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Safeguarding development aid against climate change: evaluating progress and identifying best practice

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Abstract

Official development assistance (ODA) currently totals around $130 billion USD per year, an order of magnitude greater than international climate finance. To safeguard development progress and secure the long-term effectiveness of these investments, projects must be designed to be resilient to current variability and future climate change. Previous studies have identified where ODA projects are sensitive to climate. This paper goes further, to identify where action now might be justified to 'future-proof' these projects, given balance of risks and additional costs. We review 250 recent (since 2007) projects for three countries from two development organisations. In agreement with previous studies we find that around 30% projects have a medium or high *potential* risk from climate change. Between 5% and 55% of these projects (or 2% to 30% of the whole country portfolio) could require future-proofing now, given that they have long-lived outcomes that are difficult to adjust over time. We find that in many cases (80% for the World Bank and 13% for DFID) the risks associated with climate change are not mentioned in the documentation of these projects, but there are signs of improvements in integration over the past few years. More in-depth, project-specific study is required to better assess the true level of integration and the barriers that development professionals confront in this area. Finally, we identify best practice examples of how ODA projects can be made more resilient to long-term climate change.

I. Introduction

Tackling climate change is widely recognised as crucial to achieving long-term, sustainable poverty alleviation. Poverty alleviation and climate change are intimately linked (Stern 2007); the poorest people tend to be worst affected by climate impacts and will have the least capacity to adapt to climate change. Without appropriate interventions, climate change could create a vicious circle of growing vulnerability and impacts; the poor could be driven deeper into poverty and the gains achieved through development co-operation may be short-lived (World Bank, 2010). This risk is high on the political agenda. The May 2013 report of the High Level Panel on the Post-2015 Development Agenda reiterated that "*without tackling climate change, we will not succeed in eradicating extreme poverty*" (UN, 2013).

Many development agencies acknowledge that adapting[2] to climate change is critical to achieving broader development goals. As part of the Copenhagen Accord, developed countries agreed to mobilise $100 billion USD to support adaptation and mitigation by 2020[3].

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[2] Adaptation can be defined as *"adjustments in human and natural systems, in response to actual or expected climate stimuli or their effects, that moderate harm or exploit beneficial opportunities"* IPCC (2012).

[3] UNFCCC Document FCCC/CP/2009/11/Add.1 (paragraph 8)

The UK has committed a budget of £3.87 billion to the International Climate Fund (ICF) between April 2011 and March 2015, of which around half is allocated to adaptation, and the remainder to low-carbon development and forestry. Together, the Multilateral Development Banks provided $3.7 billion USD in adaptation finance in 2011 alone[4].

Yet this represents only a small fraction of total Official Development Assistance (ODA), which reached around $130 billion USD per year from OECD DAC (Development Assistance Committee) countries over the period 2010 to 2012[5]. It is crucial to ensure that these development programmes are resilient to climate change: firstly, to secure the long-term effectiveness and value for money of these investments; secondly, to safeguard development progress; and thirdly, to ensure that they do not inadvertently create negative impacts on long-term vulnerability (Klein, 2001). This is where we focus in this paper.

Past studies have explored where the project portfolios of development organisations are at risk from climate change (for example, see review by Klein et al. 2007). We present a framework for identifying what types of projects could require 'future-proofing' now; where 'future-proofing' is defined as an *additional action* to anticipate *future* risks and act now to reduce them *ahead of time*. The first part of this paper reports a risk screening exercise to identify such projects for three countries and two development organisations. The second part of the paper considers *how projects should be designed differently* to account for long-term risks today and draws examples of best practice from recent programmes.

II. Background: Integrating Adaptation into Development Co-operation

Today climate 'shocks', like droughts, flooding and storms, have a material impact on the development prospects of the poorest countries. Since 1980, weather catastrophes have caused almost 1.2 million fatalities and led to direct damages amounting to US$610 billion in low income (LICs) and lower-middle income countries (LMICs)[6]. For the poorest in society, these direct impacts can have a long-term influence on economic prospects and erode gains in poverty alleviation (World Bank, 2010).

Climate change is expected to increase the intensity of climate shocks in many regions. For example, the global land area affected by drought is expected to rise, scientists expect more heavy rainfall events and tropical storms are likely to become more intense in some areas (IPCC 2012). In parallel, gradual changes in climate, including rising temperatures, changing rainfall patterns and sea level rise, will affect human health, food systems, water supplies and ecosystems creating a more challenging environment for development (World Bank, 2010). These impacts will interact with other pressures, like population growth, urbanisation, resource scarcity, environmental degradation and conflict, magnifying their impacts.

The only way to limit future climate change is to substantially reduce greenhouse gas (GHG) emissions. But the world is already committed to further climatic change over at least the next 30 years due to past emissions (IPCC, 2013). Adaptation is the only option to safeguard development gains from the effects of this unavoidable climate change. Indeed, the lack of progress in abating global GHG emissions has led some experts to suggest that while we

[4] http://www.eib.org/attachments/documents/joint_mdb_report_on_adaptation_finance_2011.pdf
[5] Aid statistics from OECD DAC http://www.oecd.org/dac/stats/data.htm
[6] Data provided by Munich Re

should aim to limit temperatures to 2ºC above pre-industrial levels, we should plan to adapt to 4ºC (New et al. 2011). A 4ºC warming could put many millions of people at risk from coastal inundation, particularly in South and Southeast Asia, lead to a decline in crop yields across much of West and Southern Africa (New et al. 2011, World Bank, 2013). The progress made against the Millennium Development Goals is under threat (OECD 2009).

So what does climate change mean for development projects today? Klein 2001 describes three ways in which climate change could affect development projects:

- *The direct risk to the outcome and long-term viability of projects*. The risk of underperformance of 'climate-sensitive' projects, like those involving water supply and security, food security, natural resources management, human health, disaster resilience, and infrastructure due to climate shocks or long-term climate change;

- *The indirect risk to the outcome of the projects*. As climate change alters the natural, social, economic and political environment in which projects operate;

- *The effects of the project and its outcomes on the vulnerability of communities or ecosystems* to climate change. Projects unrelated to climate change can have benefits that help reduce vulnerability to climate. On the other hand, there can also be unintended negative consequences (maladaptation).

A failure to account for climate change appropriately could mean that projects do not deliver the expected development outcomes, and possibly put people at risk. It could also mean that investments need to be replaced or retrofitted before the end of their planned lifetime, increasing long-term costs and reducing value for money (Ranger and Garbett-Shiels, 2012).

