CHAPTER IX

Summary and Conclusions

The case studies presented here have demonstrated the climate proofing of infrastructure and community development projects and the mainstreaming of climate change considerations into national strategic development plans. The field studies and other activities to develop the six case studies were undertaken in the Cook Islands and the Federated States of Micronesia. However, the innovative methodologies and tools, as well as the findings, are applicable to all Small Island Developing States, and even to larger developing and developed countries.

The ultimate aim of the case studies was to show *why* and demonstrate *how* reducing climate-related risks is an integral part of sustainable development. The results highlight the fact that many adaptation measures meet the criteria of no regrets adaptation initiatives, including being cost effective. Implementation of specific risk-reduction measures at project and local levels can be facilitated if land use planning and associated regulations and permitting procedures for structure, infrastructure, and community development projects incorporate requirements that are designed to reduce risks related to current and future climate extremes and variations.

The overall goal of a risk-based approach to climate change adaptation is to manage both the current and future risks associated with the full spectrum of atmospheric and oceanic hazards. The case studies were chosen to highlight the range of levels at which adaptation takes place and the linkages between them. The levels are i) project, ii) regulation and compliance, iii) short- and mid-term policy making and planning at the subnational level, and iv) national strategic development planning. The studies demonstrated the importance of mainstreaming adaptation, including strengthening the enabling environment for adaptation in order to increase the likelihood of successful adaptation at project and community levels.

The work undertaken included assessments of both the risks arising from current climate variability and extremes and from the future, incremental changes in those risks as a result of longer-term changes in climate extremes and variability. Significantly, the case studies demonstrated methods for prioritizing adaptation strategies and specific measures in terms of both their costs and benefits. A major goal—and challenge—was to determine, in a rigorous and quantitative manner, the incremental costs of adaptation to climate change.

For both the Cook Islands and the Federated States of Micronesia (FSM), climate risk profiles were prepared. Extreme climate events that are relatively rare at present (likelihood in one year less than 0.05), as a result of global warming are projected to become relatively common (in many cases likelihoods are projected to increase to over 0.20 by 2050).

In order to ensure stakeholder buy-in and sustained uptake, five principles underscored preparation of the case studies:

- all activities were to be undertaken in an inclusive, transparent and participatory manner;
- wherever possible, existing information and other resources were to be used;
- local experts should work alongside and at times lead their international counterparts;
- all outcomes should have high relevance to key stakeholders, add value to current and planned initiatives, and be sustainable; and

- selection of the case studies was to be in accordance with criteria established by the Asian Development Bank (ADB) and expanded through consultation with stakeholders in each country (governments, nongovernment organizations (NGOs), private sector, and communities).

In addition to the technical and policy-oriented work, considerable effort was devoted to a key dimension of adaptation, namely capacity building, including awareness raising, empowerment and action, and institutional strengthening.

Climate-related risks facing both the infrastructure projects and the communities are already considerable, but in all cases are projected to increase substantially as a result of increases in climate extremes and variability. For infrastructure projects, it is possible to avoid most of the damage costs attributable to climate change, and to do this in a cost-effective manner, if climate proofing is undertaken at the design stage of the project. Cost effectiveness can be further enhanced if environmental impact assessment (EIA) and related procedures require that all development be climate proofed. Climate proofing communities can also be cost effective if planning and regulatory measures take into account both current and future climate-related risks.

Climate proofing national strategic development plans enhances the enabling environment for adaptation; establishes the requirement for climate proofing sector and subnational (e.g., state, island and community) development plans as well as individual development projects; and helps to ensure that actions to reduce climate-related risks are an integral part of, and harmonized with, sustainable development initiatives. Such initiatives will be facilitated through the use of national Adaptation Mainstreaming Guidelines, such as those prepared and approved for the FSM and the Cook Islands.

