Irish Aid Climate Change and Development Learning Platform

Guidance note:

Integrating Climate Change into Development Programming

Table of contents

Contents

List of Acronyms

AfDB	African Development Bank
CC	Climate Change
CCFP	Climate change focal Point
COP	Conference of Parties
CSP	Country Strategy Paper
CORDEX	Coordinated Regional Climate Downscaling Experiment
CRM	Climate Risk Management
DAC	Development Assistance Committee
DfID	Department for International Development (UK)
EU	European Union
GHGs	Green House Gases
GDP	Gross Domestic Product
GCM	General Circulation Models
IA	Irish Aid
IIED	International Institute for Environmental Development
IISD	International Institute for Sustainable Development
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
LDCF	Least Developed Countries Fund
LAPs	Local Adaptation Plans
LAPAs	Local Adaptation Plans of Action
LDC	Least Developed Countries
M&E	Monitoring and Evaluation
MTR	Mid-Term Review
NAPA	National Adaptation Programmes of Action
NAPs	National Adaptations Plans
NGO	Non-Governmental Organisations
ODA	Official Development Aid
OECD	Organisation of Economic Co-Operation and Development
RCP2.6	Representative Concentration Pathways 2.6 watts/m2 (low scenario)
RCP8.5	Representative Concentration Pathways 8.5 watts/m2 (high scenario)
SDGs	Sustainable Development Goals
SCCA	Senior Climate Change Advisor
TAMD	Tracking Adaptation Measuring Development
TARI	Tigray Agricultural Research Institute
UNFCCC	United Nations Framework Convention on Climate Change
UKCIP	UK Climate Impacts Programme
WHO	World Health Organisation

Introduction: Policy framework and outline of the guidance note

The Government of Ireland has adopted ***The Global Island****: Ireland's Foreign Policy for a Changing World*. "Our world is changing faster than we think. This change can be seen in shifting balances of political and economic influence, a changing world economy, and in a widening range of global challenges that require global solutions. ….. Climate Change is a global environmental, development and security challenge. It acts as a catalyst exasperating tensions over land, water, food and energy prices and creating migratory pressures and threatening food and nutrition security and public health."

The Civil Service Renewal Plan proposes to support "the Government to make progress on major cross-cutting policy challenges (such as economic growth, homelessness, climate change, social exclusion) is dependent on our ability to fully join-up different parts of Government."

The United Nations Framework Convention on Climate Change (UNFCCC) held its 21st Conference of the Parties in Paris from 30 November to 12 December 2015. Following a period of intense negotiations the Paris Agreement was adopted, a legally binding agreement under the Climate Change Convention that was unanimously approved by all 196 Parties (195 countries plus the EU). Linking implementation of and building synergies between the Sustainable Development Goals and Paris Agreement on Climate Change will frame development programme planning for the coming years.

One World, One Future*: Ireland's Policy for International Development* – sets out in very clear terms what our goals and areas of focus are. Climate Change and development is a priority. "The majority of the world's poor are directly reliant on the environment for their survival. They are the worst affected by the global deterioration in environmental conditions caused by climate change and other factors….. Our efforts will be aimed at ensuring that developing countries, especially our Key Partner Countries, can develop in a way that is resource-efficient, climate resilient (protecting themselves from the risks of climate change) and low in carbon emissions."

Building resilience is a key part of our policy ***One World, One Future*** and **the *Framework for Action*** for *One World One Future*. Resilience is defined as 'the ability of people and communities, as well as countries, to withstand setbacks such as extreme weather events like flooding, an outbreak of violence, or an unexpected dip in income. Being resilient means you are better prepared, better able to cope, and better placed to recover'. Building climate resilience in poor households and communities will contribute to achieving outcomes 2, 3, 4 and 5 in the Framework for Action.

This guidance note sets out the reasons for and the ways to integrate climate change into development programming. It is important to note that climate change integration extends beyond assessing the environmental impact or carbon footprint of our work. At its core, it is about future proofing our programmes and policies on the basis of available information and projections. Importantly, we do this in order to secure future livelihoods for people we work with in some of the most fragile places on the planet.

The first section of this guidance note is a standalone briefing that introduces the main theme of integrating climate change into development programming focusing on how Irish Aid and partners can set out to achieve this. The subsequent sections are more technical and set out the best ways to assess and then address climate change risk and vulnerability in development programming. A summary table in the first section and a technical narrative in section 3 show how climate change can be integrated into the Irish Aid Country Strategy Paper (CSP) cycle. This can be adapted to other programming and planning cycles. The final section proposes how to assess the success of climate adaptation investments in terms of developmental outcomes. Annexes provide additional information.

Section 1. Synthesis of the guidance note

Ireland has an international commitment and high level policy (*'Global Island'* and *'One World One Future'*) to address climate change through international development. Ireland focuses on climate adaptation through climate relevant ODA to least developed countries.[1] This policy response seeks to address climate challenges by promoting a balance between the social, economic and environmental aspects of development. The two performance targets in Irish Aid's Framework for Action 2015-2017 are relevant in this:

- FFA 3.1 Ireland's development cooperation programme **incorporates climate change priorities** (which effectively contribute to international engagements and meeting Ireland's climate change commitments)
- FFA 3.2 Irish Aid programmes supports partner **governments and communities to become more resilient** to and better prepared for the adverse effects of climate change

This guidance note sets out the reasons for and the ways to integrate climate change into development programming. This opening section discusses why integrating climate change adaptation into development programming is now critical and unavoidable. A summary table and narrative show how climate change can be integrated into the Irish Aid Country Strategy Paper cycle. And ways to assess the success of climate adaptation investments in terms of how they keep development on track despite climate effects are suggested.

This section can be read as a standalone document. It acts as an introduction to the subsequent, more technical parts of the guidance note.

Policy pointers

- The overwhelming scientific consensus is that greenhouse gas emissions are causing global warming, and that by 2100 global average temperatures will rise between 2 to 7^{o}C, and there will be significant rainfall changes. Development in poor countries is most at risk.
- Climate change risks jeopardise the successful achievement of the Sustainable Development Goals (SDGs) in many parts of the world.
- Irish Aid's work on food security and nutrition, smallholder agriculture, social protection, inclusive economic growth, education and health are all sensitive to climate change effects and we need to address them.
- Vulnerable groups with less livelihoods options, especially women, children, the elderly and infirm, will need support to adapt to climate effects before these cause greater poverty.
- Irish Aid can support governments in partner countries that are developing policies and programmes to enhance the climate resilience of the poor.
- Climate resilience through adaption, and potentially linked to green growth, is a critical way to ensure environmental, economic and social dimensions of sustainable development.

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[1] Ireland's statement at the Finance for Development meeting in Addis Ababa, July 2015 https://www.irishaid.ie/news-publications/speeches/speechesarchive/2015/july/minister-sherlock-finance-for-development/

Climate change effects on development

Climate change is real and its effects will escalate towards the end of this century. Emissions of greenhouse gases (GHG) are causing global warming that will have long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts on people and ecosystems.[2]

Climate scientists agree that GHG emissions are likely to lead us to global average temperature rises of between 2°C and 4°C by 2100. Rainfall increases will occur in some locations by up to 30%, and rainfall reductions of 10% to 20% will occur in southern Africa, Amazonia, Mediterranean and parts of Australasia[1]. Climate negotiations in Paris in December 2015 sent a strong signal to all actors to make the transition to a low carbon, climate-resilient future. Intended Nationally Determined Contributions submitted in advance of the Paris negotiations cover 96% of current emissions and, taken together and if fully implemented, would limit a global temperature rise to below 3 °C however climate change will still impact development even if current commitments are met. Different economic estimates highlight that the costs of not addressing climate change to some economies at between 5% to 10% of GDP annually.[3] This is enough to arrest development for the poor and in fragile states, current gains could be lost entirely.

We also know that (i) the effects of climate change will vary considerably by region (ii) they will vary by population group; the most marginalized and vulnerable will be affected most and (iii) these effects are complex, requiring planning and action that will need to be multidimensional. The Brookings Institute notes that people and particularly children living in poverty in underdeveloped countries with weak governance and poor education systems are the hardest hit by climate change. This will have implications for migration, stability and security at local, national, regional and global levels.

Detrimental effects of climate change can be felt in the short-term through natural hazards, such as landslides, floods and hurricanes; and in the long-term, through more gradual degradation of the environment. The adverse effects of these events are already felt in many countries, particularly in agriculture and food security; biodiversity and ecosystems; water resources; human health; human settlements and migration patterns; and energy, transport and industry.

In many of these contexts, women are more vulnerable to the effects of climate change than men—primarily as they constitute the majority of the world's poor and are more dependent for their livelihood on natural resources.

Women and men in rural areas in developing countries are especially vulnerable when they are highly dependent on local natural resources for their livelihood. Those charged with the responsibility to secure water, food and fuel for cooking and heating face the greatest challenges. Secondly, when coupled with unequal access to resources and to decision-making processes, limited mobility and communications places women in rural areas in a position where they are disproportionately affected by climate change. It is thus important to identify gender-sensitive strategies to respond to the environmental and humanitarian crises caused by climate change.

The humanitarian toll of climate-related disasters is already on the rise. There has been a fivefold increase in the incidence of natural disasters since the 1970's. Current projections are for the situation to worsen. More severe and potentially more destructive storms, floods and droughts are expected. In Africa alone upwards of 7 million people are likely to be impacted by approximately 150 disasters each year. Prevention is more effective than response.

[2] www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_summary-for-policymakers.pdf
[3] http://www.worldbank.org/en/news/feature/2011/06/06/economics-adaptation-climate-change

The poorest and most vulnerable are at greatest climate change risk. Smallholder farmers dependant on rain fed agriculture for family livelihoods are particularly vulnerable. Current exposure to climate risks indicates future indicates increased future exposure for the next generation will happen.[4] To illustrate the severity and perniciousness of the effects of climate-related events, the Box below shows the effects of Climate Change in some of Irelands Key Partner Countries in Africa.

[4] http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8633.pdf

Box 1. Climate Change effects in some Key Partner Countries

Climate Change Effect	Country Evidence
Increased temperatures result in lower crop yields due to higher rate of evapotranspiration and water deficits, increases in maximum temperatures reduce yield through heat stress, drought results in reduced crop yields increased incidence and range of pests and diseases, extreme weather events cause flooding, land degradation, erosion, and crop loss. Increased prevalence of vector-borne diseases (e.g., malaria, dengue), increased risk of malnutrition due to decreased food availability, ill health due to reduced access to clean drinking water	Climate change in Ethiopia is bringing changes in precipitation patterns, rainfall variability, and temperature, which increase the frequency and occurrence of floods and droughts. Negative climate impacts affect crop and livestock production leading to negative effects on food security, food shortages, undermining the availability of clean drinking water and increasing incidence of malaria in areas of the highlands where malaria was previously not endemic[5]. Children aged five or less in drought-prone areas are 36% more likely to be malnourished and 41% more likely to be stunted if they are born during a drought year. This translates into some 2 million 'additional' malnourished children.
Damage and losses to livelihood assets, straining of traditional coping systems, increased debt burden and long-term poverty alleviation efforts are undermined, reduced investment and repeated shocks in areas vulnerable to climate undermines economic growth	According to the World Bank climate profile of Malawi, the average annual temperature in Malawi is projected to increase by 1.1 to 3.0ºC by the 2060s. Rainy seasons are tending to grow shorter which leads to repeated undermining of food security. Malawi relies on rain-fed agriculture and is particularly prone to adverse climate hazards including dry spells, seasonal droughts, intense rainfall, ravine floods and flash floods. Floods and droughts are the leading cause of chronic food insecurity which is endemic in many parts of the country. The World Bank refers to estimates that droughts, on average, cause GDP losses of almost 1% every year with much greater losses for extreme droughts (World Bank, 2014). Droughts and floods caused by climate shocks reinforce and perpetuate wider inequalities based on income, gender and other disparities. In Malawi, children are routinely taken out of school to engage in income-generating activities to supplement income during times of drought.
Higher temperatures and drought lead to increased incidence of forest fires, changes in temperature and precipitation can cause changes in flora and fauna ranges and potential losses of biodiversity, extreme weather events can damage coastal ecosystems, coral reefs and mangroves and sea level rise increases erosion, flooding and saltwater intrusion in aquifers.	In Mozambique the projected rate of warming is more rapid in the interior regions than the coastal areas. The dry season is becoming drier and longer across the country leading to decreased soil moisture before the main cropping season starts (INGC, 2009). Tropical cyclones are generally expected to increase in intensity and frequency. Generally, the climate is becoming more extreme, with hotter drought spells and more extreme floods. Furthermore, Mozambique's coastal regions are likely to be impacted by sea-level rise, and salt water intrusion is common in costal regions for dozens of kilometres inland adding to water stress in costal districts.