This is a significant issue for development organisations (Klein et al. 2007). A review in 2006 concluded that 40% of World Bank projects were at significant risk from climate (World Bank, 2006). An OECD analysis assessed all official aid flows to six developing countries and found that half a billion USD per year in flows to each of Bangladesh and Egypt, and about $200million USD to Nepal and Tanzania, over 1998 to 2000 were at risk from climate change (van Aalst and Agrawala, 2004).

A review of assessments for six development agencies in 2007 concluded that climate risks were not well assessed in development projects and were rarely mentioned in project documentation (Klein et al. 2007). A more recent review of the World Bank portfolio drew similar conclusions (IEG, 2012); it concluded that there is a general lack of forward-looking, pro-active development projects, which anticipate future risks and act to reduce them ahead of time. In 2006, OECD member states agreed to a Framework for Common Action Around Shared Goals, as well as a Declaration on Integrating Climate Change Adaptation into Development Cooperation (OECD, 2006), which included a commitment to integrate adaptation into development co-operation. This commitment is now reflected in the goals of many development organisations. For example, in its 2011 to 2015 Business Plan, DFID committed to making programmes more 'climate-smart' (DFID, 2011a).

So what does integrating adaptation into development co-operation mean in practice? Here, we focus on only one component of development co-operation: ODA projects. Integrating (or *mainstreaming*) tends to involve 'climate-proofing' projects, so that they achieve their objectives irrespective of current and future climate variability, and to avoid any negative impacts on the long-term vulnerability of people or economies to climate (OECD, 2009; Klein et al. 2007). Integration can also identify opportunities for projects to reduce vulnerability and build resilience, for example, through investing in national meteorological services or ensuring water access rights to groups exposed to water scarcity (Klein et al. 2007). This integration can conceptually be distinguished from 'stand-alone' adaptation, where new activities are formulated with the expressed goal of addressing climate change risks, such as investments in climate change prediction or climate-specific capacity building activities. In practice, this distinction is not always clear (Brown and Kaur, 2009)

In practice, the integration of adaptation into development co-operation is often framed in terms of reducing vulnerability to current climate risks and building adaptive capacity through development (Klein et al 2007). For example, Fankhauser et al. (1999) find that long-term climate risks increase the rationale for enhancing *"the flexibility and resilience of systems to react to and cope with climate shocks and extremes, as well as to improve information"* and for "*policies aimed at overall development or reduction of other stresses than climate change [in order to] increase the ability to adapt [to climate change].* In other words, climate change increases the impetus to move '*faster and harder'* on core development objectives, including addressing the current "adaptation deficit" (Burton, 2009)[7].

In many cases, increasing resilience to current climate will also build resilience to future climate. But in some cases, managing future risks will require projects to do something *different* immediately, such as building differently, changing plans or making the project more flexible to its environment. The objective of this paper is to evaluate *where it is necessary to act now to manage future*[8] *risks in development projects.* Where should we go further than just being resilient to current climate and build in *anticipatory adaptation*[9] to future climate?

III. Where should development projects adapt to future risks today?

This paper focuses on 'future-proofing'; that is, taking action now to explicitly manage expected future climate risks. This is not the status quo in development interventions, where the incentive is for rapid impact and return on investment. The majority of climate/disaster resilience and humanitarian projects tend to be either reactive (managing events as they happen) or deliberative (learning from the recent past and adapting to it) (Jones et al. 2013).

The status quo is not necessarily the wrong approach given the (potentially) higher costs of making development projects suitable for *future* climate versus the urgent need today for development assistance and cooperation to alleviate suffering, extreme poverty and inequality. World Bank (2006) estimated that accounting for future climate in high-risk projects today could potentially increase project costs by between 5 and 15%[10]. In addition, many development projects are only around 3 to 5 years in duration; the returns on investing in additional anticipatory adaptation on those timescales, to cope with risks that may not be felt for 10 years or so, are likely to be small.

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[7] Equally we must be cautious and note that adaptation projects may be detrimental to the poor (Dercon 2012).
[8] The timescale here depends on the total lifetime of the intervention.
[9] Anticipatory adaptation is defined by the IPCC as adaptation that takes place before impacts of climate change are observed, in response to expected or predicted trends. Unlike building resilience to current risks, it requires anticipation of future risks and long-term planning (Fankhauser et al 1999).
[10] Such estimates should be interpreted with caution as the costs will vary significantly between projects.

The problem is that development projects can influence the vulnerability of communities (potentially irreversibly) well beyond the formal end of the project, potentially leading to a situation where short-term interventions can result in "long-term maladaptation, increasing vulnerability to climate shocks" (Brooks et al 2009, p.741). In addition, capital investments, like roads, bridges, major irrigation systems and dams, can last for many decades.

So, when is additional action now justified despite the costs? Fankhauser et al. (1999) lays out an economic framework for appraising the *optimal timing of adaptation*; that is, where there are benefits to adapting now to future climate, and where this can be left until later, given the additional costs that may be involved. [11] They concluded that early action is likely to be justified in the case of *"quasi-irreversible investments with a long lifetime (e.g. infrastructure investments, development of coastal zones)"*, where they suggest that "*precautionary adjustments may be called for to increase the robustness of structures, or to increase the rate of depreciation to allow for earlier replacement*". Another important area identified by Fankhauser et al. (2012) is where there are *long-lead times* for action, for example, research and development, building institutional capacity, and migration out of hazard-prone areas, which can take time.

In the context of development projects this suggests three areas where additional action today is justified to adapt to future risks:

Long-lived, investments with high sunk costs

A failure to account for climate change upfront in long-lived investments, such as hydropower stations, roads, dams or other infrastructure, could mean that they underperform or need to be retrofitted or replaced prematurely. Figure 1 illustrates where projects and policies today can have long-term implications; for example, new transport and energy infrastructure can last for 40 years or more, large dams for at least 60 years, and patterns of urban development (the layout of suburbs, roads and other infrastructure in a city), for more than 100 years. Capital investments are particularly prone to maladaptation because they tend to be difficult to change over time.