Many key lessons have been learned and demonstrated. Climate change will manifest itself largely as changes in the frequency and consequences of extreme events and interannual variations, rather than as long-term trends in average conditions. While uncertainties inhere in projections of greenhouse gas emissions and of the response of the global climate as estimated by models, confidence in estimates of future changes in climate-related risks are high. This is due to the consistency in model-based projections of changes in the likelihood of extreme events and climate variability as well as between these projections and the observed changes in these likelihoods over recent decades.

While inconsistent with international conventions, at a practical level adaptation should thus focus on reducing both the present and future risks of climate variability and extremes. In many instances, current levels of climate risk are already high, because risks have increased over the past few decades. Moreover, adapting to current climate extremes and variability prevents precious financial and other resources from being squandered on disaster recovery and rehabilitation and is an essential step toward being able to withstand the pending climate changes.

A risk-based approach to adaptation is both desirable and practicable. It combines both the likelihood and consequence components of climate-related impacts and can assess risks for both current and anticipated conditions, with the option of examining either specific events or an integration of those events over time. Furthermore, risk assessment and management are common to many sectors—e.g., health care, financial, transport, agriculture, energy, and water resources—and the familiarity of planners and decision makers with risk management facilitates mainstreaming of risk-based adaptation. Compared to the more conventional approaches used in vulnerability and adaptation assessments, a risk-based approach also facilitates an objective and more quantitative approach, including cost benefit analyses that result in evaluation of the incremental costs and benefits of adaptation and assist in prioritizing adaptation options. Many players are usually involved in the risk- and cost-benefit-based assessments, but the approach provides a framework that facilitates coordination and cooperation, including the sharing of information that might otherwise be retained by information "gate keepers".

The risk-based approach is also linked to sustainable development because it identifies those risks to future generations that present generations would find unacceptable. The case studies have highlighted the need to ensure that future development does not exacerbate climate-related risks.

Adaptation has many dimensions and must also be viewed as a process. This means a framework and associated methodology are essential. Climate Change Adaptation through Integrated Risk Reduction (CCAIRR) provides an operational framework as well as relevant methodologies. The success of adaptation has enhanced CCAIRR's bottom-up and top-down approach: top-down activities should focus on creating a favorable enabling environment, for instance, by climate proofing policies, plans and regulations. This is a prerequisite to successful adaptation and should be the major emphasis and benefit of adaptation mainstreaming. Bottom-up activities should be founded on meaningful consultation and widespread empowerment of key players. Decision support tools, such as SimClim, that facilitate intercomparison of adaptation measures, are fundamental to ensuring the effectiveness of adaptation.

Most barriers to the successful application of a risk-based approach to adaptation relate to the existence of, and access to, information. The barriers to information are somewhat intractable, though again, experience in preparing the current case studies provides some grounds for optimism.

Before generalized findings and lessons can be drawn from case studies prepared using a risk-based approach to adaptation, many more examples will need to be developed. It is desirable to have internationally consistent assessment methodologies. International agencies, such as the IPCC, play major roles in establishing best practices. These agencies would need to formally endorse and encourage a risk-based approach to adaptation before their widespread uptake occurs. At present, best practice favors the more traditional assessments of vulnerability and of adaptation options. These have many limitations compared to a risk-based approach.

Until a risk-based approach to adaptation is formally endorsed and encouraged, documentation and training opportunities will also be lacking. While a risk-based approach requires no greater skills and experience than are called on in the traditional assessments, a cadre of in-country expertise will need to be built. While parallel frameworks and methodologies are being advocated, confusion and arguments for maintaining the status quo will occur.

Additional barriers include the need for formal specification of risk-based targets that define future levels of acceptable risk. This requires consultation with, and consensus among, key stakeholders; specification of relationships between magnitude and consequence of risk events of relevance; "rules" that specify future social, economic, and wider environmental changes; and appropriate discount rates to be applied to future costs and benefits. In SimClim, the discount rate is set by the user and can be adjusted without needing to rerun the simulation.

For the present case studies, all these barriers were overcome. Future efforts to develop additional case studies, as well as to support the practical application of adaptation measures, can build on both the methodologies and the experience gained in preparing the current case studies. Thus the barriers are unlikely to be as imposing as for the initial work.