



Overcoming the barriers to climate change adaptation

As adaptation moves from theory to practice, there is growing recognition that barriers may make it difficult for individuals, businesses and governments to plan and implement adaptation actions. These involve a variety of issues, especially for long-term decisions, and include economic, political economy and governance challenges. Addressing these barriers is critical to advancing climate compatible development.

This guide highlights approaches that can help to overcome these hurdles. They include: the consideration of possible barriers from the start of the adaptation planning process; interventions to address market, governance and policy failures; the use of iterative adaptation approaches that allow learning from experience; and the integration (mainstreaming) of adaptation into development.

The guide draws from a review¹ of the barriers to climate change adaptation that was undertaken as part of a Future Climate for Africa (FCFA) research study. This study investigated the economics, political economy and behavioural science of long-term development decision-making and the possibility for integrating measures to deal with future climate change.

Introduction

Adaptation refers to actions to prepare for, or reduce the harm from, the effects of climate change. It involves a wide range of measures undertaken by multiple actors and at differential spatial scales (e.g. subnational, national and regional levels). However, delivering adaptation involves challenges, not least the need to decide whether and how to be proactive in anticipation of future climate change, an approach termed 'planned adaptation'.

Planned adaptation is important for future economic development. Indeed, policies and plans should actively account for the future climate in

decisions taken today. This is especially true for developing countries, where adaptation strategies need to be built into emerging development paths, especially given the current momentum of rapid growth, investment and urbanisation.

Planned adaptation can consider future climate risks in locating and designing infrastructure, urban and rural land-use planning, and in managing ecosystem resources such as water and natural systems. In all these cases, investment decisions made today have long lifetimes (5–40 years) and will be exposed to climate change in the future, thus the absence of early action may lock in future risks. There is therefore an opportunity to make these early investment decisions 'climate-smart' by considering future risks now and looking at early adaptation options.

Complementing this, there is also a need to start planning for long-term future climate change (40 years or more), and to start planning how to tackle any major climate risks. This involves early steps such as enhanced monitoring, research and capacity development, as these provide information and skills to enable future decisions. Such activities usually form part of iterative risk management strategies.

However, as adaptation moves from theory to practice and early experiences of practical adaptation are documented, there is a growing recognition that certain barriers make it difficult for individuals, businesses and governments to plan and implement adaptation actions. Addressing these barriers is critical to advancing climate compatible development.

About FCFA

Future Climate for Africa (FCFA) aims to generate fundamentally new climate science focused on Africa, and to ensure that this science has an impact on human development across the continent.

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What are the barriers to adaptation?

Barriers or constraints to adaptation include “formidable environmental, economic, informational, social, attitudinal and behavioural barriers”² These barriers can result in less efficient or less effective adaptation, missed opportunities and/or higher costs.³

These factors can make it difficult to make adaptation decisions or take action, even when it is apparent that some form of action is needed. While some of these issues are common to all public planning decisions, particularly for developing countries, others are unique to climate change adaptation – especially regarding decisions affecting the medium- to long-term future – and these make it difficult for organisations or individuals to act. Such factors include: uncertainty about future climate change scenarios or risks; the presence of market, economic, policy or governance failures; and various social and institutional barriers.⁴

Uncertainty

Future climate change is characterised by high uncertainty. This arises in a number of forms. First, at the current time, it is not clear what pathway the world is on in terms of future emissions, i.e. whether the average global surface temperature is going to rise by 2°C or 4°C. The ‘scenario uncertainty’ between these two pathways has significant implications for the level of adaptation needed. However, even if the future pathway was known, there would still be considerable uncertainty associated with the outputs of different climate models. Indeed, the range of projected change from alternative models is almost as wide as the scenario uncertainty and, for parameters such as precipitation, in some cases different models do not even agree on the direction of the

change (i.e. whether rainfall will increase or decrease in a certain place due to climate change). This uncertainty is a major barrier to medium- to long-term adaptation. It can delay or prevent decision-making. It may also cause some individual or institutional actors to choose ineffective adaptation options.⁵

More information about how to use climate models and interpret climate model results can be found in the two FCFA guides: *Climate models: What they show us and how they can be used in planning*⁶ and *How to understand and interpret global climate model results*.⁷

Market failures

Organisations, businesses and individuals who have the power and/or responsibility to make changes will generally take action when it is in their interest to do so; i.e. when the benefits to them outweigh the costs. However, an appropriate level of adaptation often does not occur.