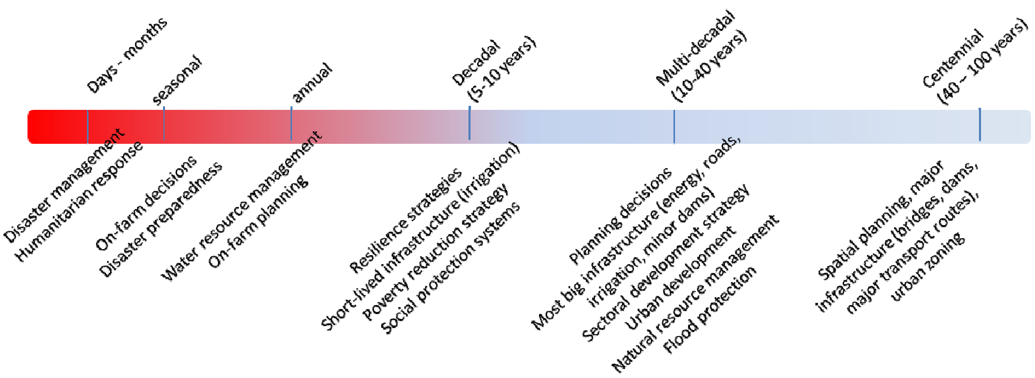

Figure 1: The timescales of different types of climate-sensitive decisions
Source: based on Stafford-Smith et al. (2011)

Long-term planning and policymaking

[11] This includes real costs, such as building a hydropower station so it that operates under a wider range of river flows, opportunity costs, and benefits foregone (e.g. from building on flood plains).

Long-lived policy and planning, such as growth strategies, sector development plans, poverty reduction strategies, coastal development plans, drought contingency planning and urban zoning can significantly can have far-reaching and complex consequences that influence vulnerability for decades. In many cases, they will have positive co-benefits long-term resilience (e.g. through strengthening governance, building capacity and increasing access to credit), but in a few cases, there is a risk of inadvertently committing people to greater and difficult-to-reverse risks from climate change down the line:

- A programme that promoted water-intensive agriculture may change behaviour semi-irreversibly and be detrimental if the climate became drier (IEG, 2012).
- Social protection systems influence vulnerability can also be difficult to adjust over time, due to political, social or legislative barriers.
- A rural roads programme that built intersections on floodplains could lead to urban development and put these communities at risk in the long-term (IEG, 2012)
- A project that built schools on a floodplain could, at best, limit access to education for local children, or at worst, put them in danger (Save the Children, 2008).

Importantly, even short-lived projects, like climate-smart agriculture or rural development programmes, can cumulatively add-up to major changes in long-term resilience.

Interventions with long lead-times

Where adaptation to future climate will take many years, it may need to start now. For example, building adaptive capacity can take time, as it can involve major changes in institutional structures, decision processes and behaviour. Research and development of, for example new crop types and piloting new agricultural technologies may take many years. Removing barriers to effective adaptation, such as weak governance, cultural norms, land and water rights, and skills and information, can also take time.

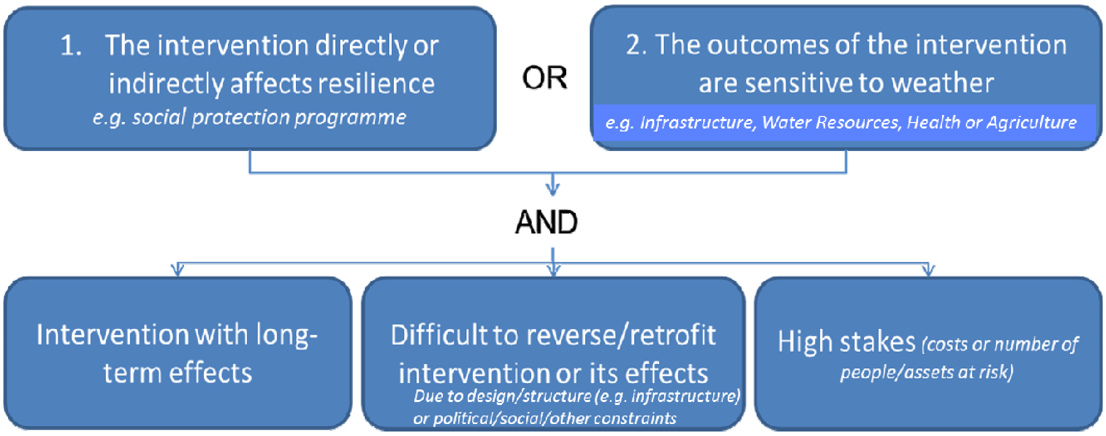

Figure 2: Simple framework illustrating the conditions under which long-term climate change is likely to be an important factor in the design of a programme.

Framework: where is 'future-proofing' necessary

These conclusions lead to a set of attributes and criteria that can help in identifying development projects where it would be beneficial to 'future-proof' investments and other activities now. In general, where the project or its outcomes are short-lived, low-cost or adjustable over time, then accounting for long-term climate change is less likely to be a central factor in design (Hallegatte, 2009). Conversely, where the project or its outcomes are long-lived, high cost and difficult-to-adjust then climate change is likely to be a central factor in design today (Ranger 2013). This framework is illustrated in Figure 2.

The reader should not draw from this that future climate change is not a central factor in more short-lived, flexible and lower-cost projects. Such projects have major opportunities to build resilience to climate (Klein et al. 2007), but this is not a focus on this paper.

IV. Analysis of development programmes in three countries

Several previous studies have assessed where the portfolios of development organisations are potentially sensitive to climate change (IEG 2012; Klein et al. 2007). We go further and also consider where there is likely to be a rationale for action today to 'future-proof' projects; managing long-term risks to implementation. We evaluate the project portfolios of two development organisations, the World Bank and DFID, for three countries over the period January 2007[12] to September 2013. All together, we evaluate almost 250 projects, with a total value in excess of $4.5 billion USD.

The three countries are situated in East Africa (country A), South Asia (B) and the Caribbean (C)[13]. Two of the three countries are low income (and one middle-income). They have very different geographies but each country is exposed to flooding (with several major events in the past decade) and to a lesser extent droughts, as well as other forms of natural hazards. The three countries are all considered vulnerable to climate change.

We use a screening tool, which combines elements from Burton and van Aalst, 2004 and DFID (2012) (See Annex A).[14] The purpose of a screening tool is to highlight where there is a *potential* risk that justifies further examination (Hammill and Tanner 2011). We refer to 'potential' risk because the screening takes no account of the quality of risk management within the project. In addition, we also build in new attributes that assess the urgency of 'future proofing' the project (Figure 2). Such a score was used in the UK's National Climate Change Risk Assessment (Defra, 2012) to give a measure of the urgency of adaptation.

We emphasize that this analysis is preliminary and should be seen in light of the following qualifications. Firstly, the findings from three countries cannot be extrapolated to all developing countries and the projects may not be representative for either organisation. Secondly, we do not consider additional activities within the country, including changes to development plans and the role of non-traditional donors. Thirdly, this evaluation is based on publicly available documents, which provide a limited picture of the projects and the organisations in question. For these reasons, this evaluation should be considered a snapshot that should be deepened with further analyses.

