Integrating Climate Change Information and Adaptation in Project Development

Emerging Experience from Practitioners

European Financing Institutions Working Group on Adaptation to Climate Change

I. Background

a. This note has been developed by technical experts collaborating in the European Financing Institutions Working Group on Adaptation to Climate Change (EUFIWACC), which consists of the Agence Française de Développement (AFD), the Council of Europe Development Bank (CEB), the European Bank for Reconstruction & Development (EBRD), the European Commission's Directorate-General for Climate Action (DG CLIMA), the European Investment Bank (EIB), KfW Development Bank (KFW), and the Nordic Investment Bank (NIB). It is an output emerging from the EUFIWACC Climate Risk Information Day for Consultants held on 2nd June 2015 in Brussels, and subsequent discussions and exchanges. Numerous reviewers have contributed to the development of this note[1].

b. This note is a 'version 1.0' document that is intended to be updated and improved based on evolving experience with climate change adaptation and related financing activities. It is the result of the common work of technical staff of the EUFIWACC group together with a consultative group of consultancies. However, it is not binding for any of the EUFIWACC member organisations, and this work contains the views of the authors and does not necessarily reflect the views of the EUFIWACC members, their governing bodies or members.

c. This note is intended as an information resource which brings together emerging experience in support of tasks relevant to a wide range of project development activities. These may include the development of strategies and plans, pre-feasibility and feasibility studies, audits, technical assessments or environmental and social due diligence, risk assessments, etc. It is intended to help practitioners and beneficiaries to ensure that climate change risks and vulnerabilities are properly assessed, and that appropriate and robust adaptation measures, which may include physical measures, actions, or financial measures, are integrated into project planning, design and implementation. The overall aim is to promote the climate resilience of projects and reinforce climate resilience of goods, peoples, economy and territories of the beneficiaries.

d. The proposed approach should be considered as a continuous learning process in a context where new tools for decision making under uncertainty are needed, and where the track record regarding best practices or specific due diligence is still developing. In this context, where analysis will generally not lead to one specific pre-determined adaptation solution, but to a range of solutions with different cost, benefit or risk values, shared decisions between all stakeholders of the projects, regarding which climate resilience and adaptation measures to implement and when, is a key element.

e. It may be used in to support a variety of projects and funding arrangements, and is intended to complement different project management methodologies. It is intended to complement the existing approaches and tools currently used by the EUFIWACC member organisations, and to cater for their specific and different remits. It may be used comprehensively or selectively taking into account the specifics of the project and context. However, while the terminology used in this note is considered to be suitable by all the member organisations, it may not be fully in line with the specific terminology currently in use in each of them.

[1] See Annex 1 for information about the contributors to this note.

II. Introduction

a. EUFIWACC members acknowledge the importance of promoting climate resilience through their operations. EUFIWACC members also consider that the assessment of climate change risks and the integration of appropriate adaptation measures in order to promote climate resilience are essential steps in project development. This will help make their investments more sustainable by supporting assets, services and businesses that are more resilient to the impacts and consequences of current and projected future climatic conditions.

b. Climate change adaptation should be considered in upstream planning and policymaking in order to set a clear context for interventions at the project level. Climate change impacts should be taken into account in the development of strategies and investment plans by governments, local authorities, communities and businesses. This will require adopting approaches for decision making and planning that reflect the high degree of uncertainty around climate change impacts. It may also influence the prioritization of economic sectors that are less vulnerable to climate change, as opposed to those that are highly exposed. In some cases, the most appropriate adaptation decision may entail not proceeding with an envisaged investment or project. There may also be a need for support for the implementation of climate change adaptation strategies and plans, and for developing relevant approaches such as climate vulnerability assessments, risk assessments, economic and/or sustainability impact assessments, and decision making support tools.

c. As the integration of climate change adaptation into planning and policymaking is a long-term process, taking no action in the meantime may reinforce risks of maladaptation and higher adaptation costs in the future. EUFIWACC members are therefore interested in outlining processes that help to integrate climate change adaptation into their investment activities, taking into consideration the inherent uncertainties and complexities, and aiming to develop flexible approaches that align with the climate risk profiles of projects and project partners. This note outlines a framework for the integration of adaptation measures in order to promote the climate resilience of projects and their economic, social and environmental benefits.

