes or path dependency, which will potentially increase future risk or vulnerability and that are difficult or costly to reverse later (irreversibility). This can be from a 'business-as-usual' action or decision, from a lack of an action or decision, or from a maladaptive action or decision. Source: CCRA3 Technical Team.

Magnitude

The size of (impact of) a particular climate hazard under a given scenario, which is expressed in monetary, social or environmental terms. Source: CCRA3 Technical Team.

Maladaptation

Any changes in natural or human systems that inadvertently increase vulnerability to climatic hazards; an adaptation that does not succeed in reducing vulnerability or exposure but increases it instead. It can also cover spending a disproportionate amount of effort and investment on adaptation beyond what is required. Source: CCRA3 Technical Team.

Natural capital

Natural capital comprises assets associated with the land (such as woodlands, fields, urban parks and the subsoil [rocks, soil, minerals etc.]), the water environment (rivers, lakes, groundwater and seas) and the atmosphere. It also includes the processes that underpin and generate the services that the natural environment provides (for example, the water cycle). The stock of natural capital therefore refers to assets that either directly provide benefits or underpin human wellbeing. In this way, natural capital generates value for society. Source: CCRA3 Technical Team.

Non-governmental adaptation

This includes spontaneous and reactive adaptation (e.g. in natural systems, from acclimatisation, or in markets) in response to the changing climate, but also planned adaptation by non-government actors, e.g. proactive, planned private adaptation. Source: CCRA3 Technical Team.

Opportunity

The potential for a beneficial consequence, as a result of a changing climate (the propensity to be beneficially affected). Source: CCRA3 Technical Team.

Productive capacity

The ability of the land (also referred to as land capability) to support the production of food, timber or other products. Source: CCRA3 Technical Team.

Resilience

IPCC AR5 defines as: the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation. However, the term resilience is now used very widely, in different ways, and as a consequence in CCRA3 we try and avoid the term due to the lack of a commonly applied definition. The exception is where it is used in existing Government policies, or in plans or actions as stated by the private sector or other groups, noting in such cases the specific definition should be included. Source: CCRA3 Technical Team.

Risk

The potential for adverse consequences where something of value is at stake and where the occurrence and degree of an outcome is uncertain. In the context of the assessment of climate impacts, the term risk is often used to refer to the potential for adverse consequences of a climate-related hazard, or of adaptation or mitigation responses to such a hazard, on lives, livelihoods, health and well-being, ecosystems and species, economic, social and cultural assets, services (including ecosystem services), and infrastructure. Risk results from the interaction of vulnerability (of the affected system), its exposure over time (to the hazard), as well as the (climate-related) hazard and the likelihood of its occurrence. Source: IPCC SR1.5. Note that in CCRA3, the term risk is used for negative consequences (i.e. threats).

Semi-natural habitat

Habitat that has many natural features, even though modified by human activities. The natural environment in the UK has been strongly influenced by the way people have shaped and farmed the landscapes over thousands of years, so that there are now very few habitats that have not been modified or even created by human actions. Consequently, many of the most species-rich habitats of greatest conservation value, such as meadows, heathlands and woodlands, created by centuries of human activities, require ongoing management to retain their conservation interest and provide ecosystem services. Technically, most are best described as 'semi-natural' rather than 'natural' habitats. Source: CCRA3 Technical Team.

Social Benefits

Social Benefits are the total increase in the welfare of society from an economic action – the sum of the benefit to the agent performing the action plus the benefit accruing to society as a result of the action (external benefits). Source: HMT (2018).

Social Cost

Social Cost is the total cost to society of an economic activity – the sum of the opportunity costs of the resources used by the agent carrying out the activity, plus any additional costs imposed on society from the activity (external costs). Source: HMT (2018).

Social Cost Benefit Analysis

Social Cost Benefit Analysis quantifies in monetary terms all effects on UK social welfare. Costs to society are given a negative value and benefits to society a positive value. Costs to the public sector are counted as a social welfare cost. Source: HMT (2018).

Social Cost-Effectiveness Analysis

Social Cost-Effectiveness Analysis compares the costs of alternative ways of producing the same or similar outputs. Source: HMT (2018).

Socio-economic scenario

A scenario that describes a possible future in terms of population, gross domestic product, and other socioeconomic factors relevant to understanding the implications of climate change. Source: IPCC AR5.

Tipping point

Earth System tipping points

Assessment of climate change risks needs to consider the potential for abrupt or non-linear climate change, and the possibility of passing tipping points in the Earth system that lead to long-term shifts or irreversible changes in climate. Examples include ice sheet collapse, shutdown of the thermohaline circulation, some aspects of biogeochemical feedbacks such as forest die-back and permafrost thawing. Source: CCRA3 Latest Scientific Evidence for Observed and Projected Climate Change Chapter Authors.

Socio-economic tipping points

There is a new emerging literature on socio-economic tipping points i.e. where the tipping point arises in the socio-economic system. The evidence on these extremes is more limited, which limits a more formal analysis, but some consideration of other large-scale, potentially catastrophic risks will be considered as part of the overall chapter review. Source: CCRA3 Technical Team.

Threat

See risk.

Threshold

These represent levels above which there is step-change in risks, and which may necessitate much greater levels of adaptation. These include biophysical thresholds, engineering thresholds, performance thresholds and policy thresholds.

- Biophysical thresholds. Typical examples are the suitability or lethal threshold limits for crops, temperature thresholds for heat and daily mortality, or thresholds for heating or cooling demand. There are sometimes translated into current policy, e.g. the Heat Health Watch heat-wave temperature thresholds, or occupational temperature thresholds.
- Engineering thresholds. These are often associated with design standards and tolerance levels for various climate parameters, e.g. rail buckling temperature thresholds, maximum water flows for drainage channels etc.
- Performance thresholds. These thresholds are linked to the adaptation tipping points literature (also known as adaptation turning points), and they relate to points beyond which a particular action is no longer adequate for meeting a plan's objectives and a different adaptation option or strategy is required, including sometimes more transformational measures.
- Policy thresholds. These may be policy levels that are set to politically determined levels of acceptable risk or economic optimality, e.g. the use of 1 in 100 year level of flood protection, or policies that define unacceptable risks.

Source: CCRA3 Technical Team.

Adaptation turning points

See adaptation pathways

Transformational adaptation

See adaptation.

Uncertainty

A state of incomplete knowledge that can result from a lack of information or from disagreement about what is known or even knowable. It may have many types of Source:s, from imprecision in the data to ambiguously defined concepts or terminology, incomplete understanding of critical processes, or uncertain projections of human behaviour. Uncertainty can therefore be represented by quantitative measures (e.g., a probability density function) or by qualitative statements (e.g., reflecting the judgment of a team of experts). Source: IPCC AR5.

Urgency

A measure of the degree to which it is felt that action is needed to reduce a risk or realise an opportunity from climate change. Urgency is expressed qualitatively according to a defined scale. Source: CCRA3 Technical Team.

Vulnerability

The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. Source: IPCC AR5.

Well-being

A state of existence that fulfils various human needs, including material living conditions and quality of life, as well as the ability to pursue one's goals, to thrive, and feel satisfied with one's life.
Ecosystem well-being refers to the ability of ecosystems to maintain their diversity and quality.
Source: IPCC SR1.5.

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