[12] The start date, 2007, is chosen as we suggest that this roughly the point in time when the linkages between climate change and poverty alleviation became much clear and more mainstream in thinking, following the release of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change in 2007, the Stern Review on the Economics of Climate Change in late 2006, and the Gleneagles G8 dialogue (with climate change and poverty as its two priority issues) in 2005.
[13] The countries remain anonymous in this paper.
[14] These rules are also consistent with guidance by USAID, GIZ, NORAD and others (Hammill and Tanner 2011).

Figure 3 shows the potential risks to the project portfolio, if climate change is not properly accounted for. In agreement with previous studies, we estimate that around 30% of the projects (by value) have a medium or high potential risk, but this varies by country and portfolio from about 20% to 80%. This is driven by the risk profile of the country and the types of projects within the portfolio rather than being a reflection of the quality of risk management. About 40% of projects were rated as negligible risk.

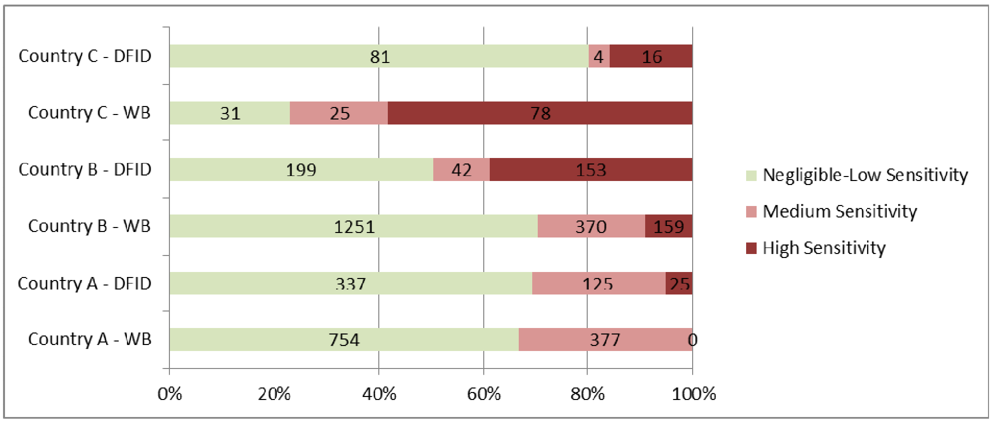

Figure 3: Preliminary assessment of the potential sensitivity of the project outcomes to climate change, if climate change is not properly accounted for. The values indicate the finance volumes.

For country C (Caribbean), around 80% of projects are rated as high potential risk. This could be because natural hazards and climate change are some of the greatest risks facing this country and therefore, development projects tend to focus on climate-sensitive sectors. It is also a much smaller portfolio and the findings are skewed by a few big projects.

The highest potential risk projects across all countries are mainly major infrastructure projects (hydropower, bridge maintenance, water supply infrastructure and post-disaster reconstruction projects) and weather risk insurance. The DFID portfolio also includes a number of climate change adaptation projects, which by their nature address sectors that are sensitive to climate. Medium-rated projects tended to be major agricultural programmes, social safety net programmes, regional electricity transmission line projects, water resource management, and rural roads development projects.

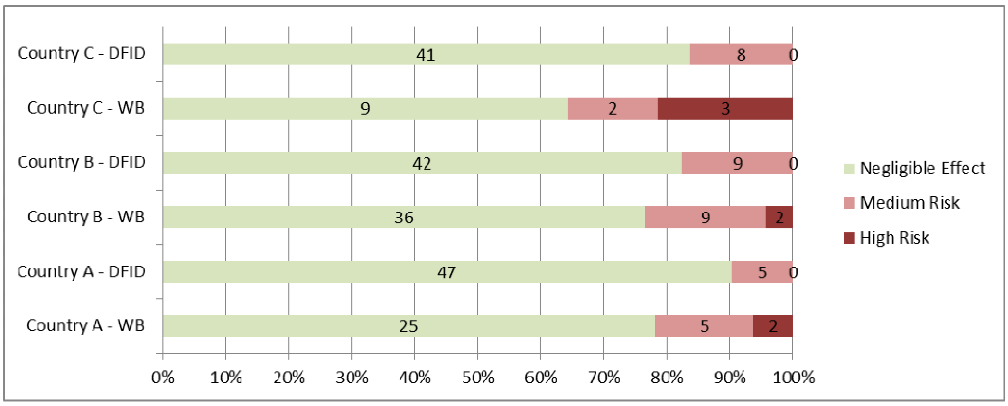

Figure 4: Preliminary assessment of the potential for a negative impact from the project on local resilience, if climate change is not properly accounted for. The values are by number of projects.

Figure 4 shows that between 10% and 35% of projects could potentially have a negative impact on local resilience if climate change is not accounted for properly; this represents 30% of the portfolio across the three countries and two organisations by value and over $1 billion USD. This includes many of those medium-to-high risk projects in Figure 3 (e.g. the failure of a hydropower station due to climate change would threaten local resilience), but also additional projects, such as support to extractive industries (which can both enhance and reduce resilience at different scales[15]) and urban governance (which affects urban resilience). This result should be balanced against our finding that over 80% of projects have a *strong* potential to increase long-term resilience; through, for example, building institutional capacity, increasing wealth and improving health, education and financial services.

Figure 5 suggests that a significant proportion of projects rated as having medium or high potential risk could require urgent action to 'future proof' activities against climate change. This varies significantly between countries, ranging from about 5% to 55% of projects (or 2% and 30% of all projects). Countries with more major infrastructure projects (as in the World Bank portfolios) tend to require more urgent 'future-proofing'.

