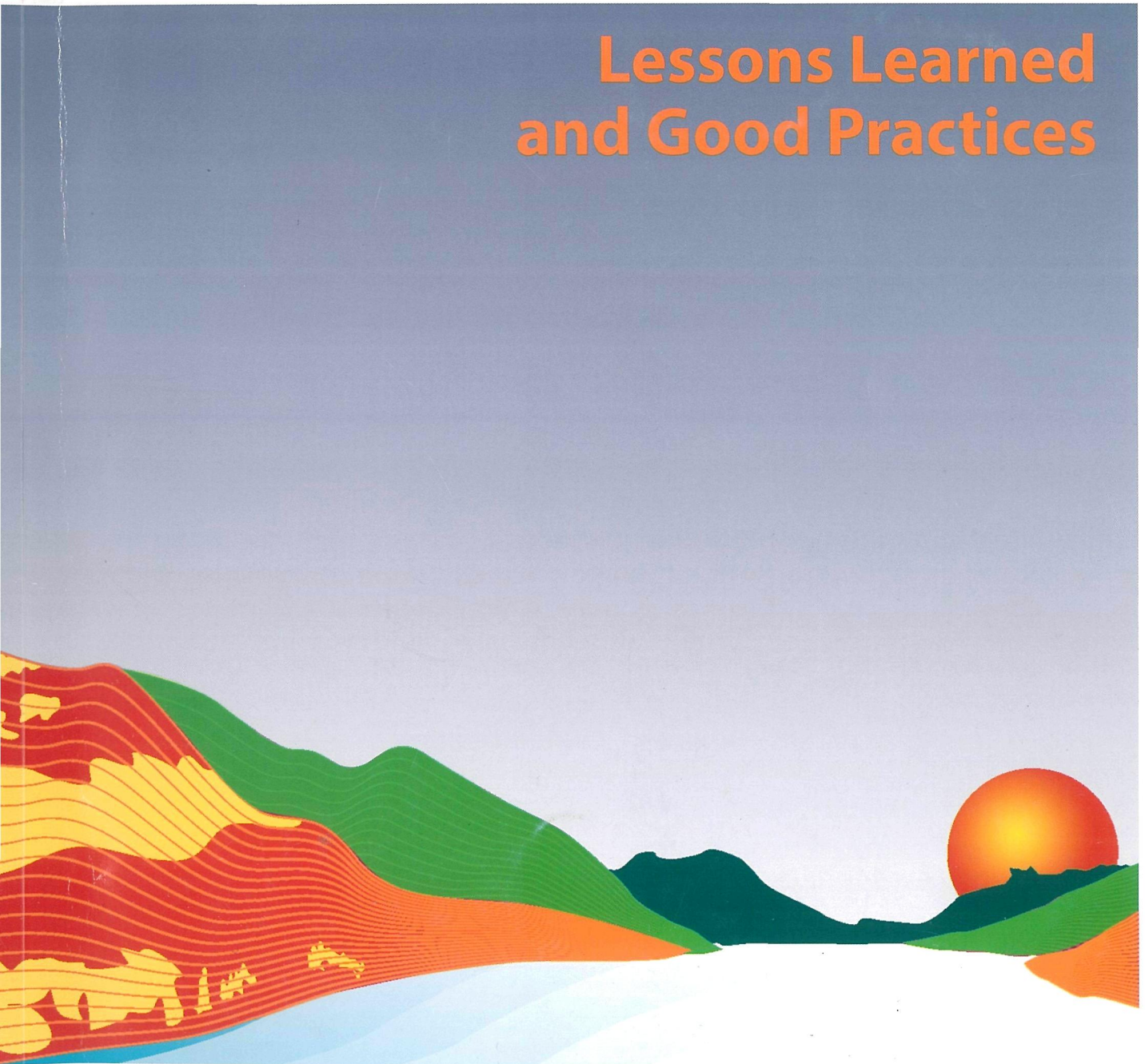


Water and Climate Change Adaptation in Transboundary Basins:

