A Regional Perspective on Water-Food-Energy

Cooperation In-and-Around Turkey

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ISTANBUL
INTERNATIONAL
WATER FORUM

T.C. Çevre ve Orman Bakanlığı

DSİ

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Cover Illustration: The water mill symbolizes Water-Food-Energy

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Note From the Editor

This book is the outcome of extensive work. Alongside planning and organizing the 2nd Istanbul International Water Forum, 3-5 May 2011, documenting and compiling its results gave this process its deepening dimension.

Foundations of the Forum rest on the Preparatory Meetings which were held in Istanbul at 5th World Water Forum Secretariat, in January and February 2011. It would be impossible to convene the meetings if we did not receive the invaluable insight and support from our advisors, and meeting moderators, Prof. İlter TURAN, Ambassador Sumru NOYAN, Prof. Hasan Zuhuri SARIKAYA, Prof. Ünal ŞORMAN, and Prof. Ayşegül TANIK. Special thanks to 14th Regional Directorate of State Hydraulic Works (DSI) for their hospitality during the preparatory process, especially the Former Director General of 14th Regional Directorate of DSI, Mr. Cüneyt GEREK.

The essence of this book is derived from its primary sources, all having their own journey for creation. Chair's Summary of Ministerial Meeting is a distinguished input for this report of a unique sort. The summary was compiled through a long process, yet, the foundations of the text lie on the session notes brought together by the Ministry of Environment and Forestry, and personal notes by the Co-Chair of the Forum, Prof. Ahmet M. SAATÇİ. The notes were then turned into the final text by Ms. Elif Ela ATAKAN and Mr. Burak TAŞTAN, and edited by Dr. İpek ERZİ. Special thanks to Dr. Cengiz T. BAYKARA, Head of Department of Foreign

and the European Union Affairs in Ministry of Environment and Forestry, and Ms. Irmak I. BENLİ, who worked as the focal point for the Ministerial Meeting in our Secretariat, for their great effort in organizing the meeting.

The reports of regional meetings were extensively used in writing this book. Regional Desk Members, Ms. Rezzan HASANBEŞEOĞLU, Ms. Gonca ÜN and myself of Central Asia Desk, Ms. İdil YILMAZ, Ms. Esra TÜRKMENOĞLU and Mr. Yunus ÖZLEYEN of Middle East Desk, Ms. Emel ÇAKIR and Ms. Elif Ela ATAKAN of Eastern Europe Desk and Dr. Emine YILMAZ, Ms. Ülfet ÜNAL and Ms. Aylin KÜLTÜREL BODUROĞLU of Turkey Desk, all deserve the praise for their outstanding job in bringing in regional representatives around the table and then compiling the results documented by rapporteurs into these reports.

Session and Wrap-Up reports of thematic sessions were prepared during the Forum with an admirable guidance by Forum's Thematic Coordinator Dr. Hüseyin GÜNDOĞDU and Thematic Coordinator Assistant Ms. Kevser ŞENTÜRK. Preparatory process of the thematic sessions was brilliantly carried out by the thematic coordination team members Mr. Fikret ERİŞ, Ms. Ayşe AYDIN and Ms. Emel ÜNAL. We hereby express our gratitude to our thematic academic coordinators for their leadership in convening the thematic sessions Prof. Mehmet KARPUZCU, Prof. Doğan ALTINBİLEK, Prof. İzzet ÖZTÜRK, Prof. Mikdat KADIOĞLU, Prof. Ahmet SAMSUNLU, and Prof. İbrahim GÜRER.

High Level Panels, convened by Dr. İpek ERZİ, with the inexhaustible coordinator Mr. Osman TIKANSAK, were the core of the Forum's synthesis. We cannot thank enough to our moderators, Dr. Jerome DELLI PRISCOLLI, Prof. Ayşegül TANIK, and to our distinguished rapporteur of IWRM Panel Dr. Aslıhan KERÇ for their precious time they put to prepare a successful panel. High Level Panels would not have been as great as it was, without the support to preparatory discussions by rapporteurs Ms. Duygu SARAÇOĞLU, Ms. Merve ŞEN, Mr. Burak TİFTİK, and Ms. Begüm SARGIN.

Side events provided plurality of ideas for the Forum, which have enriched the content of the book. For that, we are grateful, one by one, to all of our conveners. Furthermore, Side Events Coordinator Mr. Burak TAŞTAN did an extraordinary job in dealing with every

single detail of organizing logistical needs of side events, and coordinating the reporting process for each one of the meetings.

Screening video recordings of the meetings was an integral part of the writing process of this book and having access to visual recordings of every session was a luxury of a unique kind for us, the authors. In this regard, our sincere gratitude is less than enough for our IT Coordinator Mr. Nezih YALÇINKAYA, and IT specialist Mr. Adnan BİRGÜCÜ. Furthermore, special thanks to our Logistics Coordinator Ms. Didem ÖZATAY for all the incredible job in logistical issues that were vital before and after the Forum.

During the writing process of this book, authors have attended various conferences, and those had significant addition to our understanding of water related issues from different perspectives. For that, we are thankful to conveners of *Towards the 6th World Water Forum – Cooperative Actions for Water Security* Meeting held in Tashkent, in May, which enhanced our view on Central Asian water issues; *Stockholm World Water Week* in August, where we had the opportunity to engage more with Water-Food-Energy Nexus and *INBO Conference* in Porto, September 2011, that no doubt extended our grasp of European Union Water Framework Directive.

It would be impossible to write the "Food" chapter if we did not have the honor to host Prof. Tony ALLAN King's College London, in our Secretariat for 2 days, where he gave lectures for hours to our staff. His generous transfer of his tremendous insight on the subject made our job in synthesizing the Forum much easier.

Culture and art have proved themselves as an integral part of the Forum. For that, we are indebted to our Artistic and Cultural Events Coordinator Ms. Kader DAİMAGÜLER for the works that have been an inspiration to us.

We had the unique chance to work with a brilliant designer and typesetter, Ms. Gülizar ÇİLLİYÜZ, who tirelessly listened to our every demand and transformed our words into a wonderful book.

During the whole writing process of the book, we had the invaluable opportunity to receive feedback and guidance from Dr. İpek ERZİ. We cannot repay our debt to Ms. ERZİ for the time and effort she devoted to us. It was her wisdom that enabled us to reflect the Forum as objectively as we could. Moreover, special thanks to Ms. Elif Ela ATAKAN, Mr. Osman TIKANSAK and Ms. Gonca ÜN

for their contribution to editing process, and thanks to Ms. Birgül AĞCA for her assistance in the entire course of writing the book. Last but not least, we are grateful to Mr. L. Leonard WOLNER, Program Manager at US Army Corps of Engineers, for his valuable feedback for the book.

We are indebted to our Co-Chairs Prof. Ahmet Mete SAATÇİ, and Mr. Akif ÖZKALDI, along with our Steering Committee members, Mr. Cüneyt GEREK, Mr. Adem Avni ÜNAL, Mr. Salim FAKIOĞLU, Mr. Hamza ÖZGÜLER and Dr. İpek ERZİ for giving us the opportunity to work in such a distinguished project. Their constant support and their wisdom was an inspiration for us all.

Lastly but most importantly, we are deeply grateful to Turkish Minister of Forestry and Water Affairs, Prof. Veysel EROĞLU for his initiatives that made Turkey an important actor in global water issues. His insightful vision and dedication made this event possible.

Authors of this book are all members of the young and energetic staff of the Secretariat. Their comprehension of water issues around the globe were the key asset to this book. The enthusiasm and synergy, that has been created since 2007, and transferred through 5th World Water Forum and 2nd Istanbul International Water Forum, will continue at the recently established Turkish Water Institute (SUEN).

Caner AKTAŞ
2nd Istanbul International Water Forum
December 2011

Methodology

It was the great success of 5th World Water Forum that laid the foundations of the Istanbul International Water Forum. Built upon the heritage of the 5th World Water Forum's In-and-Around Turkey Regional Process, the 2nd Istanbul International Water Forum, has framed its area of focus into four different geographical units; namely Central Asia, Middle East, Eastern Europe and Turkey. The Forum's secretariat was organized into these four regional desks, composed of three to four water management specialists for each region. Regional desks then started to dig deeper into their focus areas, immediately starting research on their respective regions' water issues.

Preparatory Process: Decision on the Method

After detailed research on the regions, each regional desk organized its own preparatory meeting. Desks invited a group of prominent water experts from international and national institutions, and civil society representatives for a roundtable discussion on regional water-related issues. Meetings were moderated according to Focus Group method. Instead of previously set topics for the preparatory meetings; participants were kindly asked to bring in whichever issue they found critical about their regional water challenges. Consequently, each meeting was divided into two sessions. First session mainly covered the presentations of the participants on subjects they had chosen; whereas, the second session proved to be a fruitful discussion in the light of presented ideas at the first session.

The preparatory focus group meetings helped to map the priorities for each region in a bottom-up fashion:

- Transboundary cooperation issues dominated the discussion of the Central Asia meeting and the focus of the discussion was mostly on agricultural water use. Financial inadequacy and lack of political will in water management turned up as the major problems in the region.

- The deficiency of water network infrastructure and mismanagement of wastewater topics were the highlighted topics in the Eastern Europe Focus Meeting.

- Biggest emphasis in the Middle East Focus Meeting was on the need for technical cooperation on capacity building and rationalization of national water strategies. Food security and irrigation issues came forward as urgent challenges for the Middle Eastern countries.

Turkey desk focus meeting took a different path than the others, and it was prepared as a response to the outcomes of the three prior meetings. Therefore, Turkey Focus Meeting had a previously set agenda and dealt with topics of irrigation and water infrastructure. This choice was based on two observations: First, the topics were highlighted as a common problem in each regional meeting. Second, thanks to know-how accumulation and Turkey's great investment in the fields of irrigation and water infrastructure, the Forum Secretariat saw an opportunity for specific cooperation in these fields. Thus, a bigger focus from the Turkish side on these issues was the key objective of this meeting.

The Event

This time in particular, the Forum was organized with a regional focus. The 2nd Istanbul International Water Forum's main theme *"An Istanbul Perspective on Regional Water Problems and Search for Solutions"* was addressed in more than 50 sessions during the 3-day event.

At the same time, on the first day of the Forum, a Ministerial Meeting with the aim to stimulate political will toward taking actions regarding regional water challenges was convened with the invitation of Turkish Minister of Environment and Forestry*, Prof. Veysel EROĞLU. The Chair's Summary of this meeting proved to be a valuable input for this report (Appendix A).

Four regional meetings were organized, this time with a wider participation, in light of the outcomes of the Preparatory Regional Focus Meetings. Regional meetings were organized under the main themes of;

* Currently the Minister of Forestry & Water Affairs

- "Water and Food Security and Regional Technical Cooperation on Water" for Middle East,
- "Agricultural Challenges Focusing on Food Security – Regional and National Perspectives" for Central Asia,
- "Integrated Water Resources Management" for Eastern Europe,
- "Agricultural Water Management and Food Security" for Turkey.

The outcomes of each of these regional meetings were published in the format of a Chair's Summary after the Forum (Appendices B-E).

Thematic Sessions were shaped under six sub-themes, namely: Regional Technical Cooperation on Water, Water for Energy, Agricultural Water Management, Global Climate Change and Water, Urban Water Management, and Water Resources Management & Water Culture."