One possible barrier is the presence of market failures (see box on page 3), which can arise for a number of reasons. These include a lack of information on future climate impacts; the difficulty of markets supplying or allocating ‘public goods’ for adaptation, such as large-scale flood defenses; a difference in access to information among different actors; and misaligned incentives.⁸ These failures prevent the market (businesses or individuals) from taking efficient adaptation action; they also prevent efficient market solutions. As a consequence, the value of adaptation is not reflected in market prices, nor in the returns an individual or firm receives, and the level of adaptation will be lower than the socially optimal or socially efficient level (i.e. the level that is ideal for society as a whole).

Examples include:

- The private sector or individuals will often not implement desirable levels of adaptation⁹ (e.g. for coastal protection) due to the high costs, a lack of incentives and the nature of the actors who receive the benefits. The presence of these market failures means there will be insufficient investment in adaptation, relative to the risks. This is also an issue in sectors where no markets exist, such as ecosystems.
- Organisations that lack access to information will not act appropriately. In this case, climate information is a public good; private actors tend to under-provide it and so there is a role for governments and public authorities to support its production and dissemination.¹⁰
- Sometimes an organisation or individual will take action that is motivated by self-interest, but it may increase risks or lead to negative impacts for others. For example, flood protection may shift risks downstream, and over-using limited water resources may lead to costs that will be incurred by others.

In such cases, governments have a role to play in advancing planned adaptation, as the market (or organisations or individuals) alone will not deliver an efficient outcome.

However, while the rationale for public intervention in planned adaptation may be clear, the form it takes needs to be carefully considered to avoid creating other economic distortions (e.g. by distorting underlying markets with subsidies). Public intervention therefore often focuses on creating the enabling environment or addressing barriers to adaptation, rather than taking direct interventions. This might include, for

Market failures: Information failures, public goods and externalities^{11,12,13}

Market failures are imperfections in market mechanisms that prevent the achievement of economic efficiency.¹⁴ In the adaptation context, a market failure exists when market prices do not lead to an efficient level of adaptation. There are a number of reasons why these failures arise.

Imperfect information is a market failure that exists because organisations and individuals do not have perfect information on future climate impacts, due mainly to the issue of uncertainty, as described above. This makes it difficult for them to plan efficiently.

Markets also have difficulty supplying and allocating certain types of products and services called 'public goods'. Examples of public goods for adaptation include large-scale flood defences, resilient critical infrastructure and information about climate change. Under-investment in these goods by the private sector is therefore a market failure, and leads to inefficient decision-making by users and those affected.

Climate change affects some areas, such as ecosystems, where no markets exist. While these areas have economic and social welfare value, their benefits are not included in market prices. Consequently, there are no financial incentives to invest resources in adaptation.

'Externalities' arise when a particular activity leads to impacts that are not directly priced into the costs of goods or services (the market). A classic example is pollution; for example, a firm might pollute water rather than manage its waste responsibly, reducing its own costs but increasing costs downstream for those that rely on clean water. In this case, the polluter imposes an external cost on others. In the context of adaptation, this type of market failure can arise in relation to a transfer of risk, but also from additional and related effects (e.g. energy use in air conditioning in response to higher temperatures may result in increased greenhouse gas emissions and poorer air quality). In such cases, there is a need for governments to intervene to ensure externalities are considered and factored into market signals or policy.

Additional market failures are relevant to adaptation. There is potential for a moral hazard when an organisation or individual does not adapt under the belief that someone else will deal with the impacts for them (e.g. as in the case of subsidies or government-backed insurance). There are underlying factors associated with the nature of market structures (i.e. monopoly, oligopoly or perfect competition), which affect ability and incentives for investment. Finally, in the management of physical assets, there may be misaligned incentives. An example is the uneven split of adaptation costs and benefits between property owners and tenants, which results in little or no incentive for owners to invest in making rented properties more resilient.



example, providing information to help investors make climate-smart decisions, or training and raising awareness to encourage the uptake of climate-smart agriculture.