Source: evidence from Irish Aid programmes. UNDP and Human Development Report 2007/2008.

[5] Ethiopia's National Adaptation Programme of Action,

Climate change will both intensify existing hazards and lead to the emergence of new hazards that can impose risks to development. Medium term consequences of climate change for Sub-Saharan Africa are grave. Within 25 years the World Banks states that sub-Saharan Africa will experience:

- Increased under-nutrition resulting in increases in moderate and severe child stunting;
- Less than 15 percent of current crop land will support maize, sorghum and millet production;
- Projected crop production increases will be checked by temperature and rainfall changes leading to reduced food supply per capita of approx. 15 percent;
- 50 to 70 percent reduction in groundwater recharge in southern Africa, 20 to 30 percent increase in some parts of east Africa;
- Significantly reduced protein availability, economic and job losses from effects on marine fishing;
- 10 to 15 percent of sub-Saharan plant and animal species will become extinct;
- Unusual heat extremes over 45 percent of land area in summer months;
- Severe drought risk in southern and central Africa;
- Increase in arid and semi-arid land area of 3 per cent;
- Sea level rise of between 60 to 80cm;

WHO anticipate increased health risks including undernutrition, diarrhoea, vector-borne disease and heat extremes. Increased interruption to schooling is also anticipated.

In its recent Fifth Assessment Report the IPCC generated a long list of adaptation options for managing different types of climate risks – this is summarized on page 23.

The UN Framework Convention on Climate Change (UNFCCC) has put in place various actions by countries to address climate effects on development. Box 1 summarises these.

Box 1. Actions under the UNFCCC

Adaptation – actions taken to avert the effects of climate change on people, ecosystems and economies.
Mitigation – actions to reduce the emissions of and to sequester greenhouse gases.
NAPA – national adaptation programmes of action. Generated by all LDCs between 2001 and 2014.
NAP – national adaptation plans. All countries are encouraged to develop these now.
INDCs – intentional national determined contributions. All KPCs have prepared these and will up-date them on an iterative basis following the UNFCCC Conference of Parties in December 2015. They set out what the country will do in terms of mitigation and adaptation actions. See http://unfccc.int/focus/indc_portal/items/8766.php

Ireland's policy response

Ireland's foreign policy "the Global Island"[6] prioritises addressing Climate Change. Ireland's policy on international development *One world, One Future"*[7] makes clear that it's three policy goals require the integration of climate change into development programming (see Box 2 below). The 2030 Agenda - Sustainable Development Goals and the Paris Agreement on Climate Change are intrinsically linked and development policy frameworks and programme planning recognise that we cannot achieve any of these goals without addressing climate change in ways that prioritise good governance, eliminate

[6] https://www.dfa.ie/media/dfa/alldfawebsitemedia/ourrolesandpolicies/ourwork/global-island/the-global-island-irelands-foreign-policy.pdf
[7] https://www.irishaid.ie/media/irishaid/allwebsitemedia/20newsandpublications/publicationpdfsenglish/one-world-one-future-irelands-new-policy.pdf

hunger, secure local ecosystems, strengthen resilience and create inclusive economic growth as part of sustainable development.

Box 2. Climate change and OWOF goals in developing countries

- Reduced hunger, stronger resilience – the food security of subsistence farming households and many of the rural poor depends upon adapting food production to increasingly variable rainfall, rising temperatures and increasingly severe extreme weather events. The resilience of poor households depends all too often upon their ability to protect their assets in the face of current and future extreme events and climate-related disasters.
- Sustainable development, inclusive economic growth – pathways toward the eradication of extreme poverty need to be climate-proofed so gains are not reversed by the effects of climate change on job creation, the delivery of social protection and primary and public health services. The benefits of economic growth (increased incomes, tax revenues etc.) can be used to build the resilience of local and national economies to external stressors including climate change effects. But there are inequities in the distribution of benefits. In many growing economies there is little evidence that the poor are becoming more resilient.
- Better governance, human rights and accountability –climate responses require the active engagement of Least Developed Countries in global negotiations. Civil society in developing and developed countries need to be heard and brought in by governments as partners in addressing climate change and downward accountability. The climate vulnerable, often the most marginalised in society, need to be recognised as priority stakeholders that identify climate solutions, as well as being the main beneficiaries of the redistributive processes that better governance and accountability can bring about.

To support this work Irish Aid has partnered with International Institute for Environment and Development (IIED) to set up the Climate Change and Development Learning Platform which focuses on relating country level engagements to international policy frameworks. The Learning Platform includes a training programme to increase Irish Aid staff and partner's capacity to incorporate climate change into development programming and improve tracking and reporting of climate change activities. The Learning Platform comprises workshops, field visits, documentation and publication of case studies, a web-based component for gathering and sharing learning, dissemination of key lessons to inform international climate change dialogue.
http://www.climatelearningplatform.org/user/login?destination=home

Assessing and addressing climate change risks in development programming

Integration means routinely considering climate change risks in development planning. This might be in the design and implementation of development interventions (including plans, strategies, policies, laws, programmes and projects) that are 'climate-sensitive' i.e. affected by climate risks, or 'climate-relevant' i.e. helpful in addressing climate risks. This is done by identifying and addressing the risks while availing of the opportunities associated with climate change. For each risk, it is important to assess the impact on the poorest and most vulnerable, with particular regard to the impacts on women, the elderly and those with disability and the role that women have as agents of change.

Our ability to manage climate risks has to increase ahead of the rise in climate challenges to development, in order to ensure development gains are met in a sustainable manner. As climate risks escalate, specific adaptation actions will be needed in addition to development. Figure 1 below shows how different levels of climate change adaptation can evolve from a project and systems to a more strategic level to meet the challenges posed.

Case Study Ethiopia

Ireland's programme in Ethiopia has set about integrating climate change into development programming in Tigray. The climate change and development learning platform prioritised learning from the Tigray programme and this case study includes how climate is integrated into agricultural research in support of climate adaptation by smallholder farmers. In summary the case study found evidence that:

- Inter-annual climatic variability is increasing and there are demonstrable trends toward warming and drying, particularly in the short rainy period of the year.
- Soil and water conservation measures have been very effective in creating better conditions for agriculture and as a precursor for the adoption of improved varieties of crops and livestock.
- The Tigray Agricultural Research Institute (TARI) Operational Research initiative has provided improved crop varieties and livestock breeds that farmers want to adopt. Although these technologies have higher costs of implementation than traditional, returns are greater in terms of yields even in less favourable seasons.
- Widespread adoption of new technologies has contributed to greater productivity and food security for a large proportion of the population during a period of increased climatic variability.
- The longer term effectiveness of climate adaptation through agricultural technology adoption faces challenges of increasing climate risks, uncertainty on the sustainability of groundwater extraction for irrigation, and the compatibility of productivity versus climate resilient technologies.

Case study Tanzania

The impacts of climate change are posing a direct threat to pastoralists and agro-pastoralists in the arid and semi-arid lands of Tanzania. Increasing variability of rainfall, rising temperatures and seasonal uncertainty are increasing the level of risk posed to communities and the plans of district and national government. These impacts are exacerbating inequalities already inherent in the institutional, legislative and policy environment for pastoralists.

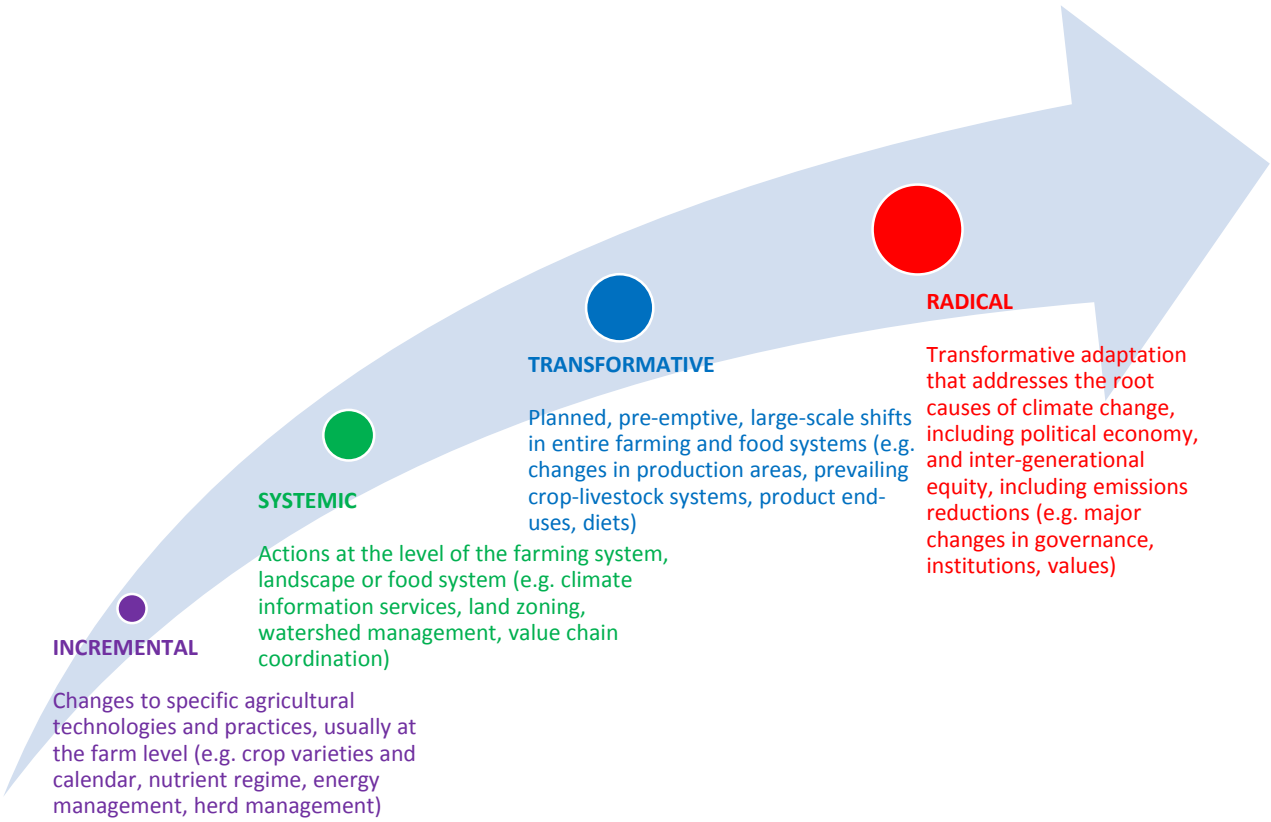
The climate change and development learning platform completed a study of three projects in Tanzania that seek to enhance climate risk management and build adaptation capacity in areas dominated by pastoralist livelihoods. The case study found evidence that:

Village land use planning has a rapid impact. Land use planning segregates areas for farming, grazing, settlements and other uses. In doing so, it designates areas in which pastoralists can manage and plan resource use using customary institutions. Land use planning coupled with legal ownership can be a powerful combination.

The district authority is the most effective entry point for climate risk management. The largest strides in mainstreaming climate change and developing climate risk management have been made when the district council has been included. Capacity building of district officials through training, dialogue, or facilitation of discussions about resource use has enabled district councils to provide improved services to pastoralists.

