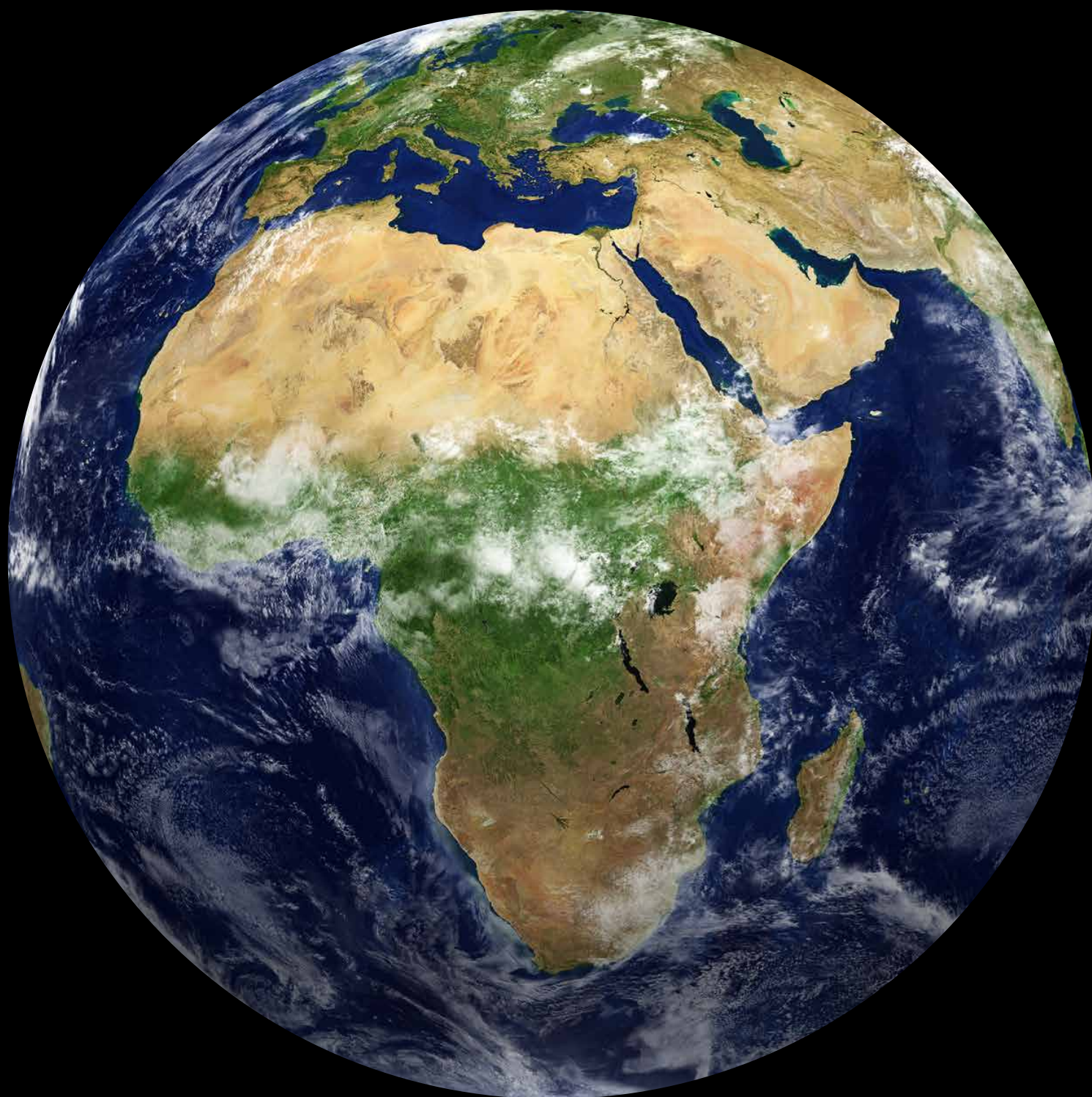




# SANITATION AND WASTEWATER ATLAS OF AFRICA



AFRICAN DEVELOPMENT BANK GROUP  
GROUPE DE LA BANQUE AFRICAINE  
DE DEVELOPPEMENT



© 2020, African Development Bank, United Nations Environment Programme, GRID-Arendal

ISBN: 978-82-7701-194-3

This publication may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made. The African Development Bank, United Nations Environment Programme, and GRID-Arendal would appreciate receiving a copy of any publication that uses this report as a source.

No use of this publication may be made for resale or for any other commercial purpose whatsoever without prior permission in writing from the African Development Bank, United Nations Environment Programme, and GRID-Arendal.

African Development Bank  
c/o Water Development and Sanitation Department  
CCIA Building, Avenue Jean-Paul II 01 BP 1387  
Abidjan 01, Côte d'Ivoire  
Tel: +225 2026 3900  
<http://afdb.org>

United Nations Environment Programme  
PO Box 30552, Nairobi 00100, Kenya  
Tel: +254 20 7621234  
Fax: +254 20 7623943/44  
<http://unep.org>

GRID-Arendal  
Teaterplassen 3, N-4836, Arendal, Norway  
Tel: +47 47 64 45 55  
<http://grida.no>

For bibliographic and reference purposes, this publication should be referred to as:

AfDB, UNEP and GRID-Arendal. (2020). *Sanitation and Wastewater Atlas of Africa*. AfDB, UNEP and GRID-Arendal. Abidjan, Nairobi and Arendal.

