

2. Complete Frameworks and Supporting Toolkits

The complete frameworks and associated toolkits described in this chapter of the compendium, listed in Table 2.1, span a broad range of approaches. The IPCC Technical Guidelines, the UNEP Handbook, and the U.S. Country Studies Program represent examples of first generation approaches to the assessment of vulnerability and adaptation. They have an analytical thrust, and focus on an approach that emphasizes the identification and quantification of impacts. The APF is a second-generation assessment and places the assessment of vulnerability at the center of the process. The AIACC approach (technically a collection of projects rather than an explicit framework) incorporates elements of both first generation and second-generation assessments. The NAPA Guidelines provide some conceptual and procedural oversight for the process of producing a document that identifies national priorities for adaptation. The UKCIP report provides guidance to those engaged in decision-making and policy processes. It lays out an approach to integrating climate adaptation decisions and more generally climate influenced decisions into the broader context of institutional decision-making. The UKCIP framework is distinctive in that it casts the assessment process in risk and decision under uncertainty terms.

Table 2.1. Complete frameworks and supporting toolkits

IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations
U.S. Country Studies Program (USCSP)
UNEP Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies
UNDP Adaptation Policy Framework (APF)
Assessments of Impacts and Adaptations to Climate Change in Multiple Regions and Sectors (AIACC)
Guidelines for the preparation of National Adaptation Programmes of Action (NAPA)
United Kingdom Climate Impacts Programme (UKCIP) Climate Adaptation: Risk, Uncertainty and Decision Making

IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations

Description	A set of technical guidelines for the scientist that does not seek to prescribe a single preferred method but rather a range of methods, some of which may be more suitable than others to particular tasks, but which yield comparable results across regions and sectors. The guidelines aid users in assessing the impacts of potential climate change and in evaluating appropriate adaptations. The Guidelines outline a seven-step process: (1) definition of the problem, (2) selection of the methods, (3) testing of the methods, (4) selection of the scenarios, (5) assessment of biophysical and socioeconomic impacts, (6) assessment of autonomous adjustments, and (7) evaluation of adaptation strategies. A range of methods is identified at each step.
Appropriate Use	To enable comparable estimates of impacts and adaptations in different sectors or regions.
Scope	All regions and sectors.
Key Output	Most suitable strategies for minimizing the effects of climate change.
Key Input	Depends on existing data, methods that will be used, and the particular objectives of the assessment.
Key Tools	General circulation model scenarios, use of the scenario data in impacts assessment (see Section 3.1) economic models, biophysical models, cost-benefit analysis (see Section 3.2). Please see the UNEP manual for more information on methods used (see summary table in Section 3.1.3). Summary of the methods used under this approach can be found in the first (FCCC/SBI/1999/11), second (FCCC/SBI/2000/15), third (FCCC/SBI/2001/14 and Add.1), fourth (FCCC/SBI/2002/16), and fifth (FCCC/SBI/2003/13) compilations and syntheses of initial national communications from non-Annex I Parties at http://unfccc.int/2709.php
Ease of Use	Depends on specific application.
Training Required	Depends on user familiarity with prescribed tools. It is likely that some training is required to complete the seven steps, particularly in using advanced quantitative models and in linking model inputs and outputs.
Training Available	No formal training currently offered though IPCC, though training may be available for particular tools the guidelines prescribe, directly from their source. See also training module of the UNITAR Climate Change Programme at http://www.unitar.org/ccp/ .
Computer Requirements	No explicit requirements for employing framework, though use of associated tools will require software and in some cases significant computing resources.
Documentation	Carter, T.R., M.L. Parry, H. Harasawa, and S. Nishioka. 1994. <i>IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations</i> . London: Department of Geography, University College London. Also, Parry, M. and T. Carter. 1998. <i>Climate Impact and Adaptation Assessment: A Guide to the IPCC Approach</i> . London: Earthscan. Guidelines are available at http://www-cger.nies.go.jp/ or http://www-cger.nies.go.jp/cger-e/e_report/r_index-e.html , or can be obtained from Department of Geography, University College London, 26 Bedford Way, London, WC1H 0AP, United Kingdom.

IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations (cont.)

Applications	U.S. Country Studies (see summary that follows), UNEP Country Studies (Contact Ravi Sharma, ravi.Sharma@unep.org), UNDP National Communications Support Programme (project documents at http://www.gefonline.org/), and the UNFCCC compilations of the INCs at http://unfccc.int/2709.php .
Contacts for Framework, Documentation, Technical Assistance	Tim Carter; e-mail: tim.carter@vyh.fi .
Cost	No cost for obtaining documentation of framework. Actual cost of conducting such an assessment can vary widely. A detailed study can cost more than several hundred thousand US dollars, although useful results can be obtained from small-scale studies costing US\$50,000-100,000.
References	Benioff, R., S. Guill, and J. Lee (eds.). 1996. <i>Vulnerability and Adaptation Assessments: An International Guidebook</i> . Dordrecht, The Netherlands: Kluwer Academic Publishers. Erda, L., W.C. Bolhofer, S. Huq, S. Lenhart, S.K. Mukherjee, J.B. Smith, and J. Wisniewski (eds.) 1996. <i>Climate Change Vulnerability and Adaptation in Asia and the Pacific</i> . Dordrecht, The Netherlands: Kluwer Academic Publishers.

U.S. Country Studies Program (USCSP)

Description	The aim of the USCSP (no longer in existence) was to assist developing countries and countries with economies in transition in meeting their obligations under the UNFCCC. Countries participating in the USCSP focused on assessing the vulnerability of their climate sensitive sectors and resources and, to a lesser extent, opportunities for adaptation. The general approach prescribed by the program involved six steps: (1) define scope of assessment process, (2) select scenarios, (3) conduct biophysical and economic impact assessments, (4) integrate impact results, (5) analyze adaptation policies and programs, and (6) document and present results to decision makers. At the center of this process is the evaluation of biophysical effects.
Appropriate Use	Best employed when an analysis of biophysical impacts of climate change (e.g., change in rainfall or crop yields) is the central goal. Relatively simple methods can still be applied when data quality and availability are limited.
Scope	All regions, coastal resources, agriculture, grasslands/livestock, water resources, forestry, human health, fisheries, and wildlife.
Key Output	Climate change impacts and, to limited extent, adaptation options.
Key Input	Climate change and baseline socioeconomic scenarios.
Key Tools	Climate change scenarios (e.g., GCM scenarios), socioeconomic baselines (e.g., IS92 _{a-r}), and biophysical impact models (e.g., CLIRUN, Holdridge Life Zone Classification model, CERES-Maize; see appropriate sectoral summary tools in Chapter 4).
Ease of Use	Depends on specific application.
Training Required	Training is required in the use of certain models.
Training Available	Contact Stratus Consulting, P.O. Box 4059, Boulder CO 80302. Tel: +1.303.381.8000; e-mail: jsmith@stratusconsulting.com .
Computer Requirements	Depends on particular models and sectors examined.
Documentation	Benioff, T., Guill, S., and Lee, J. (eds.). 1996. <i>Vulnerability and Adaptation Assessments: An International Guidebook</i> , Dordrecht, The Netherlands: Kluwer Academic Publishers.
Applications	49 countries participated, investigating impacts in one or more of eight sectors: coastal resources, agriculture, grasslands/livestock, water resources, forests, fisheries, wildlife, and health.
Contacts for Framework, Documentation, Technical Assistance	Joel Smith, Stratus Consulting Inc., P.O. Box 4059, Boulder, CO 80302, USA; Tel: +1.303.381.8000; e-mail: jsmith@stratusconsulting.com .
Cost	Depends on breadth of assessment.

U.S. Country Studies Program (USCSP) (cont.)