Economic barriers

While simple financial constraints may limit adaptation, whether at the national or household level, there is a wider set of issues associated with economic barriers. A key characteristic of adaptation relates to the profile of

costs and benefits over time. In many cases, the most important impacts of climate change are likely to arise in the future – the 2030s and beyond. The benefits of adapting to these changes accrue over extended time horizons, while the costs may be incurred early on. When undertaking an economic or financial assessment, the timing of these benefits and costs is considered using a technique called discounting (see box on page 4). This effectively adjusts all values in all time periods

to put them in equivalent terms. However, a critical consequence of discounting is that future benefits from climate change adaptation in the medium term (20 years or more in the future) are very small when expressed in current terms, i.e. when compared in value directly to early costs. This, together with the high level of uncertainty involved, presents a major barrier to medium- to long-term adaptation efforts (such as the 5- to 40-year timescales).





Furthermore, there may be hidden costs of adaptation that may not be taken into account when planning. Adaptation often turns out to be more difficult and expensive to implement than anticipated, especially when compared with technical assessments. This can create an additional barrier to implementation.

The transaction costs involved with implementing adaptation represent one set of additional costs. These include the costs over and above the engineering costs of an intervention (e.g. in addition to the cost of building 1 km of sea wall or delivering 1 m³ of

irrigated water). There are further costs involved in implementing the option (e.g. promoting the uptake of a new agricultural method), or enforcing its use or protection (e.g. protecting a restored mangrove forest).

In addition, opportunity costs may be associated with some interventions to recognise the value of alternative uses of resources. For example, such costs are associated with the labour and land needed to implement some climate-smart agriculture methods,¹⁵ and high opportunity costs are often associated with the land relinquished for set-back zones or land-use planning restrictions.

Policy and governance failures

Policy failures occur when regulations or policies create barriers to effective adaptation.^{17,18} These failures can arise when there are conflicting or competing policy objectives – or a lack of clarity in the objectives – and there are no appropriate mechanisms for addressing the problem. Policy failures also occur when regulation creates market distortions (e.g. related to subsidies), which incentivise organisations or individuals to under- or over-adapt. These various issues all prevent the development of efficient policy solutions.

As adaptation is a fairly new theme in policy-making, the existing structure and/or regulatory policy framework may be poorly aligned to adaptation objectives. For this reason, policy issues are a particular challenge. Urban development objectives, for example, may not take into account the vulnerability of people and assets to climatic risks.

Governance failures occur when there is ineffective institutional decision-making and/or policy implementation.^{19,20} These failures constrain adaptation, creating barriers or slowing planning and delivery. In developing countries, governance failures are a particular problem, forming an impediment to fiscal planning and access to finance.

Furthermore, adaptation frequently involves cross-cutting themes; thus involving multiple actors and institutions with different objectives, jurisdictional authority and levels of power and resources. There is often a lack of coordination, clear leadership or mandate, with responsibilities being shared, and an environment of (internal) competition for resources and policy control.

Discounting

Discounting is a standard economic technique used to compare the costs and benefits that occur at different points in time. The concept differs from inflation. Discounting is based on the principle that people generally prefer to receive goods and services now rather than later. This is known as ‘time preference’. For individuals or the private sector, time preference can be measured by the interest rate on money lent or borrowed. However, society as a whole also prefers to receive goods and services sooner rather than later. This is known as ‘social time preference’ and it is factored into public policy appraisal. Different approaches can be used to derive these values and to derive a discount rate, which is then used to express all costs and benefits in consistent terms as ‘present values’ to allow a direct comparison during appraisal.

While the use of discount rates is standard practice, it has major implications for adaptation. It is a particular issue for interventions that incur costs early on, but that provide benefits only in the future, as (higher) discount rates reduce the value of longer-term benefits when expressed in current prices. This is a particular issue in sub-Saharan Africa, where high discount rates (or high borrowing rates) are typically applied; here governments, development partners and international finance institutions typically use a discount rate of 10% or higher.¹⁶ This significantly reduces the present value of future adaptation benefits, making it much more difficult to justify decisions taken today but able to deliver benefits only in a distant future.