The community as an entry point offers quicker short-term positive outcomes. However, these quicker outcomes come at the cost of minimal progress on integrating climate risk into planning in the long run.

Figure 1. Types of climate adaptation - moving from incremental to radical



Currently most of Irish Aid's work on climate adaptation is **incremental** and supported through projects at the local level with some support at the national level for strategy development. Changes are made to specific technologies, practices, infra-structure and livelihoods. For adaptation to be effective it needs to be scaled out becoming systemic through actions at the level of the farming system, landscape or food system including: climate information services, land zoning, watershed management, value chain coordination, etc.

As climate risks escalate incremental changes to business as usual will not suffice. When perceptions of escalating risk are clear and shared more widely, including higher level public sector authorities, so climate adaptation can transform and be **transformative**. This is achieved through planning, pre-emptive action based on projections of climate change and risk assessments, resulting in larger-scale shifts in entire livelihood and economic systems.

However, we may need to do radically more to ensure that development is inclusive of the marginalised and vulnerable. **Radical** adaptation addresses the root causes of climate change, including the political economy of why groups are marginalised and particularly climate vulnerable. Social, economic and political constraints often result in women's unequal access to and ownership of resources and exclusion from decision-making processes.

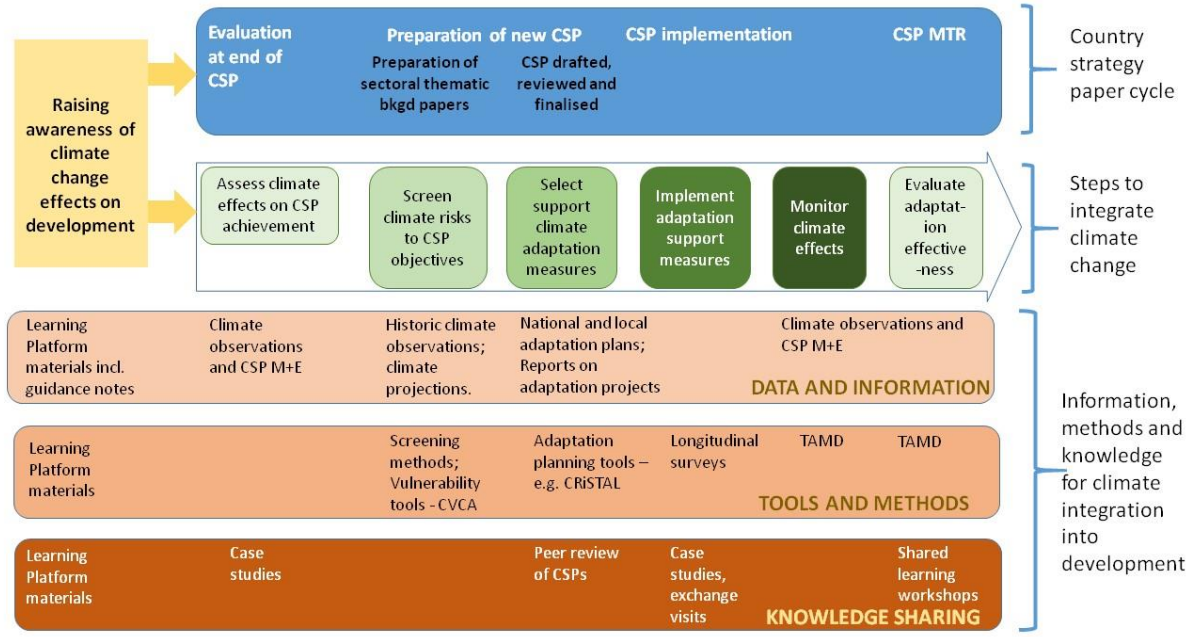
It also addresses issues of the inter-generational equity of climate change effects through emissions reductions.

Table 1: Steps and capacity needed for integrating climate change into development programming

Steps for integrating climate adaptation into development programming	Capacity required
1. Selecting entry point	• Understanding of the ways in which climate effects impact on development • Understand at what level actions occur: national, sectoral, sub-national, local
2. Identify, assess and screen current and future climate risk a. Climate risk screening b. Climate vulnerability assessment c. Assessing future climate risks and vulnerability	• Understand climate risks • Review climate vulnerability assessments and climate risk screening • Assess strengths and weaknesses of climate projections information.
3. Climate adaptation options identification and selection	• Assess climate adaptation options
4. Adaptation design	• Build adaptation options into the design of the development intervention
5. Implementation	• Standard results-based programme management
6. M&E: assessing adaptation effectiveness	• Identify/weigh up/select options for effectiveness assessment • Use TAMD tool for tracking adaptation while measuring development.

Applying the integration steps above, Figure 2 below provides an overview of how the above steps of climate adaptation can be integrated into the Irish Aid Country Strategy Paper (CSP) cycle. It shows the CSP cycle, the integration steps and suggested data and information sources, tools and methods and knowledge sharing to build climate competence. This can be applied to partners and other units in Irish Aid.

Figure 2. Climate adaptation integration into development programming through the CSP cycle.



Assessing adaptation success[8]

The success of adaptation as a means to address climate risks to development needs to be measured in terms of the developmental outcomes achieved through adaptation investments. Donors and agencies including Irish Aid are beginning to make large investments in climate change adaptation. To plan, implement and track the interventions requires robust assessments of the expected and actual returns. We need to know whether adaptation is keeping development on course and whether the adaptation costs and benefits are distributed equitably.

Judging an intervention's overall efficacy needs a mix of efficiency and effectiveness indicators. Importantly, most climate adaptation evaluation frameworks assume that adaptation can and will counter-balance climate change impacts, so that development programmes meet their original targets.

But this underestimates the transformative changes — beyond keeping 'business-as-usual' on track — that will be needed as climate change effects escalate, and it risks overlooking successes in reducing impacts that cannot be entirely countered.

Results frameworks for climate adaptation tend to focus largely on the interventions' efficiency — that is, outputs achieved from various inputs, often expressed as costs and benefits. Policymakers need frameworks to assess the effectiveness of climate change adaptation interventions in terms of their outcomes (effects of outputs). These frameworks need to focus on how well the outcomes achieve the proposed intervention objectives in comparison with other funded interventions and whether they address climate change directly or indirectly.

Using project targets to set monitoring and evaluation indicators can miss opportunities for learning about adaptation. At this moment in time, where interest in adaptation is awakening and we have the opportunity to try out adaptation strategies before more severe climate change effects prevail, we need to employ evaluative methods that emphasise learning from successes and failures.

The Tracking Adaptation Measuring Development (TAMD) framework provides a robust, tested approach to assessing how adaptation contributes to development and how development

[8] Please refer to: http://pubs.iied.org/pdfs/17143IIED.pdf and http://pubs.iied.org/pdfs/17257IIED.pdf

interventions enable adaptation to climate effects. TAMD generates evidence for learning. Its use in the Climate Change and Development Learning Platform case studies is described in the accompanying technical paper.

http://www.climatelearningplatform.org/tracking-adaptation-and-measuring-development-manual-local-planning

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Conclusions

It is more widely recognised now that climate change caused by global warming will affect the poorest and most vulnerable people most, and it will challenge the success and effectiveness of international development.

Climate adaptation will need to be consistent with the climate change challenge and we know that climate change effects will escalate over the next few decades.

Ireland has made a policy level response and is beginning to follow this with investments through development programming that address climate vulnerability e.g. the support to agricultural research in Ethiopia that generates technologies for smallholder farmers that need to adapt.

Responsive programming of international development investments requires that all risks are assessed and addressed. Irish Aid is committed to building resilience and managing risk in all its partnerships. The technical paper that accompanies this briefing sets out how climate risks can be assessed and addressed through adaptation and the developmental effectiveness of that adaptation evaluated.

Section 2. Climate risks to inclusive economic growth

Climate change related shocks and trends do impact on livelihoods. The vulnerability and resilience literature has used sustainable livelihoods approaches concentrating on individuals and households framework to assess climate risks effects. This has led to a focus on community based adaptation mostly rural focussed as a response. This is the most usual approach but is it the most useful? It focuses on tackling barriers to autonomous action at household or community levels. But there are inevitably limits to what households, communities and firms can individually do to adapt. And, there may be negative spill-over effects from some people's or communities' adaptation.

A more macro and economic perspective assessment of trends reveals evidence of climate related impacts on economic growth but causality is not easy to irrevocably prove. Although, many econometric cross country studies find a correlation between economic growth and weather variables. There is mixed evidence on climate-related shocks and GDP growth in developed countries. More consistent findings are found in developing countries and evidence is better at sectorial levels e.g. impacts on agricultural production, industrial production and human health.

For Irish Aid, however, it is essential to assess and understand the impact of climate change on the inclusiveness of the economy – the extent to which poor and vulnerable people have access to economic activity that can provide them with growing and sustainable livelihoods. This means assessing the climate change impacts on the sectors and subsectors of the economy, and on the specific economic activities within them, from which poor people derive for their livelihoods.

The resilience of livelihoods is a fundamental driver of inclusive growth – it protects and maintains assets, productive capacity and incomes. Adaptation of livelihoods systems, particularly agricultural and natural resource related production, is critical for economic inclusion. For household economies to grow they must be based on livelihood technologies and production systems that are increasingly resource efficient and resilient to climate change. Adaptation to climate change must be a central part of overall technology development and productivity enhancement. While much of this type of adaptation is focussed at local level, economy-wide measures are also essential and need to be designed specifically to increase economic opportunity for poor and economically marginalised people. Technology development, eg in renewable energy, offers huge opportunities for greater inclusion. Climate programmes should be designed to maximise and realise these opportunities.

The economic transformation required to respond to climate change must also be used to make local and national economies more inclusive and accelerate poverty reduction. This requires a public policy and investment approach to climate resilience that focusses resources and opportunity on poor people and their capacities.

Although direct climate change effects are important, there is also the need to understand how indirect effects transmit through local to national economies affecting other households and firms. Indirect effects may occur through harmful rises in food prices etc. Transmission mechanisms by which climate shocks are transmitted through an economy are an important component of managing climate risks to development. There could be scope to manage climate risks blocking the transmission of a negative climate effects.

The benefits of economic growth (increased incomes, tax revenues etc.) can be used to build the resilience of local and national economies to external stressors including climate change effects. But there are inequities in the distribution of benefits including increased resilience from economic

growth. Responses to climate change will not automatically benefit the poor, there are both opportunities and risks for the poor. In many growing economies there is little evidence that the poor are becoming more resilient. In addition there are issues as to the sectorial composition of growth. Are the new industries resilient and do they contribute to the resilience of people and local economies? There are implications for both programming to support adaptation and resilience of poor people. Hence the importance of tracking national policies and use policy dialogue to engage with these[9].

The geography of growth and resilience is also important. In Africa the majority of fast growing cities are on the coast and here climate related effects such as storm surges, sea level rise, salt water incursion into aquifers etc. challenge their resilience.