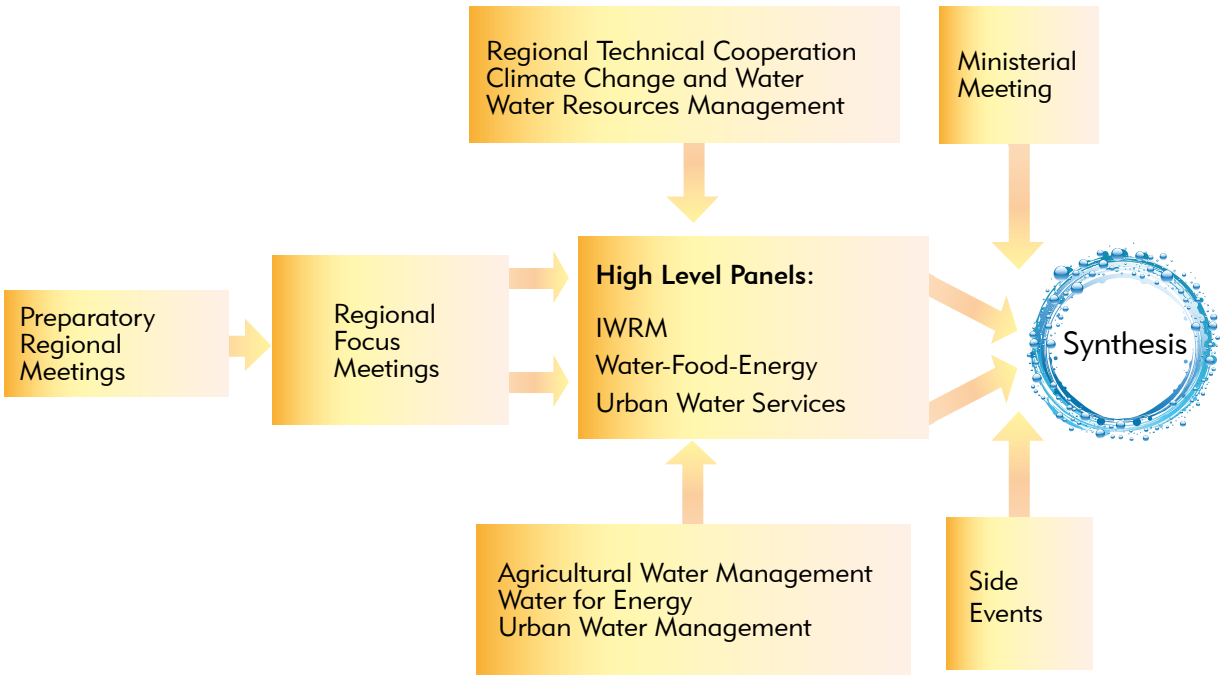
Three High Level Panels were also convened with a different approach, aiming to synthesize the Forum results during the Forum. In a conventional organization, the outcomes are compiled and synthesized after the event is over. In the Istanbul International Water Forum, it was our intention to distill the results of one day in the high level panel held on the consecutive day. The High Level Panel team met with the rapporteurs of the thematic and regional sessions in the evening to prepare the agenda for the panel next morning.

Discussions in High Level Panels
- Integrated Water Resources Management,
- Water-Food-Energy Nexus
- Urban Water Services

proved to be the basis for the decision of the focus areas for this synthesis, namely: Water, Food and Energy.

Primary Sources

The Forum was recorded and documented with diligence during the proceedings. First, all presentations were gathered from the panelists before the Forum. Conveners of each meeting prepared Information Files, covering various topics from general information on the meeting subject, to résumés of the panelist and their presentations. Assigned rapporteurs for each session prepared "session reports" in a specified format. In addition, wrap-up sessions for each thematic and regional



meeting provided interactive discussion to produce wrap-up documents. In order to be able to make an in-depth analysis after the Forum, visual and audio recordings were also available for each session.

Synthesizing the Forum

This book analyzes the Forum in three separate, however deeply intertwined, chapters: Water, Food and Energy. Topics have been chosen according to deliberations during the Secretariat meetings shortly after the Forum. Each topic has been divided into sub-themes according to the main issues discussed during the Forum:

Water chapter covers:

- Access to Water
- Transboundary Cooperation and the Role of International Agreements in Water Management
- Water in the City and Sanitation

Whereas, Food chapter deals with:

- Food Security
- Agricultural Water Management: Irrigation

Lastly, Energy chapter of this report focuses on:

- Water as a renewable energy source
- Licensing and private sector involvement
- Environmental Impact Assessment

Authors of this book worked in three study groups. The study groups were planned by the Synthesis Report Coordinator and were made based on the authors' backgrounds, experience and their area of interest.

Study groups started the in-depth analysis of their respective topics immediately after the Forum. The process encompassed analyzing the documents of the sessions, and screening of audio-visual content separately for each group. This study was followed by regular brainstorming sessions moderated by the study coordinator. Consequently, draft texts were jointly produced by each group of authors.

Primary sources of this study are all archived in the Secretariat database, and the Final Report of the Forum has already been published and can be accessed at www.iusf.org.tr. Secondary sources used in this book as references are the publications and documents widely addressed during the Forum.

Water

Right to Water

Water is one of the most basic needs for survival. Over the preceding decades, the world population has grown to 7 billion, bringing about a dependency on fresh water. Today water related problems represent one of the world's most pressing and yet most complex issues to resolve. In this chapter, we deal with the human and domestic need for water and the governance aspect of water, in this instance, international arrangements and agreements on the issue will be brought under spotlight from the perspective of the 2nd Istanbul International Water Forum.

Access to safe and clean water is a basic human need (Erzi, 2010). 884 million people lack safe and clean drinking-water, 2.6 billion lack sanitation and 88% of global diarrheal deaths are related to unsafe water, inadequate sanitation, and poor hygiene (UNICEF, 2011). Urgent solutions are needed to tackle the issue at hand, yet states seem to be far from reaching an appropriate remedy in the near future.

One attempt was the adoption of the General Comment (No. 15) of the UN Committee on Economic, Social and Cultural Rights in 2002, which recognizes the right to water as a human right (UNCESCR, 2002)*. The General Assembly adopted the Resolution 64/292 brought by Bolivia in July 2010, by formally recognizing the right to water and sanitation. In doing so, it acknowledged that the

* General Comment No:15/2002 of UN Committee on Economic, Social and Cultural Rights states as follows: "Water is a limited natural resource and a public good fundamental for life and health. The human right to water is indispensable for leading a life in human dignity. It is a prerequisite for the realization of other human rights […] The human right to Water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable Water for personal and domestic uses."

provision of clean drinking water and sanitation were essential in the quest for universal human rights.

However, while the approval of access to water and sanitation as a basic human right in the UN General Assembly has been supported by 122 votes, 41 countries abstained from voting, including Japan, Turkey, United Kingdom and United States (UNGA/10967,2010). Clearly these abstentions represent differing opinions regarding water as a human right. It should be noted that the number of abstentions is indicative of the distance to reaching a consensus. In addition, the abstainers were concerned that the adoption of the Resolution would undermine the still ongoing Geneva process as the UN Independent Expert report on the issue of human rights obligations related to access to safe drinking water and sanitation has not been completed. Furthermore, there also exist notable concerns regarding the legal status of the water as a right issue as set out by the General Assembly. For example, the United States delegation stated that current Resolution "describes the right to water and sanitation in a way not reflected in the existing international law" and the Resolution is an attempt "to take a short cut around the serious work formulating, articulating, and upholding universal rights." United Kingdom delegation said that "there was no sufficient legal basis for recognizing water and sanitation as freestanding human right, nor was there evidence that they existed in customary law"(UNGA/10967, 2010). On the other hand, the Resolution was conceived by some countries as an urgent solution which can resolve bad governance problem of water.

Right to Water at the 5th World Water Forum

"Access to safe drinking water and sanitation was also argued from different perspectives during the thematic, political and regional processes of the 5th World Water Forum and is defined as a basic human need.* At The Ministerial Meeting, most of the delegations preferred to take up this issue following the conclusion of the process and deliberations carried out at the UN Human Right Commission in Geneva. The Ministers chose to wait for the UN Independent Expert's report about the implications of Right to Water and Sanitation (RTWS) implementation rather than including it in the Ministerial Statement." (Erzi, 2010).

* Also, UN Human Right Council accepted the third annual report of the Special Rapporteur that has good practices and national and local recommendations on the right to safe drinking water and sanitation, and adopted a resolution on the human right to safe drinking water and sanitation on 28 September 2011.

"Transboundary rivers have been identified as a source of tension, instead they should be considered as a catalyst of cooperation."

Ambassador Mithat RENDE

Nearly half of the global available surface water is found in 263 international river basins and account for an estimated 60% of global freshwater flow cross at least 273 international borders.

(UN-Water, 2008)

"From 1950 to 1970, nothing happened in Rhine Basin, because of lack of political will and the support of politicians. It's a matter of time. Collaborating with political scientists is important."

Prof. Jan LEENTVAAR

Cooperation as the Key Term

During the 2nd Istanbul International Water Forum's Thematic Session titled "Regional Technical Cooperation for Water", it was discussed that cooperation starting at a technical level can lead to political solutions by mobilizing political will. Ambassador Yaşar YAKIŞ, Former Foreign Minister* of Turkey, stated that "A political solution has to be based on technical cooperation and continue with the political framework." This sentiment was echoed at the Ministerial Meeting, by Minister of Environment and Forestry of Turkey, Prof. Veysel EROĞLU, who presented that transfer of "wastewater treatment technologies, drinking water, irrigation technologies, early flood warning systems, capacity building, technologies, technology transfer and exchange of experience among neighbors" as technical cooperation options. Thereby, the intention is to build trust among actors, which in turn would lead to concrete solutions for water, especially within the transboundary context.

Achieving for efficient water management is a difficult one, as water does not recognize borders. "Both surface water and groundwaters may flow across several official boundaries between countries, following natural courses before reaching their final destination", which make water issues very political (Karpuzcu, Gürol & Bayar, 2009). The transboundary basins and aquifers link populations of different countries and affect the incomes and livelihoods of hundreds of millions of people worldwide. "Water energizes all sectors of society, from basic food production to advanced industrial technologies" (Jägerskog & Zeitoun, 2009).

During the first part of Thematic Session: Regional Cooperation on Water, presentations made by keynote speakers Mr. Jean François DONZIER, the General Manager of International Office for Water in France, Dr. Jerome DELLI PRISCOLLI, Senior Advisor for U.S. Army Corps of Engineers' Institute for Water, Mr. Jan LEENTVAAR, Senior Advisor at UN-Water Decade Programme on Capacity Development in Bonn, highlighted the idea that cooperation in a transboundary context was considered to be a key solution towards achieving more efficient integrated water resources management (IWRM). In the discussions that followed, it was argued that there is a strong need for political will in order to encourage cooperation among riparian states. Political will is a prerequisite, even for small scale cooperation between states, as it is politicians who decide the mandate for a regime of cooperation in the first place. However, the assertion, "that political will is a must for cooperation" alone

* Currently the Minister of Forestry & Water Affairs

does not explain how political will would come into existence. Political will for cooperation can only occur in specific instances and is susceptible to political situation between countries, economic relations and the question if the countries can afford the obligations related to cooperation regime. The real challenge is to answer these requirements in realizing the political will. In this context, it was stated by Ambassador Mithat RENDE that the preparation of cooperation mechanisms in each river basin is different.

