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Policy brief

National laws and policies on climate change adaptation: a global review

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Headline issues

- A significant majority of countries have enacted laws and policies to address climate change adaptation.
- While many identify floods and droughts as major hazards, other impacts such as ocean acidification remain under-addressed.
- Framework laws and policies often include adaptation plans, information generation, regulation, and early warning systems.
- Apparent gaps are adaptation investment and economic incentives to encourage adaptation.

Summary

This first global review of climate change adaptation laws and policies shows that many countries now have legislative and policy frameworks to govern adaptation. This includes many framework laws and policies that mainly set priorities on adaptation action.

Information generation and sharing, adaptation planning, establishing institutional arrangements, and processes for managing and monitoring adaptation action are common areas of focus. These are useful for directing attention to priority areas: for example, climate risk information is foundational to effective adaptation planning and a priority for the majority of countries. But the more complex solutions, such as investing in the physical and social infrastructure that is required to adapt to climate change, are largely missing.

Other apparent gaps in adaptation laws and policies include enhanced investment in public goods that go beyond hazard early warning systems, explicit reference to building codes and land use planning, and incentives and market-based mechanisms to facilitate adaptation. These may be covered by other, non-climate-specific regulatory instruments, or addressed at the local level, and as such may not be captured in national-level policymaking; this warrants further research.

Policy briefs provide analysis on topical issues, presenting specific recommendations to inform ongoing policy debates. Drawing on the Grantham Research Institute's expertise, they summarise either our research findings or the state of knowledge about a particular issue.

This policy brief has been written by **Michal Nachmany, Rebecca Byrnes** and **Swenja Surminski**.

"With impacts of climate change already being experienced, recognition of the urgent need for adaptation is growing"

Why enhance knowledge of adaptation governance?

Adaptation to the impacts of climate change has typically received less attention than emissions reduction (mitigation) in the international climate negotiations and global policy discourse. However, with impacts of climate change already being experienced, recognition of the urgent need for adaptation is growing. The Global Commission on Adaptation (2019) highlighted the need to accelerate adaptation action around the world and in September 2019 launched a 'year of adaptation action'.

In light of this growing recognition, and because limited analysis has been carried out in this area to date (UNEP, 2018), this global review of adaptation laws and policies has been undertaken to understand how adaptation to climate change is governed at the national level. While much adaptation activity occurs at the local level, national governments play a vital role in overseeing, mandating and allocating resources to local adaptation activities.

Most countries have national adaptation laws or policies

Box 1 sets out the scope and methodology of our analysis, including how the laws and policies were identified and analysed. Looking at all countries of the world, we find that:

- 91 countries have at least one law (passed by a legislative branch, e.g. parliament) that addresses climate change adaptation.
- Adaptation is now addressed in the executive policies of at least 170 countries.
- More than 120 countries have at least one framework document that addresses climate change adaptation (laws or policies that lay down the overarching and cross-sectoral obligations and principles, but often have more detailed subsidiary laws or policies that set out how these goals are achieved).

Most adaptation laws and policies came into force between 2009 and 2016, representing approximately 40 per cent of the total number of all climate change laws and policies introduced in that period (Nachmany and Setzer, 2018). In general, countries have tended to pass adaptation laws after passing mitigation laws. To date, the most intense period of legislative activity was 2012/13 when 85 countries passed a total of 133 adaptation laws and policies.

Understanding specific risks is critical

Many framework laws and policies explicitly address the physical hazards they respond to. These include both extreme weather events, e.g. floods, droughts, storms and heatwaves, and slow-onset impacts such as sea level rise and ocean acidification. The importance of identifying specific hazards is twofold. First, it focuses the design of the specific measures to respond to these hazards – e.g. incorporating sea level rise considerations into spatial planning. Second, it provides guidance to ministries and sub-national governments on where to prioritise their adaptation efforts.