Finally, these types of failures may be compounded by the problem of competing priorities, and the more urgent need to address short-term priorities rather than long-term climate risks. This problem is inherent in political terms and in medium-term (five-year) planning cycles. This is a particular issue since medium- and long-term adaptation delivers benefits by averting the risk of future damage, rather than generating more immediate and tangible benefits.

Behavioural barriers and constraints

Alongside the categories above, there is an additional set of behavioural constraints or barriers to adaptation that exist because individuals and organisations do not always make rational decisions.^{21,22} These barriers may manifest themselves as inertia or procrastination and can result in an inefficient or ineffective level of adaptation.

Behavioural barriers arise for a variety of reasons, which are often quite complex. Indeed, social, ethical, religious and cultural considerations will shape individual and societal norms and rules; these include risk perception and the management and allocation of resources. These same issues also affect the underlying importance that groups may place on scientific findings versus indigenous knowledge, or the value they give to different places and traditions. These factors may therefore constrain efforts to reduce climate risk or undermine preferences for efficient and effective adaptation.

Adaptation is associated with an additional challenge since people generally find it difficult to make trade-offs across time and between options with uncertain benefits.²³ This includes 'time inconsistency' between the short- and long-term decisions (see also the

box on discounting). It is also clear that when people make choices, their current reference point matters; notably, people dislike losing goods more than they like gaining them (this is termed 'loss aversion'). At the organisational level, this also makes it difficult to implement reforms and policy changes that transfer resources from one interested group to another, even if it will lead to overall societal gains.

Barriers to adaptation: Impact at sector level

The FCFA review of barriers to adaptation, on which this guide is based, included an analysis of the potential barriers affecting some of the priority areas for medium- to long-term climate adaptation thinking. The priority areas included:

- Land-use and spatial planning, which is important due to the long lifetimes involved (land-use planning typically locks in patterns of development for decades), and applies to urban areas, coastal zones and rural land use

- Critical infrastructure (e.g. public water supply, hospitals, wastewater treatment and bridges) and large hydro-electric power schemes or dams, due to the long lifetime of these investments and their importance in reducing wider economic costs from current and future extremes
- Natural resource management, using forestry as an example due to its long timescales.

The analysis found that all these areas involve multiple actors who can facilitate or hamper adaptation at different points in the decision-making process. It also found a range of barriers in each area, including a combination of uncertainty, market and policy/governance failures, economic and behavioural barriers, and that a combination of instruments is required to address these hurdles. The barriers were found to be both real and significant, and addressing them is therefore critical to successful medium- to long-term climate adaptation.



What can be done to overcome adaptation barriers?

Successful adaptation depends on addressing the significant barriers identified, especially when making medium- to long-term decisions. This section outlines several examples illustrating how such barriers may be overcome.

Planned intervention

Many market failures can be tackled by various forms of government intervention. Issues relating to public goods, externalities and non-market values can be addressed by ensuring these issues are included in policy appraisal, with a view to creating an enabling environment for private adaptation initiatives, and/or through the direct delivery of adaptation actions. This includes, for example, the explicit consideration of future climate risks in new investment appraisals (for an example, see the African Development Bank's climate safeguard system²⁴) as well as in national government medium-term development planning.

It also includes public investment in climate information to address information barriers. For example, there is an important need for the provision of public information on future climate change, recognising that climate information is a public good. The FCFA programme – with its investment in more robust projections of the future climate that will be made freely and openly available – provides a 'good practice' example of addressing this need using UK Government funds. It will be important to ensure that FCFA takes account of some of the other barriers highlighted in this guide to climate adaptation, especially uncertainty, to enable this climate information to be used in decision-making.

Iterative adaptation approaches

To address the issues of uncertainty and the economic barriers discussed above, there has been a recent shift to focus on the timing and phasing of adaptation. This has been captured through the development of frameworks²⁵ that emphasise early 'low-regret' options, decision-making under uncertainty and iterative climate risk management.