"... a regional water fund to provide financing to water supply projects in poor regions."

Prof. Veysel EROĞLU

Each case for transboundary water management has its own individual characteristics, which means "one size fits all" approach to water management will not work, as discussed during Theme 1. Each case is unique and should be treated as such. In order to develop a long lasting cooperation mechanism, priorities of the riparian states are the main elements and the prerequisites of reaching an agreement. Third parties, in this regard, can only play a limited role in creating a cooperation mechanism.

A good example of cooperation for riparian states was stated at the Ministerial Meeting, by the sub-regional coordinator for Central Asia of Food and Agriculture Organization (FAO), Mr. Mustapha SINACOEUR. He underlined the importance of the cooperation in Central Asia and mentioned that the lack of cooperation as the essential difficulty in overcoming water related challenges. Mr SINACOEUR noted that the Joint Committee on River Management between Kyrgyzstan and Kazakhstan is a promising exception to the status quo. He concluded his speech by expressing his support for the development of cooperation in Aral Sea (Appendix A).

Technology transfer and capacity building for poorer regions were highlighted during the Ministerial Meeting. Minister EROĞLU proposed to establish a regional water fund to provide financing to water supply projects in poor regions. Minister EROĞLU invited the participants of the meeting from high and middle income countries to discuss this issue (Appendix A). In this context, it is concluded that cooperation in the form of technology transfer and capacity building can be initiated by creating aid mechanisms, which in turn would generate the much needed mutual trust for the regional cooperation.

"Trust building between parties is important, political will comes afterwards."

Mrs. Iman ABD EL AL

Cooperation Mechanisms

Agreements are required for effective water resource management, with cooperation mechanisms taking place at every scale, whether transboundary, urban or sectorial. However, it is not always easy to create a consensus on water issues. Even in the European Union,

the Water Framework Directive was formed after long deliberations, going through many different versions to reach a final text.

In his keynote speech, Mr. Jean François DONZIER emphasized the importance of the European Union Water Framework Directive (EUWFD) to achieve IWRM, pointing out that the Directive applies to 27 European countries and accession countries. During the High Level Panel on IWRM, Ambassador Mykola MELEVENSKY, the Head of the Delegation of Ukraine to the International Commission for the Protection of the Danube River (ICPDR) mentioned that Danube River "is shared by many countries and it clearly shows that water does not recognize borders" and added that the IWRM approach was intrinsic to ICPDR practices, and that the "EUWFD is the bible that they (ICPDR) have to follow for water management issues."

However, Mr. J.F. DONZIER underlined that the application of EUWFD is difficult for member states, and that it can take decades to fulfill the obligations of the directive, despite the fact that there are clear and imminent deadlines attached to the directive. EUWFD has drawn together decades of European thought on water management into a comprehensive framework. Political will is a key component for implementation.

In parallel, at the Eastern Europe Regional Focus Meeting on IWRM, it was concluded that Balkan and Eastern European countries consider the EUWFD as a roadmap to improve their water resources management. Eastern Europe Regional Focus Meeting Declaration, which was adopted by the meeting participants and Chair Ambassador Sumru NOYAN indicated that the EUWFD contains administrative and legal difficulties in its implementation. Especially, the lack of infrastructure at the Balkan and Eastern Europe countries, the difficulty of financing and the absence of adequate cooperation among these countries were also noted during the meeting as key obstacles in EUWFD application at the region (Appendix D).

The Aarhus and Espoo Conventions are implicit to the EUWFD, Aarhus Convention, the "UNECE Convention on Access to Information, Public Participation in Decision Making and Access to justice in Environmental Matters" was signed on June 25, 1998 by the European Union and 40 countries; and ratified by 41 countries. The Aarhus Convention protects the public rights and "guarantees the rights of access to information, public participation in decision-making, and access to justice in environmental matters", in both local, national and transboundary environments (Aarhus Convention, 1998). On the other hand, The Espoo Convention on Environmental Impact Assessment in a Transboundary

Context which was signed in 1991, "sets out the obligations of Parties to assess the environmental impact of certain activities at an early stage of planning. It also lays down the general obligation of States to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact across borders" (UNECE, 1991).

The international agreements on water, aim to create a transboundary context by taking into consideration that water does not recognize political borders, as it is also highlighted in the Espoo Convention. Looking at the nature of 1997 UN Convention on the Law Non-Navigational Uses of International Watercourses, it can be assumed that the convention's aim is to create a comprehensive international regime for transboundary waters. The 1997 convention, which has not come into force yet, is still open to signature and it was signed by 29 countries while the number of 35 is required for the convention to come into force. It is crucial to note, as Prof. Asit BISWAS demonstrates, that the 1997 convention does not present a solution to the most conflictual basins in the world. There is no consensus on this convention in these transboundary river basins such as Euphrates-Tigris (Syria in favour, Turkey against, Iraq not involved), Mekong (Combodia, Laos PDR, Thailand and Vietnam in favor, China against) Nile (Sudan in favor Egypt Ethiopia abstained and Burundi against), Plata (Brazil in favor but Argentina abstained), Jordan, (Jordan in favor, Israel abstained), Ganges (Bangladesh and Nepal in favor, India abstained) (BISWAS, 2008).

On the other hand, as Prof. BISWAS says that "generally it has been easier to negotiate treaties on the navigable uses of rivers, since these do not require water allocation, or use considerations." He adds that, "historically it has been most difficult to get countries to agree on the actual allocation of water quantities between the appropriate co-basins" (2008). In parallel, during the Forum discussions, quality problems were reflected as areas of opportunity for technical cooperation, without neglecting the fact that quantity issues prove to be much more difficult. At the same session, Prof. LEENTVAAR demonstrated the Rhine River Commission's case study as a good example of Integrated Water Resources Management (IWRM), where there are more quality related problems than quantity.

Furthermore, Ambassador Mithat RENDE argues that "if you have quantity problem such as Jordan River, Euphrates and Tigris; dealing on transboundary context is quite challenging. Comprehensive approach means that we need to deal with all aspects, not just to pick and to choose

from the upper basin to the lower parts." Ambassador RENDE picked up a previous example of the Danube and Rhine Rivers, arguing that these rivers basin management cases cannot apply to all river basins, as the problems in each case are different. In these two cases, cooperation is relatively easier since the issues between riparian countries are focused on qualitative subjects that are not related to matters of quantity. It can be said therefore, that the quantity conflicts of water is more difficult in terms of cooperation than the quality conflicts.

A key theme at the 2nd Istanbul International Water Forum was that in order to overcome the aforementioned political obstacles to water issues, cooperation between countries through bilateral agreements, joint mechanisms, capacity building and data sharing programs must exist for good water management to succeed. Dr. İbrahim KAYA from Canakkale Onsekiz Mart University, reiterated this during the Theme1 session: "joint mechanisms are required and the cooperation between countries is needed." Additionally, during the High Level Panel on IWRM, Ambassador MELENEVSKY stated that "bilateral agreements between countries are necessary to make it work. There are lots of international conventions like Danube River and Black Sea for basin management. However, there is a need for deeper cooperation and this can be accomplished only with bilateral agreements." Furthermore, in the same panel, Mrs ABD EL AL noted that "cooperation can be initiated with joint research projects. In this way training can be promoted and technical cooperation is achieved."

Water in the City

One integral dimension of "Access to Water" issue comprises urban water services. However, providing adequate and good quality water services for urban areas is becoming more challenging due to population growth, increasing population density in urbanized areas, and increasing water usage per capita. For the first time in history, more than half its human population, 3.3 billion people, is living in urban areas (UNFPA, 2007). The urban world population is expected to be 70% in 2050 (United Nations Department of Economic and Social Affairs, 2007).

Looking at the issue from the perspective of Forum's focal regions, it is expected that Middle East population living in the urban areas

Urbanization and Water

"Rapid global changes such as population growth, economic development, migration and urbanization, with over half of the world population now living in cities, are placing new strains on water resources and infrastructure and on the systems that supply water and sanitation services to our citizens, businesses, industries, and institutions."

Istanbul Water Consensus, 2009

will reach 60% by 2020; whereas, there will be a decline in the urban population of Eastern Europe. The urbanized population in the Eastern Europe is now only 32% as stated in 2nd Istanbul International Water Forum Preparatory Regional Focus Meetings. According to the projections stated in Central Asia Regional Focus Meeting, 58% of the total population of Central Asia is expected to be urban by 2050.

With regards to the information above, pressure over water resources is expected to become more prevalent. As the populations grow in urban areas, requirements for well-functioning water treatment systems, use of alternative water resources and multiple uses of water will be of utmost importance.

The Forum mainly discussed technical aspects of urban water management primarily focusing on water and wastewater treatment technologies and practices. Whereas, urbanization and its adverse effects on water resources were treated as given facts.

In the framework of the thematic programme, a number of sessions were dedicated to urban water management under Theme 5 Urban Water Management. In addition to this, a high level panel named "Urban Water Services" was organized with the participation of water professionals from various regions.

Istanbul Water Consensus (IWC)

IWC was the main outcome of the Local and Regional Authorities' political process of the 5th World Water Forum. It involves commitments and strategies for signatories who wish to adapt their water infrastructure and services to major challenges such as climate change, urban growth, the depletion and pollution of water resources or aging of existing infrastructure.

Since the 5th World Water Forum, more than 750 cities signed the IWC.

Infrastructure

Infrastructure was central to a number of discussions in various sessions, particularly in the Eastern Europe Regional Focus Meeting. The inadequate and aging infrastructure, which was described as one of the major water-related problems in the Eastern Europe, has been causing disease outbreaks and environmental damages. The

water supply and sanitation infrastructure in the region was built in the 60s and 70s, and was not properly maintained and renovated after the 80s. As a result, both water and sanitation services have been dramatically degrading in the region. Leakage problems in the existing networks also constitute a big concern with many distribution networks losing 25-75% of the water put into supply.

Adequate investment in infrastructure and water services can yield a high economic return by avoiding costs related to water pollution, contamination and disasters (UNWWDR, 2009). The need for investment in order to improve existing infrastructure was one of the key messages of the Eastern Europe Regional Meeting. In Eastern Europe, this investment is expected to be coming from the government.

On the other side, High Level Panel "Urban Water Services" supported the idea of private sector's involvement in the urban water services through Build-Operate-Transfer (BOT) systems. Mr. Waleed Ahmad SUKKAR from Ministry of Water and Irrigation stressed that Jordan has a good experience of private sector participation in the wastewater services. However, as addressed in the preparatory meeting, some part of the Eastern Europe, particularly in Bulgaria, public-private participation caused major increases in the prices of water.

Achieving good quality water services requires safe, sustainable and adequate infrastructure. At the same time, capacity building among institutions through water operator exchanges in the region has crucial importance. The guidance of countries which have the capacity to construct and operate their own water plants effectively could be beneficial for other countries to improve knowledge and skills for practitioners and institutions.

Supply and Demand Management

Water demand management refers to the implementation of policies or measures which aim to control or to influence the amount of water used (Lallana, et al, 2001). On the other hand, supply management simply means to use best water resources for the best purposes. For example, the quality of water that will be used for irrigation does not need to be treated according to drinking water standards.

