

Integrated Watershed Management - Ecohydrology & Phytotechnology -

- Manual -



UNITED NATIONS ENVIRONMENT PROGRAMME

DIVISION OF TECHNOLOGY, INDUSTRY AND ECONOMICS - INTERNATIONAL ENVIRONMENTAL TECHNOLOGY CENTRE

*Osaka Office
2-110 Ryokuchi koen, Tsurumi-ku,
Osaka 538-0036 Japan
Tel: +81-6-6915-4581
Fax: +81-6-6915-0304*

*Shiga Office
1091 Oroshimo-cho, Kusatsu City,
Shiga 525-0001 Japan
Tel: +81-77-568-4581
Fax: +81-77-568-4587*

*Email: ietc@unep.or.jp
URL: <http://www.unep.or.jp>*

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Design: Kamil Zakrzewski
Typesetting: Przemyslaw Nyga



Editors:
Maciej Zalewski
 (ICE-PAS)
Iwona Wagner-Lotkowska
 (CEHS-UL)

Assistant Editor:
Richard D. Roberts
 (UNEP-GEMS/Water)

Coordination & Supervision:
Vicente Santiago-Fandino
 (UNEP-IETC)
Philippe Pypaert
 (UNESCO-ROSTE)



UNEP

The United Nations Environment Programme
 International Environmental Technology Centre
 2-110 Ryokuchi Koen, Tsurumi-ku, Osaka 538-0036
 1091 Oroshimo-cho, Kusatsu-City, Shiga 525-0001, Japan



UNESCO Regional Bureau for Science in Europe
 Palazzo Zorzi, Castello 4930
 30122 Venice, Italy



UNESCO International Hydrological Programme
 Division of Water Sciences
 1, rue Miollis 75732 Paris Cedex 15, France



Centre for Ecohydrological Studies
 University of Lodz
 12/16 Banacha Str., 90-237 Lodz, Poland



International Centre for Ecology
 Polish Academy of Sciences
 Warsaw, Dziekanow Lesny, 1 Konopnickiej Str.
 05-092 Lomianki, Poland



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The following experts contributed to the production of this manual:

- Chapter 1: M. Zalewski, I. Wagner-Lotkowska
- Chapter 2: M. Zalewski (A), V. Santiago-Fandino (B), I. Wagner-Lotkowska (A, B, C)
- Chapter 3: I. Wagner-Lotkowska (A, C, D, G), A. Magnuszewski (A, C), Z. Kaczmarek (B), A. Trojanowska (D), K. Krauze (E), M. Lapinska (F), K. Izydorczyk, A. Wojtal & P. Frankiewicz (H), L. Chicharo (I)
- Chapter 4: R. Kucharski, A. Sas-Nowosielska, M. Kuperberg (C), K. Krauze (B), J. Bocian (A)
- Chapter 5: A. Zdanowicz (A), K. Krauze (B), I. Wagner-Lotkowska, J. Markowska & J. Markowski (C)
- Chapter 6: M. Lapinska (A, B), A. Trojanowska (C), M. Zalewski (B)
- Chapter 7: A. Trojanowska (A), A. Bednarek (B), K. Izydorczyk (C), J. Mankiewicz, T. Jurczak, B. Romanowska-Duda, M. Tarczynska (D), A. Wojtal (E), P. Frankiewicz (F)
- Chapter 8: A. Chicharo (A, B), L. Chicharo (C)
- Chapter 9: R. Kucharski, A. Sas-Nowosielska & M. Kuperberg (A), L. Ryszkowski, A. Kedziora (B, C)
- Chapter 10: K. Krauze (B), I. Wagner-Lotkowska, E. Kiedrzyńska, B. Sumorok (C), J. Bocian (A)
- Chapter 11: M. Lapinska (A, C), K. Krauze (B), Z. Kaczkowski (D)
- Chapter 12: I. Wagner-Lotkowska, K. Izydorczyk, T. Jurczak & M. Tarczynska (A), P. Frankiewicz (B), S. E. Jorgensen (C, D)
- Chapter 13: L. Chicharo
- Chapter 14: A. T. Calcagno (A), Z. Kaczmarek (B)

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■ PREFACE

The World Summit on Sustainable Development (WSSD) held in Johannesburg, South Africa in 2002 and the 3rd World Water Forum held in Kyoto, Japan in 2003 highlighted the importance of the UN Millennium Declaration and the Millennium Development Goals. Both events emphasized the importance of elaborating strong science to support sustainable development policy.

Further, the International Council for Scientific Unions (ICSU) declared that in the twenty-first century science „must become more problem-focused and apply an interdisciplinary approach to sustainable development issues in order for science to become more policy relevant“. Likewise, the UN World Commission for Sustainable Development (CSD), besides supporting the development and application of sound science towards sustainable development, also underscored the importance of developing and transferring environmentally sound technologies.

As the twenty-first century begins, it has been recognized that successfully managing water resources is an essential component of achieving sustainable development. However, due to the anthropogenic modification of the hydrological cycle by deforestation, urbanization and irrigation, water resources have been overexploited, degraded and wasted, resulting in higher risks to human health, economic and social development as well as to the functioning of ecosystems and the preservation of the environment.

In light of this scenario, there is a need to develop a novel, environmental management approach within the context of Integrated Watershed Management (IWM). This is where ecohydrology as well as the application of Environmentally Sound Technologies (ESTs) such as phytotechnology constitute a new dimension.

The concept of ecohydrology and its scientific foundations were developed by UNESCO-IHP over the past few decades. The integration of the two components - hydrology and ecology - by means of regulating hydrological, biotic and landscape interactions and processes, has contributed to improving ecosystems' resistance to stress. The concept of phytotechnology, developed by the UNEP-International Environmental Technology Center, encompasses a variety of environmental approaches and technologies based on the ecosystem services that plants provide. The use of phytotechnologies, together with the development of ecohydrology, can help prevent, control and even reverse the degradation of water resources.

Considering the complementarities of ecohydrology and phytotechnology and, taking into account the calls for an interdisciplinary approach by the WSSD, the 3rd WWF and the ICSU, UNESCO-IHP, UNESCO-Regional Bureau for Science in Europe (ROSTE) and UNEP-IETC merged their efforts through a number of projects and activities, including the present publication. The „Manual for Integrated Watershed Management“ follows on the „Guidelines for the Integrated Management of the Watershed“, published in 2002 by the same agencies, in which the general philosophy of ecohydrology and phytotechnology was put together for the first time, providing the reader an understanding of the concepts and their application to the integrated management of watersheds.

Due to the great interest generated by the Guidelines, and in order to provide practitioners with practical information about how to implement the concepts and approaches considered within ecohydrology and phytotechnology, the Scientific Advisory Committee of Ecohydrology IHP-VI and UNEP-IETC decided to produce the present publication. The manual has been designed to improve decision makers' identifica-

tion capabilities and understanding of mechanisms used to solve problems related to water resource degradation within watersheds. It is also expected that a larger audience would benefit from the present publication (i.e., technical experts, scientists, NGOs and others interested in water resource management.)

Bearing in mind once again that one of the major questions in achieving sustainable development is „whether scientific evidence can successfully overcome social, economic and political resistance” (Kennedy, Science 2003), we sincerely hope that the new approaches of ecohydrology and phytotechnology, developed in IHP-V and VI and supported by UNEP-IETC, will generate positive socioeconomic benefits for those living in watersheds in addition to improving the water resources quality.

Steve Halls



Director
UNEP-IETC

Andras Szöllösi-Nagy



Director
Division of Water Sciences, UNESCO
Secretary of the UNESCO IHP