Lessons Learned and Good Practices



UNITED NATIONS



CONTENTS

FOREWORD.....	iv
KEY MESSAGES	vi
ACKNOWLEDGEMENTS	viii
ABBREVIATIONS	xviii
Chapter 1 Introduction	1
1.1 Background and objectives of the document.....	1
1.2 Target audience.....	2
1.3 Why transboundary cooperation is important in climate change adaptation	2
1.4 Structure of the document.....	3
Chapter 2 The Context and the Process.....	7
2.1 Principles of basin adaptation.....	7
2.1.1 Basin-wide approach to climate change adaptation.....	8
Lesson 1. Develop an adaptation strategy at the transboundary level	8
Lesson 2. Ensure political support for the basin-wide strategy	8
Lesson 3. Demonstrate the benefits of basin-wide cooperation in adaptation	9
Lesson 4. Integrate climate change adaptation within river basin management planning.....	9
Lesson 5. Position river basin management planning and Environmental Impact Assessment/ Strategic Environmental Assessment as legal instruments/regulations/policy to implement climate change adaptation.....	11
2.1.2 Uncertainty and the need for flexibility.....	12
Lesson 6. Reconcile uncertainty and confidence in recommendations and strategy	12
Lesson 7. Adopt a flexible approach to climate change adaptation in the transboundary basin	13
2.1.3 Ecosystem-based adaptation, green adaptation and green infrastructure.....	15
Lesson 8. Use ecosystem-based adaptation as a cost-effective alternative to “grey” infrastructure	16
2.1.4 Linking to other levels and sectors.....	18
Lesson 9. Ensure synergies and linkages between adaptation actions at different government levels and across different sectors	18
Lesson 10. Involve all sectors and ministries in defining adaptation priorities	19
2.1.5 Climate as an added pressure	20
Lesson 11. Ensure that adaptation policies consider climate change as one of many pressures on water resources	20
2.2 Legal and institutional frameworks.....	21
2.2.1 Adaptive legal frameworks	22
Lesson 12. Implement existing transboundary agreements in a flexible way.....	23

Lesson 13. Design new transboundary agreements to be flexible	24
Lesson 14. Include flexibility mechanisms in water allocation schemes	25
Lesson 15. Climate-proof regulations for water quality	26
2.2.2 Importance of context-sensitive and functional transboundary institutions for basin adaptation	26
Lesson 16. Give a mandate to river basin organizations to address climate change	27
Lesson 17. Create a specific working group responsible for climate change adaptation as part of a joint commission's institutional framework	28
Lesson 18. Use existing non-RBO institutions and mechanisms for transboundary cooperation to the extent possible	29
2.3 Organizing the process of adaptation strategy development	29
2.3.1 Dialogue and participation	30
Lesson 19. Facilitate trust building and collaborative learning	31
Lesson 20. Apply transparency and openness throughout the process	32
Lesson 21. Involve decision makers in the adaptation process from the beginning to ensure that the process is integrated with policymaking processes	33
Lesson 22. Ensure stakeholder participation in all steps of the development and implementation of adaptation strategies and measures	33
Lesson 23. Ensure stakeholder participation and ownership of adaptation measures at different decision-making levels and spheres of influence.....	35
Lesson 24. Build transboundary teams among scientists, administrative authorities, non-governmental groups and technical experts to enable joint actions, such as assessments	37
2.3.2 Capacity development	37
Lesson 25. Identify the needs for capacity development	38
Lesson 26. Develop a capacity-development plan	40
Lesson 27. Ensure that investments in information and data-sharing systems target not only technological solutions, but also capacity development and the ability to integrate multidisciplinary information	41
Lesson 28. Facilitate the exchange of insights and experience between stakeholders on adaptation activities to learn and build capacities	42
Lesson 29. Ensure the exchange of knowledge between technical specialists and decision makers	42
2.3.3 Communication	43
Lesson 30. Clearly define the strategic objectives of communication in advance	45
Lesson 31. Launch an initial communication plan at the beginning of the project, and update, adjust and revise it progressively	46
Lesson 32. Raise awareness of the importance of acting at a basin-wide scale	46
Lesson 33. Tailor messages to your audience, based on its characteristics and needs	47
Lesson 34. Handle internal communication between project partners with the same care as external outreach	48