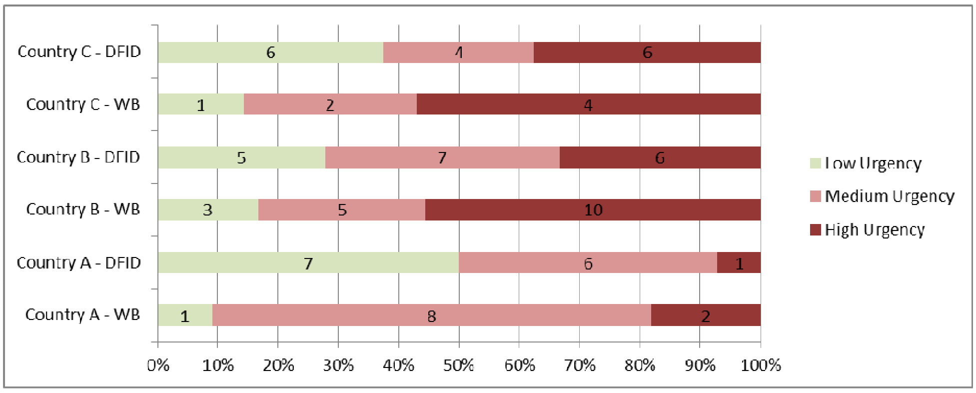

Figure 5: Urgency of considering long-term climate risks in development intervention for those projects at medium to high potential risk. Value are given in terms of project numbers.

Figure 6 summarises the types of projects that tend to emerge as 'high urgency' in the analysis. The most common are public buildings (schools, hospitals) and transport infrastructure, followed by urban planning, infrastructure and post-disaster reconstruction.

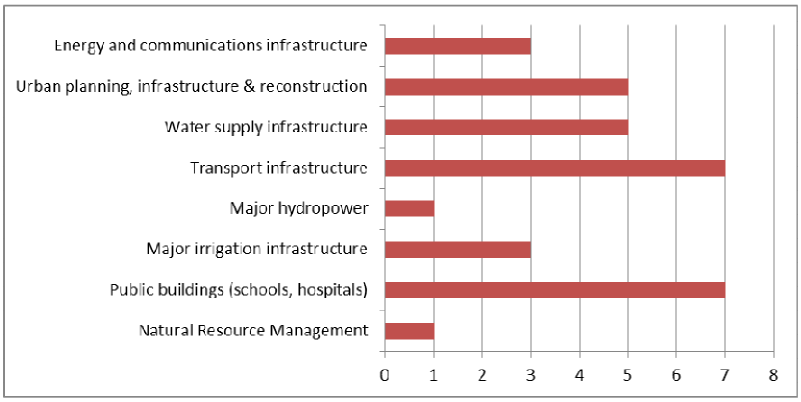

Figure 6: Types of projects rated as requiring urgent action and their count.

[15] It should be noted that extractive industries could, in local terms, reduce resilience of the environment and local communities. However, at the national scale could improve the ability of a country to manage external economic shocks (UNECA 2013)

The final part of this section analyses the project documentation of projects rated as medium and high potential risk to evaluate if and how climate is considered in the project design. The results are reported in Figure 7. Projects are rated as reaching one of five levels:

- Level 1. No mention of climate or climate change at all.
- Level 2. Climate risks mentioned in the documentation (but not climate change)
- Level 3. Climate change mentioned in the documentation
- Level 4. Risks from climate change to the project and/or opportunities discussed
- Level 5. Signs that resilience to climate change is integrated in the project design[16].

Three constraints on this analysis are noted. Firstly, public records are incomplete for some projects, particularly in the DFID portfolios in the earlier years; these projects are not included in the analysis. Secondly, some project documentation may not mention climate or adaptation, but may still serve to build resilience. Such projects would not be captured through this analysis. Third, this analysis provides only a limited review of the extent of climate risk management in the project[17] and no measure of the quality of implementation.

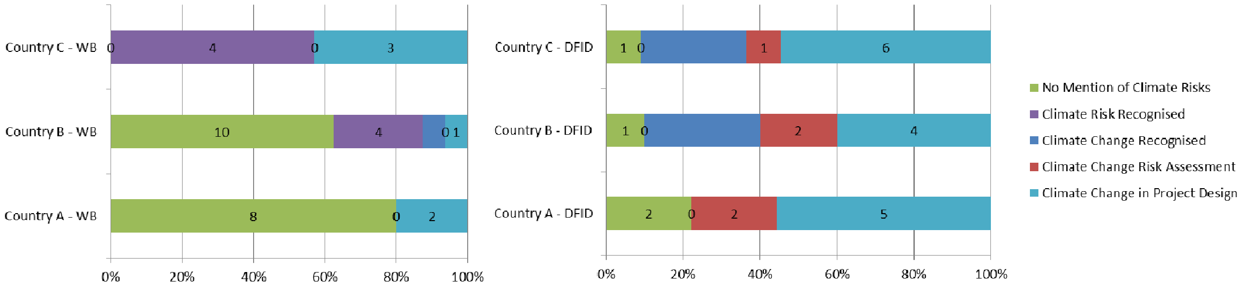

Figure 7: Treatment of climate risks and climate change in the project documentation of medium and high potential risk projects: (left) World Bank portfolio and (right) DFID portfolio.

Across the World Bank portfolio, we find that only 20% of medium-high potential risk projects mention climate change. Across the 93 projects reviewed, we found only six where climate change was explicitly considered in the project design. This included, for example, climate-proofing social protection systems, integrating climate change adaptation into reconstruction after a disaster, and incorporating knowledge generation and capacity building into projects. But performance varies significantly by country; for country C, all projects at least mention climate risks (Level 2) and almost half integrate resilience to climate change into the project design (Level 5). These findings are consistent with the recent World Bank Independent Evaluation Group's evaluation of the World Bank portfolio (IEG 2012).

There are indications that the DFID portfolio is beginning to integrate resilience to climate change into project design. Most medium to high potential risk projects (87%) at least mention climate change (Level 2) and about 50% consider the risks and opportunities to build resilience within the project design (Level 5). Some of these projects were climate change programmes (so would be expected to show a high degree of integration), but there were also examples of integration into non-climate change projects, for example, a growth and poverty reduction grant and an agricultural sector development project.

[16] For example, the project might include measures to reduce climate risks or build capacity to cope with climate change, or climate risks may feature in the options appraisal.
[17] For example, there it is difficult to establish whether climate change is merely 'name-checked' or 'tick-boxed' instead of being truly integrated into the project. This would require deeper investigation at project-level.

Figure 8 shows that there has been a clear improvement in the level of integration over time. It shows the proportion of all medium to high potential risk projects (where documentation is available[18]) that at least reference climate change in their documentation (i.e. reach at least Level 3 above) divided into two time periods (by project start date): 2007-2010 and 2011-2013. We find that all of the medium-high potential risk DFID projects at least reference climate change in the latter period, and the proportion of World Bank projects mentioning climate change improves from 14% to 22% inclusion. This estimate is consistent with IEG (2012), which found that the proportion of all World Bank projects mentioning climate change adaptation increased from less than 1% in 2000 to around 12% by 2011.