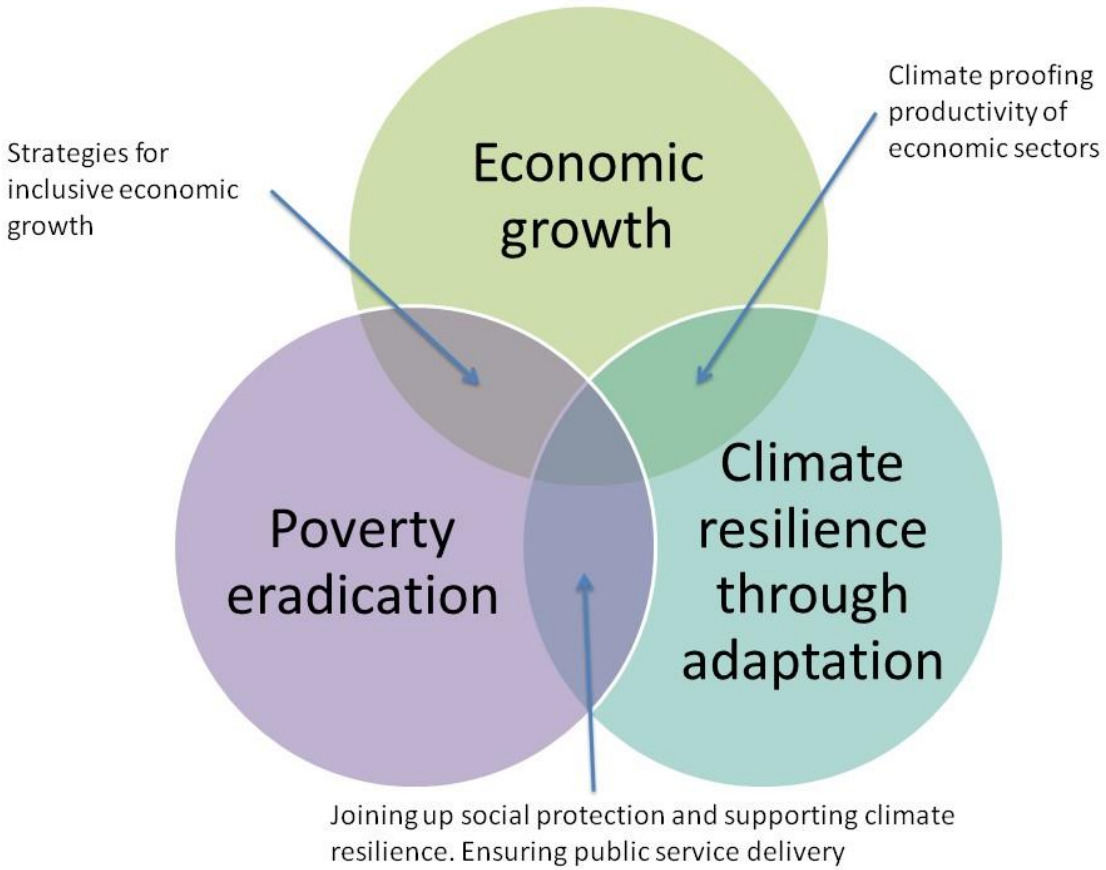
Previous GHG emissions have locked certain changes into the climate system so while we have limited scope to mitigate (change and/ or ameliorate) climate impacts to 2040, we know that the cost and human impacts are not just a function of the climate effects but also are determined by the patterns of development upon which they impact.

Climate change represents a direct threat to poverty reduction. This is because the poor are already the most at risk from climate-related stressors and shocks as they have the least ability to cope with negative change and recover from a shock when it hits. They frequently live on the most vulnerable land and are disproportionately at risk from the effects of droughts, floods, landslides, extreme weather and food insecurity. Social protection measures are increasingly seen as appropriate and efficient instruments for delivering aid flows in support of climate change adaptation and for cushioning the impact of crises on vulnerable groups. Social protection programmes can be built up incrementally. Evidence on impact shows that even small and local programmes produce positive benefits. It is key that implementation plans are effectively tailored to country contexts and to the needs of the poorest. Integrating climate vulnerability assessment into social protection targeting systems is key to assuring that the poorest and most vulnerable people are better able to manage climate risks and respond to negative climate related crises.

Developing countries are not just passive victims of climate change and have some scope to avoid some climate impacts by changing their patterns of development and investing in social development policy measures that contribute to inclusive growth, social protection and climate resilience. The diagram below illustrates a combination of policy measures that developing countries can use and development agencies such as Irish Aid can support.

[9] This Guidance Note should be read in conjunction with the guidance provided by Inclusive Economic Growth which informs our approach to integrating climate change into development programming.

Diagram 1: Social development measures for inclusive growth, social protection and climate resilience.



Section 3. Integrating climate adaptation into Irish Aid programming

Both increases in climatic variability and climate change can cause negative effects on development. Climate scientists tell us that increased variability in the climate system is a pre-cursor of climate change. Climate variability is widely reported across Irish Aid's key partner countries and includes erratic rains, prolonged dry spells in the planting season, periods of intense rains mid-season causing flooding, more frequent El Niño effects, etc. Adapting to increased climatic variability is a good way to increase adaptive capacity ahead of the escalation of climate change effects.

There are different ways to understand climate variability, the most useful is to examine historical records of climate observations where they are available. Patterns in climate observations can be detected and these can correlated with what climate models project as probable trends in climate change.

So by integrating climate adaptation into development planning both climatic variability and climate change are taken into account.

Figure 2, in the introduction provides an overview of how climate adaptation can be integrated into the Irish Aid Country Strategy paper cycle. It shows the CSP cycle, the integration steps and suggested data and information sources, tools and methods and knowledge sharing to build climate competence. This can be adapted to other planning and programming processes by Irish Aid or our partners.

The table below provides more detail on the tasks for integration. Some of these tasks require specialist knowledge and it may well be that the country programme brings in expertise to carry out these.

Table 1: Integration of climate change into the Irish Aid Country Strategy Paper cycle.

[The table assumes that the initiation of the process to integrate climate change into the CSP is at the planning of the next CSP and should include a review of national processes NAPA, NAP, climate risk scenarios etc. However, first steps toward integration could also take place as part of the MTR.]

Country Strategy Paper stage	Tasks for integrating climate change	Comments
Retrospective evaluation of CSP	• Assess the climate hazards and associated climate risks/vulnerabilities to the intended direct beneficiaries of the previous CSP. • Assess the climate risks that affected the delivery of CSP • Assess the scale of any current and future climate adaptation deficit. • Analyse climate observations data for the duration of the previous CSP and for relevant intervention locations. • Assess for any trends in climate challenges.	Include assessment of the extent that climate-related effects were taken into account in CSP in CSP evaluation ToR to be able to assess relative importance of climate-related effects to CSP success. Climate risks assessment by specialists.
Preparation of new CSP		
Preparation of thematic/ sectoral/ background strategy papers	• Establish internal enabling conditions by building climate competence, and generating and disseminating information. • Identify and assess potential future climate risks to new CSP objectives. • Identify best entry points for climate change integration into development programming. • Consider how climate effects can be addressed/ framed in social protection, hunger, resilience, national growth strategies, etc.	Important to build awareness raising among staff on climate change and climate risk management. Also to review national and sub-national climate risk and vulnerability information, and availability of climate observation data. Climate risks assessment by specialists.
Complete CSP preparation	• Examine the extent to which climate effects represent significant risks to CSP theories of change. • Select the entry points for climate change integration. • Identify, prioritise and select risk management/ adaptation measures. • Integrate climate change into sectoral level theories of change (with risks and assumptions), identify domains and indicators of climate risk management/ adaptation success.	Look at alignment with national and sub-national climate adaptation programmes and plans.
Implementation of CSP	• Establish external enabling conditions, build capacity of partners, generate/ disseminate information. • Implement selected climate risk management/ adaptation measures. • Develop M+E for CSP interventions based on TAMD. • Monitor & evaluate success of adaptation interventions.	As implementation proceeds climate effects on CSP interventions reviewed in real-time.
MTR for CSP	• Assess current implementation of the CSP as regards to climate risks. • Identify gaps for research in preparation for the next CSP. • Assess how well adaptation measures are managing climate risks.	Draw together climate observation data and evidence of climate challenges to CSP implementation to contextualise performance.

Carry forward into design of next CSP understanding of how climate affected CSP effectiveness and identification of current and future climate risks.

Build critical mass for addressing climate effects.
Range of climate risks identified that could be addressed under new CSP.
Options for entry points.

Design of climate integration into CSP.
Inputs, activities, outputs and expected outcomes.
Framework for M+E.

Evidence generated and made available for MTR in a 'learning by doing' modality.

Section 4. Detailed guidance on integration of climate change into development programming

In this section we will look at more technical aspects of integrating climate change risk and vulnerability into development programming. Particular attention is paid to climate risk assessment and measuring the effectiveness of adaptation as these have been identified as the areas where most guidance is needed. Additional information is available on the Learning Platform web-based portal[10]; and on the GIZ Factsheet on climate mainstreaming.[11]

The table below shows how each step in integrating climate adaptation into development programming can be managed by Irish Aid Country Programmes through a combination of in-house and brought-in expertise.

Table 2: Steps in integration of climate change into development programming

Steps/ decision point in integration process	**How to cover through in-house resources**	**Need for brought-in expertise**
1. Selecting entry point	IA Country climate change focal (CCFP) point convenes stakeholder group	
2. Identify, assess and screen current and future climate risk a. Climate risk screening b. Climate vulnerability assessment c. Assessing future climate risks and vulnerability	Senior Climate Change Adviser (SCCA) recommends best process and methods	Secondary information reviewed and/ or specialist service provider used
3. Climate adaptation options identification and selection	SCCA and/ or CCFP facilitate in-house process	Learning Platform IIED support
4. Adaptation design	SCCA and/ or CCFP facilitate in-house process	Learning Platform IIED support Specialist service provider used
5. Implementation	CCFP oversees implementation by contracted service providers	
6. M&E: assessing adaptation effectiveness	SCCA develops plans for assessment	Learning Platform IIED support

Step 1: Selecting entry points

Integrating climate change into development should consider both climate adaptation and mitigation strategies that seek to maximise the two-way co-benefits for the poorest and most vulnerable in society from combined interventions.

Integration can happen at different levels, and can be carried out at different steps of the planning and decision-making process:

- National/regional plans, strategies, investments, programmes, policies;
- Sector programmes, plans, strategies;
- Community level development / projects;
- Project cycle - planning and implementation;
- Institutional decision-making in an organization; and,
- Portfolio screening of development interventions.

[10] http://www.climatelearningplatform.org/

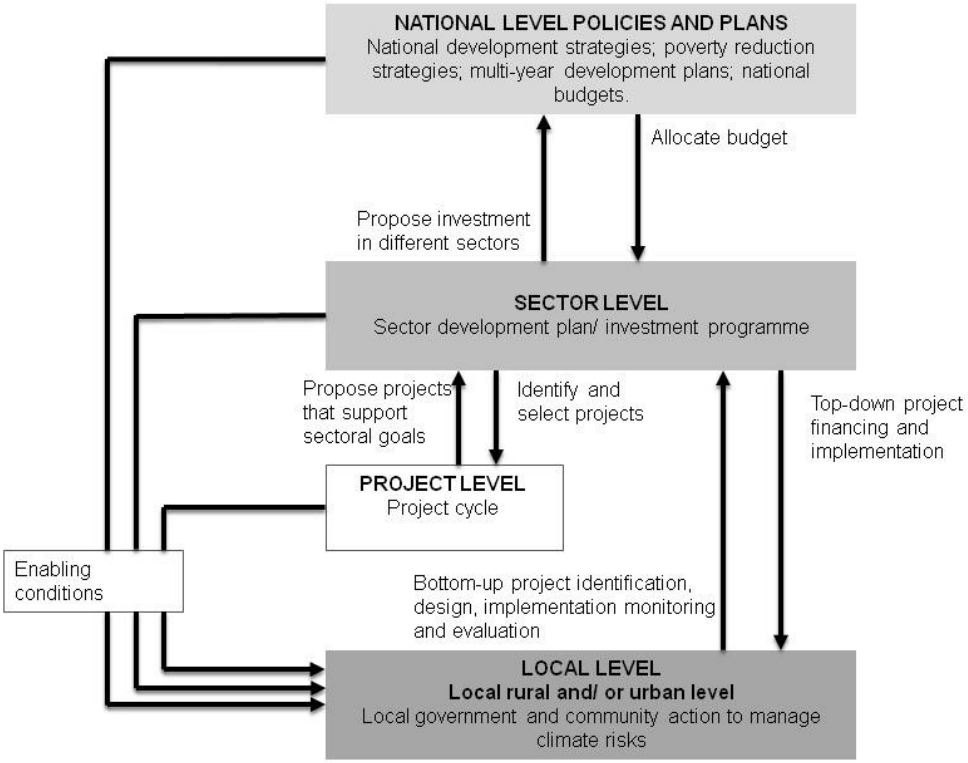
[11] See: https://gc21.giz.de/ibt/var/app/wp342deP/1443/wp-content/uploads/filebase/ms/CloserLook-mainstreaming.pdf

The diagram below taken from the OECD Policy Guidance[12] illustrates the different entry points for integrating climate change into development programming. Commonly, project level as the entry point is used with the objective of contributing to local climate adaptation processes. This strategy is of course self-limiting as regards to impact and outcomes with significant scaling-out and up challenges. Scale can be addressed by looking at sectoral and national level entry points seeking to improve the enabling environment for action at different levels of climate adaptation and mitigation.