Achieving good demand management preemptively requires calculation of the true cost of water. The most effective way used for determining the real cost of water is to make the measuring

accurate, which establishes a correct balance between real water consumption and unaccounted water (water losses). In order to increase the water supply, reuse of wastewater in a controlled manner could be used as an alternative method. Pierre LACONTE, Foundation for the Urban Environment, pointed out that issue in the High Level Panel "Urban Water Services" by noting that the demand management could be further developed in the urban systems through pricing and regulatory measures. He also added that an internalization of external cost is necessary to have the real cost of water consumption. The necessity of demand management system for water use efficiency was also highlighted at the Middle East Regional Focus Meeting.

"Demand management can only take place in a democratic society through having real cost of the water used"

Mr. Pierre LACONTE

On the contrary, Mr. SUKKAR stated at the High Level Panel on "Urban Water Services", that they initiated the demand oriented approach.

Sanitation

The world leaders committed in 2002 in the World Summit for Sustainable Development (WSSD) to halve the proportion of people who do not have access to safe drinking water and basic sanitation by 2015. However, progress so far indicates that urban water and sanitation Millennium Development Goals will not be easily achieved.

Access to water and sanitation was not a specific topic of any thematic session of the 2nd Istanbul International Water Forum; however, the issue was discussed thoroughly in different sessions during the Forum. In the Ministerial Meeting, this issue was brought to the table by Mr. Shaddad ATTILI, Head of the Palestinian Water Authority, emphasizing that Palestine is unable to provide continuous safe drinking water and that the sanitation system is non-existing. Lack of appropriate sanitation was also deliberated among the participants of the High Level Panel "Urban Water Services." The active participation of the private sector was supported for its ability to reach newest technologies in a competitive environment for providing safe sewerage systems and utilization of non-conventional water supplies. The coordination between private and public sector for the implementation of urban wastewater management through BOT models was encouraged in the sessions related to urban wastewater management.

"Access to good quality water and sanitation is a basic right for all human beings and plays an essential role in life and livelihoods, the preservation of the health of the population and the fight against poverty."

Istanbul Water Consensus, 2009

In the light of the regional discussions, lack of access to basic sanitation appeared as one of the major water-related problems of the Eastern Europe Region. People, especially living in the rural areas of the Eastern Europe states, some of which are EU members, do not have access to safe sanitation mainly due to inadequate infrastructure, mismanagement of wastewater and limited resources allocated by governments. Financial crisis, changes in ownership status of infrastructures, political instability and restructuring of water and sanitation sector, that occurred through the liberalization process after the dissolution of the Soviet Union, also affected the quality of water and sanitation services in the region. As expressed in the thematic sessions, there are many solutions available on the table to improve sanitation status of the countries, but the important point is that to ensure sustainable, feasible and affordable ones.

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Food

The Prominent Topic of the Forum

If there is one conclusion that could be derived from the Forum's Regional Focus Meetings, it is as follows: especially in Central Asia and Middle East, the dominant water related challenges are irrigation and food security. Agricultural production in the Forum's Focus Region (In and Around Turkey) is dependent on irrigation. Therefore, the relationship between water and food is defined in terms of agricultural production by the regional representatives. This is not surprising since agriculture accounts for approximately 75% of water withdrawals in Central Asia, and 80% in the Middle East.

Pursuing a "bottom-up" approach, agricultural water management and food security became dominant topics of the 2nd International Istanbul Water Forum based on the Preparatory Regional Meetings. Food and water relationship was comprehensively discussed at the High Level Panel on Water-Food-Energy Nexus, Regional Focus Meetings (RFM) of Turkey, Central Asia, and Middle East. The issue was also touched upon at the Ministerial Meeting, and an entire Thematic Session was dedicated to Agricultural Water Management. Furthermore, a number of Side Events have contributed and provided valuable inputs to the discussion.

Population growth, urbanization and economic growth all contribute to an increase in food demand. In 2050, with a population of 9.1 billion, food production will have to increase 70% to cope with this growing demand (FAO, 2011). Some argued during the Forum that lack of water for irrigation is the limiting factor in increasing food production. During the High Level Panel on Water-Food-

Energy Nexus Prof. Bart SCHULTZ, UNESCO-IHE Institute for Water Education, stated that the need for more irrigation water is inevitable. However, agriculture is already the major water user in the Forum's Focus Region. Moreover, domestic and energy water demands are also increasing. Thus, efficiency increase, or "more crop per drop," is a principle that found general support during the Forum.

Self-Sufficiency vs. Self-Capacity

Food self-sufficiency is achieved by meeting all food needs through domestic supplies (FAO, 2002). In a manner, self-sufficiency is a shield against fluctations and volatilities of global food market. However, climatic conditions and disasters constitute a major threat against stable food production domestically. Especially countries insisting on self sufficiency in arid regions are more vulnerable against stable food production because of the over exploitation of aquifers and groundwater.

Food self-capacity, on the other hand, is a country's ability to produce the food itself or to import the food. The main drive is to make food available and accesable all time by any legal means possible.

Food Security

Almost 1 billion people are suffering from hunger. World Hunger Report 2011 by UN food agencies (Food and Agriculture Organization-FAO, International Fund for Agricultural Development-IFAD, World Food Program-WFP) is alarming. *The State of Food Insecurity in the World 2011* (FAO, 2011) report predicted that high and volatile food prices will likely persist and possibly increase, making poor farmers, consumers and countries more vulnerable to poverty and hunger. FAO, IFAD and WFP called on the international community to act forcefully to banish food insecurity from the planet.

Food security is not only about agricultural production, but it is closely interrelated with urban water, energy, environment, finance, governance, migration, and infrastructure. There had been intense discussions about the definition of food security during the High Level Panel on Water-Food-Energy Nexus and Central Asia Regional Focus Meeting. FAO Central Asia Sub-region Land and Water Management Technical Officer Mr. Giovanni MUNOZ commented at both meetings that food security is misunderstood in the meaning of food self-sufficiency. He recommended trade

Defining Food Security

The concept of food security is 37 years old. It was first defined and adopted at the World Food Conference held in Rome in 1974. Since its adoption by FAO, food security has been redefined in over 200 different ways. After wide scale debates the final proposal in 1996 has become the point of reference as "Food security at the individual, household, national, regional and global levels is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life."

(Gonzalez, 2010).

as a means to food security. He said, "Countries that are trying to produce all their food at any cost obviously do not have food security and it is not sustainable. Japan is not self-sufficient in food production but it has market guarantees and an economic system that allows buying and selling the things in market. Countries should produce the goods that are comparatively advantageous by diversifying economic productivity. …there is a real need for trade negotiations and agreements."

Prof. Ari MICHELSEN, Professor at Texas Agrilife Research Center, has highlighted at the High Level Panel on Water-Food-Energy Nexus that food security is not just markets and economics but it is all politics, a global allocation issue. Prof. MICHELSEN stated that "food security is many other things rather than production; it is ensuring that you have a reliable supply under changing conditions such as drought, flood or political conditions. We have a global responsibility for providing food security. There are three major points in food security: 1-Increasing competition between urban, environmental and energy water demands. 2- The need to work together to have integrated, interdisciplinary and comprehensive management. There is also a need to have engineers working with the economists, hydrologists, scientists, growers of agriculture, lawyers and policy makers on food security. 3- A holistic approach is needed for a much larger pattern of food security in the world. Because we need multi-disciplinary, integrated approaches to manage water resources for water, food and energy. "

On the other hand, in Central Asia, Tajikistan adopts policies that favor self-sufficiency and sees food independence as a national strategy for social stability. Tajikistan has adopted a special law of food security in 2010. Correspondingly, during the Middle East Regional Focus Meeting, water and food security as a national security issue was adopted. At the Ministerial Meeting, the head of the Palestinian Water Authority Mr. Shaddad ATTILI, stated their inability to exploit water resources in the West Bank and Gaza effectively due to political problems, declaring that they had already called for help in the 5th World Water Forum to no avail.

Impact of Water Availability on Food Security

The earth has the means to provide adequate food to feed its population indeed, so the real problem is a matter of distribution as Prof. Hayri COŞKUN, Rector of Abant Izzet Baysal University, argued during High Level Panel on Water-Food-Energy Nexus. Nevertheless, uneven distribution of water, structural constraints on

local production, occupation of fertile lands for urbanization and industrialization all constitute a threat to food security. Additionally there is an intense competition among different sectors such as domestic water services, industry and energy*. In response, the agriculture sector has to face two major challenges. First challenge is to produce enough food for ever growing world population with fewer rural population and arable land. Second challenge is to achieve this in a sustainable way. In other words, agriculture sector has to do better with lesser means. The aim is challenging, yet debates in the Forum provided stimulating deliberations.

Being aware of the existence of structural and social constraints against enhanced agricultural production efficiency motivates water community to turn to technical solutions. Irrigation methods that enable optimal use of water is the first and foremost solution. Today, irrigated agriculture covers 275 million hectares – about 20% of cultivated land – and accounts for 40% of global food production (UN-WWAP, 2009). An obvious solution based on this data would be to expand irrigated area, resulting in expansion of cultivated land. However, this means brand new investments in irrigation infrastructure and need for greater amount of water; whereas, currently cultivated land has very promising potential for increasing productivity, which is yet to be exploited. In other words, as long as water availability in terms of access and stability is not maintained, expanding cultivated land is not a viable and sustainable option. Experience shows that agricultural production booms owe a lot to increased productivity of inputs, particularly water in the already cultivated lands (Birendra et al, 2011). Regarding Middle East and North Africa (MENA) Region and Central Asia Region, the statistics indicate that both regions are already withdrawing almost 75% of the renewable water resources (FAO, 2002, Dukhovny et al, 2011). Thus it becomes clear that the solution is not solely expansion of irrigated land, but to make water available and use it in a more efficient way. On the other hand, Dr. Murad BINO, Inter-Islamic Network on Water Resources Development and Management (INWRDAM), Jordan, stated at the Middle East Regional Focus Meeting that "land is not a limiting factor at regional scale and land is not scarce for the region, but water is." He added that "We have plenty of productive lands if we have the components for production: water and good management." Furthermore, when considering the future demographic predictions which will dramatically be heavier in rapidly urbanizing developing world, it appears that food

"We need to develop technologies for poor countries and help people help themselves. We know that where food is scarce people rise up. That can trigger revolts. It's very, very understandable."

Mr. Klaus TÖPFER, compiled from the interview with Euronews

* Sectorial distribution of 1m^3 of water's contribution to Turkish economy: 2.5$ in agriculture, 93$ in industry, 511$ in service sector, *2nd Istanbul International Water Forum*, (İzzet ÖZTÜRK-Theme 3.3)

As long as water availability in terms of access and stability is not maintained, expanding the land is not a viable option.

demand will require multiple coordinated methods with a special focus on yield increase. By 2050, rain fed area will have to increase 5%, irrigated area 7% and water withdrawal 10-14%. The data shows that additional 3 billion people (34% more than today) (FAO, 2011) in 2050 are expected to be stepping on a planet where they will have to settle in a food scarce world. In this case, the question is where the food will come from. In his presentation at Stockholm Water Week 2011, Alexander MUELLER, the Assistant Director General of Natural Resources Management and Environment of FAO, stated that 72% of the food will come from yield increase, 16% from crop intensity, and 12% from arable land expansion (Mueller, 2011).