d. A climate change adaptation assessment is usually more effective when initiated at an early stage of project development so that appropriate adaptation measures can be built into project planning, design, operation and maintenance in order to promote climate resilience. Projects should be screened for climate risks, vulnerabilities and opportunities as early as possible in the project cycle. Avoid as far as possible 'end of pipe' climate resilience measures that are added on to project design at a late stage, as these are often more costly and less effective. In some cases, an early assessment leads to a more climate resilient outcome by informing fundamental decisions around project location or infrastructure type and technology options, e.g. avoiding construction in floodplains altogether.

e. A climate change adaptation assessment may be integrated into a range of appropriate project development steps, which may include, inter alia, strategies and planning, pre-feasibility and feasibility studies, audits, technical assessments, risk assessments, or environmental and social due diligence, e.g. environmental and social impact assessments. In order to illustrate how this may be done, the remainder of this note describes aspects of guidance which can be relevant during different stages of the development of plans, programmes and projects.

III. Guidance topics

Assessment scoping

a. Project boundaries may be established that take into account the assets and systems being financed while also carefully accommodating wider 'outside the fence' boundaries as needed, for example infrastructure, systems, communities, institutions or ecosystems that directly affect, or are affected by the performance or sustainability of the project (e.g. power supply, transport links, lake providing cooling water). These project boundaries should define the scope of the climate change adaptation assessment.

b. An appropriate timescale over which climate change impacts are assessed should be established. This should match the intended lifespan of the assets, systems or institutions being financed under the project. In some cases, it may be appropriate to use observed data plus more than one time horizon to understand shorter-term and longer-term climate change implications, bearing in mind that the longer the time-span, the greater the uncertainty. This should consider planning, construction, financing, operational and design life cycles as well as decommissioning and/or removal or replacement. In order to assess the climate change signal above observed climatic variability, the characteristics of future climate should be assessed over a period of at least 20 to 30 years, e.g. near future (2021-2050) and far future (2070-2099). A baseline scenario of a suitable historical reference period should also be used.

c. Preliminary priority vulnerabilities should be identified for the climate change adaptation assessment, focussing on key climate change risks that could significantly impair, or potentials that could enhance the performance of the project or system. This step should also include learning from past project experience of weather and climate impacts, including challenges faced during responses and recovery to the impacts of climate-related events. Scoping may include benchmarking comparable investments/infrastructure.

Climate information and impacts

a. A clear context of vulnerability to climate variability and change should be set using a robust evidence base, which may include using existing, authoritative and preferably peer-reviewed analyses[2] or reports such as the Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC AR5), National Adaptation Strategies and/or Action Plans (NAS/NAPs), National Adaptation Programmes of Action (NAPAs), Nationally Determined Contributions (NDCs), Strategic Programmes for Climate Resilience (SPCRs), and other relevant adaptation strategies and policies, and academic journals[3]. An initial review at the national level should be followed by a more detailed assessment focusing on the project area.

b. A wide envelope of climate change uncertainties should be explored by drawing on a range of climate change model projections, including an appropriate[4] range of emissions scenarios, general circulation models (GCM), and downscaled data when available, appropriate and robust. For projects or assets with longer lifespans where emissions uncertainty can be important, the assessment should explore the consequences of a range of relevant GHG emissions scenarios commensurate with likely outcomes of international climate policy (e.g. RCP2.6 and RCP4.5). In general, the longer the lifespan of the asset, the wider the range of scenarios that should be used. Climate change uncertainties should be presented and interpreted in a transparent way, taking into account any underlying model uncertainties, data weaknesses or spatial scale limitations. Impact modelling using the outputs of climate models (e.g. hydrological models) should adopt the same explicit approach towards presenting uncertainties. Where appropriate, extreme or peak climate-related events (e.g. peak temperatures, storms, floods) should be considered and explored (subject to careful assessment to take account of the potentially strong bias of high temporal resolution data), as well as projections of mean climate conditions, e.g. mean temperatures.

Project Planning and Design

a. A clear and direct link between the context of climate vulnerability and the planning and design of the project, should be articulated, by mapping the vulnerabilities against the specific components, functions and objectives[5] of the project, and the assets, systems or institutions being financed or affected.

b. A comprehensive assessment of climate risks should be carried out based on the identified project vulnerabilities, the exposure of its components to projected climate hazards, and the probability of those hazards to materialise. This should identify the key risks to be addressed and the gains to be expected in terms of reduced vulnerability and/or increased resilience. Priority climate risks should be prioritised in a way that takes into account potential impacts and probabilities:

- Mapping of risks: where, how and why
- Characterisation of the risks: tangible, intangible

[2] Robust and authoritative climate change information sources should always be used, of which a non-exhaustive list is shown in Annex 3.