Box on NAPAs and health

In 2010, WHO assessed the inclusion of health within NAPAs (conducted by least developed countries and small island states). The assessment concluded 'that 39 out of 41 (95%) NAPAs identified health as a priority sector negatively impacted by climate change. 30/41 (73%) of the NAPAs identified health interventions within their list of adaptation needs and proposed actions. While 11% (50 out of 459) of the priority projects focused on health, only approximately 4% of the portfolio of the Least-developed Countries Fund (LDCF) funds supporting the NAPA process targeted health adaptation.' Explanation included a lack of support for health sector adaptation that includes the health community and limited technical guidance made available to ensure the proposals on health adaptation that were developed fulfilled minimum technical requirements. There is therefore a need for all sectors to be properly represented in the NAP and other processes.

Diagram 3: Entry points for integrating climate into development programming.



[12] See: http://www.oecd.org/dac/43652123.pdf

The integration process

Common elements of strategies for integrating climate change into development programming include:

- Establish enabling conditions by supporting national and local planning processes, build capacity, generate/disseminate information
- Engage programme stakeholders, raise awareness, build partnerships
- Identify/assess relevant current climate hazards & associated risks/vulnerabilities
- Identify/assess potential future climate hazards (as relevant to context)
- Evaluate need to modify development intervention
- Identify, prioritise & select risk management/adaptation measures
- Monitor & evaluate success of adaptation interventions

The first two elements are common to all development interventions. They require some climate specificity to raise awareness of climate change issues, risks & potential responses. The second set of four elements involves highly climate specific tasks of climate change screening, climate risk and vulnerability assessment, and adaptation planning and implementation. M+E is common to all development interventions, but the M+E of climate adaptation is associated with some quite specific methodological challenges.[13]

The integration process can be envisaged as part of the project cycle involving climate risk management decision making with specific tools. Sources of information on integrating climate into development are included in Annex 3

Climate and Education

From an 'in-school' perspective we already know that climate change events damage and/or destroy school facilities and educational systems. They are also threatening the physical safety and psychological well-being of communities and interrupting educational continuity. These are reducing school enrolment, as children are kept out of school to help with livelihoods. Research is also suggesting that in all instances, such outcomes are likely to affect girls and children with disabilities dis-proportionately. However, although threatened by climate change, the education sector can offer an opportunity to combat climate change through contributing to mitigation efforts and enhancing the adaptive capacity of education systems and learners, thereby reducing vulnerabilities and building resilient societies.

Climate and health

Avoiding climate-sensitive health risks is an additional reason to mitigate climate change, alongside the immediate health benefits that are expected to accrue from measures to reduce climate pollutants, for example through lower levels of particulate air pollution. It also supports the case for strengthening programmes to address health risks including undernutrition, diarrhoea, vector-borne disease and heat extremes, and for including consideration of climate variability and change within programme design. The strong effect of socioeconomic development on the projections of future risks emphasizes the need to ensure that economic growth, climate policies and health programmes particularly benefit the poorest and most vulnerable populations. (WHO Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s)

[13] Please refer to: http://www.iied.org/tracking-adaptation-measuring-development-tamd

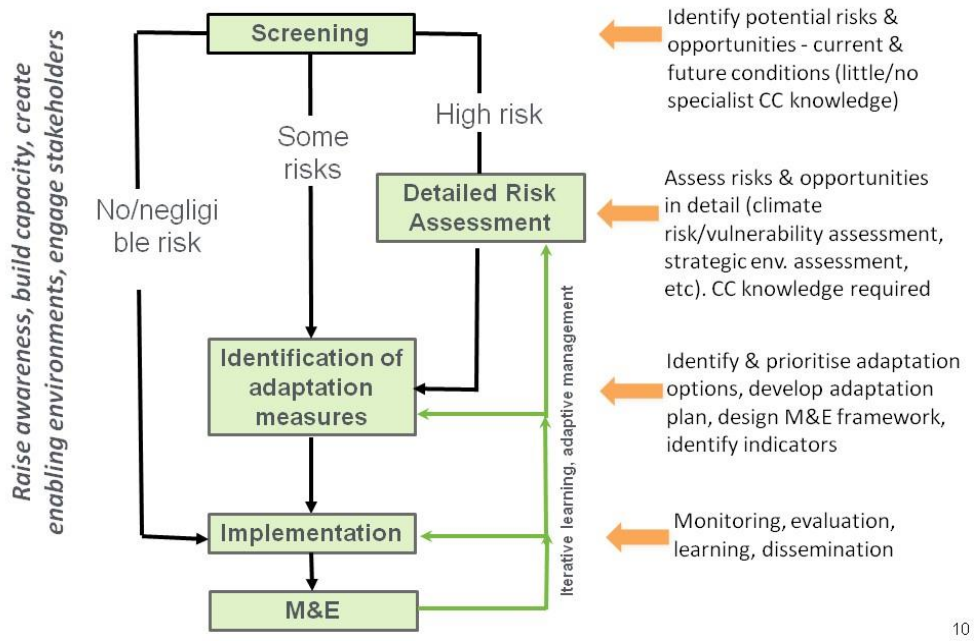
Step 2: Climate risk assessment

Climate risk assessment is central to managing climate risks to development investments. Diagram 4 below frames risk assessments in the context of integration processes.

The identification of potential risks and opportunities in current and future conditions requires little or no specialist climate change knowledge. If risks are assessed as being currently negligible then implementation can proceed with no further integration. However, if climate risks are assessed to be present then adaptation measures will need to be identified and if risks are substantial then a more detailed risk assessment will be required.

Assessing climate risks and opportunities in detail through a climate risk and vulnerability assessment, strategic environmental assessment and alike, require more specialized climate change knowledge. As do the identification and prioritization of adaptation options, the development of adaptation plans, and the design of monitoring and evaluation frameworks including domains and indicators.

Diagram 4: Key processes in the integration of climate into development



Climate risk screening and the identification of adaptation measures are often combined into a single set of guidance notes or mainstreaming tool, at least for lower risk interventions and projects. Annex 3 provides links to sources of information on these methods and tools.

Climate risk screening

The purpose of climate risk screening is to assess whether interventions are likely to be associated with climate risks. Screening involves a preliminary identification of risks and opportunities. Assessment of the extent to which any risks and opportunities are already addressed and then to determine whether detailed risk/vulnerability assessments are required.

The climate risk screening can act as scoping exercise to develop the terms of reference for a complete risk assessment.

Risk screening seeks to ascertain the expected impacts of climate change on interventions be they projects, programmes, policies, etc. these can be categorized as:

- Risks to the implementation or outputs of initiatives (e.g. projects, programmes) over the lifetime of initiative e.g. destruction of project infrastructure by unexpected extremes (outputs), or outputs not delivered due to poor access resulting from unexpected extremes.
- Risks to longer-term outcomes/impacts or the success of initiatives over periods beyond the intervention that benefits expected e.g. expected yields increases not realised or sustained due to worsening climate hazards, or systems (agriculture, water, etc.) supported by intervention become unviable or redundant, or anticipated gains in human welfare, reductions in losses, not achieved due to climate effects.

Impacts of intervention on society, economic welfare and environment, mediated by climate change:

- Risks that initiatives will increase vulnerability of certain groups. Further marginalisation or exclusion of vulnerable groups in worsening climate e.g. loss of dry-season grazing by pastoralists facing drought or crop farming expansion as rainfall increases, or exclusion of poor through water pricing as water becomes scarcer. Risks in relation to exacerbated levels of social exclusion and gender inequality, further burdens on women and the particular vulnerabilities of women and girls (particularly to SGBV) following extreme events and other emergencies.
- Risks that activities will contribute to or drive maladaptation by for example creating dependency on systems/resources that will not be there in future e.g. agricultural expansion into areas likely to become unproductive.
- Risks that activities will increase environmental sensitivity to climate change. Accelerate environmental degradation/destruction, biodiversity loss e.g. loss of migration corridors, fragmentation, or agriculture or urban expansion, and incursion of infrastructure.

Climate screening can be done in a number of ways. Each have advantages and disadvantages:

- Checklists of intervention criteria (e.g. sector, location, etc).
- Expert judgment and assessment based on specialist knowledge of climate change related risks and vulnerabilities.

Some screening approaches require knowledge of climate change and/or interpretation of climate data, while others do not. The most useful approach is to screen with little or no climate knowledge requirements and not depending on climate data, followed by more detailed expert assessment if required.

Checklist approaches have the strengths that they are simple, quick and easy to develop and apply, they require little or no knowledge required other than familiarity with intervention in question, and if developed in-house they can form part of climate risk management system that means findings more likely to be acted on

Examples of checklist approaches are:

- Asian Development Bank (ADB) Project Risk Screening Tool.[14] Multiple sectors and projects, uses 'risk tables', 15-20 minutes, no climate knowledge required. Helps mainstream climate and DRR. Recommends risk management & adaptation options.

[14] For general information and contact see:
http://unfccc.int/adaptation/nairobi_work_programme/knowledge_resources_and_publications/items/5465.php

- DFID's ORCHID tool.[15] Sector or region vulnerability to climate variations. Based on list of known hazards.

Expert judgement for risk screening is a very common approach. It ensures that screening is based on informed judgment and can identify issues that might be missed by checklist approach.

The AfDB provides that Climate Screening and Adaptation Review and Evaluation Procedures Booklet.[16]

At the end of the day climate risk screening will lead to one of following conclusions i.e. that the intervention requires no further action to address climate change issues, or that some modifications are required to address climate risks/opportunities, or that a detailed climate risk/vulnerability assessment is required.

Tools and approaches for climate risk and vulnerability assessment

The table below summarises the different approaches for risk and vulnerability assessment. Approaches can be quantitative or qualitative, impacts or vulnerability based, conducted top-down or bottom-up and based upon modelling or scenarios.

Table: Typology of risk and vulnerability assessment.

Quantitative Numeric indicators, mapping	Qualitative Expert judgment/review, narrative
Impacts-based Model climate hazards & impacts	Vulnerability-based Assess societal underlying sensitivity
Current risks/vulnerabilities Existing risks & near-term benefits	Future risks/vulnerabilities Identify & plan for future risks
Top down Mapping risks, identify priority areas	Bottom up Stakeholders identify risks/needs
Prediction/projection based Climate model outputs, downscaling	Hypothetical/plausibility based What would happen if....?

Quantitative risk and vulnerability can be conducted using maps. Hazard distribution and vulnerability maps are normally available from the Ministry responsible for Disaster Risk Reduction in country.

Impacts-based approaches to risk and vulnerability assessment use climate projections from climate system models (general circulation models GCM) where climate change is modelled using ranges of high and low GHG emissions scenarios. Changes in temperature and rainfall etc. are then used as drivers in system models, most often agricultural productivity models, to derive likely changes in yields.

Scenario based planning can also be used to assess climate risks and vulnerabilities.[17] Under this approach we ask what future risks/impacts are implied by different climate change scenarios. The climate change scenarios allow planners and communities to identify potential impacts/implications

[15] http://www.ids.ac.uk/project/adaptation-screening-tools-for-development-cooperation-piloting-orchid-and-other-approaches
[16] See: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/CSS%20Basics-En_def.pdf
[17] See for example: http://pubs.iied.org/pdfs/10023IIED.pdf and http://www.fao.org/fileadmin/user_upload/epic/docs/workshops/Technical_consultation/Presentations/CCAFS_CSA_scenarios.pdf

of range of future conditions and to identify potential responses, adaptation options and associated needs.