Agricultural Water Management

Resource Allocation

Increase in stress over finite water sources require reasonable allocation of water for sectors of food, energy, industry and domestic use. However, restriction of water usage as the major input for food production is not likely to be realized due to the increasing food demand and water intensive nutritional habits. Urgent need for enhanced water efficiency methods in irrigation and financing policies come forward at national scale. Political initiatives, technical cooperation and trade relations may contribute to equitable allocation of water on a regional scale. The Forum discussions were geared towards developing a water utilization perspective that is in favor of increased resource productivity through irrigation, as well as, implementation of political and economic incentives at regional and global levels.

"We should develop agricultural policies in accordance with available water instead of searching water for agriculture."

Mr. A. Fikret KASALAK

Irrigation

The need for better management of water for irrigation is inevitable. Prof. Bart SCHULTZ and Prof. Louis BERGA, International Commission on Large Dams, favored greater storage facilities, i.e. dams to keep the amount of water for food production steady even in drought periods. Looking at particular countries and regions separately, reservoir capacities are not enough, unless irrigation is done properly.

Modernization of irrigation and drainage systems is an urgent issue in Central Asia. Agricultural investment is necessary, yet adoption

of new technologies and rehabilitation of old ones require financing and cooperation. It does not suffice to have these technologies *per se* but efficient use of them through capacity building and training the experts should be realized through regional cooperation. It was revealed at the Central Asia RFM that agricultural water withdrawals in some parts of the region reaches up to 90% due to inefficient methods used in agriculture. Low value products, low productivity, ineffective irrigation methods and infrastructural problems such as underpriced water services, lack of measuring and recording, old pumping stations, leakages in irrigation pipes and inability of farmers' access to market altogether cause low profit in irrigated agriculture.

On the other hand, gradually depleting water resources in the Middle East where 80% of water is used in agriculture, suggestions such as increased reuse of water, desalination, rain water harvesting, transferring water between basins and regulated deficit irrigation (RDI) came upfront as necessary technical steps to be taken. During the Middle East RFM, it was emphasized that water productivity is now more important than land productivity as improving 10% on irrigation efficiency could provide more than 50% of all domestic water needs.

During the Turkey Focus Meeting, Prof. Süleyman KODAL, a prominent expert of agricultural irrigation technologies, predicted that 20% reduction in irrigation water use in 2010, which is 31.5 billion m^3, can compensate the domestic need of 6.4 billion m^3. In Turkey, surface irrigation is used at 85% of total irrigated area, whereas it is 12% and 3% for sprinkling and drip irrigation, respectively. Because of the increasing competition among sectors reducing the amount of agricultural water use from 74% to 64% through institutional and technical measures has become a priority as stated by Seyit AKSU, Deputy Head of Management and Maintenance Department, DSI. Among the institutional measures; field education, developing communication and collaboration among agricultural actors and adaptation of crop pattern according to available water resources are the prominent ones. Rehabilitation of old irrigation facilities while developing modern ones such as closed conduit systems are two of the first among the technical measures. Also, there is considerable effort carried out by State Hydraulic Works of Turkey (DSI) for replacing surface irrigation with modern sprinkle and drip irrigation systems and transferring water

between basins. Regional and Ministerial Meetings of the Forum introduced common good will as having such valuable experience in irrigation technologies, Turkey in all aspects defines the peaceful use of water in Central Asia and Middle East regions and is eager to cooperate with the countries especially in sharing know-how, technology transfer and capacity building.

Agricultural irrigation, an immense sector, has multi-dimensions such as wastewater use, groundwater utilization and energy production. Treated wastewater reuse was elaborated by Prof. İzzet ÖZTÜRK at the Thematic Session on Agricultural Water Management and Dr. Melike GÜREL during the Side Event: "Turkish-Dutch Cooperation on Water Agriculture and Innovation", as an option for efficient utilization of water for irrigation taking into consideration the quality of treated wastewater and the intended use according to microbiological quality criteria. They have highlighted that standards and guidelines of wastewater reuse are vital, have to be revised frequently and differ between countries and even within a country. Ecological, economical and health risks of wastewater reuse should not be underestimated.

The negative impact of agriculture upon excessive and illegal withdrawals of groundwater was an highlighted topic of discussions at the Forum. At the High Level Panel Water-Food-Energy Nexus and the Side Event "Operation and Maintenance Practices in Agricultural Water Management" convened by DSI, small farmers' random withdrawals of groundwater were criticized. Especially at drought periods overexploitation of groundwater is a serious concern of the sector.

Financing

As stated by Mr. Giovanni MUNOZ at the High Level Panel on Water-Food-Energy Nexus, investments required for agriculture and irrigation has been neglected since 1970s, the midst of the period called as "green revolution" that led to immense agricultural output boom. However, global food crisis of 2008 has revealed that states should allocate more money for water optimization and infrastructure modernization (Dana, 2009).

A particular instance addressed at the Forum shows how the budget for irrigation has in fact sharply decreased in recent years. Dr. Vadim SOKOLOV from Uzbekistan stated that;

"…water productivity and efficiency in Central Asia is very poor. As a consequence of ancient infrastructure, there is a huge loss of water at irrigation canals. Particularly, agricultural production and irrigated farming left without state financing. During the Soviet period 2000 USD was spent for irrigation per hectare and after 20 years it is just 20 USD in Uzbekistan. As a consequence of finance restraints irrigated areas decreased sharply in Central Asia."

"Ending hunger is not a charity, but an investment in our poorest people and a key to sustainable development."

Mr. José Graziano da SILVA

One important prerequisite for effective agricultural financing is proper pricing of the water that is used in irrigation. Yet, what is subject to be priced is not water itself, but operation and maintenance costs. Under these conditions, managing the finance for agricultural water becomes a tackling issue. Gurria Task Force Report (Task Force on Financing Water for All Report 1: Enhancing Access to Finance for Local Governments, Financing Water for Agriculture, 2006) is a quite detailed study regarding the water pricing policies. It defines water as a local issue, that should be dealt in accordance with the local peculiarities, instead of a one- size-fits-all approach. The report shifts the attention in financing from the supply side to the demand side. In other words, it is suggested that water demanders should provide the money for water service suppliers. The report also briefly reflects significant similarities with the perceptions presented at the Forum. As Prof. Ari MICHELSEN stated during the High Level Panel on Water-Food-Energy Nexus:

"When you subsidize, you are simply offsetting the price of a product. In this case agricultural products… Subsidizing any input means that the consumers are going to pay higher prices. It is not an efficient way for water or any other resource to charge different prices for different uses. If you do that, you are going to end up with very poor allocation… It is not going to encourage food security or food production…"

In response to the claim that goes against multiple pricing of water for different uses, there are advocates of allocating the costs among users according to their ability to afford. Dr. Murad BINO favors higher domestic user price for domestic use compared to agricultural use. Pricing of water is very much related to social issues and access to water, as one of the inputs of agricultural production especially in poor countries. There are two things in economics which need to be mentioned: price of water and value of water. Value of water is simply what water can produce. It is

Water User Associations (WUAs)

WUAs are cooperative associations composed of a group of independent water users, generally farmers and irrigators, who has varying amount of autonomy in gathering and providing the financial, technical and human resources for the management of a water system.

(Chandrasekaran, et al., 2001)

much higher than any price established for water. In this respect, pricing the water itself is not viable. Thus charging only for service and operation according to purchase power is a generic method according to Mr. Oleg GUCHGELDIYEV, Environmental and Community Development Consultant, from Turkmenistan.

Governance: Political and Economic Measures

Water governance has many dimensions ranging from sectorial allocation of water to local and regional management. Decisive actors in water governance are decision makers and stakeholders that affect the process of policy implementation. It should be noted that decision making is not a one-dimensional phenomenon, but has many components such as political, economical, social and administrative systems, as noted by Prof. MICHELSEN at High Level Panel on Water-Food-Energy Nexus. Actors in the governance of water should be coordinated well in accordance with shared responsibilities, norms and principles. The first part of this section elaborates the actors and their roles in policy making processes particularly at local and regional level; whereas, the latter part focuses on an alternative approach of regional and global water governance in the form of virtual water.

Politics and Actors of Agricultural Water Management

Theme 3, Agricultural Water Management, provided a fertile platform for discussing the actual challenges needed to be confronted regarding agricultural water management. Multidisciplinary approaches and grassroots participation were proposed as favorable features of good water governance. One of the points that the panelists agreed upon at the Theme 3 sessions was the necessity of integrated water management approaches at basin level by considering the needs of different water users and availability of sources. In this regard, Theme 3 occasionally approached the agricultural water management issue within the wider domain of general water management. For instance, privatization of water services was handled without specifically excluding domestic water services and other sectors. Additionally, special emphasis was directed towards feasibility of participatory irrigation management options not only during the Thematic sessions, but also at Regional Focus Meetings, as well.

The main actors of water management were listed by Prof. Bart SCHULTZ during Agricultural Water Management Thematic

Meeting and the Central Asia Regional Focus Meeting. He listed the responsible ones as government (policy, legislation and national waters), agencies (main and distributary systems) and farmers (field systems). Prof. SCHULTZ commented that if these parties agree and share responsibility, high feasibility studies will emerge. The ones who contribute to management are consultants, contractors, manufacturers, universities, research institutes, banks, donors, NGOs, international organizations and farmers associations. Special emphasis was attributed to farmers in a changing world and their new role was described as the managers of economics. Mr. Giovanni MUNOZ from FAO at the High Level Panel on Water-Food-Energy Nexus also strongly supported the farmers to take responsibility in management of water. Water User Associations (WUAs) in this regard, were referred as good examples at the Regional Focus Meetings of Central Asia, Turkey and Middle East.

Governance & Society

Good governance means inclusiveness, accountability, transparency, predictability, participatory and responsiveness. These criteria have been listed by Mrs. Alice M. BOUMAN, President of Women for Water Partnership, at the Side Event: Women and Water Policies, which highlighted cooperation and empowerment. There should be simultaneously three levels for efficient water governance:

1. Institutional level that covers legal & policy frameworks and institutional mechanisms,

2. Socio-cultural level including building awareness, getting people involved and creating an enabling environment for change,

3. Community level that consults the community and implements demand driven projects.

Although the support of the top authority level is vital for success, governments alone cannot change anything. Empowerment and participation of stakeholders more than mere consultation is the key. Commitment combined with action is also important.

The options of water management practices can be either centralized or decentralized management or public-private partnerships (PPPs). FAO representatives' survey study titled "Irrigation Management Transfer: Worldwide Efforts and Results", presented by Mr. Giovanni

Why Management at Local Level?

"To understand the issue (agricultural water management) you have to be close to it; live with it. Decentralized management and being in the fields is also useful for advancing and solidifying the cooperation. It's necessary to ensure good understanding and well utilization of the local / traditional knowledge and the drivers of the change."

Mr. Ali Barakat Al ADWAN

MUNOZ was a coherent and cumulative source covering 33 sample countries on understanding public private partnerships in irrigation.* The study reveals the reasons why transfer of management services is taking place in the following order of importance; shortage of public funds (35%), poor operation and maintenance (27%), low fee collection rate (8%), liberalization policies (4%) and other reasons (16%). At the end of process, the majority of tasks are tended to be generated in the hands of WUAs with simple organizational characters. Financing of WUAs is either met by water fees or government funds and subsidies. Authorization of WUAs causes higher operation and management spending for farmers, whereas government spending significantly decreases. One interesting outcome of the survey indicates that equity of service access, volume of irrigated area, crop yield and farmer incomes have improved in the majority of the survey samples since WUAs were established.