Lesson 35. Implement and model communication about adaptation for key audiences on the most appropriate scale, which may be the local or sub-basin scale rather than the whole-basin level.....	49
Lesson 36. Select appropriate instruments to communicate about climate change impacts on water resources and adaptation options	51
Lesson 37. Use targeted approaches to raise awareness on the need for adaptation	52
Chapter 3 Vulnerability and impact assessment in transboundary river basins	55
3.1 Data collection, exchange and storage.....	55
Lesson 38. Identify information needs and processes for assessing, gathering, compiling and exchanging information	56
Lesson 39. Ensure collection and sharing of the appropriate and necessary data, information and models for the entire basin and across the water cycle	56
Lesson 40. Evaluate thematic, spatial and temporal areas of data coverage and gaps	59
Lesson 41. Build a common repository of the information to be communicated	60
3.2 Assessing vulnerabilities, opportunities and synergies	60
3.2.1 Vulnerability assessment at the basin and sub-basin level.....	61
Lesson 42. Develop a common understanding of the concepts of vulnerability, opportunity, impacts and uncertainty related to climate change	61
Lesson 43. Consider the whole basin and all steps of the water cycle in the vulnerability assessment	62
Lesson 44. Assess vulnerability at both the basin and sub-basin levels	64
Lesson 45. Link the vulnerability assessment with capacity-building for decision makers and stakeholders	66
3.2.2 Use and integration of scenarios and models.....	66
Lesson 46. Harmonize and integrate the use of climate, environmental and socioeconomic models and scenarios	66
Lesson 47. Involve stakeholders in vulnerability assessments.....	68
Chapter 4 Developing adaptation measures.....	71
4.1 Adaptation measures in the transboundary context	71
4.1.1 Structural and non-structural measures	73
Lesson 48. Develop a mix of structural and non-structural measures	73
4.1.2 Basin-wide monitoring and observation system	75
Lesson 49. Develop a common monitoring system	75
Lesson 50. Ensure that monitoring and observation systems are capable of adjusting to the possible changes in information needs	76
Lesson 51. Develop a transboundary early warning system	76
4.2 Prioritization of measures and their location.....	78
Lesson 52. Assess the economic, environmental and social costs and benefits of different adaptation options on a basin scale	78
Lesson 53. When selecting adaptation measures consider their impact on mitigation	79

Lesson 54. Establish a transparent, participatory and explicit prioritization process	79
Lesson 55. Locate adaptation measures at the most beneficial location in a transboundary basin and consider sharing the costs and benefits	81
Lesson 56. Consider using economic analysis to build the case for action and to inform the selection of adaptation options	84
4.3 Financing the implementation of adaptation measures	84
4.3.1 Mix of public and private funds.....	84
Lesson 57. Ensure adequate financing for adaptation through a mix of public and private funds	85
4.3.2 Mainstream basin adaptation in development policies and programmes	86
Lesson 58. Mainstream adaptation costs into the overall costs of water management	86
Lesson 59. Use economic instruments for water management to reduce baseline stress and provide flexibility to changing conditions	86
Chapter 5 Monitoring and evaluation of adaptation actions.....	89
5.1 Build a basin-wide evaluation system.....	89
Lesson 60. Develop a theory of change	90
Lesson 61. Use a portfolio of monitoring and evaluation tools and be cautious in attributing impacts to climate shifts	90
5.2 Regularly update assessments.....	94
Lesson 62. Evaluate the effectiveness of adaptation measures	94
Lesson 63. Establish mechanisms for regularly reviewing the assessments in order to ensure flexible adaptation	96
Annexes	99
ANNEX 1	100
List of pilot projects and basins members of the global network of basins working on climate change adaptation.....	100
ANNEX 2	102
References	102

LIST OF BOXES

<i>Case study 2.1</i>	First climate change adaptation strategy for the international Rhine River Basin: A new challenge!.....	8
<i>Case study 2.2</i>	Developing a strategy for climate change adaptation in the Danube Basin.....	10
<i>Case study 2.3</i>	Environmental planning for the lower Dniester	11
<i>Case study 2.4</i>	Transboundary Great Lakes studies — joint integrated assessments.....	14
<i>Case study 2.5</i>	Ecosystem Management and Restoration: Tancat de la Pipa	15
<i>Case study 2.6</i>	Ecosystem-based approaches and green infrastructure in Denmark.....	17
<i>Case study 2.7</i>	Making the case for an ecosystem adaptation strategy in the Great Lakes Basin	17
<i>Case study 2.8</i>	Bugesera initiative and its link to the national level	18
<i>Case study 2.9</i>	Disaster preparedness measures across diverse sectors in the Zambezi Basin.....	19
<i>Case study 2.10</i>	Addressing climate change and other pressures through technical innovations and hydro-agricultural and agricultural development in the North-Western Sahara Aquifer System	20
<i>Case study 2.11</i>	Creating a policy framework for negotiating uncertainty and trade-offs in the Mekong River Basin	22
<i>Case study 2.12</i>	The Sava Flood Protocol	23
<i>Case study 2.13</i>	Cooperation between Mexico and the United States	24
<i>Case study 2.14</i>	Legal framework for cooperation between Spain and Portugal	25
<i>Case study 2.15</i>	The Great Lakes Water Quality Agreement between Canada and the United States and its 2012 Protocol.....	26
<i>Case study 2.16</i>	Agreement between Kazakhstan and China on Water Quality.....	27
<i>Case study 2.17</i>	River basin organizations and adaptation strategies	28
<i>Case study 2.18</i>	Great Lakes	28
<i>Case study 2.19</i>	The Drin Memorandum of Understanding and the role of stakeholders.....	31
<i>Case study 2.20</i>	Colorado River.....	32
<i>Case study 2.21</i>	Climate change stakeholder consultations in the transboundary Bugesera Basin shared by Rwanda and Burundi (GWP Eastern Africa).....	34
<i>Case study 2.22</i>	Making space for water in the Bodrog River Basin.....	36
<i>Case study 2.23</i>	Garonne 2050: how to involve stakeholders in the development of adaptation plans.....	36
<i>Case study 2.24</i>	Mekong Climate Change Forum — Adaptation to Climate Change in the Transboundary Context.....	39
<i>Case study 2.25</i>	Quantifying surface water and groundwater fluxes towards the Dead Sea	41
<i>Case study 2.26</i>	Exchanges between basin organizations on climate change: First Rhine-Mekong Symposium	42
<i>Case study 2.27</i>	Global network of basins working on climate change adaptation	43
<i>Case study 2.28</i>	Goals and objectives of the communication strategy for the Permanent Okavango River Basin Water Commission	44
<i>Case study 2.29</i>	The communications and visibility strategy of the joint EU/UNDP project “Promoting Integrated Water Resources Management (IWRM) and Fostering Transboundary Dialogue in Central Asia”	47