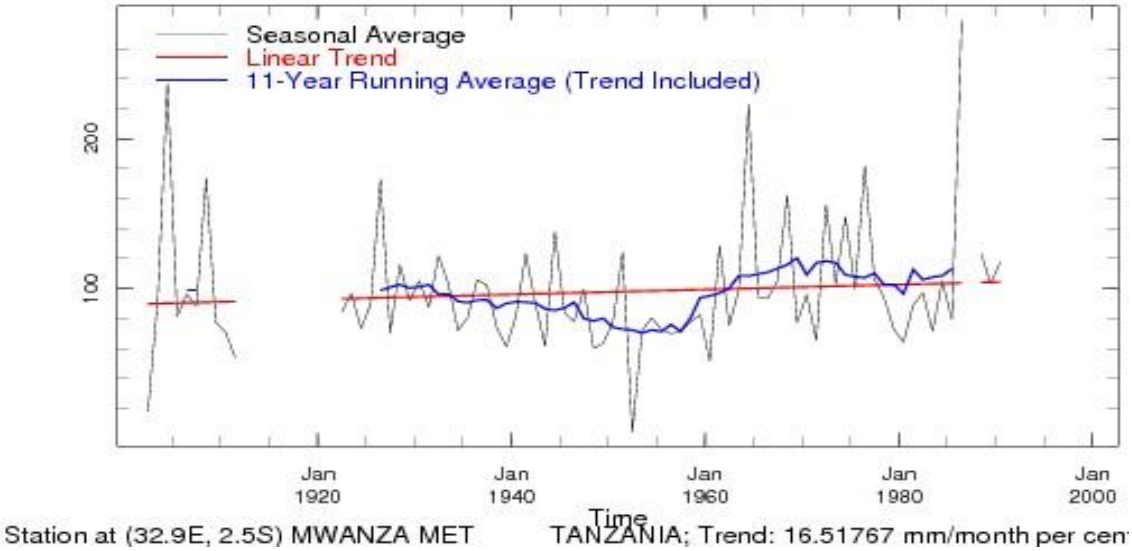
Participatory assessments can be used also to conduct hazard and resource mapping. Note the benefit to communities owning and understanding their environment and risks and making informed decisions. This approach uses participative methods to understand livelihoods and resources important to livelihoods. Also to map the natural, physical, financial, human, social, political resources including different stakeholders' access and control. To explore the relative importance of resources to different livelihoods. To discuss experience of past climatic changes / trends. To develop an understanding of non-climate hazards and interaction with climate hazards. To identify impacts associated with climate hazards and most climate-sensitive resources and to identify and explore response strategies. Examples of these approaches include the CRiSTAL[18] tool and the work of the Adaptation Consortium[19], in Kenya where resource mapping is being used for climate adaptation planning.[20]

Using climate data and information in assessing current risks and vulnerability

Climate information can be from observation records and from simulation models that generate projections of future climate changes – forecasts of differing durations.

Observational data come from weather stations and national meteorological services. Care needs to be taken in the ways this data is presented and interpreted. The graph below shows January to December precipitation (mm/month) for Mwanza, Tanzania, from 1901-2000. This is based on station data produced using World Bank Climate Variability Tool.[21] The graph shows seasonal averages, the linear trend and running 11 year averages. From the data the high inter-seasonal variability is obvious, the discontinuity of the observations and the apparent trend of increasing rainfall.

Graph: Climate observation data from Mwanza, Tanzania.



[18] See CRiSTAL User Manual: http://www.iisd.org/pdf/2012/cristal_user_manual_v5_2012.pdf
[19] See: http://adaconsortium.org/
[20] http://www.iied.org/responding-climate-change-east-africa-strengthening-dryland-governance-planning
[21] http://iridl.ldeo.columbia.edu/maproom/Global/World_Bank/Climate_Variability/index.html

To enable interpretation of climate observation data indices have been developed. Simple indices include mean, maximum and minimum temperatures, total annual or seasonal rainfall, and average rainfall per day. This data should be available from meteorological service agencies or in on-line datasets.

Indices must be relevant to development contexts and impacts. For example, date of onset of wet season, longest period without rainfall, rainfall intensity, may be much more important than total annual or seasonal rainfall. Interpretative indices constructed from simple indices include: Wettest consecutive 5 days –maximum consecutive 5-day precipitation; Consecutive dry days – maximum number of days with precipitation <1mm; High temperatures – seasonal/annual maximum values of daily max/min temperatures. Precipitation – very wet days - % precipitation from days >95th percentile. There is also the Palmer Drought Severity Index and the Power Dissipation Index for storms.

Local knowledge can be used to track changes where climate observation data are scarce or absent. It can complement scientific data where the latter misses important locally specific details. And local knowledge has been seen on some occasions to have significant predictive value. Such local knowledge can be calibrated against meteorological data.[22]

However, erosion of local knowledge makes forecasting less reliable. The disappearance of biological indicators makes forecasting more difficult as do the changing relationships between indicators and climate phenomena. Care needs taken as easy, simple explanations (e.g. drought) may mask more complex situations.

Assessing future climate risks and vulnerability

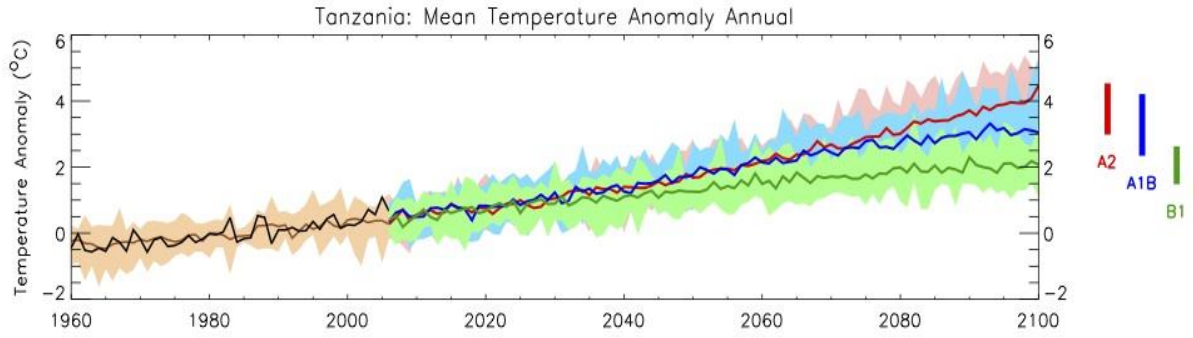
Global and regional climate models can provide information for broad characterization of future climate risks. What are called 'downscaled' model outputs provide higher resolution projections of climate changes.

Regional downscaled climate projections information is attracting significant investment. For example, CORDEX (COordinated Regional Climate Downscaling EXperiment) is an international effort to provide users and impact communities with standardised regional climate scenarios over different regions of the globe. It is sponsored by the World Climate Research Programme.[23]

Outputs from downscaled modelling can be used to look at the range of most likely climate changes into the future. The graph below shows one such for Tanzania where a range of temperature increases reflect the different emission reductions scenarios used to drive the climate models.

[22] See: Nakashima, D.J., Galloway McLean, K., Thulstrup, H.D., Ramos Castillo, A. and Rubis, J.T. 2012. Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation. Paris, UNESCO, and Darwin, UNU.
[23] http://wcrp-cordex.ipsl.jussieu.fr/

Graph: Tanzania mean annual temperature 1960 to 2100



Because developing regional and downscaled climate projections to assess risks and vulnerability is a highly specialized activity care should be taken in choosing the sources of climate information to be used for the purposes of integrating climate change into development programming. Recommended sources are included in Annex 3

Step 3. Framing adaptation and identifying options

Investing in climate adaptation is an important way to integrate climate change into development programming. This can be done by mainstreaming climate risk management into development planning and programming so that risks to development objectives are addressed often referred to as climate-proofing. And by investing in specific adaptation actions that protect livelihoods and assets from climate effects.

In order to be able to support climate adaptation effectively, investment plans have to be framed correctly and convincingly and the following aspects need to be addressed in any proposal to support climate adaptation as part of development programming:

1. What are the climate hazards and risks that are to be addressed?
2. What climate change impacts are expected?
3. What aspects of climate vulnerability will be targeted?
4. Who are the intended direct beneficiaries? What is the likely poverty impact of the intervention?
5. What timescales are relevant to the intervention?
6. Could they lead to greater levels of climate vulnerability in the medium to longer term?
7. What options are available for reducing climate risks and vulnerabilities?
8. What type of adaptation is being pursued - reducing adaptation deficit, incremental adaptation, or transformational adaptation? (refer back to fig 1, page 9)

The selection of climate adaptation investments has to be based on explicit and agreed criteria – see below. These criteria can be used as checklist for what adaptation intervention proposals should address.

Feasibility and efficiency

- Are the proposed adaptation options realistic?
- What is the benefit to cost ratio of the investment?
- How soon could they be implemented and across what timescale?
- Is there sound evidence of the likely performance of the adaptation and is the investment
- Does the investment capture the value of women as agents of change?

- Does the investment best leverage the extensive local knowledge which women have (e.g. water management, land management)?

Based on an explicit theory of change?

- Are the adaptation options robust and within an appropriate envelope of uncertainty?
- Is there an enabling environment for successful implementation?
- Are we ensuring that women's voices are heard in the design, implementation and evaluation of our programming on climate change? Are programmes engaging men and boys in tackling the social norms which exacerbate women and girls vulnerabilities to climate change?

Acceptability

- Do people – direct and indirect beneficiaries – agree with the adaptation options selected
- Have the winners and losers been identified and consulted?
- Does the implementing entity have legitimacy with the affected population?

Has the equity of the probable costs and benefits been assessed? Risks

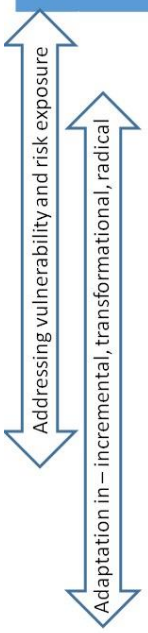
- Could the adaptation options selected become maladaptive in the longer term? (check against
- screening criteria)
- If so, are plans in place to monitor and revise options?
- To what extent are impacts of adaptation irreversible and what flexibility is there to adjust strategies?

UK Climate Impacts Programme (UKCIP) provides further guidance on the assessment of adaptation options.[24]

[24] http://www.ukcip.org.uk/wizard/wizard-4/4-2/

Step 4: Adaptation Design

This step will be very context specific. A number of adaptation options for mitigating climate risks can be considered, relevant to the climate risks identified in the previous step. The table below shows some of these.



Approaches	Sector	Examples
	Human development	Social service provision; Public health; Nutrition security; Housing etc.
	Poverty eradication	Social safety nets; Insurance; Savings and loans etc.
	Sustainable livelihoods	Access to natural resources; Secure assets; Technology; Human and social capital investments; Diversification etc.
	Disaster risk management	Communications and early warning systems; Shelter from extreme weather events; Building codes etc.
	Ecosystem management	Watershed management; Soil and water conservation; Coastal afforestation etc.
	Land-use planning	Land zoning; Protected areas; Urban planning etc.
	Social	Education, training and awareness raising; Extension services; Action-research; Hazard warning and response systems; Climate information services; Migration support; Social networks.
	Rights	Reduced gender inequity; Counter social exclusion; Indigenous climate information systems etc.
	Institutional and governance	Bottom-up and inclusive decision making; Downward accountability; Community based adaptation etc.

Step 5: Implementation of adaptation options

Standard guidance for programme cycle management applies. Continuous monitoring of adaptation options is incorporated into the Tracking Adaptation and Measuring Development (TAMD) Tool introduced in the next step.

Step 6: M&E: assessing the effectiveness of integrating climate change into development programming

People, governments and enterprises are responding to the effects of climate change as they become apparent. Although adaptation is new and complex, organisations at all levels need to integrate it into development before climate effects escalate significantly. To do this successfully, every opportunity to learn how to enable effective adaptation must be taken.