Printed by Synkron Media

This atlas is part of the Wastewater Management and Sanitation Provision in Africa Project, a partnership between the African Development Bank (AfDB), United Nations Environment Programme (UNEP) and GRID-Arendal. The project is supported by the AfDB through its Rural Water Supply and Sanitation

Initiative (funded by the Governments of Burkina Faso, Canada, Denmark, France, Italy, Switzerland and the Netherlands), and the Multi-Donor Water Partnership Programme (funded by the Governments of Canada and Denmark). The project is also funded by the Government of Norway and UNEP, and technically supported by GRID-Arendal.

#### DISCLAIMER

The views expressed in this publication are not necessarily those of the agencies cooperating in this project. The designations and presentations employed do not imply the expression of any opinion whatsoever on the part of the cooperating agencies concerning the legal status of any country, territory, city, or area, of its authorities, or of the delineation of its frontiers or boundaries. Mention of a commercial company or product in this report does not imply endorsement by the cooperating agencies. The use of information from this publication concerning proprietary products for publicity or advertising is not permitted. Trademark names and symbols are used in an editorial fashion with no intention of infringement on trademark or copyright laws.

We regret any errors or omissions that may have been unwittingly made.

# SANITATION AND WASTEWATER ATLAS OF AFRICA





# Foreword

Sanitation, including the proper management of wastewater, is central to ensuring human and ecosystem health, and economic and environmental benefits. While significant efforts are being made across Africa to ensure better access and services, many places still have inadequate infrastructure for sanitation and wastewater management. This is happening at a time of greater need due to population growth, rapid urbanization, improving lifestyles, and industrial and agricultural expansion – all in a region that has low resilience to climate change.

This atlas – a joint effort by the African Development Bank, the United Nations Environment Programme, and GRID-Arendal – profiles the state and trends in wastewater management and sanitation delivery in Africa; highlights the human health and ecosystem impacts of poor sanitation and wastewater management; and discusses the continent's policy and institutional arrangements. It benchmarks Africa's progress towards the

Sustainable Development Goals (SDGs) and other aspirations, including Africa's Agenda 2063 and Africa's Water Vision 2025. The findings of the atlas will allow policymakers to track progress on sanitation and wastewater, making it a valuable tool to accelerate change.

The continent's efforts in this area are largely guided by SDG 6. Of particular concern are the sub-targets on access to adequate and equitable sanitation and hygiene – paying special attention to the needs of women, girls and vulnerable populations – and improving water quality by reducing pollution, eliminating dumping and halving the proportion of untreated wastewater. However, all other SDG 6 targets are linked to Africa's aspirations, including those on universal and equitable access to safe and affordable drinking water, efficient water use and integrated water resources management. Other SDGs – including those for health, education, cities and industry – will be boosted by better sanitation provision and wastewater management.

Providing adequate sanitation with proper wastewater treatment represents an opportunity to reclaim vital waste resources and lead the way towards the realization of a circular economy, as well as more sustainable services delivery. Solutions to increase sanitation coverage and improve wastewater treatment will help boost public health and secure the sustainability of Africa's natural resources. They can trigger investments in integrated wastewater management and offer employment opportunities while ensuring the integrity of water resources and water-related ecosystems. As the atlas discusses, industry and the private sector have a key part to play by investing in and innovating on solutions for sanitation and wastewater management.

We trust that the *Sanitation and Wastewater Management Atlas of Africa* will be of use to Africa's leaders, development allies and interested parties to guide and track the solutions needed to provide better sanitation and wastewater management services to Africa's people.



**Akinwumi A. Adesina**  
President  
African Development Bank



**Inger Andersen**  
Executive Director  
UNEP



**Peter T. Harris**  
Managing Director  
GRID-Arendal

# Acknowledgements

The *Sanitation and Wastewater Atlas of Africa* is the outcome of a collaborative effort by the African Development Bank, the United Nations Environment Programme (UNEP), and GRID-Arendal. The three partners jointly fundraised for the preparation and production of the atlas, coordinated input from several players and provided technical support. The efforts by the three partners will not end with the atlas. Wide outreach will continue, taking advantage of the various networks that each partner brings.

The atlas is a result of the convergence of thought by Oswald Mulenga Chanda and Maimuna Nalubega (African Development Bank), Thomas Chiramba and Birguy Lamizana-Diallo (UNEP), and Clever Mafuta and Bernardas Padegimas (GRID-Arendal), who acknowledged that part of the reason for the failure of the majority of African countries to meet their Millennium Development Goals was a lack of information that could inform policy direction. The atlas is therefore meant to benchmark Africa's progress towards key targets under the Sustainable Development Goals.