References

USCSP. 1999. *Climate Change: Mitigation, Vulnerability, and Adaptation in Developing Countries*, U.S. Country Studies Program, Washington, DC

Smith, J.B., N. Bhatti, G. Menzhulin, R. Benioff, M. Campos, B. Jallow, and F. Rijsberman. 1996. *Adaptation to Climate Change: Assessments and Issues*, Springer-Verlag, New York;

Benioff, R., S. Guill, and J. Lee (eds.). 1996. *Vulnerability and Adaptation Assessments: An International Guidebook*. Dordrecht, The Netherlands: Kluwer Academic Publishers; Smith, J.B., Huq, S., Lenhart, S., Mata, L.J., Nemesova, I., Toure, S. 1996. *Vulnerability and Adaptation to Climate Change. Interim Results from the U.S. Country Studies Program*. Kluwer Academic Publishers; Dixon, R.K. 1997. "Forward." *Climatic Change* 36:1-2; Smith, J.B. and J.K. Lazo. 2001. "A Summary of Climate Change Impact Assessments from the U.S. Country Studies Program." *Climatic Change* 50:1-29.

UNDP Adaptation Policy Framework (APF)

Description	The APF provides guidance on designing and implementing projects that reduce vulnerability to climate change, by both reducing potential negative impacts and enhancing any beneficial consequences of a changing climate. It seeks to integrate national policy making efforts with a “bottom-up” movement. The framework emphasizes five major principles: adaptation policy and measures are assessed in a developmental context; adaptation to short-term climate variability and extreme events are explicitly included as a step toward reducing vulnerability to long-term change; adaptation occurs at different levels in society, including the local level; the adaptation strategy and the process by which it is implemented are equally important; and building adaptive capacity to cope with current climate is one way of preparing society to better cope with future climate. The APF is a flexible approach in which the following five steps may be used in different combinations according to the amount of available information and the point of entry to the project: (1) defining project scope and design, (2) assessing vulnerability under current climate, (3) characterizing future climate related risks, (4) developing an adaptation strategy, and (5) continuing the adaptation process. The framework focuses on the involvement of stakeholders at all stages.
Appropriate Use	The APF is particularly applicable where the integration of adaptation measures into broader sector specific policies, economic development, poverty reduction objectives, or other policy domains is desirable.
Scope	All sectors, all regions, particularly developing countries.
Key Output	Increased adaptive capacity through prioritized adaptation strategies that can be incorporated into development plans.
Key Input	Depends on the particular application and available information. Stakeholder derived information is a key input at all stages.
Key Tools	Vulnerability mapping, dynamic simulation of sustainable livelihoods, multistakeholder analysis (see Section 3.3), cost-effectiveness, decision trees, multicriteria analysis (see Section 3.2), among others.
Ease of Use	Depends on specific application.
Training Required	Depends on nature of particular application.
Training Available	A User’s Guidebook is available on the APF web page (see below). Training will be developed (see UNDP web page).
Computer Requirements	In most cases personal computer is sufficient. Depends on tools employed, however.
Documentation	A User’s Guidebook for APF and the technical papers that elaborate the APF can be obtained online at http://ncsp.undp.org/report_detail.cfm?Projectid=151 .
Applications	Kenya, Honduras, Central America (see APF web page, above).
Contacts for Framework, Documentation, Technical Assistance	Bo Lim, Chief Technical Advisor, Capacity Development and Adaptation Cluster, UNDP, New York; Fax: 1.212.906.6998; e-mail: bo.lim@undp.org . Technical assistance on individual steps can be obtained from lead authors of the appropriate technical papers.
Cost	Depends on particular application.

UNDP Adaptation Policy Framework (APF) (cont.)

References

Burton, I., S. Huq, B. Lim, O. Pilifosova and E.L. Schipper 2002. *From Impacts Assessment to Adaptation Priorities: the Shaping of Adaptation Policy*. Climate Policy, Amsterdam, Vol.2, 145-159.