Assessing adaptation success[25]

To plan, implement and track adaptation interventions requires robust assessments of the expected and actual returns. We need to know whether adaptation is keeping development on course and whether the adaptation costs and benefits are distributed equitably.

The Tracking Adaptation Measuring Development framework provides a robust, tested approach to assessing how adaptation contributes to development and how development interventions enable adaptation to climate effects.

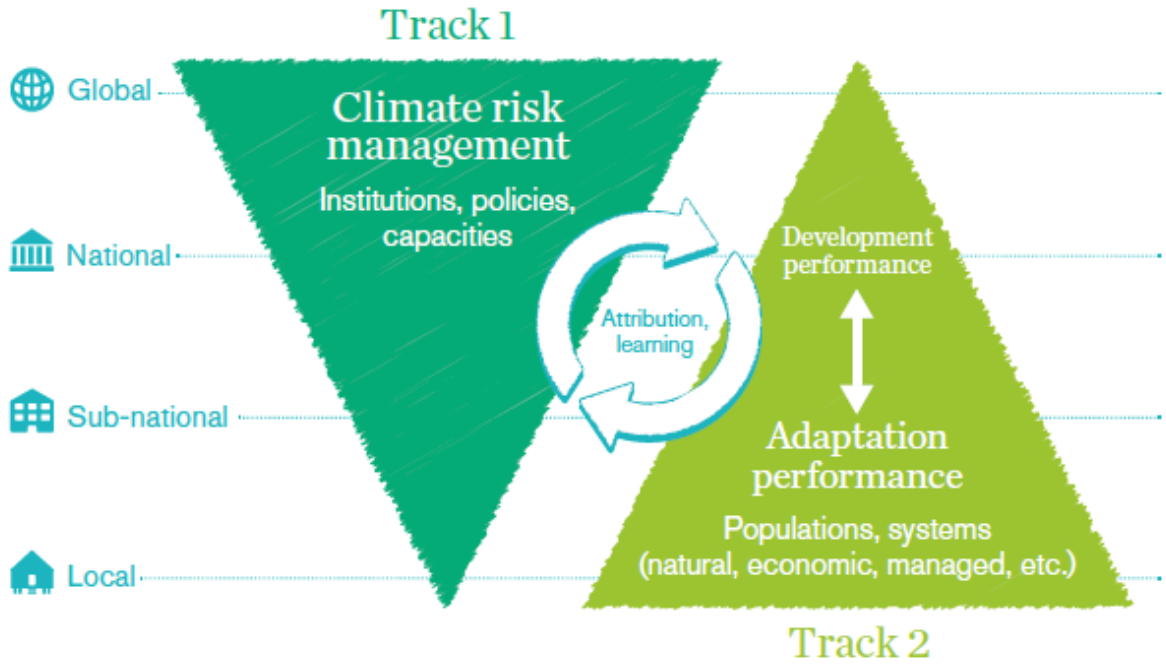
[25] Please refer to: http://pubs.iied.org/pdfs/17143IIED.pdf and http://pubs.iied.org/pdfs/17257IIED.pdf

Tracking adaptation and measuring development[26]

The success of adaptation as a means to address climate risks to development needs to be measured in terms of the developmental outcomes achieved through adaptation investments. The Tracking Adaptation Measuring Development (TAMD) is designed to do just that. It can be used to assess whether climate change adaptation leads to effective development and also how development interventions can boost communities' capacity to adapt to climate change.

TAMD[27] is a twin-track framework that assesses the way in which climate risk management (CRM) interventions (in Track 1) influence development and adaptation outcomes (in Track 2) through various processes described for each intervention in a theory of change. It is intended to be a flexible framework for evaluating adaptation and adaptation-relevant development interventions in diverse situations. It can be modified for different contexts and types of adaptation. See the figure below.

Figure: the TAMD framework



There are six key steps to the effective application of TAMD that can be followed in diverse M&E contexts (see the Figure below). These steps are iterative, meaning results from one step can feed back into previous steps, and steps may be repeated. This can lead to refinements in the processes represented in these previous steps during an intervention, or improving the way these steps are followed or applied in future initiatives. The results can therefore be used to inform the planning of subsequent adaptation investments and activities, and to develop climate risk management (CRM) processes. There are also cross-cutting issues to consider while applying the framework, such as gender equality and the political context. The particular vulnerabilities of women and girls have been mentioned as well as their potential as agents of change. It is important to note also that gender considerations cut across mitigation, financing, technology transfer and capacity building.

[26] Full documentation on the TAMD framework including manual for operating the assessment of climate adaptation, briefings on the technical aspects, and country experiences can be found at: http://www.iied.org/tracking-adaptation-measuring-development-tamd

[27] The TAMD step by step manual can be found and downloaded free at: http://pubs.iied.org/pdfs/10100IIED.pdf

Figure: TAMD steps

The TAMD framework can be applied to different circumstances and entry points where adaptation and development are integrated. The framework can be used to test different theories of change. Examples are given in the Table below.

Table: Entry points and theories of change that can be used to test.

Entry point	Theory of change
1. Tracking the performance of adaptation at the national level	Improved CRM at national level leads to better CRM at sub-national scales, which enhances resilience and builds the adaptive capacity of people, institutions and systems, enabling them to respond effectively to climate change and secure and improve wellbeing and development performance.
2. Tracking the performance of adaptation within a particular sector	Improved CRM at sector level makes the sector in question more resilient and better able to respond effectively to climate change risks, thus improving performance.
3. M&E of individual programmes and projects	Project activities and outputs enhance CRM and improve the resilience of targeted systems and populations.
4. Evaluating the impacts of particular policies	Policies that address climate change (directly or indirectly) influence CRM processes and factors that are important for people's and communities' resilience (and/or drivers of vulnerability).
5. Tracking and/or strengthening adaptation planning and performance at the local level	Multiple activities at local level aimed at addressing climate-related risks result in better local CRM and improved resilience of communities and households, with a positive impact on wellbeing and development performance.

Once a theory of change has been established, tracking adaptation and measuring development provides a framework for exploring the links between climate risk management, resilience and

wellbeing/ development outcomes – the three key elements of any system for tracking adaptation and its relationship to development – and outputs, outcomes and impacts.
Where there is an institutional component to the system undergoing M&E, the beginning of the pathway or entry point should be located in Track 1, representing the contribution of that component to climate risk management. This remains the case even when an intervention or system is not designed in the context of climate change and does not seek directly or explicitly to address climate change or deliver adaptation. This is because interventions and systems that do not target climate change explicitly or directly might still deliver ancillary adaptation benefits. For example, poverty reduction or agricultural interventions involving economic diversification to increase incomes or productivity might also spread or reduce risks associated with the impacts of increasing climate variability and intensifying extremes on crop production, food security and household incomes.

Changes in resilience, adaptive capacity and/or vulnerability, and changes in human wellbeing (such as poverty or health) and development performance, measured by metrics such as economic growth or the Human Development Index form part of Track 2. This data should be disaggregated where possible to show differential impact on different socio-economic groups and between women and men.

A specific intervention (e.g. a project or programme) may target climate risk management processes and mechanisms, and thus have an entry point in Track 1. Alternatively, its outputs may seek directly to influence the resilience, vulnerability or adaptive capacity of individuals through the provision of resources or infrastructure. In such cases, the entry point for the intervention would be in Track 2, most likely at the local level (see Annex 3 for an example).

The Table below provides some examples of changes in Track 1 and Track 2 associated with different types of interventions at different scales/levels.

Table: Changes to be tracked using the TAMD framework.

Intervention types	Examples	Track 1 changes	Track 2 changes
Improvements in CRM at national level	Climate proofing transport infrastructure	Use of climate projections to judge severity of climate impacts and level of protection measures	Lower incidence of climate-related disruption of transport services Reduced loss of access to trading routes due to climate effects
Improvements in CRM at sub-national level	District authorities prepared for extreme weather events	Increased effectiveness of early warning systems	Reduced losses of household assets
Improvements in CRM at local level	Livelihoods-oriented local adaptation plans of action	Location-specific measures to protect natural resources	Fewer incidences of reduced food, water, energy or human security
Adaptation-related development	Micro-hydro energy generation for off-grid communities Local seed systems to diversify cropping systems Social safety net provision	Energy generation infrastructure located away from flooding Drought-tolerant landraces included in seed system Climate-vulnerable people targeted	Energy access improves range of adaptation options Local food insecurity due to drought is reduced Climate-vulnerable people use safety net provision to recover from climate-related events

Climate risk management indicators are used to assess the extent and quality of institutional processes and mechanisms for addressing climate-related risks. Nine generic institutional climate risk management indicators have been defined within the TAMD framework:

- The use of climate information in policy and programme design
- How well national Institutions coordinate and integrate climate change into programmes
- Budgeting and finance for climate adaptation
- Institutional knowledge and capacity
- Climate information and managing uncertainty
- Proportion of development initiatives that are modified to be more climate resilient
- Mechanisms for targeting the climate vulnerable
- Awareness among stakeholders and participation (including communities)
- Existence and coverage of local climate risk management processes

Methodological notes and scorecards are available[28] for eight of these indicators, which are intended to be generally applicable to institutional contexts at large.

There are no universal or generally applicable indicators of resilience (or of vulnerability or adaptive capacity), as these phenomena are highly context-specific. However, a number of studies have sought to define dimensions of resilience, with each dimension gathering together a suite of related factors that might be represented by context-specific indicators.

Wellbeing indicators

Adaptation success can be measured in terms of indicators that represent avoided losses in terms of lives, assets and livelihoods as a result of climate-related shocks and stresses. Indicators can also be used for ecosystem health or functioning, or for the state of other systems that are likely to be affected by climate change, to see how well these systems are coping with or adapting to climate change, with or without human intervention in the adaptation process. These will overlap to a large extent with standard development indicators used to track changes in poverty, inequality, health, nutrition, economic status, education, longevity, conflict, and economic growth – in short, any aspects of development that might be adversely affected by climate change.

This overlap with widely used development indicators means that there is much greater potential for using secondary data as resilience indicators. Wellbeing indicators may be tracked at the national level, or used in the M&E of projects and programmes. In the latter case they will be defined at the impact level. At the programme or project level there will be considerable challenges associated with the tracking of these impact level indicators because of the timescales that are likely to be required for project outputs and outcomes to translate into detectable impacts. As a result, many programmes and projects will not track these indicators, although they may identify them in their logframes and develop narratives of how they are likely to contribute to impacts that will be measured over longer periods by, for example, national monitoring systems. Nonetheless, longer-lived interventions might track impact level indicators of wellbeing, using attribution methods involving techniques such as comparison/control groups or the construction of counterfactuals to address attribution/contribution issues.

Climate hazard indicators/indices

We need to determine whether adaptation actions have improved wellbeing compared to a situation in which these actions did not take place (a counterfactual scenario). If the implementation of adaptation actions and interventions was the only thing that had changed in a given development

[28] See TAMD weblinks above.

context, we could simply measure changes in wellbeing over time and attribute these to the adaptation actions.

However, changes in wellbeing indicators will also be influenced by other drivers – including economic trends, policy changes and changes and variations in climate. Economic trends may be identified using relevant economic indicators and both these and policy changes can be identified and described using more general analyses and narratives of the development context.

Climate indicators or indices are required to identify and track trends and variations in climate hazards that may complicate the interpretation of wellbeing indicators and must be taken into account in order to develop any 'no adaptation' or 'no intervention' counterfactual.

Climate indicators should represent the hazards that are most relevant to the adaptation context being assessed, at scales representative of the processes that lead from the occurrence of a hazard to the adverse consequences that adaptation actions are intended to address.

The most commonly used and cited indicators of climatic conditions – average or extreme temperature, average daily rainfall, total annual or seasonal rainfall – may be some of the least useful indicators for interpreting wellbeing indicators, especially at small scales. More useful indicators might include maximum rainfall intensity (for runoff and flood risks), composite drought indices such as the Palmer Drought Severity Index, soil moisture indices, the onset date of seasonal rains, the number of days without rain during the growing season, the storm intensity of destructiveness.

