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Environmental Security

Environmental Security in Watersheds: The Sea of Azov

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Series C: Environmental Security

Foreword

Though the term "Environmental Security" is a widely used, well perceived and intuitively clear concept, it lacks a commonly accepted definition and methodologies. Definitions vary greatly depending on the institution or context in which it is discussed. Existing approaches to Environmental Security (ES) can be divided into two broad yet interlinked categories: (1) in which ES is a subject for international relations studies aiming to avoid violent conflicts over scarce resources; and (2) in which ES is a sign of sustainability in nature–environment interactions and, correspondingly, a part of national and human security.

According to the first approach ES is a process for effectively responding to changing environmental conditions that have the potential to reduce peace and stability in the world. Undoubtedly, this definition identifies an important issue. Changing environmental conditions cause harm and endanger societies depending on them, which in turn undermines peace and global stability. However, this approach suggests actions when changes have already commenced. At the same time most environmental changes which have affected human societies so far are human induced due to overexploitation of some ecosystem services and goods (e.g. overfishing) or their irrational usage (e.g. building in floodplains). Carefully planned patterns of natural resources consumption might assist in prevention of such changes to secure achieve in the functioning of ecosystems and societies. This observation brings up the need to consider the ecosystem services a vital component of the environmental security concept. Losing these services due to anthropogenic influence or natural hazards not only causes significant monetary losses, but also endangers human and societal well being. The second approach to ES definition is based on these considerations and allows the full complexity of human-environment interactions to be taken into account. At the same time, starting from this basis the perception of environmental security as an issue in international relations and conflict prevention/resolution can still easily be developed.

This approach also fits well with the traditional perception of environmental security in the former Soviet Union countries. In scientific and managerial communities in the region this term is understood in a much broader way than in the western tradition. As a rule Environmental Security is translated into Russian as "Ecologicheskaya

Bezopasnost" (Ecological Safety), which is perceived as a newer paradigm and logical development of the well known and long studied "Life and Industrial Safety" concept ("Bezopasnost' Jiznedeiatelnosti"). The latter, an assessment of anthropogenic activities on ecosystems and possible associated harm to humans, was an important discipline in the Soviet scientific arena for decades. Most educational programs on environmental management and policy that have appeared in the region since the 1980s have been launched by the mentioned academic departments. Undoubtedly, this fact has contributed to the formation of the perspectives and frameworks in which environmental security is being studied in the post-Soviet countries.

While almost every aspect of society-nature interactions can potentially be treated as an environmental security issue, threats originating from inadequate freshwater management constitute one of the most wide-spread and pressing problems. A perfect example of this feedback is the well-known Aral Sea catastrophe. The management policy oriented on economic growth and profit maximization (e.g. growing water withdrawal for irrigation) resulted in overexploitation of ecosystem resources and irreversible changes in the riverine and marine ecosystems. As a result of their degradation the regional economy has collapsed, causing social problems and international tensions. Prior to the disintegration of the Soviet Union the Aral Sea used to be an internal problem with little attention paid to it by international environmental communities. However, lately it has become an international issue with the risk of violent conflicts over the scarce resources in the area.

Unfortunately, this catastrophe has not led to radical changes in water management practices. The Sea of Azov, similar to the Aral Sea in many aspects, is following the same path. Neglected by most international environmental programs and suffering from a lack of national attention to environmental issues in development plans, the Sea of Azov is another example of ecosystem collapse due to water mismanagement and associated social-economic decline.

The Sea of Azov provides a perfect case study to consider environmental security issues from various perspectives. It has strategic importance for both basin countries (Russia and Ukraine) which depend on its ecosystem resources. Once one of the most productive seas in the world, it is now exposed to scarcity in water and aquatic resources. Some ecosystem services and goods are prioritized, while other needs are neglected. It is also increasingly high on the international political agenda, as the gateway to the landlocked and mineral-rich Caspian countries.

Analysis of these issues was given a major boost by the establishment in 2009 of the Azov Center for Watershed Cooperation (http://azovcenter.ru), which aims at studying the Azov's problems and contributing to ES threat mitigation. Based on the broad ES definition the Center's activities are diverse. One of the important areas of the Center's activities is an education and training program targeting water stakeholders and decision makers in the Azov region. Education facilitates environmental security through public awareness-raising not only because of the growing recognition of environment–security interdependences and negative consequences of unilateral decisions, but also due to stakeholders' exposure to points of view and needs other than those defined by their professional duties and daily routine.

The NATO Advanced Study Institute "Watershed Approach to Environmental Security: Fostering integrated water management in the Azov Sea Basin" has been carried out as a part of this program in September 2010. The Institute, co-financed by the NATO Science for Peace Program and the Black Sea Trust for Regional Cooperation, was attended by experts, researchers and practitioners from Governmental Environmental Agencies, NGO and business representatives from both basin countries (Russia and Ukraine), and representatives from relevant international organizations: the Food and Agriculture Organization of the United Nations, the Secretariat of the Wetland Convention (RAMSAR), the Secretariat of the Commission on the Protection of the Black Sea Against Pollution, the International Association on Danube Research, and many others representing a wide spectrum of Azov water stakeholders.

The current volume is based on the contributions made by the Institute participants, both faculty and students, who have learnt from each other during the Institute. Environmental security is a highly interdisciplinary subject regardless of the way in which it is defined or which approach is used for its assessment. The choice of these disciplines is always region-specific, depending on the problems, challenges, and available management options. Though the papers presented in this volume cover a wide range of disciplines, this is only an attempt to attempt to grapple with some aspects of the Azov Sea situation and does not pretend to be an exhaustive analysis of the threats to environmental security in the Azov basin. It is rather seen as an attempt to initiate a broad discussion over the fate of this important region and the first step towards productive international cooperation.