Lim, B and E. Spanger-Siegfried (eds.). 2004. *Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures*. New York: United Nations Development Programme.

Also see individual technical papers available on website for references.

Assessments of Impacts and Adaptations to Climate Change in Multiple Regions and Sectors (AIACC)

Description	AIACC is a global initiative to advance scientific understanding of climate change vulnerabilities and adaptation options in developing countries. AIACC aims to fill gaps in the current understanding of vulnerability and opportunities for adaptation by funding, training, and mentoring developing country scientists to undertake multisector, multicountry research of priority to developing countries. AIACC takes an approach to assessment that is research driven and focused on building capacity. While it does not prescribe an explicit framework for undertaking vulnerability and adaptation assessments it does offer a toolkit for researchers that are useful in the design of projects, as well as the tenets of a general approach. The toolkit also gives also information and links on climate models, agriculture models, water resources, ecosystems models. The AIACC regional studies are diverse in their objectives, scientific methods, and the sectors and systems to be investigated, but they share a common second generation assessment approach that places understanding vulnerability at the center of the assessment, engages stakeholders in the assessment process, and gives priority to strengthening the information base for making decisions about adaptation to climate change.
Appropriate Use	The 24 AIACC studies (funded to date) are best used as a source of lessons concerning the process or elements of the process of assessing vulnerability and adaptation options in particular sectors and regions. The AIACC web page can also be consulted for a listing of tools and methods that might be of use in designing such an assessment.
Scope	All sectors, all regions.
Key Output	Adaptation options to reduce vulnerability and risk.
Key Input	Stakeholder generated information about exposure, vulnerabilities, changes, risks, and driving forces.
Key Tools	Stakeholder analysis, sustainable livelihoods and indicators (see Section 3.3b), decision support systems, multicriteria analysis (see Section 3.2), cost-benefit analysis, among others (see http://sedac.ciesin.columbia.edu/aiacc/toolkit.html).
Ease of Use	Depends on specific application.
Training Required	Depends on design of particular assessment and tools employed.
Training Available	A formal series of workshops (on scenarios and on V&A) has been held for the benefit of project participants with several meetings scheduled for the near future (http://www.aiaccproject.org/meetings/meetings.html). Proceedings of past meetings can provide a useful source of information about AIACC projects and approaches. Mentoring and networking also comprise important components of the process. Regional networks will have the capacity to support continuing investigations and can be an important source of technical support (http://sedac.ciesin.columbia.edu/aiacc/resources/network2.jsp and http://sedac.ciesin.columbia.edu/aiacc/synthesis.html). There are also a newsletter and “AIACC Working Papers” to present information on the different project. The AIACC Technical Committee provides guidance on project design, assessment methods, scenario development, and use and training to AIACC projects.
Computer Requirements	Depends on design of particular assessment and tools employed.
Documentation	http://www.aiaccproject.org/ .

Assessments of Impacts and Adaptations to Climate Change in Multiple Regions and Sectors (AIACC) (cont.)

<i>Applications</i>	Applications across a wide range of regions, countries, sectors, systems, and groups. There is a web-based information network to share information from the AIACC regional assessments (http://sedac.ciesin.columbia.edu/aiacc/ , and a synthesis of AIACC projects (http://sedac.ciesin.columbia.edu/aiacc/synthesis.html). See also http://www.aiaccproject.org/aiacc_studies/aiacc_studies.html .
<i>Contacts for Framework, Documentation, Technical Assistance</i>	The project is managed by the AIACC Science Director and Project Coordinator and overseen by the AIACC Implementing Committee. The AIACC Technical Committee, including a Scenarios Advisory Group, provides guidance on project design, assessment methods, scenario development and use, training, and selection of projects. Sara Beresford, AIACC Project Coordinator; Tel: 202.462.2213; e-mail: sberesford@agu.org , Neil Leary, Science Director of AIACC; e-mail: nleary@agu.org , or general inquiries to aiacc@agu.org .
<i>Cost</i>	Depends on design of particular assessment.
<i>References</i>	A listing of AIACC reports and publications can be accessed at: http://www.aiaccproject.org/publications_reports/Pub_Reports.html .

