

ECOSYSTEMS AND HUMAN WELL-BEING

El Maghara, Northern Sinai, Egypt



Copyright ©2010, United Nations Environment Programme

ISBN: 978-92-807-3056-2

Disclaimers

The content and views expressed in this publication do not necessarily reflect the views or policies of the contributory experts, organizations, or the United Nations Environment Programme (UNEP) and neither do they imply any endorsement.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNEP concerning the legal status of any country, territory, or city or its authorities, or concerning the delimitation of its frontiers and boundaries. Mention of a commercial company or product in this publication does not imply the endorsement of UNEP.

© Maps, photos, and illustrations as specified.

Reproduction

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 acknowledgment of the source is made. UNEP would appreciate receiving a copy of any publication that uses this publication as a source.

No use of this publication may be made for resale or any other commercial purpose whatsoever without prior permission in writing from UNEP. Applications for such permission, with a statement of purpose and intent of the reproduction, should be addressed to the Division of Communication and Public Information (DCPI), UNEP, P.O. Box 30552, Nairobi 00100, Kenya.

The use of information from this publication concerning proprietary products for publicity or advertising is not permitted.

Produced by

Division of Early Warning and Assessment (DEWA) – United Nations Environment Programme
P.O. Box 30552, Nairobi 00100, Kenya
Tel: (+254) 20 762-1234
Fax: (+254) 20 762-3927
E-mail: unepub@unep.org
Web: www.unep.org

Cover: Audrey Ringler, UNEP, Nairobi

Concept and layout: ©Ocean Graphics, Cairo, Egypt

Printing: Progress Press Ltd., Malta

Distribution Services: SMI Ltd., UK

This publication is available from Earthprint.com <http://www.earthprint.com>

UNEP encourages environmentally sound practices on the global level as well as on the level of its own activities. This publication has been printed on chlorine free and acid free paper made from 100 per cent recycled pulp. Our distribution policy aims to reduce UNEP's carbon footprint.

Acknowledgments

UNEP acknowledges the contributions made by many individuals and institutions that have contributed to “Ecosystems and Human Well-Being: Al Maghara, Northern Sinai, Egypt”. A special word of thanks goes to H.E. Eng. Maged George Elias Ghattas, Minister of State for Environment Affairs in Egypt for his support. Also, our special thanks go to the encouragements and supports provided by Professor Mohamed El Zhogby, president of the Suez Canal University, Professor Farouk Abdelkader, president of Sinai University as well as Professor Ibrahim Nagi Aly, vice president of the Suez Canal University. A special word of thanks goes to Ms. Hanna Ayoub, Ms. Judy Barsalou, Ms. Marina Dawoud, Ms. Sharry Lapp, Ms. Amany Manqabadi and Ms. Emma Playfair from the Ford Foundation, Cairo office. Our thanks are also extended for the coordination and support provided by the directors of the Millennium Ecosystem Assessment Dr. Walter V. Reid (January 2002 - March 2005) and Mr. Marcus Lee (April - September 2005). The full list of names to acknowledge is given below:

Authors

Lead Coordinating Author

Mohamed Tawfic Ahmed

Introduction

Author: Mohamed Tawfic Ahmed

Chapter 1

Lead Author: Mohamed Tawfic Ahmed

Contributing Authors: Ahmed Abdelrehim, Ali Amasha, Mohamed O. Arnous, Khairy El Ashry, Hamdy El Sharabasy, Mohamed El Tabie, Mayar Sabet

Chapter 2

Lead Authors: Mohamed Tawfic Ahmed, Mohamed O. Arnous, Mohamed A. El Ghawaby, Kamal Ouda Ghodie

Contributing Authors: Raafat Abdelwahab, Mohamed El Shafie, Hamdy El Sharabasy, Mohamed A.A. Hassan, Naglaa Loutfy, Mahmoud Zahran

Chapter 3

Lead Author: Mohamed Tawfic Ahmed, Luohui Liang

Contributing Authors: Manal Hassan, Manal Hefny, Naglaa Loutfy, Kariman Mahomoud, Mayar Sabet

Chapter 4

Leading Authors: Mohamed Tawfic Ahmed, Mohamed Mostafa Saleh

Contributing Author: Adel Abdelkader, Ahmed Abdelrehim

Chapter 5

Lead Author: Ahmed El Kholy

Contributing Authors: Adel Abdelkader, Ahmed Abdelrehim, Mohamed Tawfic Ahmed

Funding: The Government of the Kingdom of Saudi Arabia, the Ford Foundation, Cairo Office, the Millennium Ecosystem Assessment and UNEP, World Fish Center, Penang, Malaysia together funded this assessment.