We analysed the framework documents of 100 countries (see Box 1) and found that the two most commonly mentioned hazards are floods and droughts (mentioned by approximately 80 per cent of the countries analysed). Wildfires, heatwaves and mudslides or landslides are mentioned by only half of the 100 countries, while

Box 1. Scope and methodology

Source documents

We identified 658 national climate change adaptation laws and policies in the Grantham Research Institute's Climate Change Laws of the World database*, which covers all countries (and 1,811 laws and policies in total). These include laws passed by national legislative branches, and decrees, policies, strategies and plans (which we refer to collectively as 'policies') issued by national executive branches. Note that documents submitted to international organisations e.g. national and local adaptation programmes of action (NAPAs, LAPAs) and nationally determined contributions (NDCs), are not included, unless they have been converted into explicit government policies or legislative acts.

Content analysis of framework laws

We performed a detailed textual analysis on a subset of framework laws and policies governing adaptation and climate-related disaster risk management in 100 countries chosen to represent a wide cross-section in terms of size, geography and income level. As overarching regulatory, supra-sectoral instruments, frameworks can provide insight into national governments' priorities and allocation of resources, and they have been shown to raise the likelihood of additional laws and policies being introduced (Fankhauser et al., 2015).

Frameworks include Climate Change Acts/Policies and Climate Adaptation Acts/Policies, for example.

In our analysis of framework laws and policies, we identified:

(i) the hazards (e.g. floods, heatwaves) explicitly mentioned in the documents

(ii) the planning and regulatory functions they include (see typology below)

(iii) references to international frameworks such as the Paris Agreement on climate change and the Sendai Framework for Disaster Risk Reduction.

Typology of functions applied in framework law analysis

The framework laws and policies were analysed by applying a high-level typology categorising the functions mandated by each of the frameworks. The typology was inspired by the 'NATO' typology for policy instruments (Hood, 1983, standing for nodality, authority, treasure and organisation), which we adapted and restructured with two aims:

(i) to enable observations of particular relevance to climate change practitioners, drawing from the authors' experience analysing climate legislation and policy data over several years

(ii) to enable useful and searchable categorisation of legislation and policy frameworks in the Climate Change Laws of the World database.

The typology consists of five broad categories of functions:

- **Capacity-building** (knowledge generation and dissemination, research and development, education and training)
- **Regulation** (standards and obligations, building codes, zoning and spatial planning, disclosure obligations)
- **Incentives** (taxes, subsidies)
- **Governance and planning** (creating bodies/institutions, designing processes, developing plans and strategies, assigning responsibilities to other levels of government, monitoring and evaluation)
- **Direct investment** (in public goods or social safety nets, provision of climate finance).

Gaps in coverage

Adaptation focus

Many of the national laws and policies included in our analysis explicitly address climate change adaptation. However, it is challenging to identify all laws and policies relevant to adaptation because of its "multi-sectoral and nebulous" nature (Persson and Dzebo 2019): for example, adaptation overlaps with disaster risk reduction frameworks and sustainable development. While best efforts were made to locate all adaptation-related laws and policies, some gaps may remain. We therefore recognise the study does not capture countries' full regulatory response to adaptation.

Local adaptation action

Adaptation action often happens locally (Di Gregorio et al., 2019). Therefore, while national-level analysis provides an important understanding of country-level adaptation priorities, important adaptation activities that occur at the local level and are not reflected in national policy may be obscured.

*Access the database at **www.climate-laws.org**

"Climate change information is commonly seen as a baseline requirement for being able to implement effective long-term planning and to direct resources towards adaptation activities"

slow-onset impacts like soil erosion are mentioned by 60 per cent. Ocean acidification, which has adverse effects on economies that are particularly dependent on the oceans (IPCC, 2019), is acknowledged by less than 10 per cent of the 100 countries.[1]

Functions in framework laws and policies

Of the 100 countries whose national framework laws and policies we analysed (see typology in Box 1), more than three-quarters include governance and planning arrangements and capacity-building functions. A smaller but still significant number include regulatory measures and investment in early warning systems, while only 10 explicitly include some sort of economic incentive: see Figure 1.