<i>Case study 2.30</i>	“Colours of the Dniester”: how to engage children in climate change adaptation	48
<i>Case study 2.31</i>	Gathering project partners around the same table in the Dniester River Basin	49
<i>Case study 2.32</i>	Communicating at basin and local levels in the Mekong River Basin	50
<i>Case study 2.33</i>	“Multiple tools multiple times!” Dissemination tools in the AMICE communication plan.....	51
<i>Case study 2.34</i>	Using games for capacity development	53
<i>Case study 3.1</i>	Development of geoportal for the Dniester basin.....	57
<i>Case study 3.2</i>	Prediction of water levels of the Ubangi River.....	58
<i>Case study 3.3</i>	Joint database for the Neman River Basin	59
<i>Case study 3.4</i>	The Nile Information System.....	60
<i>Case study 3.5</i>	Classifying the climate vulnerability of the Moldovan part of the Dniester River Basin.....	62
<i>Case study 3.6</i>	The vulnerability of the Iullemeden–Taoudeni–Tanezrouft Aquifer System	65
<i>Case study 3.7</i>	Neman River Basin data and model harmonization.....	67
<i>Case study 3.8</i>	Caucasus vulnerability assessment through capacity building and sharing data, models and expertise.....	68
<i>Case study 3.9</i>	Participatory analysis of the vulnerability of the Neman and Dniester River Basins to climate change according to severity and probability of its consequences	68
<i>Case study 4.1</i>	Structural interventions in the Senegal River Basin	75
<i>Case study 4.2</i>	The TransNational Monitoring Network.....	76
<i>Case study 4.3</i>	The GEF/UNEP/ACTO project on integrated and sustainable management of transboundary water resources in the Amazon river basin considering climate variability and change: Adapting to Climate Change in the Transboundary MAP Region: Madre de Dios (Peru), Acre (Brazil) and Pando (Bolivia)	78
<i>Case study 4.4</i>	Methods used for prioritizing adaptation measures in national and transboundary adaptation strategies	80
<i>Case study 4.5</i>	Prioritizing measures and their location in the Dniester River Basin.....	81
<i>Case study 4.6</i>	Making a link between upstream and downstream issues in the Dniester River Basin.....	83
<i>Case study 4.7</i>	The Columbia River Treaty	83
<i>Case study 4.8</i>	Assessing the socioeconomic costs of climate change to spur adaptation action in Armenia.....	84
<i>Case study 4.9</i>	Australian Water for the Future Programme.....	85
<i>Case study 4.10</i>	Exploring innovative financing mechanisms.....	85
<i>Case study 4.11</i>	Illustrations of adaptation costs for the water sector	86
<i>Case study 4.12</i>	Pooling catastrophe risk due to excessive rainfall events in the Caribbean.....	87
<i>Case study 4.13</i>	Incentives for managing urban rainwater: the “Rain Tax” in France	87
<i>Case study 5.1</i>	Establishing a theory of change.....	90
<i>Case study 5.2</i>	The approach by the Global Environment Facility in evaluating water initiatives.....	97

LIST OF TABLES

<i>Table 1.</i>	Examples of water-related adaptation measures	72
<i>Table 2.</i>	Examples of monitoring and evaluation tools, methods and approaches.....	92
<i>Table 3.</i>	Questions to guide indicator development for adaptation initiatives	95

LIST OF FIGURES

<i>Framework for the development of a climate change adaptation strategy</i>	4
--	---