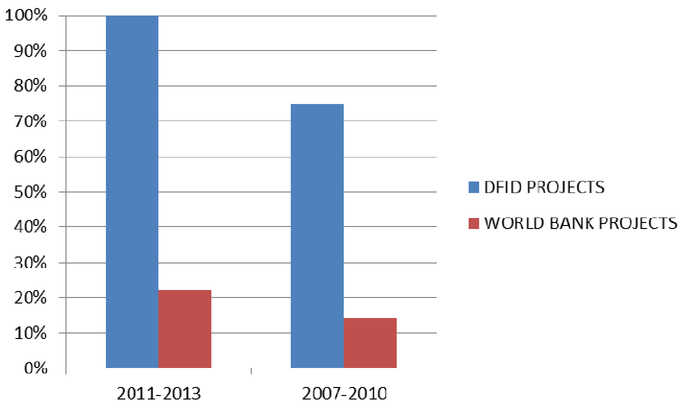

Figure 8: Proportion of projects rated as medium to high potential risk that at least reference climate change in the publicly-available documentation.

The higher level of integration within the DFID portfolio may partly reflect the introduction of the Climate and Environment Appraisal (CEA) process in late 2010. This made it mandatory for all DFID project business cases to include an assessment of the potential risks and opportunities from climate change to the project. DFID's Strategic Programme Review (2010/2011), International Climate Fund and 'Future Fit' initiative (2012/2013), may also have driven greater awareness and incentives for integration. More detailed study is required to assess the true extent of integration of (anticipatory) climate change adaptation both in project design and, most importantly, outcome. For example, we find that for some projects, climate change risks are given a thorough assessment within the CEA section of the business case and recommendations made, but then are not mentioned anywhere else in the documentation. An assessment of climate change risks was not mandatory within World Bank projects. We also note that the World Bank is a far larger organisation, so integration at the project-level will inevitably take longer to achieve. Given that climate change is a special theme for IDA 17[19], we expect the level of integration to increase over the coming years.

V. Integrating resilience to future climate risks into projects today

So, how should long-term climate risks be built into projects today? Evidence suggests that this does not necessarily mean that projects will look radically different, or that they will be

[18] For some DFID projects, particularly in the earlier period, no project documentation is publicly available.
[19] IDA17 is the next funding phase of the International Development Association (IDA), the part of the World Bank that focuses on helping the world's poorest countries.

more expensive. For example, Klein et al. (2007) stresses that it is not necessarily about technological measures, like building bigger pipes in drainage programmes or drought-resistant crops but can also include addressing the underlying drivers of vulnerability, providing training and capacity building and institutional support.

McGray *et al.* (2007) suggests that adaptation can entail a continuum of measures, from 'low-regret' measures like reducing vulnerability through human development and capacity building, through to making more significant adjustments to plan to explicitly address future risks, such as relocation and radical technological change (OECD, 2009). Based on a literature review and the portfolio review undertaken for this paper, we suggest that a similar continuum applies to integrating resilience to long-term climate change into development projects. For some projects, 'low-regret' measures may be sufficient, but a few may need to move further up to continuum toward major adjustments. Figure 9 illustrates this continuum; the pyramid structure reflects our expectation that there will be fewer projects requiring more radical adaptations. In this Section, we describe our proposed continuum and give best-practice examples from the wider portfolios of the World Bank and DFID.

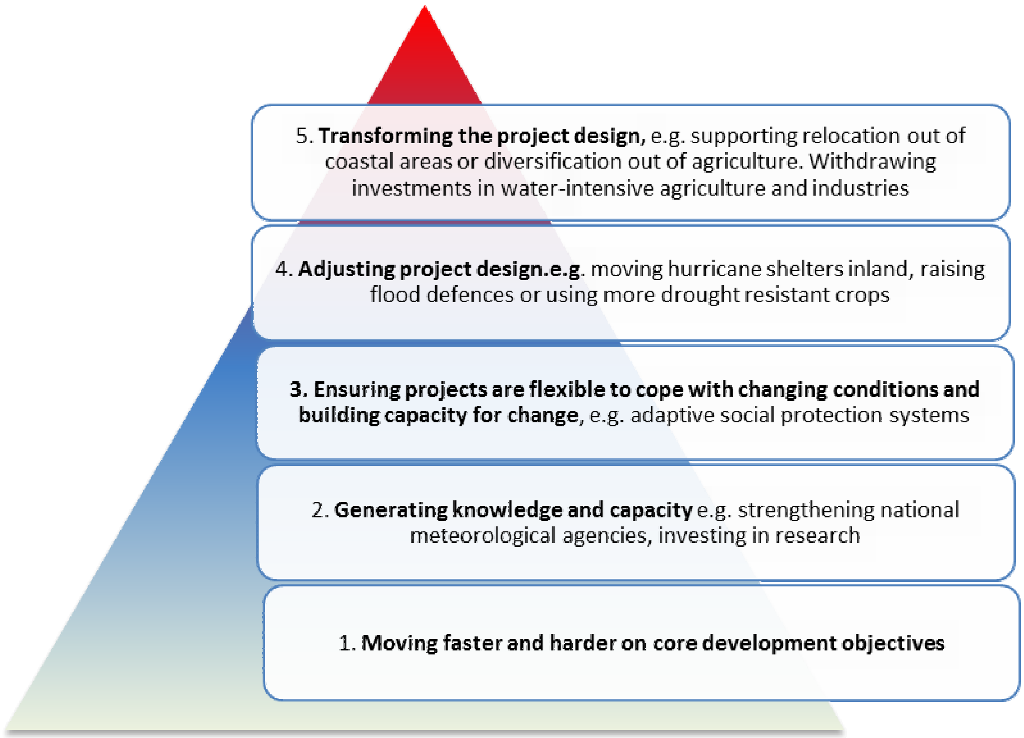

Figure 9: An illustrative scale of how the inclusion of climate change within interventions today may alter those interventions, relative to the counterfactual.

In line with McGray et al. (2007), we suggest that the first and second levels of the continuum of integrating *long-term* climate change are: firstly, increasing efforts to reduce vulnerability through good development and reducing other stresses; and secondly, building *general* capacity, including investing in knowledge and skills. Fankhauser et al. (1999) showed that long-term climate risks increases the rationale for moving *faster and harder* on core development and disaster resilience, and for investing in information. From our portfolios review, we observe that most of the projects that integrate climate change tend to fall into these categories, though this requires more project-specific study to confirm.