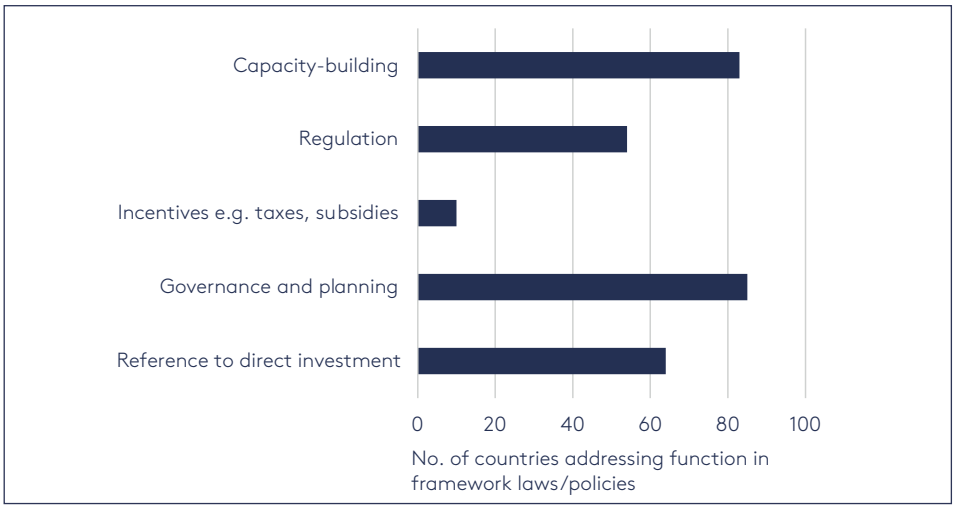
Capacity-building: knowledge

Generation of knowledge about climate risk across different sectors, through risk assessments for example, as well as generation of information on adaptation approaches and the sharing and dissemination of such knowledge, are the most common functions mandated or proposed by adaptation frameworks. These appear in the framework laws of 80 of the 100 countries analysed. Research and development, education and training and general capacity-building measures also feature strongly. This suggests that climate change information is commonly seen as a baseline requirement for being able to implement effective long-term planning and to direct resources towards adaptation activities, and that countries recognise the need to overcome constraints in accessing relevant, user-friendly climate and risk information (Jones, 2017).