UNEP Coordination: Adel Abdelkader

Extended Team:

UNEP: Yasmina Adra, Marion Cheatle, Salif Diop, Habib El-Habr, Ahmed Ghosn, Peter Gilruth, Marcus Lee (2006-2008), Hiba Sadaka, Gemma Shepherd

Suez Canal University: Yassir Awad, Gamal El Kady, Samir El Shazli, Amira Gamal, Salah Goaid, Gamal Gomaa, Sara Griesh, Samia Henneidk, Samar Kishta, Nehal Loutfy, Samia Massoud, Moustafa Saleh, Eid Quraish, Rabie Saleh, Adel Salem, Tamer Shawki

Desert Research Centre: Yassir Hanafy, Badran Hassanain

Jawaharlal Nehru University: JK Saxena, New Delhi, India

Editors: Cathy Costain, Mona Hashish, Rosemarie Philips

Technical Editors: Adel Abdelkader, Mohamed Tawfic Ahmed

Concept and Layout : ©Ocean Graphics, Cairo, Egypt

Art Director : Sheridan Mohamed Hashish

Design: Mona Mahmoud Fouad

Cover Design: Audrey Ringler

Capacity Building Component Team: Asma Abahussain, Mohammad Abido, Anwar Shaikh Al-Din A. Khalil, Waleed Zubari

Institutions

Centre for Environment and Development for Arab Region and Europe, CEDARE

Desert Research Centre, Egypt

Egypt Metrological Service

Governorate of North Sinai

Jawaharlal Nehru University, New Delhi, India

Ministry of Electricity, North Sinai

Ministry of Water Resources and Irrigation, North Sinai

Petroleum Research Centre, Cairo

Soul Water, Cairo

United Nations University, Tokyo, Japan

World Fish Centre, ICLARM, Penang, Malaysia

Reviewers:

Reda Bayoumi, Hernán Blanco, Colin Filer, Manal El Batran, Mohamed El Ghawaby, Mohamed El

Kassas, Wafa Essahli, Edgar Göll, Marcus Lee, Luohui Liang, Belinda Reyers, Adel Zakri

Contents

Foreword	x
Preface	xi
Introduction	1
Chapter 1: Assessment Methods	9
Chapter 2: El Maghara Ecosystem, Trends, Conditions and Impacts	31
Chapter 3: Local Knowledge: A Valuable Resource	73
Chapter 4: El Maghara Scenarios: Alternative Images of the Future	87
Chapter 5: Policy Responses: Moving Toward Sustainability	127
Glossary	156
Index	160

List of illustrations

Introduction

Figure 1. Conceptual framework of the millennium ecosystem assessment	3
Figure 2. Consequences of ecosystem change on human well-being	4
Figure 3. Proportion of capital stocks in-country in different income groups	5
Figure 4. Map of sub-global assessments worldwide	6
Figure 5. Location map of Arab MA	7
Figure 6. Location map of El Maghara area with reference to Middle East region	8

Chapter 1 Assessment Methods

Figure 1.1. A regional map showing where the assessment was conducted	14
Figure 1.2. Satellite image of El Maghara area showing main geo-morphological units	15
Figure 1.3. Digital elevation model (DEM) of El Maghara area	16
Figure 1.4. Land use/land cover map of El Maghara area	17
Figure 1.5 Populated areas around El Maghara	22
Figure 1.6. Proportion of the El Maghara population at various income levels	24
Figure 1.7. School enrollment, El Maghara area	25
Figure 1.8. Men education status, El Maghara area	26
Figure 1.9. People's aspirations and needs in El Maghara area, as indicated by questionnaire	29