[3] National Communications to the United Nations Framework Convention on Climate Change (UNFCCC) may need to be supplemented by other authoritative sources of information.

[4] Appropriate for the size, type and lifespan of the project.

[5] These may include economic, social and ecological objectives.

- Time-space value: where and/or when a given risk represents the highest threat
- Economic evaluation: expected damages to the project
- Decision matrix: determine risk management actions and priorities

c. The results of the climate risk assessment may be used to inform project planning and design, in order to identify and appraise a range of adaptation options for tangible improvements in the climate resilience of the systems, assets and infrastructure being financed under the project with different values in terms of cost, risk or impact. This requires the use of robust climate change information (as outlined above) to inform better decisions in the design and appraisal of such investments, for example through technology selection (e.g. wet process vs. dry process; water cooling vs. air cooling), or modifications to infrastructure design specifications (e.g. altered spillway capacity or quayside height), or by implementing a flexible design that can be adapted at a low or moderate cost.

d. Both structural and non-structural adaptation measures should be considered in response to the project-specific climate risks identified. For example, structural measures may include modifications to the design or specification of physical assets and infrastructure, or the adoption of alternative or improved technologies. Examples of non-structural measures may include improved monitoring or emergency response programmes, capacity building, staff training and skills transfer activities, the development of strategic or corporate climate risk assessment and management frameworks (based on a thorough assessment of institutional capacities and development needs), or financial solutions such as insurance against supply chain failure. A combined method may be used to ensure project readiness for enhancing resilience at a later stage. In such a case, there may be minimal structural modifications at the outset, with the project designed in such a way that facilitates more rapid action at a later stage, if and when necessary.

e. The adaptation recommendations should be as specific as possible, in order to identify the specific components, equipment or attributes of the assets or systems being financed that are critical for climate resilience. Wherever possible, identify specific and quantifiable performance standards or thresholds that can serve as benchmarks for ensuring that critical assets and systems are resilient to the projected range of future climate conditions, and allows performance monitoring over time. Clearly state the targeted benefit of each adaptation measure and suggest suitable project-level indicators[6], which should be gender-disaggregated where appropriate.

f. Established 'international best practice' industry standards or guidance on adaptation should be used wherever possible and appropriate. This may include, for example, standards/guidance on adaptation developed by specific industry associations (e.g. buildings, ports, hydropower, etc.)[7], or by national or international standards associations (see Annex 4). As much of this kind of guidance has been developed in OECD countries, it may be necessary to make adjustments in order to reflect conditions experienced in developing countries and emerging economies.

Analysing and Explaining Risks, Costs and Benefits

a. A range of adaptation measures to address the identified climate risks should be explained and analysed. These should be compared in terms of cost and benefits in order to inform decision making.

b. The costs (if any) associated with adaptation measures should be clearly explained and expressed where possible in monetary terms, giving costs estimates at a level of detail appropriate for the project and based on currently available information. The social or institutional costs (change of behaviour, impact on particular groups of people, etc.) associated with adaptation measures should also be clearly assessed and explained where appropriate.

c. The expected benefits of recommended adaptation measures should be clearly explained. Such benefits may be estimated in terms of projected improvements in system performance (taking into account climate change impacts), estimated resource savings (taking into account projected future resource availability or costs), or avoided damages. This should be expressed in financial terms where possible and appropriate.

d. These analyses and explanations will be necessary in order to reach agreement with project partners including importantly the beneficiary, on the inclusion of climate resilience measures in project design and finance agreements. This should acknowledge that in some cases, such as short-lived assets, the most acceptable course of action may be not to adopt any specific adaptation measures but simply accept some damages or losses, or alternatively insure against such damage or losses.

e. The estimated costs and benefits of recommended adaptation measures should be analysed. Taking into account the costs and benefits of recommended adaptation measures, the financial and economic viability of the measures should be explored. A reasonable timespan and relevant financial indicators should be used culminating in the presentation of applicable financial indicators such as net present value (NPV), internal rate of return (IRR) or cost-benefit ratio (CBR) where appropriate, or semi-quantitative approaches[8] when financial metrics cannot be reliably calculated or used.