Mandating further planning and establishing processes or institutions

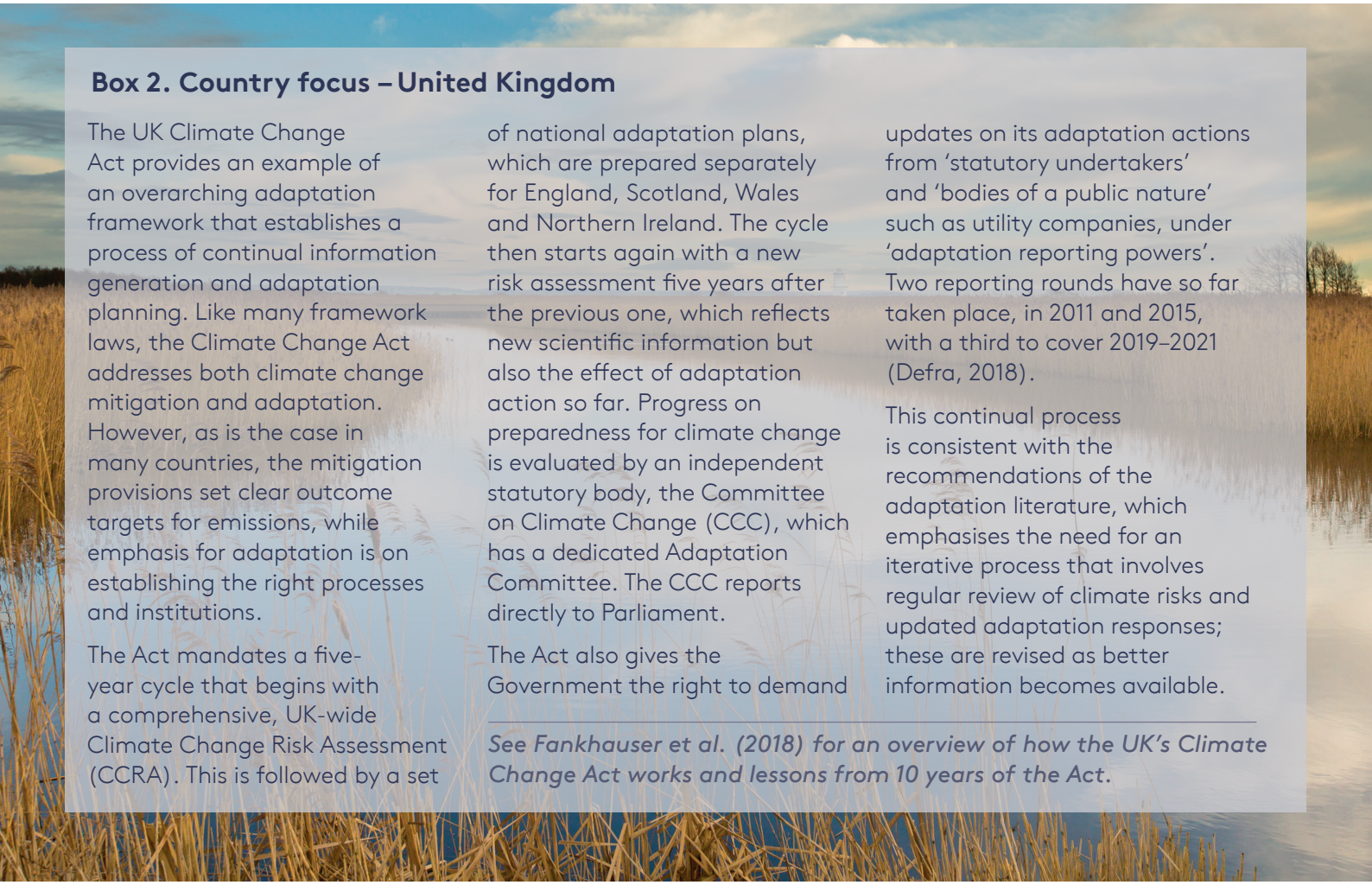
Two-thirds of the 100 countries have mandated that further adaptation planning be undertaken by national government ministries and/or local governments. More than half of the countries have established new processes such as regular reviews and updates of climate adaptation policy, and just under half have established monitoring and evaluation requirements for their adaptation activities. More than half of the countries have established new institutions designed to deal with adaptation (some covering both climate change mitigation and

Figure 1. Functions in the framework laws and policies of 100 countries[2]



1. Future research should map the hazards included in frameworks against the hazards projected to be experienced by individual countries. This analysis would have to take into consideration that currently, much of the data on climate vulnerabilities and impacts is self-reported by countries.

2. These 100 countries were chosen to represent a wide cross-section in terms of size, geography and income level (see Box 1).



Box 2. Country focus – United Kingdom

The UK Climate Change Act provides an example of an overarching adaptation framework that establishes a process of continual information generation and adaptation planning. Like many framework laws, the Climate Change Act addresses both climate change mitigation and adaptation. However, as is the case in many countries, the mitigation provisions set clear outcome targets for emissions, while emphasis for adaptation is on establishing the right processes and institutions.

The Act mandates a five-year cycle that begins with a comprehensive, UK-wide Climate Change Risk Assessment (CCRA). This is followed by a set of national adaptation plans, which are prepared separately for England, Scotland, Wales and Northern Ireland. The cycle then starts again with a new risk assessment five years after the previous one, which reflects new scientific information but also the effect of adaptation action so far. Progress on preparedness for climate change is evaluated by an independent statutory body, the Committee on Climate Change (CCC), which has a dedicated Adaptation Committee. The CCC reports directly to Parliament.