Chapter 2 El Maghara Ecosystem Trends, Conditions and Impacts

Figure 2.1. Land use / land cover map, El Maghara area, 2007	35
Figure 2.2. Land use pattern in El Maghara area, 1986	36
Figure 2.3. Land use pattern in El Maghara area, 2000	36
Figure 2.4. Enhanced classified landsat satellite image of El Maghara area, 1986	38
Figure 2.5. Enhanced classified landsat satellite image of El Maghara area, 2000	38
Figure 2.6. Soil erosion rate map, El Maghara area	39
Figure 2.7. Distribution of plant species around El Maghara, 2006	44
Figure 2.8. Percentage vegetative cover	44
Figure 2.9. Classified enhanced landsat (TM, 1986) image, El Maghara area	46
Figure 2.10. Classified enhanced landsat (ETM, 2000) image, El Maghara area	46
Figure 2.11. Average annual rainfall on Sinai peninsula	49
Figure 2.12. Flashfloods in main basins and sub - basins of El Maghara area	50
Figure 2.13. Drainage basins and surface water distribution map constructed from ETM image	52
Figure 2.14. The distribution of water points (wells) from different aquifers in El maghara area	52
Figure 2.15. Aquifer type distribution map, El Maghara area	54
Figure 2.16. Static flow water level map of El-Massajid aquifer	54
Figure 2.17. Salinity in aquifers map, El Maghara area	57
Figure 2.18. Sodium absorption ratio (SAR) map of all aquifers in the study area	57

Figure 2.19. Variations in current per capita water availability for each watershed in El Maghara area	59
Figure 2. 20. Soil sampling sites	61
Figure 2.21. Soil fertility map, El Maghara area	62
Figure 2.22. Silt content map, El Maghara area	63
Figure 2.23. Organic matter map, El Maghara area	63
Figure 2.24. Integrated land capability classes map, El Maghara area	64
Figure 2.25. Integrated fertility classes map, El Maghara area	64
Figure 2.26. Biodiversity and population density of some soil inhabiting organisms around El Maghara coal mine	66
Figure 2.27. The morphological distortion in an isolate of <i>Aspergillus Niger</i> from the study area compared with the normal isolate of the same Fungus	66
Figure 2.28. Soil salinity map, El Maghara area.	67
Figure 2.29. Lithological map of El Maghara area	69
Figure 2.30. Rock use map, El Maghara area	69

Chapter 4 El Maghara Scenarios: Alternative Images of The Future

Figure 4.1. The hybrid scenario process used in the El Maghara assessment	91
Figure 4.2. Indirect influence / dependence map	96
Figure 4.3. Potential indirect influence graph	97
Figure 4.4. Map of influence and dependence between actors	100
Figure 4.5. Sustainable development competitive scale	100
Figure 4.6. Quadrate of key drivers shaping the scenarios	102
Figure 4.7. Average monthly family income in each scenario	123
Figure 4.8. Literacy rate in each scenario	123
Figure 4.9. Employment rate in each scenario	124
Figure 4.10. Population levels in each scenario	124
Figure 4.11. Water share per capita in each scenario	124

Chapter 5 Policy Responses: Moving Toward Sustainability

Figure 5.1. Problem tree: implications of poor governance	130
Figure 5.2. Objectives tree: implications of good governance	132

List of boxes

Chapter 1 Assessment Methods

Box 1.1 Ecosystem, natural resources, and social fabric development in Sinai	20
Box 1.2 Crisis and people: A Sinai perspective	24

Chapter 2 El Maghara Ecosystem Trends, Conditions and Impacts

Box 2.1 Drivers and indirect drivers: A case study illustrating a domino reaction	46
Box 2.2 Juniperus phoenicea, values and uses	48
Box 2.3 Desert and natural resources	68

Chapter 3 Local Knowledge: a Valuable Resource

Box 3.1 El Karma dam	81
Box 3.2 Information validation	85

Chapter 4 El Maghara Scenarios: Alternative Images of The Future

Box 4.1 The power of a well-told story	103
Box 4.2 Bedouin protest against government	118

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_10139