Guidelines for the Preparation of National Adaptation Programmes of Action (NAPA)

Description	NAPA is a programme for least developed countries (LDCs) to address their current and urgent adaptation needs. Countries are required to rank adaptation measures for funding by the LDC Fund and other sources based on such criteria as urgency and cost-effectiveness. The NAPA Guidelines are not in themselves a detailed framework for the assessment of vulnerability and adaptation. Instead, they provide some guidance for the process of compiling a document that specifies priority adaptation actions in the LDCs. The Guidelines outline some “guiding elements” that inform this process and sketch out a process; however, they fall short of providing a structured framework. The guiding elements imply that the NAPA process should emphasize: (1) a participatory approach involving stakeholders, (2) a multidisciplinary approach, (3) a complementary approach that builds on existing plans and programs, (4) sustainable development, (5) gender equity, (6) a country driven approach, (7) sound environmental management, (8) cost-effectiveness, (9) simplicity, and (10) flexibility based on country specific circumstances. In the NAPA process, much of the work of assessing vulnerability and adaptation is intended to be drawn from existing sources. The Guidelines do stress the importance of conducting a participatory assessment of vulnerability to current climate variability and extreme events as a starting point for assessing increased risk due to climate change.
Appropriate Use	Relatively rapid prioritization of adaptation options.
Scope	All regions and sectors.
Key Output	A document describing priorities for adaptation action, emphasizing especially how these priorities and associated plans for action fit in with a country’s development needs, other plans, and multilateral environmental agreements.
Key Input	Results from existing and ongoing assessment of vulnerability and adaptation to both current climate variability and climate change.
Key Tools	Cost-effectiveness analysis, cost benefit analysis, multicriteria analysis, stakeholder methods (see Sections 3.5 and 3.6).
Ease of Use	Relatively straightforward, given reliance on existing studies. Ranking of adaptations may be challenging.
Training Required	Some instruction in the NAPA process is helpful.
Training Available	Regional workshops devoted to increasing understanding of the NAPA process are organized by UNITAR. Materials from these workshops are available at http://www.unitar.org/ccp/napaworkshops.htm , http://www.napa-pana.org
Computer Requirements	None.
Documentation	Annotated guidelines at http://unfccc.int/files/cooperation_and_support/ldc/application/pdf/annguide.pdf Special website for LDCs at http://unfccc.int/2666.php
Applications	Ongoing UNDP, UNEP and World Bank projects to develop NAPAs in the 48 LDC Parties to the UNFCCC. Submitted NAPAs are available at http://unfccc.int/2679.php

Guidelines for the Preparation of National Adaptation Programmes of Action (NAPA) (cont.)

Contacts for Framework, Documentation, Technical Assistance	General information: Paul Desanker, UNFCCC secretariat; Tel: +49.228.815.1362; e-mail: Pdesanker@unfccc.int . For technical guidance and advice on the preparation and on the implementation strategy of NAPAs, including the identification of possible sources of data and its subsequent application and interpretation, contact the LDC Expert Group (LEG) at http://unfccc.int/2666.php .
Cost	No cost for obtaining Guidelines.
References	United Nations Institute for Training and Research. 2003. <i>Developing Human and Institutional Capacity to Address Climate Change Issues in LDCs: Preparing for NAPAs</i> . Available at http://www.unitar.org/ccp/LDCreport.pdf .