The Act also gives the Government the right to demand updates on its adaptation actions from 'statutory undertakers' and 'bodies of a public nature' such as utility companies, under 'adaptation reporting powers'. Two reporting rounds have so far taken place, in 2011 and 2015, with a third to cover 2019–2021 (Defra, 2018).

This continual process is consistent with the recommendations of the adaptation literature, which emphasises the need for an iterative process that involves regular review of climate risks and updated adaptation responses; these are revised as better information becomes available.

See Fankhauser et al. (2018) for an overview of how the UK's Climate Change Act works and lessons from 10 years of the Act.

adaptation actions) through their framework laws or policies. Within the 100 countries, we identified at least 15 national funds that direct finance either exclusively towards adaptation activities, or to both mitigation and adaptation.

About half of the 100 analysed countries explicitly delegate some responsibility for managing adaptation to local governments. This aligns with the local nature of climate impacts and adaptation action. For some countries devolution of responsibility for certain activities to local or provincial governments is enshrined in law. These countries may therefore not rely on their framework law to allocate responsibility. However, even in such instances there could be a role for framework laws and policies in clarifying responsibilities for sub-national governments as they relate to adaptation activities.

Further research in this area is required to understand to what extent this represents a gap in coordination between national and local levels or is addressed elsewhere. In other cases, the absence of devolution of responsibilities can be explained by a lesser need for such arrangements – for example in some small island states whose size would imply more control by central government.

Reliance on regulation over economic incentives to encourage adaptation

Only 10 of the 100 analysed countries explicitly include economic incentives such as subsidies for resilient technologies. This is in

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Box 3. Sector focus – flooding

In order to better understand the interplay of climate change adaptation and natural hazard management we conducted an additional in-depth analysis* of 127 flood-related laws in 33 flood-prone countries (the analysis captures only laws passed by legislative branches, not executive policies).

The analysis shows the reactive nature of law-making for flood risk, which usually happens only after a significant disaster rather than as a proactive intervention to reduce risk. For example, in the United States the National Flood Insurance Act of 1968 was passed as a result of the loss and damage caused by the Hurricane Betsy flood surge in Florida and Louisiana in 1965. In France, following serious flooding in 1981, a law was passed in 1982 to institute a new compensation system for natural disasters (Magnan, 1995). In Germany, the one-in-100-year flood of summer 2002 prompted the federal parliament to pass the Flood Control Act in 2005, which introduced nationally binding requirements for the prevention of future flood damage. In Indonesia, the tsunami of Boxing Day 2004,

In Indonesia, the tsunami of December 2004 led to the development of the Disaster Management law of 2007. This is one example of flood risk law-making occurring only after a significant disaster.

which caused tremendous loss of life and destruction of property and infrastructure in the province of Aceh, led to the development of the Disaster Management Law of 2007.

In terms of linking current and future risk management, only 7 per cent of the flood laws analysed contain a specific climate change focus: some of these laws emphasise the inclusion of climate change parameters in the flood and hazard-related policies and regulations in order to take account of dynamic future risks and resilience. These include the UK Flood and Water Management Act (2010) and the Indonesia Act on Meteorology, Climatology and Geophysics (2009). However, while climate change adaptation is increasingly recognised as a conceptual framework for flood risk management, the laws and legislation related to 'adaptation' and 'flood risk management' tend to be separate, which can lead to gaps in terms of institutional ownership and responsibility, and to separate budgets. This could also mean that investments in flood prevention might be based on current risk levels and underestimate future risk trends, reducing their effectiveness.

**This research was led by Sara Mehryar and Swenja Surminski and conducted under the Zurich Flood Resilience Alliance programme (ZFRA), investigating data from the Climate Change Laws of the World database, the Disaster Law Database of the International Federation of Red Cross and Red Crescent Societies (IFRC, 2019), and key informant interviews and expert discussions at country level.*

For more information on the ZFRA see https://floodresilience.net/.

line with IPCC's findings (2014) that despite economic incentives having the potential to flexibly and efficiently incentivise adaptation behaviour, such instruments have not been well explored apart from through risk financing instruments such as insurance. Fifteen per cent of the countries mention climate-related insurance schemes in their framework laws.