Besides this global survey of FAO, a specific case study from Central Asia was explored through Azerbaijani experience presented by Mr. Mammad ASADOV from Azerbaijan Amelioration and Water Farm at Theme 3. His presentation was about the WUA development project in Azerbaijan, financed by the World Bank in the years between 2004 and 2010, that aims establishment of WUAs and their training in order to rehabilitate irrigation networks and increase efficiency. ASADOV said that the project has enabled considerable success in terms of rehabilitation of old systems, water efficiency, yield increase and fee collection. However, Central Asia participants did not refrain from focusing at the absence of participatory mechanisms. They have accentuated that governments are sometimes very critical of new, creative approaches and special advisory bodies for management of water resources. Mr. Ali Barakat Al ADWAN from German Technical Cooperation (GIZ) at Theme 3 introduced the successfully introduced WUA practices from Jordan Valley. He stated that "to understand the issue you have to be close to it; live with it. Decentralized management and being in the fields is also useful for advancing and solidifying the cooperation. It is necessary to ensure good understanding and well utilization of the local / traditional knowledge and the drivers of the change." Jordan Valley has developed a bottom up WUA approach relying on win-

* Theme 3: Agricultural Water Management, Session 4: Is particapatory Irrigation Management a Dream?, Presentation: "*Irrigation Management Transfer: Worldwide Efforts and Results*"

win principle with the aim to benefit all farmers, project team and government. Water management has gradually been transferred to WUAs in the process. For the time being, maintenance, monitoring and reporting are the assigned duties of WUAs in Jordan Valley. In time, pricing arrangements will also be added to WUAs' duties as the confidence between the stakeholders improve.

Drawing a pleasant scene by referring to individual case studies may be deceptive especially considering the lack of institutional regulations. Institutional and legal reforms and highly qualified human resources are also substantial as much as actors and options of management. Dr. Vadim SOKOLOV from Uzbekistan as the representative of Global Water Partnership – Central Asia&Caucasus (GWP-CACENA) and Scientific Information Center – Interstate Commission for Water Coordination (SIC-ICWC) highlighted the lack of institutions for water efficiency. He claimed that institutional changes require less investment but more time. Prof. Ilter TURAN, the moderator of Central Asia and Middle East Regional Focus Meetings, stated that there is a pervasive network of WUAs in Turkey and it is highly successful. His observations regarding the success of WUAs in Turkey are quite applicable and valid for other regional cases as well. Prof. TURAN said that when WUAs function well, farmers choose to pay for water because:

1) They are ensured of getting the water since the WUAs do a much better job in repairing the facilities and minimizing the losses;

2) Decision making becomes local and speeds up the bureaucratic process;

3) Tendency for corruption is limited due to relative grassroots accountability;

4) WUAs enable farmers to have their say and the farmers feel that they can more easily change the leader;

5) Projects become more likely to be successful,

6) WUAs train farmers about risk taking and new methods for efficient production.

Challenges in WUA Applications

Mr. İhsan Oguz BEYARSLAN, the representative of a local irrigation union in Turkey, made parallel assertions regarding the benefits of WUAs in Turkey by adding the challenges waiting ahead as follows: Newly established WUAs fall short of financing the necessary operation and maintenance services until they reach a considerable economic power. Credit extension and grantee options for farmers during the very first years of WUAs would be a viable solution. Legislative adjustments and a just election system that enables fair representation of farmers in WUAs is needed to be established for a good participatory governance. A well-functioning WUAs system will relieve a part of the burden over the bulky agriculture sector. State and society gets closer through the process and so the social problems become visible, yet they will be easier to handle due to increasing economic prosperity that is allocated at grassroots level.

Food Socio-Politics

During the High Level Panel on Water-Food-Energy Nexus, while all panellists were considering political, technical, economic dimensions of food security, Mrs. Iman ABD EL-AL, WWC Governor from the audience reacted as, "We never tackle social aspects of the topic. We have to re-humanize the agriculture and the water in the world." This outcry was in fact a reaction to the interrelations of food security to migration, climate change, gender gains and behavioral changes.

Migration can be either rural to rural or rural to urban. The mitigation of rural population because of migration means fewer farmers to produce more agricultural products for the world population as stressed by Prof. SCHULTZ at thematic and regional sessions. Concurrently, climate change is a factor for risk assessment of agricultural policies. If there are natural crises such as droughts or floods, the countries should be able to implement emergency action plans to diminish the risks. This was the suggestion by Mr. Giovanni MUNOZ during the High Level Panel on Water-Food-Energy Nexus, after years of experience in Central Asia. The relation between the climate change and migration was summarized best in

the Ministerial Meeting. It was pointed out that because of climate change, Palestinians face water security and food security problems that culminate in migration from Gaza and the West Bank.

82% of natural disasters affect the world's most vulnerable populations, especially women and children in these regions. Mrs. Michelle BACHELET, former President of the Republic of Chile and current UN Under-Secretary-General and Executive Director, UN Women, has made a keynote speech on the World Food Day (October 16, 2011) at FAO headquarters in Rome about the food insecurity and women. Her declaration was as following: "The significant cause of food insecurity is the poverty and discrimination faced by women and girls, including women farmers. Since women are on the frontlines of food security, we need to put their needs and rights at the forefront of trade and agricultural policies and investments to move from crisis to stability. If the world is to meet the challenge of feeding people today and 9 billion people by 2050, we must invest in girls and women. Empowering women and girls is key to progress in development, food security and improved nutrition."

Behavioral changes are also crucial for the priorities of food availability. We should not ignore the wasted food all over the world. Prof. Hayri COŞKUN asserted that if we look at the research reports, it is expressed that the food produced in the world is sufficient for all the people. He commented that also some of the money spent for the war and war technologies may be allocated for the hungry people in the world. A fund of 30-40 billion dollars may be created for hunger mitigation.

Virtual Water

The term virtual water has gradually been integrated to the agenda of the water community since its introduction by Prof. Tony ALLAN, King's College London, in mid-90's. "Virtual water" refers to the amount of water used in the production of a good –not necessarily agricultural products– or service. The term has the potential to offer valuable insight when thinking about the water-food-energy nexus. However, for the time being virtual water concept remains as a loose term with minor practical implications and narrowly used by academia. At the High Level Panel on Water-Food-Energy Nexus, Prof. Bart SCHULTZ

A diverse economy has the capability to produce and export number of industrial goods and services whereas dependency on agricultural production for economic well being is lessened.

admitted that virtual water is a good topic to be studied, but it has almost no role in governmental decision making. Although governments are aware of aspects of virtual water it does not influence their policies in land and water management. As an example, Prof. SCHULTZ claimed that being aware of the immense amount of water used in producing one cup of coffee does not motivate governments to take measures to prevent people from drinking coffee. During the same High Level Panel, Mr. Richard TAYLOR, the Executive Director of the International Hydropower Association, pointed to the importance of the consciousness derived by being aware of virtual water for realizing integrated sustainability approach, though he did not mention the term's influence on government policies. In other words, although the term lacks practical application at government level it may have the influence on changing people's consumption patterns to a less water intensified way.

Despite the term's loose practical applicability at decision making level, a closer look at the food trade relations between countries through the scope of virtual water concept reveals significant points in reasonable water allocation. Majority of the countries are net virtual water importers and the deliberate usage of the term might be an important element for the management of water in many countries (Makonnen and Hoekstra, 2011). Applying virtual water concept to a single country only reveals the water deficit or surplus of a country, yet if it is applied within a basin and rationalized through trade among the countries in the basin, it might reach to some optimization and benefit for all parties. As stated by Dr. Murad BINO at the High Level Panel on Water-Food Energy-Nexus:

"We have to understand that we are living in an interdependent world today. Turkey is a net importer of 5 billion m^3 of virtual water, while Egypt imports 11.5 billion m^3 water every year from other countries. There is already a big trade – the Arab world imports water from Turkey because they import food products, this trade already exists but we are not opening our eyes to see how we can manage it in a cooperation-wise way."

The Forum revealed that cooperation and interdependence through food trade might be a relevant option to achieve water and food security. The panelists at the High Level Panel on Water-Food Energy-Nexus did not raise a significant objection against the statement that countries should engage in reliable trade relations regionally if we are to approach food security at international level. In other words, this approach conceptualizes food security as self-capacity.

Water and Food: More Crop Per Drop

"Get ready, farmers and foreign ministers alike, for a new era in which world food scarcity increasingly shapes global politics."

Mr. Lester BROWN (Global Environmental Analyst)

Global food security is the hot topic of 2012. "Water for food security" has been selected by UN-Water as the theme of World Water Day on March 22, 2012. Stockholm International Water Institute announced that Stockholm Water Week 2012 will convene for "Water and Global Food Security." The coordinator of 2012 United Nations Conference on Sustainable Development in Rio de Janeiro (Rio+20 Summit) Mr. Brice Lalonde has suggested agriculture as the main topic for sustainable development of the summit.

Food-Water relationship is a multidimensional issue that is structured around the allocation of resources defined either as input or output; water and food respectively. Among the components of this multidimensionality, water efficiency issue gets the greatest share of attention. Apparently, instead of expanding the amount of irrigated land within the total cultivated land, utilization of water through cropping more for every drop is a preferable method. In this manner, the primary challenge against food security for the Forum's Region is to increase the yield in a sustainable way. However, sustainable efficiency is not an easy task when considering the growing water demand in competing sectors. It requires multidisciplinary co-working to increase total water efficiency. Thus the responsibility should be shared by independent water users at local level.

Regional Focus Meetings indicated that agriculture has been the greatest exploiter of water and this trend is likely to continue increasingly due to increasing populations and demand for water intense products. More water will be needed not only for agriculture, but for other uses as well. It is clear that satisfying every single water user is not a realistic approach. Thus cooperation and compromise among different water users at local level and trade of virtual water at regional level may mitigate the pressure on water allocation conflict in a mutually beneficial fashion. Not to mention, opportunities of operating locally available technologies through learning from each other should not be neglected.

On the other extreme, if the humanity is still sincere and determined for the first target of Millennium Development Goals, halving the poverty and hunger globally until 2015, it is time to impose institutional reforms and effective governance to support women at all aspects, small scale farmers for a greater and fair access to

market at local, national and regional level, and investment to agriculture so to convert the tipping point to turning point, from water and food insecurity to security at competing levels.

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Energy

Lack of Access to Energy

1.4 billion people live without access to electricity. Another billion only have access to unreliable electricity. Lack of access to electricity in 2010 is 1441 million people (World Energy Outlook, 2010). As the International Energy Agency forecasted the increase in the energy demand is a proverbial and steady concern as that the global economy will necessitate at least 40% more energy by 2030 compared to today.

(International Energy Agency - World Energy Outlook, 2008-2009).

Growing Thirsty for Energy

Water for energy is one of the challenging subjects discussed in the United Nations World Water Development Reports, corresponding with the 3rd, 4th and 5th World Water Forums. Energy generation was discussed as an integral part of agricultural water management during the Central Asia Focus Meeting in the 2nd Istanbul International Water Forum (2IIWF). Population growth, urbanization, increasing wealth and improved living standards, accompanied by energy-intensive consumption habits contribute to the globally rising energy demand. "There is too little thought and planning being introduced to the water-energy nexus in most parts of the world, especially developing countries. With fluctuating costs, rapid decisions have to be made about how these two sectors will be interrelated. It is therefore important to develop a good understanding of the water-energy nexus at the local, national, regional and international levels as both water and energy actions place at the global level all the way down to individual communities where water and energy choices take place on the ground" (Istanbul Water Guide (IWG), Article 38, WWF5). The Istanbul Ministerial Statement and the Istanbul Water Guide have been circulated as a UN General Assembly document (A/63/852) after the 5th World Water Forum. They together involve critical recommendations and commitments on global water issues as successfully reflecting the 5th World Water Forum's thematic outcomes.

