



The Baker River  
in Patagonia,  
Chile. Photo:  
Kate Ross

## Introduction

**H**ealthy, flowing rivers are the lifelines of our planet. They provide people with water, food, medicines, building materials, land-replenishing silts, navigation, recreation, and cultural and spiritual strength. Rivers and their catchments – and the rich variety of life they sustain – reduce the impacts of floods and droughts, support forests, recharge groundwater supplies, sustain fisheries, and maintain the ecological integrity of local ecosystems. For instance, the river's estuary, where fresh water mixes with the ocean saltwater, is one of the most biologically productive parts of the river – and of the planet. Most of the world's fish catch comes from species that depend for at least part of their life cycle on estuarine habitats.

Rivers and riverine ecosystems are also one of the most threatened in the world.<sup>1</sup> Historically, key stressors have included the over-extraction of water, pollution, diversions, and channelization. In the past 50 years, the amount of runoff flowing into rivers has changed substantially in many basins due to the combined effects of withdrawals, dams, and climate change.

Climate change does not affect all parts of the water cycle equally, nor does it impact freshwater ecosystems or water resource management (or even all regions) evenly. Climate change is also not always experienced in a negative way by people and the species dependent on freshwater resources. However, long-standing intensive human use and alteration of lakes, rivers, and wetlands, combined with the quickening pulse of climate change, has resulted in many negative impacts.

In many cases, human impacts such as pollution and over-extraction have had far more serious negative impacts than climate change on freshwater ecosystems and species. However, the importance of climate change impacts on river systems – and especially how it can amplify human modifications to the natural system – is becoming increasingly important as riverine communities become more vulnerable to both. This guide is intended to help explain and suggest ways to manage these negative impacts.

Two current impacts of climate change on aquatic systems are especially important to address: climate change can intensify existing problems of poor water resources management (for example, reducing water quality and lowering water availability), and it can profoundly alter key ecological and hydrological qualities (for example, altering fundamental flow regime qualities). Climate change is now beginning to shift from its current role as an “intensifier” to a widespread fundamental driver of changes to ecosystems, with the potential for ecological and economic impacts comparable to the worst of previous human interventions.

In response, many public and private institutions have developed projects and programs for climate adaptation at both the national and local levels. These responses often represent two different modes of development: one based on top-down decision-making framework, traditional water development projects and large infrastructure projects such as large dams and diversions, and another that uses a bottom-up, community-based, decentralized framework.

While it will be necessary to have adaptation projects and programs at several scales, as well as partnerships among many types of user groups, to address the impacts of climate change, unfortunately, the top-down large infrastructure model is currently dominating many national and international debates on development – and thus decisions on how to prioritize limited adaptation and mitigation funding. In contrast, the most successful projects and programs are those that are grassroots driven and include community participation at every step of the process. Only in this way can adaptation practitioners fully understand the needs, capacity and vulnerabilities of affected communities to climate risks, and effectively deliver solutions that meet those needs while empowering stewardship of local resources.

International Rivers’ experience in the movement to protect rivers has made us keenly aware of the importance of civil-society-developed informational resources for use by community-based organizations. With the help of a number of partner organizations, we have developed this *Civil Society Guide to Healthy Rivers and Climate Resilience*, which summarizes how

climate change is impacting rivers and provides some tools that we hope will be useful for those working with riverine communities to build their resilience to climate change. While there are many information sources on building climate resilience, this guide focuses on river resources and some of the key infrastructure projects, especially large dams that could impact riverine communities’ ability to adapt to a changing climate.



#### HOW TO USE THIS GUIDE

The guide begins with an introduction to the role of rivers and their services in sustaining both local and global functions, as well as major threats to these resources. Chapter 1 sets the scene and describes why protecting rivers is important in a warming world. Chapter 2 provides the background on a range of climate-change risks that river systems and river-dependent communities and economies can expect, in order for users to begin to **understand** the types of risks they may be facing. Chapters 3, 4 and 5 will lay out the key recommendations and resources necessary for users to **assess** (Chapter 3), **address** (Chapter 4), and find the solutions to **adapt** (Chapter 5) to a world of increasing climate risks.

Throughout each chapter, we offer case studies and examples from around the world on successful adaptation projects, specific climate risks to a particular basin, key issues and concepts, and other topics. Sources for the facts listed in the sidebars can be found on the back inside cover.

A set of key recommendations (found in Chapters 3-5 and summarized in the conclusion) will help guide users in evaluating how dams and other water

Activists march through the town of Temacapulín, Mexico during Rivers for Life 3: The Third International Meeting of Dam Affected People and Their Allies in 2010.

and energy-sector projects in combination with climate change might impact the climate resilience of local communities. In the Appendix, you will find a table of key questions to ask decision-makers when evaluating a particular dam project for its potential climate risks, as well as a list of resources and regional worksheets you can modify and use for conducting climate adaptation trainings in your specific region.

With such broad and complex topics as rivers and climate adaptation, this guide is not meant to be comprehensive or prescriptive. There will be limitations to implementing some of our recommendations depending on your local context. In addition, while this guide is focused on adaptation, we recognize that ensuring that all countries promote a low-carbon development path and drastic cuts to

carbon emissions (especially for the biggest polluters) remains a critical and difficult to solve issue. Without such “climate mitigation,” adaptation practices will have limited impact. While mitigation is beyond the scope of this guide, many of the tools included here are applicable to projects that are supposedly efforts at mitigation.

Finally, we hope that the tools and recommendations in this guide will help you chart a path towards assessing and addressing the particular climate risks that your river basins are facing. Whether it’s evaluating a government infrastructure project for its climate risks to a river system, or developing a new adaptation project, we hope that this guide will allow you to effectively advocate for the climate resilience of your river basin community.

## Contact us!

This guide is an evolving document. If you have a question, correction, case study or other suggestions on how to improve this guide, please send it to Ms. Lori Pottinger, [lori@internationalrivers.org](mailto:lori@internationalrivers.org), and Ms. Dipti

Vaghela, [dvaghela@internationalrivers.org](mailto:dvaghela@internationalrivers.org). If you have a suggestion for a translation of the guide or have questions about how to conduct regional trainings based on this guide, please feel free to contact us as well.