In contrast, more than half of the 100 countries include regulatory measures to incentivise adaptation: a quarter have adaptation-related building code requirements and around a third have relevant land use planning requirements. Given that land zoning and building codes are key instruments to increase resilience of infrastructure to climate impacts, these numbers were lower than expected. This may be because established legislative frameworks for building codes and land zoning already exist in many countries under environment and planning regulations. However, this gap might indicate that some countries have failed to update pre-existing codes and land use planning requirements in the light of climate change adaptation needs.

Only the UK and Guatemala include explicit risk disclosure obligations in their framework laws. Such obligations may be covered under other legislative frameworks. Nevertheless, this very small number indicates that disclosure of climate-related risk is not typically considered a climate change adaptation measure or that it is perceived to be sufficiently captured by knowledge-sharing

provisions. The recent wave of climate change-related litigation may cause this to change: court cases are seeking to hold corporations and investors to account for failing to disclose their climate risk (see Setzer and Byrnes, 2019).

Limited direct government investment in adaptation

A third of the 100 analysed countries make provision for spending on early warning systems, while only a fifth mention investment in other public goods such as flood defences in their framework laws or policies. While further research is warranted to determine the extent to which any adaptation investment is occurring at the local level or through other instruments, this gap supports the general recognition that countries are not investing enough into adaptation measures, and there is a role for national governments in rectifying this (Global Commission on Adaptation, 2019).

Only four of the 100 countries explicitly mention provision for social safety nets such as social protection or other welfare schemes in their frameworks. This may be because such instruments are typically broader than just climate change-related and may be more likely to be found within development-related frameworks. Twenty of the 100 analysed countries reference the need to give or receive international climate finance in their frameworks.

Linking to both climate change and disaster risk reduction frameworks

Responsibility for adaptation governance tends to be shared across multiple ministries. The ministries in question vary by country but are most commonly those responsible for emergency management and disaster risk reduction, agriculture, health, planning, finance, meteorology, education, science and research, foreign affairs, forestry, and environment.

Countries tend to associate their adaptation frameworks with both climate change and disaster risk reduction. For example, two-thirds of the 100 countries analysed refer to disaster risk reduction or disaster risk management, and seven of these explicitly mention the Sendai Framework on Disaster Risk Reduction. More than three-quarters of the 100 countries mention the United Nations Framework Convention on Climate Change and around a quarter mention the Paris Agreement.

Recommendations for policy and further research

In light of the urgent need for adaptation to the increasing impacts of climate change, we recommend that as a baseline all countries implement laws or policies aimed at addressing adaptation at the national level, to mandate adaptation activities across sectors and coordinate sub-national action. Framework laws or policies may be a useful tool to achieve this: even where specific adaptation activities are included in other sectoral or local laws and policies, frameworks can create the mandates that instigate local and sectoral adaptation action and play an important oversight role.

Within framework laws and policies there appears to be a gap in direct government spending on public goods and programmes to address adaptation beyond early warning systems. National governments should ensure sufficient resources, whether from their national budget or international climate finance, are allocated towards

"National governments should ensure sufficient resources are allocated towards implementing public goods such as flood defences and nature-based-solutions"

implementing other public goods such as flood defences and nature-based-solutions.

Further research could helpfully explore what adaptation activities are occurring at the local level that are not visible through national laws and policies, as well as the flows of knowledge, responsibilities and finance between the levels.

Further research could also examine if the limited reference to other instruments, such as building codes and land use planning, reflects gaps in these important regulatory tools, or if resilience standards have been incorporated into existing regulatory regimes not captured by this analysis.

Finally, national governments may be missing the opportunity to use economic incentives such as taxes, subsidies and other measures to encourage efficient and flexible adaptation, so these should be considered.

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