Scientists continue working on improving models and new scenarios that predict the future energy demand. Considering the scenarios

related to threats and opportunities facing the global energy system, the critical role of governments are indicated in worldwide articles and reports in order to define the objectives and implement the policies necessary to shape our energy future (World Water Energy Outlook, 2011). Just like Iran's 2007 Gas Rationing Plan, Canada's National Energy Program,USA's Energy and Security Act of 2007, and China's specific targets within their 5 year plans, energy policies are developed to cope with greater energy intensity (Global Status Report). Moreover, UN has created a diplomacy centre, Regional Centre for Preventive Diplomacy, in Ashkhabad, focusing also on water and energy. Participants of the Central Asia Regional Focus Meeting indicated that neighbours must cooperate, because the combined effort is greater than the benefits achieved independently.

During the Forum it was emphasized that, energy security is a concern of governments and it is a critical precondition for economic growth. As highlighted at the High Level Panel on Water-Food-Energy Nexus, developing countries are facing a critical challenge in establishing effective energy infrastructures to support their progress towards economic and social development. Considering the ascending demand for energy all over the world and the gap between energy supply and demand, it is also expected that energy prices will gradually increase. In this regard, "Wide participation from relevant stakeholders is necessary from both sectors to include users and user associations, professional associations, business and the private sector, regulators, governments, NGOs, scientists, the academic community and workers and trade unions, farmers' organizations and civil society." (IWG, Article 38, WWF5).

Energy-Water Link

The Forum discussions were limited to the use of water for energy, not energy for water; although, energy required for access to water is also an integral part of the global energy-water deliberations.

Every form of energy generation is considered in order to meet the growing energy demand. Most forms of energy production depend on the availability of water, either for resource exploitation or utilization in the generation processes.

The vitality of water in comparison to energy was underlined in the Central Asia Focus Meeting by Dr. Vadim SOKOLOV, Regional

"Mr Sultan RAHIMOV, First Deputy Minister for Soil Improvement Affairs and Water Resources of Tajikistan underlined during the Ministerial Meeting, that water security and energy security should be taken into account together. He argued that the existing water potential can cover the needs of inefficient water management. Moreover, he added that Tajikistan alone has a hydropower potential three times higher than the total requirement of Central Asia and that Tajikistan can supply irrigation water for 4 million hectares of land. He emphasized the influence of political will by indicating that Tajikistan has the potential but without cooperation including national policies, water challenges in Central Asia cannot be overcome"

(Ministerial Meeting Chair's Summary).

"Hydropower could be substituted by other sources; thermal, sun, wind, nuclear, but water could not be substituted by any other source"

Dr. Vadim SOKOLOV

Coordinator at Global Water Partnership Central Asia and Caucasus (GWP-CACENA). Dr. SOKOLOV pointed out that water consumption can be reduced by alternating the energy source, as he also stated that energy can be alternated but water cannot.

Water is used for extracting primary energy sources, natural gas, petroleum, coal etc., as well as, for plant cooling processes in fossil and biomass fuel fired plants, and in nuclear plants (USAID Global Environment Center- Environment Note, 2001). Hydropower also depends on water, in fact water is its basic need. Hydropower proponents argue that water is not consumed for energy generation in hydropower plants, while in fact, hydropower can only be generated by taking water from a source to capture the energy of falling water. The kinetic energy originating from the potential energy (height) of falling water is transferred to electricity at hydropower plants. However, based on the research published by Virginia Water Resource Research Center, hydropower is a highly water efficient energy generation subsequently used water is mostly returned to the ecosystem.

European Water Supply and Sanitation Technology Platform projected that water demand will rise 60% and energy demand will rise 45% by 2030 in Europe (European Water Supply and Sanitation Technology Platform (WssTP), 2011). Water and Energy scarcities feed each other and hence, they are interconnected looming crises. In this respect, the increasing recognition takes water and energy concepts into consideration together, as inextricably linked issues.

Table 1. Water Use Efficiency of Power Generation Systems (Gallons/MBTU)

Power Generation Method	Low Range Efficiency Gallons/MBTU	High Range Efficiency Gallons/MMBTU	Sources
Hydroelectric	20	N/A	USDOE 2006; Gleik 1994; EIA 2008
Geothermal	130	N/A	USDOE 2006; EIA 2008
Hydrogen	143	243	USDOE 2006;
Solar Thermoelectric	230	270	USDOE 2006
Fossil Fuel Thermoelectric	1100	2200	USDOE 2006; Hutson et. Al 2004
Nuclear	2400	5800	USDOE 2006; EPRI 2002a; EPPRI 2002b

Source: Virginia Water Resource Research Center

Geothermal Energy

According to the panellists and participants in the Forum, geothermal energy is defined as a clean, environmentally friendly, economic, sustainable, and renewable energy source. European Geothermal Energy Council (EGEC), the World Bank, European Solar Thermal Electricity Association and many other international organisations support the developments and investments in geothermal energy to promote its use. For example, the World Bank elaborated a project known as Geothermal Energy Development Program, which aims to remove the barriers to the development of renewable energy in Europe and Central Asia countries. Based on the report "Proceedings European Geothermal Congress 2007", the geothermal potential varies from country to country according to the geothermal technology that best suits the geological properties.

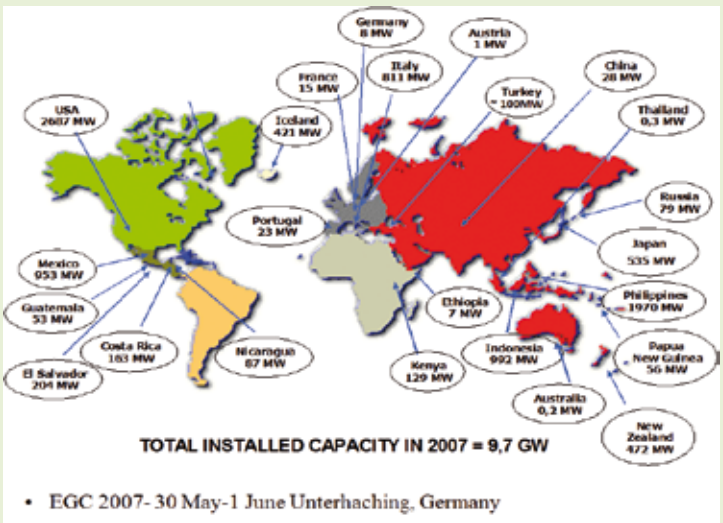

Figure 1. Total Installed Geothermal Capacity in 2007

According to geologists, the area which covers 5% of the geographical area of the world and contains the geothermal resources is called as "Ring of Fire." Turkey one of the countries located in this area. Based on the data presented in World Geothermal Congress-Bali/Indonesia (WGC, 2010), 78 countries around the world are using geothermal resources. EGEC announced that the European geothermal target by 2020 is 37 000 MWt for heating and 6000 MWe for electricity. As Prof. Şakir ŞİMŞEK, Hacettepe University, pointed out during the Thematic Session "Geothermal Energy & Water Culture" 526 units of geothermal power plants in 24 countries with the 10715 MWe of installed capacity prevents the emission of 148.2 million cubic tones of CO_2 to the atmosphere.

International Geothermal Association remarks that Turkey's installed geothermal electricity generation capacity in 2010 is 82 MWe. The discussions in the Thematic Session showed that the total geothermal electricity potential of Turkey is around 2000MWt, that means 16 billion kWh/year, and the total geothermal heat potential is 31.500 MWt. Moreover, based on the presentation of Dr. Orhan MERTOĞLU, Turkish Geothermal Association, geothermalists and Universities report that geothermal theoretical heat potential of Turkey is estimated as 38 000-60 000 MWt. As he stated during the Forum, Turkey has become the world leader in geothermal greenhouse development in last 5 years with that there are 10 million m^2 geothermal greenhouse applications in the world and Turkey has more than 2,3 million m^2 of them. For instance, products from such greenhouses in Şanlıurfa and Dikili are being exported to European countries.

Inevitable Emergence of Hydropower in the Forum

Energy sources vary from country to country according to the primary energy sources that the geological features allow. Hydropower was put forward as the most preferable renewable energy source in the Forum discussions. It was presented as the favourable energy source In-and-Around Turkey due to the Region's exploitable water bodies and geographical features. Regarding the role of water in energy production, the discussions during the Forum were limited to the opportunities and challenges of hydropower generation. It was stressed in the related Regional Focus Meeting and the Ministerial Meeting that hydropower dominates discussions around the energy sector in Central Asia. By all accounts, during the Forum, hydropower stood out as an economically and environmentally friendly energy form.

Ms. Alison BARTLE, Director of Aqua-Media International and editor of the International Journal on Hydropower & Dams, emphasized the hydropower potential within region during the Water for Energy Thematic Sessions by remarking that the largest hydropower capacity resides in Asia, with 926 GW of clean renewable hydropower in operation and 161.4 GW more is under construction. Additionally, more than 60% of these facilities are multipurpose structures. Similarly, Mr. Ziyadin JAMALDINOV, Chief of State Committee for Water Management and Land Improvement of Kyrgyzstan, stated in the Ministerial Meeting that

water is an important source for energy generation and energy security is a priority issue for Bishkek. During Water for Energy Thematic Session, Mr. Mustafa ELDEMİR, Deputy Secretary of Ministry of Environment and Forestry of Turkey, indicated that Turkey taps into only 13% of its own hydropower potential.

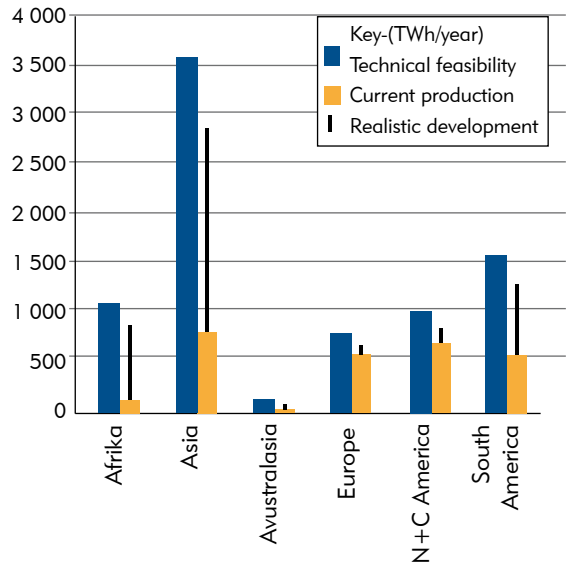

Figure 2. Estimated Hydropower Development, Source: IHA, 2007

European Union consider renewable energy sources in their future plan by setting the target of 20% renewable energy share in their gross final energy consumption by 2020 to adapt an active policy on the promotion of renewable resources. Accordingly, proponents of hydropower development in Turkey asserted that the use of hydropower should increase to meet 20% renewable energy requirement. Deducing from the Forum, arround 25% of energy supply in Turkey depends on hydropower as a renewable energy source. Mr. Salih PAŞAOĞLU, Essentium Energy Investment Inc., former Undersecretary of Ministry of Energy and Natural Resources of Turkey, stated that Turkey just met the 20% renewable energy target with the supply of 25% hydropower, 1.5% wind power and 0.3% geothermal energy production out of the total energy generation in Turkey. Another statistic dated 2011, presented by Mr. Atilla ATAÇ, former Deputy Head of Department of Surveying and Planning, indicated that 19% of Turkey's total energy generation depends on hydropower energy production.