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[6] e.g. SMART – Specific, Measurable, Achievable, Realistic and Timely

[7] e.g. UK Chartered Institute of Building Services Engineers (CIBSE), World Association for Waterborne Transport Infrastructure (PIANC)

[8] e.g. semi-quantitative cost-benefit analysis (CBA)

Communicating Findings

a. The findings and recommendations should address both the climate resilience of the project and the system or network within which it operates, even if outside the direct control of the project partner. For example, a climate change adaptation assessment of a transport project may result in specific changes to the project itself, plus further recommendations for the wider transport network within which the project sits. The identification of potential cascading or third party risks should be made clear to potentially affected parties and in a transparent way.

b. Climate risk assessment findings and adaptation recommendations should be communicated in a transparent way that allows them to be used in decision making about the project and its implementation by the client, partner or beneficiary (and which may involve other stakeholders and involve public consultation). This will require an appropriate level of explanation and substantiation of the recommendations to the client, partner or beneficiary and other stakeholders, as well as for the financing institution. Communication should focus on impacts, risks and recommended actions, rather than focusing on the scale and nature of change which risks reversion to a debate on climate science rather than a focus on investment and response. These should be gender responsive and inclusive, and disaggregated on gender basis if and where appropriate.

Implementation, Operations and Monitoring

a. The final adaptation recommendations should be presented in a form that can be integrated into financing agreements and detailed project design documents. Financing institutions may need to covenant climate resilience commitments into finance agreements in order for them to have meaningful influence over the use of project finance. Management recommendations should also be presented in a form that can be integrated into tender documentation or operations manuals. Where appropriate, priorities for technical cooperation for capacity building or skills transfer should be included in response to identified adaptation needs. These recommendations should also consider the long-term sustainability of a project, with consideration of what will happen after project completion, in order to secure the transition towards a self-sustaining phase beyond the project implementation or construction.

b. Effective monitoring and evaluation measures should be proposed, for both the construction and operation phases, to assess delivery of adaptation features, and their effectiveness. Monitoring indicators should be gender disaggregated if and where appropriate.

ANNEX 1: Acknowledgements

The technical experts from EUFIWACC would like to thank:

- Climate Service Center Germany (GERICS) for their assistance and contribution to the EUFIWACC Climate Risk Information Day for Consultants held on 2nd June 2015 in Brussels, which has through further exchanges, led to the development of this note.
- JASPERS (Joint Assistance to Support Projects in European Regions) for contributions and input to this note.
- The various consultancy companies who attended the above Information Day and/or have contributed to the discussions and exchanges that followed, leading to the preparation of this note.

ANNEX 2: Glossary of Terms

Adaptation (to climate change)

IPCC AR5 definition: The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate harm or exploit beneficial opportunities. In natural systems, human intervention may facilitate adjustment to expected climate and its effects.

UNFCCC definition: Actions taken to help communities and ecosystems cope with changing climate conditions.

Adaptive Capacity

Adaptive capacity is the ability or potential of a system to respond successfully to climate variability and change, and includes adjustments in both behaviour and in resources and technologies. The presence of adaptive capacity has been shown to be a necessary condition for the design and implementation of effective adaptation strategies so as to reduce the likelihood and the magnitude of harmful outcomes resulting from climate change. Adaptive capacity also enables sectors and institutions to take advantage of opportunities or benefits from climate change, such as a longer growing season or increased potential for tourism.

Baseline Period

The baseline (or reference) is the state against which change is measured. It might be a 'current baseline,' in which case it represents observable, present-day conditions. It might also be a 'future baseline,' which is a projected future set of conditions excluding the driving factor of interest. Alternative interpretations of the reference conditions can give rise to multiple baselines. For example, the Intergovernmental Panel on Climate Change (IPCC) recommends a baseline of 1961 – 1990, and the World Meteorological Organisation (WMO) recommends a baseline of 1981 – 2010.

Capacity building

In the context of climate change, the process of developing the technical skills and institutional capability in developing countries and economies in transition to enable them to address effectively the causes and results of climate change.

Climate change

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

UNFCCC definition: A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Climate change adaptation assessment

The process of identifying options to adapt to climate change, and of evaluating them in terms of criteria such as availability, benefits, costs, effectiveness, efficiency and feasibility.

Climate change signal

Observed and simulated climate change is the sum of the forced (signal) and the natural variability (noise).

Climate model

A numerical representation of the climate system based on the physical, chemical and biological properties of its components, their interactions and feedback processes, and accounting for all or some of its known properties. The climate system can be represented by models of varying complexity, that is, for any one component or combination of components a spectrum or hierarchy of models can be identified, differing in such aspects as the number of spatial dimensions, the extent to which physical, chemical or biological processes are explicitly represented, or the level at which empirical parametrisations are involved. Climate models are applied as a research tool to study and simulate the climate, and for operational purposes, including monthly, seasonal and inter-annual climate predictions.

