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Central Asia is one of the largest irrigated zones worldwide. For centuries, irrigated agriculture has been the most important economic basis in the Khorezm Province in northwestern Uzbekistan. Unsustainable land management practices introduced during the soviet era combined with outdated and inefficient irrigation and drainage infrastructures inevitably led to wide-spread soil degradation and low-productivity systems. The overuse of water resources has been exacerbating the desiccation of the Aral Sea. For that reason the German engagement in the Aral Sea region in research and capacity development aimed to make an important contribution to economic and social development while simultaneously safeguarding water and land resources in the region.

Under the funding initiative “Integrated Water Resources Management (IWRM) – From Research to Implementation” of the German Federal Ministry of Education and Research (BMBF), new approaches and concepts have been developed and adapted to the different natural and socio-economic conditions in cooperation with emerging and developing countries. The strategic framework for this IWRM funding initiative was set in the BMBF funding programme entitled “Research for Sustainable Development – FONA”, which includes the funding priority “Sustainable Water Management – NaWaM”. With these measures, German research contributes innovatively to the design and implementation of solutions for better water resources management worldwide. Precondition for these research projects was the active participation and cooperation of industrial partners and stakeholders from Germany and the respective countries. Besides the development and testing of technological solutions to improve water use efficiency, all projects had to consider the enabling institutional and policy environment. An important aspect of all project’s activities was local capacity development to strengthen participants and stakeholders to secure sustainable project continuation in the future. The Khorezm project in Uzbekistan was one of seventeen research projects that developed and implemented IWRM concepts.
The aforementioned key elements of IWRM guided the activities of the German-Uzbek project entitled “Economic and ecological restructuring of land and water use in the Khorezm region of Uzbekistan – A pilot project in development research”. It has been led by the Center for Development Research (ZEF) on the German side, the State University of Urgench (UrDU) on the Uzbek side and UNESCO at the international level. Activities started in 2001 and project results were delivered to the local institutions until 2011. In the process, a sustainable structure of local institutions and the UNESCO has been established to take over the project after its lifetime and to disseminate project findings in and beyond the model region Khorezm. The results achieved within one decade of interdisciplinary research to improve land and water management in agriculture demonstrate the enormous efforts of the bilateral project team.

The project recommended a range of technical innovations to improve irrigation water use efficiency supported by economic tools and improved enabling institutional and policy environments. A number of these innovations are being adopted by farmers and found their way into national agricultural policies. Moreover, a modern GIS and soil laboratory at UrDU funded by BMBF supports the state-of-the-art research and education in natural and social sciences at UrDU for future generations. The partnership between ZEF, UrDU and UNESCO resulted in the establishment of a UNESCO Chair on Education for Sustainable Development at UrDU, which ensures the transfer of scientific methods and research findings from the project into teaching. More than 50 PhD students and more than 100 MSc students, most of them from Uzbekistan, have become experts and decision makers assuring a broad communication of research findings to regions with similar agro-ecological conditions.

For Germany, the improvement of the environment, particularly of water resources is of highest importance. That is why BMBF engages with local partners in research projects worldwide. Thus it contributes to the development of sustainable solutions in water management for a better future for all. In the geographically strategic region of Central Asia, Germany promotes security and stability, supports economic development and sustains water and land resources. This book aims to share the experiences gained in the Khorezm project with you and is testimony of the BMBF commitment to integrated water management.

In addition to scholarly and scientific insight, this book may also raise your interest in our BMBF research initiatives. I certainly hope that it triggers also new ideas for future research activities on all levels. Thus I wish you a pleasant time while reading this publication.

Dr. Georg Schütte, State Secretary
German Federal Ministry of Education and Research
Foreword (Ruzumbay Eshchanov)

Uzbekistan needs cooperation for research and higher education development.

Seven decades of integration in the Soviet Union have brought our country not only laureates. No doubt, the expansion of irrigated agriculture to produce cotton throughout much of Central Asia has been of paramount social and economic importance. Cotton revenues still account for a considerable share in foreign exchange revenues and national income, and employment and income security for rural families. However, the (ab)use of the natural resources for irrigated crop production has also had ecological and social consequences: the desiccation of the Aral Sea, land degradation and desertification arising from soil erosion, salinization, overgrazing of pastures, unsustainable agricultural practices, sand encroachment, seasonal drought, and more. The implementation of the ZEF/UNESCO project in the Khorezm region aiming at good governance of natural resources in general but especially of land and water management in the irrigated areas of the Aral Sea Basin came, therefore, just at the right time.

We knew some facts. Between 1950 and 1990, the irrigated cropland areas in Central Asia grew from 2 to ca. 8 million ha, and between 1950 and 2000 the population increased by about 300 %. Irrigated agriculture became the keystone for the welfare of the region and its rural population. Modern means of production replaced traditional crop rotations. Only later were we confronted with widespread land and ecological degradation of the irrigated dryland ecosystems. We were convinced that fertilizers, seeds, machinery, pesticides, water schemes, etc., were all that was needed. However, the consideration given to the environment and to our farmers did not match these efforts; a high price is being paid for this.

The texts of the Avesta, the sacred book of the Zoroastrians, teach us that one should be committed to a life based on good thoughts, good words and good deeds. In this context, the ZEF/UNESCO project was exemplary for us in various ways. It combined the best knowledge, experience and approaches from both worlds, the east and the west, together with local and international views. In light of our immense need for trained and educated people in sustainable develop-
ment, the initiative by the German Federal Ministry of Education and Research (BMBF) and ZEF/Bonn boosted education in the region. The project served as an example of educational structures spreading their outputs for sustainable development throughout Uzbekistan. The reputation of our regional university, the number of internationally accepted publications, the number of international collaborations, all increased dramatically. The spread of innovations and insights benefited both the environment and the population of the region already during the lifetime of the project.

This unique partnership in higher education and research and science development resulted in extensive media coverage and parliamentary support. It also contributed to the development of options for the use of our natural resources and markets that will be sustainable for a long time, and be acceptable to farmers, decision makers, and those worrying about the environment. This book provides an overview of these important aspects.

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