Links between indicators and across scales

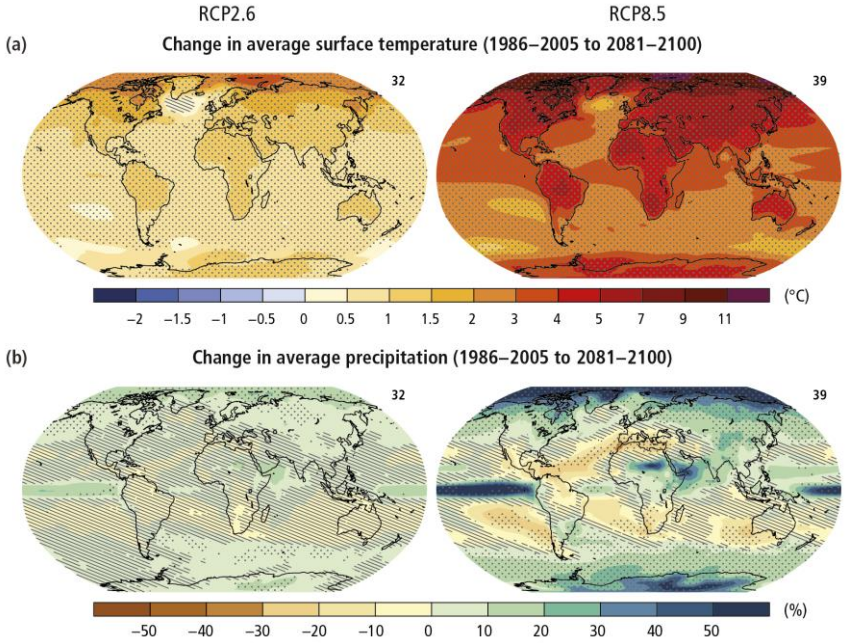
The different types of indicators discussed in this step should be linked by a theory of change (Step 2). Where M&E is concerned with the links between climate risk management and enhanced resilience, and/or between enhanced resilience and improved wellbeing, a theory of change should explain how the one leads to the other. Climate risk management, resilience-type and wellbeing indicators should make sense and be complementary in this context.

For specific interventions, there should be logical causal links between output, outcome and impact indicators, situated within a coherent theory of change. Where a specific intervention specifies that improved climate risk management should drive enhanced resilience, which in turn will improve certain aspects of human wellbeing, both of the above conditions should be met.

The scales at which different types of indicators are measured also need to be considered, as these may be different. For example, climate risk management at the national level might be linked in a theory of change with improvements in resilience at the district or local level. Conversely, a local planning system may link local, community-level resilience indicators to the adaptation interventions they are implementing, but track related wellbeing and impact indicators at the county government level.

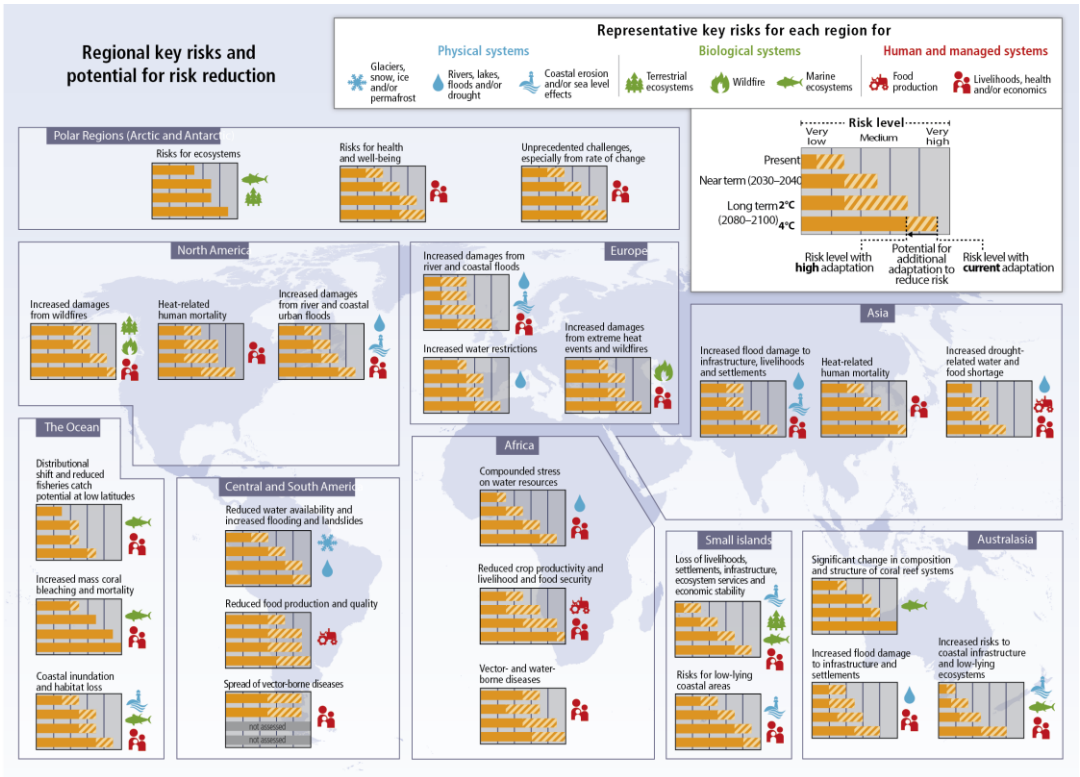
Annex 1. Projections of climate change effects

Recent IPCC derived projected global changes in temperatures and rainfall. The maps show the projected difference in average surface temperature and in average precipitation from records of the period 1986 to 2005 as compared to climate model projections for the period 2081 to 2100. These are repeated for scenarios where GHG emissions decrease from present levels (RCP2.6) and where emissions do not decrease (RCP8.5).



The IPCC have assessed what the projected changes in temperature and rainfall could mean for development in different parts of the world. The figure below summarises these findings.

Figure 2. IPCC derived climate risks to development for different regions of the world.



Annex 2. Summary of World Bank projected climate change effects for sub-saharan Africa.

RISK/IMPACT		0.8°C WARMING (Observed)	2°C WARMING (2040s)[1]	4°C WARMING (2080s)
Heat extremes	Unusual heat extremes	Virtually absent	About 45 percent of land in austral summer months (DJF)	>85 percent of land in austral summer months (DJF)
	Unprecedented heat extremes	Absent	About 15 percent of land in austral summer months (DJF)	>55 percent of land in austral summer months (DJF)
Drought		Increasing drought trends observed since 1950	Likely risk of severe drought in southern and central Africa, increased risk in west Africa, possible decrease in east Africa but west and east African projections are uncertain[2]	Likely risk of extreme drought in southern Africa and severe drought in central Africa, increased risk in west Africa, possible decrease in east Africa, but west and east African projections are uncertain[3]
Aridity		Increased drying[4]	Area of hyper-arid and arid regions grows by 3 percent	Area of hyper-arid and arid regions grows by 10 percent
Sea-level rise			70cm (60–80cm) by 2080–2100	105 (85–125cm) by 2080–2100
Ecosystem shifts			10–15 percent Sub-Saharan species at risk of extinction (assuming warming too rapid to allow migration of species) [5]	
Water availability (Run-off / Groundwater recharge)			50–70 percent decrease in recharge rates in western southern Africa and southern west Africa; 30 percent increase in recharge rate in some parts of eastern southern Africa and east Africa[6]	Increase in blue water availability in east Africa and parts of west Africa[7]; decrease in green water availability in most of Africa, except parts of east Africa
Crop yields, areas and food production	Crop growing areas		Projected climate over less than 15 percent of maize, millet and sorghum areas overlaps with present-day climate of crop-growing areas	Reduced length of growing period by more than 20 percent
	Crop production	Baseline of approximately 81 million tonnes in 2000, about 121 kg/capita	Without climate change, a large projected increase of total production to 192 million tonnes that fails to keep up with population growth, hence decrease to 111 kg/capita. With climate change smaller increase to 176 million tonnes and further decrease to 101 kg/capita[8]	
Yields	All crops		Increased crop losses and damages (maize, sorghum, wheat, millet, groundnut, cassava)[9]	
Livestock		Severe drought impacts on livestock[10]		10 percent increase in yields of *B. decumbens* (pasture species) in east and southern Africa; 4 percent and 6 percent decrease in central and west Africa[11]
Marine fisheries			Significant reduction in available protein; economic and job losses projected[12]	
Coastal areas				Approximately 18 million people flooded per year without adaptation[13]
Health and poverty			Undernourishment is expected to increase significantly, and those affected by moderate and severe stunting is expected to increase[14]	

Annex 3. Sources of information on integrating climate into development:

Agrawala S., A. Matus Kramer, G. Prudent-Richard and M. Sainsbury. 2010. Incorporating climate change impacts and adaptation in Environmental Impact Assessments: Opportunities and Challenges. OECD Environmental Working Paper No. 24, OECD Publishing, © OECD. doi: 10.1787/5km959r3jcmw-en http://www.oecd-ilibrary.org/environment/incorporating-climate-change-impacts-and-adaptation-in-environmental-impact-assessments_5km959r3jcmw-en

CARE Toolkit for Integrating Climate Change Adaptation Into Projects: http://www.careclimatechange.org/tk/integration/en/

CDKN 2013. Integrating climate change in the post-2015 development agenda.

European Commission 2009. Guidelines on the Integration of Environment and Climate Change in Development Cooperation. Tools and Methods Series: Guidelines No. 4. https://ec.europa.eu/europeaid/sites/devco/files/methodology-tools-and-methods-series-integration-environment-in-development-200911_en_2.pdf

European Union 2013. Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment http://ec.europa.eu/environment/eia/pdf/SEA%20Guidance.pdf

GIZ/OECD online training materials: http://bit.ly/1l2Jt9v

OECD 2009. Integrating Climate Change Adaptation into Development Co-operation: Policy Guidance. http://www.oecd.org/dac/environment-development/oecdpolicyguidanceonintegratingclimatechangeadaptationintodevelopmentco-operation.htm

van Aalst, M. Hellmuth, M. and Ponzi. D. 2007. Come Rain or Shine: Integrating Climate Risk Management into African Development Bank Operations. African Development Bank Working Paper No. 89. http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/26326430-EN-ERWP-89.PDF

The UK Climate Impacts Programme (UKCP) has developed a body of knowledge on climate adaptation measures. Please refer to the following:

http://www.ukcip.org.uk/adopt/types-of-adaptation/ for more detail & links to tables for capacity building measures and adaptation actions and strategies

UKCIP AdOpt (Identifying Adaptation Options) guide at http://www.ukcip.org.uk/adopt/

Other resources including searchable database: http://www.ukcip.org.uk/wizard/wizard-4/4-1/

Using regional and downscaled climate projections to assess risks and vulnerability requires a highly specialized knowledge. Care should be taken in choosing the sources of climate information to be used for the purposes of integrating climate change into development programming. Recommended sources include:

UNDP-Oxford Climate Change Country Profiles: Climate data analysis for 52 developing countries, nationally averaged data, based on old SRES climate scenarios see: http://www.geog.ox.ac.uk/research/climate/projects/undp-cp/

IPCC reports (http://www.ipcc.ch) Regional and sectoral chapters (WGII) and regional projections (WG1). Reference numerous individual studies that can be used in assessment

World Bank Climate Change Knowledge Portal: Historical climate data. Historical Variability Tool (station data). Future projections - averaged and downscaled for key variables (multi-model). Climate Risk and Adaptation Country Profiles - hazards, baselines, vulnerabilities. Development and climate impacts. http://sdwebx.worldbank.org/climateportal/index.cfm

University of Cape Town Climate Information Platform: http://cip.csag.uct.ac.za/webclient2/app/ Global map of observed sea-level trends with data for individual stations. Observed and projected (downscaled) climate data for Africa, by station. Plot ranges across 10 models, with 10th & 90th percentile values & extremes. Older version with SRES scenarios, new version with RCPs.