Low-regret options are interventions that address the impacts of current climate variability, while also building future resilience. They provide immediate benefits and thus address the uncertainty and discounting challenges described above (the economic barriers). Examples of low-regret options include weather and climate services, early warning systems, disaster risk management and climate-smart agriculture (sustainable soil and water conservation).

The use of decision-making under uncertainty²⁶ enables a climate-smart approach to be taken to early investment decisions with long lifetimes, such as large infrastructure. It uses climate risk screening and decision-support tools that emphasise how to address uncertainty and reduce lock-in. Examples include advancing adaptation that is more robust (i.e. that works well under multiple future scenarios, not just one), that builds flexibility into design to allow subsequent upgrades in the future (as risks emerge), or that uses diversification to protect against future uncertainty.

Finally, a focus on early planning and preparation for future major risks, as part of iterative adaptive management, can help to address policy challenges and information failures. Examples include early activities that provide information to improve adaptation decisions in the future and help to keep

options open (e.g. research, monitoring and piloting).

Integrating adaptation into development

The recent focus on mainstreaming may also help address some of the policy and governance barriers highlighted above. Mainstreaming is the integration of adaptation into existing policies and decision-making, rather than the implementation of stand-alone adaptation policies, plans or measures. For example, there is an emerging focus on mainstreaming climate change into national and sector development strategies and plans (five-year plans) as well as long-term vision documents.

There are a number of advantages. Mainstreaming aligns to the existing decision-making cycle and existing policy objectives, thus bringing adaptation closer to existing activities and building on current processes. By using existing development policies as the starting point, it aligns adaptation with existing institutional responsibility and mandates, helping to facilitate planning and implementation, while reducing policy and institutional barriers. An example is given in the FCFA case study on integrating climate information into decision-making in Rwanda's tea and coffee sectors.²⁷ Importantly, by building on underlying activities and budgets, mainstreaming can reduce some of the additional costs of adaptation (transaction and implementation costs), and has the potential to promote adaptation at a large scale.

Monitor and learn from experience

While these various aspects will help to address some of the adaptation barriers, the wide array of existing challenges documented in the review points to the need to develop solutions that are context-specific and tailored to the various actors involved in each decision.

It is also important to recognise that there will be differences in governance, ethical dimensions, equity and value judgments as well as diverse perceptions of, and responses to, risk and uncertainty. This further strengthens the need for continuous monitoring and learning to ensure effective adaptation.²⁸

Finally, the review considered the various priority areas for medium- to long-term climate adaptation (outlined above) and analysed them to identify how the various barriers could be overcome. In all cases, it was found that a range of approaches was needed, including supply-type solutions (e.g. changes in regulation, better integrated regulatory

frameworks, and clarity on the roles and responsibilities of different agencies), as well as demand-type solutions (e.g. more sustainable use of resources and services).

Conclusions

Drawing on the review and analysis, the overall conclusion is that addressing barriers is critical to successful climate change adaptation, especially for medium- to long-term decisions. There are ways to reduce or overcome these barriers; however, these issues need to be considered throughout the process of developing climate information, assessing risks, developing adaptation options and,

finally, implementing them. As a next step, it is a priority to develop guidance on how to identify and overcome barriers as part of standard climate change and adaptation assessments.

Further reading

This guide is based on a literature review²⁹ of long-lived policies, practical examples of long-term decisions, and barriers to long-term decision-making commissioned by the Future Climate for Africa programme. The literature review and a summary of its findings can be accessed at <https://tinyurl.com/ybmya98q>.

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About FCFA

Future Climate for Africa (FCFA) (www.futureclimateafrica.org/) aims to generate fundamentally new climate science focused on Africa, and to ensure that this science has an impact on human development across the continent. This guide was written by Federica Cimato and Paul Watkiss of the Global Climate Adaptation Partnership.

About GCAP

The Global Climate Adaptation Partnership (GCAP) (www.climateadaptation.cc/) is a consultancy specialising in climate adaptation. It has world experts on climate adaptation and operates through three main areas: knowledge-led consulting, training through the Adaptation Academy and online knowledge management services.



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