United Kingdom Climate Impacts Programme (UKCIP) Climate Adaptation: Risk, Uncertainty and Decision Making

Description	The report proposes a step-wise approach to vulnerability and adaptation assessment in a risk uncertainty decision-making framework. The framework and guidance aim to help decision-makers and their advisors in identifying important risk factors and to describe the uncertainty associated with each. It aims to help them judge the significance of the climate change risk compared to the other risks they face, so they can work out what adaptation measures are most appropriate. There are questions for the decision maker to apply at each stage, and tools that can be used. The report identifies methods and techniques for risk assessment and forecasting, options appraisal and decision analysis. There are eight stages in the framework: (1) identify problem and objectives, (2) establish decision making criteria, (3) assess risk, (4) identify options, (5) appraise options, (6) make decision, (7) implement decision, and (8) monitor, evaluate, and review. It prescribes a circular process in which feedback and iteration are encouraged, and emphasizes a sequential implementation of adaptation measures.
Appropriate Use	The UKCIP framework is applicable to any decision that is likely to be influenced by climate or made in specific response to climate, barring those related to mitigation. Diverse applications are possible. The methodology is particularly relevant to decision makers (1) who are responsible for areas or sectors that are sensitive to climate change, (2) who are responsible for managing the consequences of present day variability in weather or climate, (3) whose decisions could be vulnerable to assumptions about the risks associated with future climate, (4) who are responsible for commissioning or overseeing technical assessments of climate change vulnerability, impacts and associated adaptation options, or (5) who need to address the robustness of a proposed decision to assumptions associated with the nature of the future climate.
Scope	All regions, all sectors. Written from the UK perspective but applicable internationally.
Key Output	Preferred adaptation options (especially no regret and low regret options) based on evaluation criteria and information regarding optimal timing and extent of implementation. Feedback based on monitoring, evaluation, and review from the implementation of these options is an important output, and becomes a key input in the iterative process.
Key Input	Decision-makers' objectives, benchmark levels of climate risk, multiple climate and non-climate scenarios and feedback from already implemented adaptations.
Ease of Use	Depends on specific application.
Training Required	Depends on user familiarity with prescribed tools. It is likely that some training is required to complete the eight steps.
Training Available	No formal training currently offered, but UKCIP Technical Report provides fairly detailed instruction.
Computer Requirements	No explicit requirements for employing framework, though use of some associated tools will require software (see Appendix 4 of UKCIP Technical Report).
Documentation	Willows, R.I. and R.K. Connell. (eds.). 2003. Climate Adaptation: Risk, Uncertainty and Decision-Making. UKCIP Technical Report. UKCIP, Oxford.

United Kingdom Climate Impacts Programme (UKCIP) Climate Adaptation: Risk, Uncertainty and Decision Making (cont.)

<i>Applications</i>	(1) Scoping study for the Isle of Man (http://www.gov.im/dlge/enviro/climatechange.xml). The study used the Risk, Uncertainty and decision-making framework to investigate projected impacts of climate change impacts across key sectors for the Island. (2) Climate proofing rural resource protection policies and strategies in Wales (http://publications.environment-agency.gov.uk/epages/eapublications.storefront - this is a link to the Environment Agency's publications catalogue).The study used the framework to investigate how robust rural resource protection policies and strategies are in the face of a changing climate. (3) Defra (Global Atmospheres Division) Climate change impacts and adaptation: Cross-regional research programme. Topic C: Water (http://www.futuredrought.org.uk/Defra_Home.htm). Study with the aim of aim of developing practical guidance on how to manage water resources in a changing climate.
<i>Contacts for Tools, Documentation, Technical Assistance</i>	enquiries@ukcip.org.uk
<i>Cost</i>	Technical report is available free of charge from the UKCIP website (http://www.ukcip.org.uk).
<i>References</i>	As above (applications) and: Branch project (http://www.branchproject.org/documents/FinalReport/Annex1.pdf), ESPACE decision testing tool (http://www.espace-project.org/part1/publications/pdf23.pdf), City of London Adaptation strategy (http://213.86.34.248/NR/rdonlyres/7347D392-3CF3-4344-8B2D-9AF9315E8801/0/SUS_climateadapt.pdf).