The volume consists of three distinct yet logically connected parts.

The first part introduces the Sea of Azov and its watershed, describing ecosystem services utilized by humans, both positive and negative feedbacks, as well as challenges arising and problems caused. Some threats to regional Environmental Security are identified here and some ways of mitigating them are also suggested.

The second part of the volume is devoted to the Black sea as the ecosystem hosting the Sea of Azov. These two seas are not only closely interconnected but also often considered as one system. Nevertheless, as a rule the Sea of Azov is excluded from the Black Sea's environmental agenda. Deeper insight into the processes taking place within the larger watershed is crucial for better understanding of the Azov processes and trends. Moreover, ES practices which have been successfully applied in the Black Sea situation will often be applicable to the Sea of Azov. One of the important considerations in this regard is habitat restoration for migratory species (e.g. sturgeon), which serve as a perfect bioindicator of an ecosystem's health.

At the same time reviewing international experience from other regions might also be useful to identify the ways to restore the Azov ecosystem's resilience and to secure a sustainable pattern of natural resources. The third part, devoted to available experience in transboundary basin management, starts with a chapter on the catastrophe of the Aral Sea. Numerous signs of the Azov Sea following the Aral's path can be already observed, and the largest manmade water-related catastrophe can serve as a perfect case study of the negative influence of prioritizing one ecosystem service (water for irrigation) over all others.

Stakeholder involvement is one of the most important prerequisites for successful water management, sustainable usage of water resources and developing mechanisms of environmental security. At the same time it is often one of the most challenging and controversial issues. The volume concludes with discussion of the best ways to secure stakeholder communication and active involvement in decision-making process.

All illustrations in this volume have been developed by the authors of the corresponding chapters unless otherwise indicated.

Prof. Viktor Lagutov

Preface

The issue of integrated watershed management for environmental security is extremely complex both scientifically and politically, especially given the additional factor of transboundary considerations. Notably, bringing together stakeholder representatives from national, regional, university organizations that deal with the Azov-Don watershed as well as international experts in multidisciplinary areas of scientific investigation and public policy expertise for this ASI was an excellent approach to addressing problems in the Azov-Don watershed. At the same time, the focus on this system makes important contributions to similar systems elsewhere in the world.

A myriad of economic development activities such as agriculture, manufacturing, dams, climate change, increasing coastal populations, waste management, transportation, and others all have impact on and an interest in the viability and health of watershed systems. Numerous important issues were addressed in this ASI. The over-arching issue of environmental security was a key focus, and component parts included ecosystem services, water usage issues, role of a variety of stakeholders, governance priorities and concerns, applicable scientific methodologies, monitoring techniques, predictive modeling tools, aquatic species (especially sturgeon) protection, problems analysis, and restoration efforts and successes.

It is gratifying to see the diverse roles represented by the participants in this ASI. When such a group comes together to address these important environmental security issues and collegially and knowledgeably discuss scientifically sound and economically practical solutions to problems, there is real hope for successful environmental protection side-by-side with economic development, not only in the Azov Sea Basin but across the world.

Rosemarie C. Russo, Ph.D.
International QSAR Foundation

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- Rostov Chamber of Commerce and Industry;
- Don Cossack communities.

The role of individuals in event organization and manuscript preparation always plays a major role. To stress this contribution personal thanks are expressed to

- Brenda Rashleigh for her invaluable advice and guidance;
- John Wolflin for his great personality and professional team building skills during the course of the Institute;
- Rosemarie Russo for honoring this volume by starting it with her ideas and thoughts;

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[1] Opinions expressed in the written or electronic publications do not necessarily represent those of the Black Sea Trust, the German Marshall Fund, or its partners.

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Abbreviations

AALS	Aydar-Arnasay Lake System
ADB	Asian Development Bank
ARC	Advanced Resource Connector
AzNIRH	Azovskij Nauchno-Issledovatelskij Institut Rybnogo Khoziaystva (Azov Sea Fisheries Research Institute)
AzovCenter	Azov Center for Watershed Cooperation
BASINS	Better Assessment Science Integrating Point and Non-point Sources
BSERP	Black Sea Ecosystem Recovery Project
DPSIR	Driving Forces-Pressure-State-Impact-Response framework
DWSI	Dutch Water Sector Intelligence
EEA	European Environment Agency
EGEE	Enabling Grids for E-sciencE project
EPA	United States Environmental Protection Agency
ES	Environmental Security
ESA	Environmental Security Assessment
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FWS	United States Fish and Wildlife Service
GIS	Geographic Information System
ICPDR	International Commission for the Protection of the Danube River
IES	International Institute for Environmental Security
IPCC	Intergovernmental Panel on Climate Change
IUCN	The World Conservation Union
IWRM	Integrated Water Resource Management
IWTS	Inland Water Transport System
MAC	Maximum Allowable Concentration
MEA	Millennium Ecosystem Assessment
mil, mln	million
MPC	maximum permissible concentration
NGO	Non-Governmental Organization
OECD	Organization for Economic Co-operation and Development

SD	Sustainable Development
SDI	Spatial Data Infrastructure
STELLA	Structural Thinking Experiential Learning Laboratory with Animation
SWAT	Soil Water Assessment Tool
TAC	Total Allowable Catch
TDA	Transboundary Diagnostic Analysis
UNDP	United Nations Development Program
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
WCMC	World Conservation Monitoring Centre
WFD	Water Framework Directive
WWF	World Wildlife Fund

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The Azov Basin: Services, Drawbacks and Challenges