While acknowledging and appreciating the efforts of the three partners, it is important to note that big achievements are made through coordinated effort. The preparation of the atlas benefited from the expertise of several authors drawn from across Africa. The authors (see Appendix 1) provided draft content that went through several rounds of peer and government reviews. The peer reviewers (Appendix 2) were also drawn from across Africa. Two review workshops – held in Kigali, Rwanda, and Gaborone, Botswana – helped to fine-tune the content of the atlas through input mainly from government reviews (Appendix 3). Some case studies to support the chapters were compiled by scholars and researchers working on topics related to sanitation provision and wastewater management in Africa.

The process leading up to the printing of the atlas started in 2017 with the annual partners meeting of the African Development Bank, UNEP

and GRID-Arendal. At the meeting, the partners agreed on the draft outline of the atlas and a list of possible authors. The commissioned authors met in April 2018 and further refined the outline to avoid overlaps and gaps. Initial drafts of the chapters were prepared and then subjected to peer review followed by chapter revisions. In May 2019, the chapters were subjected to a government and peer review process through another workshop held in Gaborone. The chapters were revised before undergoing technical edit and later copy edit.

The atlas is one of a suite of products that also includes various online outputs, including policy briefs, an explanatory video, photo-rich stories, and a multimedia presentation with interactive maps. Funding for the production of the atlas and the ancillary products was made possible through the support of the African Development Bank, UNEP's Environment Fund and Norway's Ministry of Foreign Affairs through the Norwegian Agency for Development Cooperation (NORAD). The African Development Bank funding came from the bank's Rural Water Supply and Sanitation Initiative, which was funded by the Governments of Burkina Faso, Canada, Denmark, France, Italy, Switzerland and the Netherlands, as well as the Multi-Donor Water Partnership Programme, funded by the Governments of Canada and Denmark.

The atlas benefitted from copy editing by Strategic Agenda and cartography by Studio Atlantis and GRID-Arendal.

Many other organisations and individuals contributed directly and indirectly to the Wastewater Management and Sanitation Provision Project in Africa whose main output is the *Sanitation and Wastewater Atlas of Africa*. While efforts have been made to acknowledge their input, it may be that not everyone has been credited by name. Please accept this acknowledgement of your role in this important publication.





# Contents

Foreword	5
Acknowledgements	6
<b>1 OVERVIEW</b>	<b>9</b>
1.1 Introduction	10
1.2 Water, Sanitation and Hygiene in Africa	18
1.3 Development Goals for the Water Sector	24
1.4 Galvanising for Action	30
1.5 Sustainable Sanitation and Wastewater Management	32
1.6 Conclusion	35
<b>2 WASTEWATER STREAMS</b>	<b>37</b>
2.1 Introduction	38
2.2 Municipal Wastewater and Faecal Sludge	39
2.3 Industrial Wastewater Management	50
2.4 Hospital Wastewater Management	55
2.5 Agricultural Wastewater	56
2.6 Storm water Run-off	60
2.7 Rural Water, Sanitation and Hygiene	61
2.8 Emergency Sanitation	63
2.9 Conclusion	65
<b>3 ECOSYSTEMS</b>	<b>67</b>
3.1 Introduction	68
3.2 The Concept of Ecosystems Health	70
3.3 Ecosystem Services	71
3.4 Untreated Wastewater and Ecosystem Health	72
3.5 Contamination/Degradation of Ecosystems	74
3.6 Contaminants of Emerging Concern	84
3.7 Efforts at Reducing Ecosystem Health Risk Through Wastewater Treatment	85
3.8 Ecosystem Health Risk Reduction and SDG 6	86
3.9 Conclusion	89
<b>4 HUMAN HEALTH</b>	<b>91</b>
4.1 Introduction	92
4.2 Toilet barrier: A clean functioning toilet	93
4.3 Safe water barrier: Clean water to drink and cook with	95
4.4 Hygiene Barrier: Water for Washing and Cleaning	96
4.5 The wastewater barrier	97
4.6 Disease related to WASH	98
4.7 Conclusion: Stopping the Spread of Disease	105
<b>5 POLICY AND INSTITUTIONAL FRAMEWORKS</b>	<b>107</b>
5.1 Introduction	108
5.2 Continental Policy and Institutional Responses	109
5.3 National Initiatives	111
5.4 Sanitation Governance	116
5.5 Conclusions and recommendations	125
<b>6 CIRCULAR ECONOMY</b>	<b>127</b>
6.1 Introduction	128
6.2 Driving Factors for the Application of the Circular Economy Approach in Wastewater Management	130
6.3 Circular Economy Approaches in Wastewater Management	132
6.4 Constraints to the application of a circular economy approach in wastewater management in Africa	144
6.5 Conclusion	145
<b>7 COUNTRY PROFILES</b>	<b>147</b>
7.1 Introduction	149
Notes	260
References	261
Acronyms and abbreviations	275
Contributors	276
Appendix 1. Wastewater streams	278
Appendix 2. Impacts, risks and lessons from implementation of Circular Economy Approaches (CEA)	279



预览已结束，完整报告链接和二维码如下：

[https://www.yunbaogao.cn/report/index/report?reportId=5\\_13722](https://www.yunbaogao.cn/report/index/report?reportId=5_13722)