Climate prediction

A climate prediction or climate forecast is the result of an attempt to produce an estimate of the actual evolution of the climate in the future, e.g., at seasonal, inter-annual or long-term time scales.

Climate variability

Climate variability refers to variations in the mean state and other statistics (such as standard deviations, statistics of extremes, etc.) of the climate on all temporal and spatial scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability).

Fifth Assessment Report (AR5)
The Fifth Assessment Report of the Intergovernmental Panel on Climate Change, released in 2014.

National adaptation programmes of action (NAPAs)
Documents prepared by least developed countries (LDCs) identifying urgent and immediate needs for adapting to climate change.

National communication
A document submitted in accordance with the Climate Convention (and the Kyoto Protocol) by which a Party informs other Parties of activities undertaken to address climate change. Most developed countries have now submitted their sixth national communications; most developing countries have completed their first national communications, many have also completed their second, and some are in the process of preparing their third.

Reference Period
Climate 'normals' are reference points used by climatologists to compare current climatological trends to that of the past or what is considered 'normal'. A normal is defined as the arithmetic average of a climate element (e.g. temperature) over a 30-year period. A 30 year period is used, as it is long enough to filter out any inter-annual variation or anomalies, but also short enough to be able to show longer climatic trends. The current climate normal period is calculated from 1 January 1961 to 31 December 1990.

Resilience
The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation.

Risk
The potential for consequences where something of value is at stake and where the outcome is uncertain, recognizing the diversity of values. Risk is often represented as probability or likelihood of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. In this report, the term risk is often used to refer to the potential, when the outcome is uncertain, for adverse consequences on lives, livelihoods, health, ecosystems and species, economic, social and cultural assets, services (including environmental services) and infrastructure.

Sensitivity
Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g., a change in crop yield in response to a change in the mean, range or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea-level rise).

Temporal average
The temporal mean is the arithmetic mean of a series of values over a time period. Assuming equidistant measuring or sampling times, it can be computed as the sum of the values over a period divided by the number of values.

Vulnerability to climate change
The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including changes in climate variability and extremes. Vulnerability to climate change is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.

ANNEX 3: Examples of authoritative climate change information sources

Climate Service Centre Germany
http://www.climate-service-center.de/index.html.en

Climate Service Centre Germany & KfW's Climate Fact Sheets
http://www.climate-service-center.de/036238/index_0036238.html.en

ClimateWizard synthesis of a broad range of climate models
http://www.climatewizard.org/

European Climate Adaptation Platform – Climate-ADAPT
http://climate-adapt.eea.europa.eu

European Commission Joint Research Centre
https://ec.europa.eu/jrc/en/research-topic/climate-change

IPCC Data Distribution Centre
www.ipcc-data.org/maps/

IPCC Fifth Assessment Report WG I
https://www.ipcc.ch/report/ar5/wg1/

Royal Netherland Meteorological Institute
http://climexp.knmi.nl

UK Climate Impacts Programme
http://www.ukcip.org.uk/

UK Met Office
http://www.metoffice.gov.uk/precis/

UNDP climate change country profiles
http://www.geog.ox.ac.uk/research/climate/projects/undp-cp/

World Bank climate knowledge portal
http://sdwebx.worldbank.org/climateportal/

ANNEX 4: Examples of industry standards and guidance on climate resilience[9]

British Standards Institute (BSI)
http://www.bsigroup.com/localfiles/en-gb/iso-22301/resources/bsi-sustainability-report-adapting-to-climate-change-using-your-business-continuity-management-system-uk-en.pdf

Standards Australia
http://www.standards.org.au/OurOrganisation/News/Pages/New-Australian-Standard-for-Climate-Change-Adaptation.aspx

European Committee for Standardization (CEN) and European Committee for Electro-technical Standardization (CENELEC)
http://www.cencenelec.eu/standards/sectors/climatechange/pages/default.aspx

International Organisation for Standardisation (ISO)
http://www.iso.org/iso/home/news_index/iso-in-action/climate_change.htm

EU Non-paper Guidelines for Project Managers: Making vulnerable investments climate resilient (2013)
http://ec.europa.eu/clima/policies/adaptation/what/docs/non_paper_guidelines_project_managers_en.pdf

EU Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment
http://ec.europa.eu/environment/eia/pdf/EIA%20Guidance.pdf

[9] Work on standardising approaches to climate resilience is still in its very early stages, and specific guidance issued by national, European or international standardisation organisations is largely still in draft or study phases.