An example is the *"Adaptation for Smallholder Agriculture Programme"* (ASAP) (DFID, 2012b), launched in 2012 by the International Fund for Agricultural Development (IFAD). ASAP works in forty countries to invest in practices and knowledge to build the capacity of smallholder farmers to manage current risks and adapt to climate change[20]. It aims to safeguard the food systems on which poor smallholder farmers depend and demonstrate how to scale up practices and technologies to build resilience and increase prosperity.

Another example is the Ethiopian Productive Safety Net Programme (PSNP) Climate Smart Initiative (CSI) (World Bank, 2013). The PSNP provides food and cash to food insecure Ethiopians; in a typical year fourteen million Ethiopians do not have enough food to eat and climate variability is an underlying driver[21]. To address chronic food security over the long-term, Ethiopia needs to build a consideration of climate change into its current food security programming. The PSNP CSI will enhance adaptive capacity through improving information flows, such as weather information and early warning systems, and supporting local decision making in the PSNP. It will also help to build capacity to adapt for the long-term by enabling communities to diversify livelihoods and introduce new technologies.

The third level is where projects begin to look very different. The focus here is not on making radical changes now, but on designing the project so that it can anticipate, learn and evolve over time to cope with changing climate risks, while still achieving its objectives (Walker et al. 2012). The most commonly cited example of this is the Thames Estuary 2100 Project, where instead of building a costly new flood barrier for London today, a plan was constructed where the flood management system could be adjusted incrementally over time as was more learnt about future risks. The same principles can be transferred to development interventions (Ranger 2013); an example is an *adaptive* social protection system, which is designed from the start to expand or contract in response to changing needs (IDS, 2012).

These first three levels are 'low-regret'; they are low cost and likely to have benefits today and in the future (OECD, 2009). The next two levels entail measures that are designed explicitly to account for future risks now. Designing these types of projects will likely require more technical expertise and information, including detailed analyses of risks under different climate and socioeconomic scenarios and quantitative assessments of options. This is likely to apply to fixed, long-lived capital investments that are difficult to adjust.

The fourth level is akin to Klein *et al.*'s "*building bigger pipes in drainage programmes or drought-resistant crops".* It can mean changes in engineering (higher sea walls, better drainage systems, resilient school buildings), new practices (climate-smart agriculture), new policies (water permits, resilient urban zoning and stronger building codes) and different technologies (rainwater harvesting, insurance) (OECD, 2009). We find a good number of examples of these in the portfolios, mainly in disaster reconstruction and school and hospital building programmes; two examples are:

[20] These will include small scale water-harvesting and storage, flood protection, irrigation systems, agroforestry, and conservation agriculture, strengthening farmers access to markets and information (e.g. weather forecasts), and working with governments on policies to enable growth and climate resilience agriculture (DFID, 2012).
[21] This is in return for labour for those who can provide it (around 80% of beneficiaries), and as a grant to those who are elderly and sick (around 20%) (DFID, 2012c)

- The Haiti Strategic Programme for Climate Resilience (CIF, 2013), which conducts a detailed assessment of climate change risks and proposes a strategy to engineer its infrastructure, agricultural systems and coastal cities to cope with future risk, as well investing in measures to build adaptive capacity through climate monitoring, training and institutional strengthening.
- The $412 million Trung Son Hydropower project in Vietnam that adopted high safety standards, zoning and warning systems and built a secondary “fuse dam” to reduce the risks associated with failure due to changing river flows (IEG, 2012).

Finally, the fifth level is a transformation of a project. Stafford-Smith *et al.* (2011) describe how in the highest risk areas, communities may need to transform where and how they live to cope with climate change. One example is a Small-Island State, where populations may need to relocate to escape rising sea levels. We suggest that in some cases, development projects may need to similarly transform, or drive transformational change in societies.

We observed very few examples of where this has been done in practice, though further analysis is needed to confirm this observation. One example is a recent World Bank project in India (reported by IEG, 2012). The Indian portion of the Sundarbans, a great mangrove-dominated delta facing the Bay of Bengal, is home to more than 4 million poor people. Many live at or below sea level and are at constant risk from floods and cyclone. An analysis found that many well-intentioned and apparently adaptive activities, like strengthening embankments, were maladaptive, boosting long-run vulnerability. While there are urgent poverty challenges it concluded business-as usual development is not sustainable in the long run. Instead, the project proposes that the Sundarbans embark on a multigenerational plan to re-engineer estuary management (e.g. moving back defences and allowing mangroves to recover) and enable welfare-improving voluntary out-migration from the most threatened areas, including through education. In the short-term, this would be complemented by investments in early warning systems, cyclone shelters, and health, water and sanitation services (IEG, 2012). These types of programmes can be extensive and entail difficult and complex trade-offs.

VI. Discussion

So, why is there so little evidence of integration of climate change into development programmes? Hammill and Tanner (2011) report that the difficulties in identifying and assessing climate and complex vulnerability information is often cited as one of the biggest challenges in integrating climate change into development projects. There is also a lack of information about the costs and benefits of different adaptation measures and until recently, little robust or systematic monitoring and evaluation of adaptation.

Historically, planning and policymaking is often slow to react to changes in the relevant institutions external environment and have limited capacity to learn from and foresee change. The challenges to ‘future-proofing’ may include (IPCC 2012):

- There may be a general lack of awareness of the issues.
- ‘Future-proofing’ will require more time, resources, information and technical capacities, in an environment where there are already constraints.

- The administrative separation of finance for 'specific and additional' adaptation from normal development programme finance may also create a barrier in this respect.
- The incentives on development professionals for projects that deliver rapid impacts and high returns on investment will tend to reduce investment in adaptation, which is often percieved as having more uncertain, long-term, difficult-to-quantify and sometimes intangible benefits.
- A lack of long-term monitoring and evaluation systems for adaptation.

An often cited challenge in integrating future climate into decisions today is the uncertainty over long-term climate projections (IPCC, 2013). Most risk assessments are backward-looking; but planning for climate change requires a more forward-looking approach. The risk of getting it wrong increases as one moves up the continuum of adaptation (Fig. 10). For the first three types of adjustments (Fig. 9), uncertainty is unlikely to be important as the measures are 'low-regret' (OECD, 2009). Where major changes to plans are made to account for long-term climate change, the potential for maladaptation is greater. Uncertainty means that we cannot 'optimize' the design of a project to a particular future climate. However, in theory this should not be a barrier to integrating resilience to climate change into development projects (Ranger, 2013). A desirable approach is one that is "*robust, meaning that it performs well under a wide variety of futures, and adaptive, meaning that it can be adapted to changing (unforeseen) future conditions"* (Walker et al. 2013). There are tools available to help do this in practice, for example 'futures' techniques like scenario planning and methods for decision making under uncertainty (Ranger, 2013)[22].

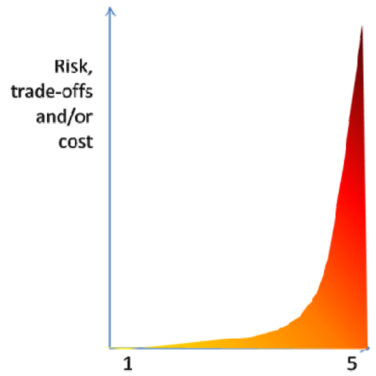

Figure 10: Illustration of how risk, trade-offs and costs increases along the continuum given in Fig. 9

A further issue is the potential trade-offs between long-term resilience and short-term poverty alleviation (Dercon, 2012). For example, more drought-resistant crops tend to have lower productivity. Another example is the Sundarbans case given above. In that case a balance was struck by both planning for the long-term by relocating some people and investing in building resilience and reducing poverty in near-term. These '*wicked problems'* in adaptation require a high level of understanding of the complex societal processes that generate poverty and vulnerability (Klein *et al.* 2007; Jones *et al.* 2013).

[22] See also, for example, the work of the Mediation programme (http://www.mediation-project.eu/platform/pbs/home.html) funded under the EU's 7th FP.

What more can be done to enable and promote 'future-proofing' of development projects? Appropriate evidence and tools are a foundation to this; for example, there is a need for further economic analysis to identify where and how long-term risks should be built into projects today and to provide learning examples. Training and skills will also be important in applying evidence and tools in practice. But, the most important advance must be to build an institution that creates the right incentives to integrate climate change; this requires leadership to institute a cultural change toward placing a greater value on the long-term sustainability of development investments and progress.

Both organisations are working to deliver both specific climate change interventions and also mainstream climate change across other areas through portfolio screening or safeguard systems. For example, the DFID Future Fit programme initiative aims to integrate long-term resilience to climate change and resource scarcity across all DFID programmes. By coupling climate change resilience to the disaster resilience agenda (DFID, 2011), provides an opportunity to do this more efficiently[23]. For the World Bank, climate change is a special theme for IDA 17, and the Bank has committed to "integrate climate risk into all new developments" (World Bank 2013c); it is also worth noting the Management Response to the recent IEG evaluation of World Bank experience with adaptation.[24] We recognize that changing the operations, practices and behaviors of large institutions takes considerable effort, time and leadership. This evaluation should therefore be considered an initial snapshot and should be repeated after IDA17 and broadened with further analyses.

VI. Conclusions

This paper gives a framework for identifying where and how development projects should integrate long-term climate risks into their design today. We conclude that portfolio-level screening can be a useful tool, but more project-specific evaluations are needed to assess the extent to which long-term climate is being integrated into projects in practice and the barriers faced by development professionals in this area.

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[23] DFID is conducting a number of activities to integrate disaster resilience into programmes, including pilots and risk assessments (DFID, 2011). A similar framework would be needed to deliver climate change resilience. Coupling the two processes together would therefore be more efficient.
[24] Available from: https://ieg.worldbankgroup.org/Data/reports/chapters/cc3_mgmt_response.pdf

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Annex A: Climate Change Risk Screening Tool

The project screening conducted in this study aims to identify where there are *potential risks* to a project, based on a set of attributes and criteria about the programme. The attributes and criteria are taken from EuropeAid (2009), DFID (2012) and Burton and van Aalst (2004) (which are all similar). It is a simple rules-based rating tool, similar to those currently used by DFID, USAID, ADB and GIZ (Hammill and Tanner, 2011). The tool used in this paper also screens where action may be needed today to enhance the resilience of the project to long-term climate change. These attributes, explained in Section II and Figure 2, are drawn from Defra (2012). The tool inevitably requires some professional judgement to apply. To reduce biases, we calibrate our ratings against the examples given by Burton and van Aalst (2004). The tool benefits from a basic level of knowledge about how climate change may affect the country(s) in which the project operates.

A. **POTENTIAL DIRECT OR INDIRECT EFFECTS OF CLIMATE ON PROJECT OUTCOMES**

Is the achievement of the programme's objectives directly and significantly dependent on the climate over the coming ten years or more?
Could the programmes objectives be indirectly affected by climate change? E.g. The achievement of objectives in a rural development programme may be highly dependent on the availability of increasingly scarce water for irrigation

High	*Possible major threat to long-term success of project* E.g. The projects is a large fraction composed climate sensitive sector (e.g. >50% agriculture, infrastructure or water) and entails climate sensitive activities (e.g. irrigation, water supply management, malaria).
Medium	*Outcome of project could be affected by climate, but unlikely to be a major threat to long-term success. E.g. Some elements of the project are subject to climate risks (e.g. >20%* in climate sensitive sectors or with >10% climate sensitive activates) *or exposed to indirect effects from climate change* (e.g. schools in risky areas). Also, projects that are climate-sensitive, but are likely to have benefits under any climate (e.g. social protection, capacity building in agriculture).
Low	*Climate change unlikely to be a threat to long-term success of programme.* Minor inclusion of climate sensitive sectors and activities OR potential indirect effects from climate change.
Negligible	Climate sensitive activities make a negligible fraction of the project

B. **EFFECT OF THE PROJECT ON LOCAL OR REGIONAL VULNERABILITY**

Are there any indications at this stage that the project could have positive impacts on vulnerability? (Y/N) e.g. Does the project enhance governance capacity?
Are there indications that the project may increase the vulnerability of the population to climate variability and/or the expected effects of climate change?

High	*Project could have a strong effect on the climate risks facing the country or region*. E.g. infrastructure could trigger development in dangerous areas, even if the infrastructure itself is not at risk.
Medium	*Project may have indirect effects on the vulnerability of communities*. E.g.an agricultural market reform project that removes subsidies from certain crops can lead farmers to switch to crops that could make them more vulnerable to climate variability and change.

C. URGENCY OF INCORPORATING CLIMATE CHANGE

(i) LIFETIME: How long will the outcomes of the project last: Long (>30 years), Medium (10 – 30 years), Short (<10 years)

(ii) FLEXIBILITY: How easy it is to change the activities to adjust over time? (Low, Medium, High). *E.g. Infrastructure is an inflexible investment, whereas early warning systems can be adjusted every year*

(iii) SCALE: How large is the project: Large (>50m), Medium (>5m), Small (<5m)