"Worldwide, an installed capacity of 1,010 GW supplied hydroelectricity in 2010. This was approximately 16% of the world's electricity, and accounted for about 76% of electricity from renewable sources"

(Renewables 2011 Global Status Report, 2011).

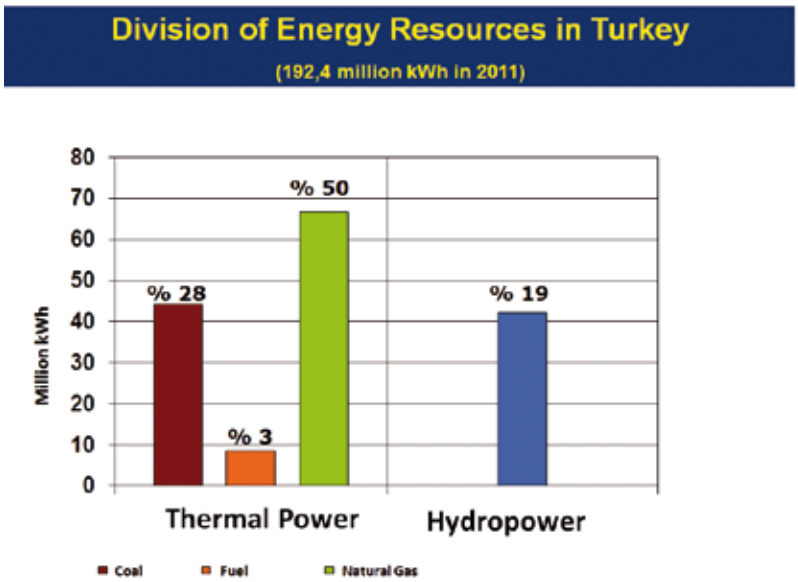

Figure 3. Division of Energy Resources in Turkey, Source: Atilla ATAÇ, Water for Energy Thematic Sessions

If Turkey cannot reach the above mentioned target at the end of 2020, it will become an import dependent country in terms of renewable energy since EU legislation obligates member and candidate states to use 20% of renewable energy in total energy consumption. Traditional energy sources are not accepted as renewable energy sources since they raise greenhouse gas (GHG) emissions, thus promote climate change.

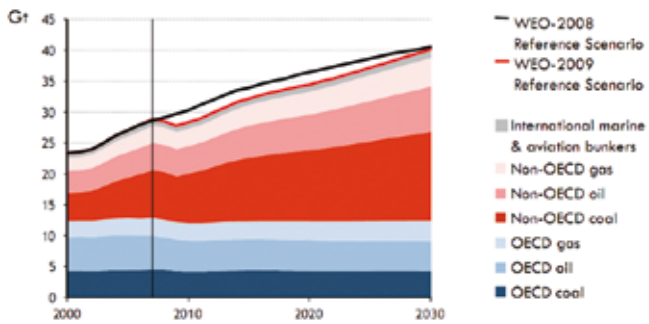

Figure 4. Worldwide Greenhouse Gas Emissions, Source: IEA, 2009 (1Gt = 10^9 tonne)

Hydropower was addressed as an indigenous renewable energy source that reduces dependency of Turkey on energy import. Mrs AKÇOLLU OĞUZ, Lead Energy Specialist The World Bank, contributed to the previous idea by denoting that, hydropower accounts for almost one-fourth of the electricity generation, while, 46% of the electricity generation comes from natural gas for which Turkey is 97% dependent on imports. The electrical efficiency of gas turbines are used to generate electricity from natural gas is only 30%. If gas motors are used, the efficiency can be up to 45% (Istanbul Water and Sewerage Administration (ISKI) Operational Data). The rest of the energy is given out to the environment as waste heat. Turkey is well-endowed with renewable energy resources with 216 TWh technical and 140 TWh economic capacities supported by hydropower (Source: General Directorate of State Hydraulic Works (DSI)), 1 TWh = 10^6 MWh, 1 TWh/year = 114 MW).

"Additional energy production capacity is a need for Turkey starting from 2015"

Mrs. Yeşim AKÇOLLU OĞUZ

Solar and wind power are other renewable energy sources besides hydropower. Nonetheless, owing to the intermittent nature of solar and wind power, they were not presented as the foremost priority in the Region, albeit the probable potential of solar and wind power In-and-Around Turkey.

According to hydropower proponents, in order to achieve energy security, all the economic hydropower potential should be utilized. It was denoted in the report of The World Bank that Turkey is among the countries that are most vulnerable to climate change (ranking third among Europe and Central Asia (ECA) countries following Russia and Albania) and therefore, hydropower energy generation is an important tool to cope with the growing energy demand and achieve security of supply from local renewable sources as the geological conditions permit.

Licensing and Private Sector Participation

Energy generation increases with private sector participation on account of financial restrictions and long durations in the government projects. As indicated during the Water for Energy Thematic Sessions, private sector analyses the financial feasibility of the project thoroughly and executes the project as feasible as possible.

In order to encourage private sector participation, renewable energy power plants, which have an installed capacity up to 500kW, are exempted from the requirements of establishing a generation licence and eligible for feed-in-tariffs for 10 years in Turkey. "Private investors in hydropower demand predictable business and regulatory framework, "One-stop-shop" licensing process, clear guidance by competent authorities to avoid conflicts and to ensure "public benefit" in the watershed, continued deregulation with clear separation of generation, distribution, traders and retailers" Mr. Bjorn WOLD senior advisor at Statkraft AS, Norway, stated in "Water for Energy" Thematic Sessions.

Mr. Salih PAŞAOĞLU, listed the challenges in energy unit prices obtained by negotiations with DSI and he added the need for a guarantee by the State for the loans and credits used in these projects. According to Mr. Atilla ATAÇ, Kolin Construction, Turkey, long drawn out inter-organisational correspondence and time consuming processes are some of the bureaucratic obstacles. Moreover, Mr. PAŞAOĞLU stressed that fully planned projects have to wait in line for licensing processes due to the great number of energy generation projects that emerge one after another. In this respect, Mr. Bjorn WOLD, enumerated some important elements in licencing process such as transparency, predictability, environmental impact, total cost, focus on relevant impacts and progress and time consumption. He added that protection plans including natural conservation, cultural heritage and hydropower potential and many others are also taken into account as important criteria in terms of licensing process. Moreover, he drew attention to biological flow and fish passages for the sake of protecting all water bodies in the frame of EU Water Framework Directive.

One-stop-shop was presented to encourage the private sector and to shorten the duration for licensing. As mentioned above, in the interest of private sector involvement in Turkey, renewable energy generation has been improved since 2003. Although renewable energy legislation in Turkey was enacted not long ago, in 2005, and amended by the end of 2010, Mr. PAŞAOĞLU describes it as well-organised and thoroughly structured.

Throughout the Forum, long discussions on licensing processes were initiated by both regional and international participants. Except domestic use of water, withdrawal and all other industrial

uses of water are subject to licensing. According to European Economic Area Agreement (EEA), just like other natural resources, hydropower also needs to be well-regulated in the light of public interest. The challenges of private sector participation were presented during the Forum with various case studies from all around the world. As it turned out, public protest is a global phenomenon, caused by distrust in licensing criteria and processes regarding the environmental impacts of every industrial enterprise.

"Private investors in hydropower claim predictable business and regulatory framework, "One-stop-shop" licensing process, clear guidance by competent authorities to avoid conflicts and to ensure "public benefit" in the watershed, continued deregulation with clear separation of generation, distribution, traders and retailers"

Mr. Bjorn WOLD

Environmental Impact Assessment (EIA)

Every industrial enterprise has an unavoidable environmental impact. During the High Level Panel "Water-Food-Energy Nexus", Mr. Richard TAYLOR, Executive Director of the International Hydropower Association, stated that "with regard to improve of outcomes and sustainability, dam building and hydropower has received considerable criticism over the years." Moreover, he added that there should be a trade-off between the energy need and environmental impacts of energy sources. The benefits can be achieved in a more balanced way through optimization. The environmental impact of hydropower plants and correspondingly Environmental Impact Assessment (EIA) were vastly discussed in the Water for Energy Thematic Sessions convened by DSI.

To support improvements in clearer and greener energy generation, considering the possible advantages of small and large scale hydropower plants, applications and investments should be encouraged (Istanbul Water Guide, Article 43, WWF5). Private sector involvement is one of these applications encouraged by governments; however, it brings about widespread criticism from local communities regarding environmental concerns over hydropower infrastructures. Communities advocate that private sector does not give a sufficient awareness on environmental impacts. There have been massive protests by local communities, especially in the Black Sea Region of Turkey, against micro hydropower plants. "While the villagers to be impacted by these private ventures perceived an unjustified attack against their agricultural as well as household water consumption, the government defended the projects as a sustainable means to diversify energy production"(Erensu, 2010). Public protest is a widespread disturbing phenomenon perceived by both public and

private sector. According to Mr. WOLD in 1970s the resistance originated from an environmental group in Norway underlined the importance of environmental impacts and indicated its critical role in the decisions on account of sustainable development. Based on research at the University of Minnesota, most of Black Sea Region protestors have migrated from big cities (Erensu, 2010).

Outcomes of Q&A Session in Thematic Session "Water for Energy"

- Local communities are anxious about the probability of quality change in drinking water the sources of which are located close to hydropower plants.
- People worry about the environmental impacts of the sequential location of hydropower plants along a single river.
- Communities believe that the private sector purchases the river, and hence, it withholds their access to water.
- Prof. Meriç ALBAY, Istanbul University Faculty of Fisheries, highlighted the biodiversity richness of Turkey and added that a thoroughly prepared EIA is vital to protect this ecological diversity. He stated that "because such EIA takes 2-3 years to be well-prepared with academic research on the sites, the current EIAs which were prepared on short notice are not very scientific."
- The audience strongly underlined the insufficiency in public participation in EIAs.

Just like many other industrial enterprises, not only hydropower but also traditional and nuclear energy generation come under the concept of environmental impacts of energy sector. The discharge of cooling water is classified as highly contaminated and harmful for the environment, although it is a recyclable waste in some specific cases. In terms of wastewater generation, hydropower is least harmful to the environment in comparison to traditional and nuclear energy.

During the Forum it was pointed out that not only the EIA report prior to the inception of the project but also subsequent monitoring of the facility carries weight. An adequate amount of water is needed in the river bed at any given time in order to sustain the ecological balance and protect the life of flora and fauna of the habitat. Mr. Salih PAŞAOĞLU and Mr. Fevzi İŞBİLİR, Ministry of

Environment and Forestry of Turkey, EIA Implementation for Dams and Hydroelectric Power Plants (HEPPs), noted that ecosystem services are valued and taken into account before and after the project completion in the light of EIA and the environment agreements which were signed by the company before the launch of the project.

"Environmental flows are crucial to ensure best outcomes of projects, plans and policies"

Dr. Jian Hua MENG

Hydropower was addressed during the Forum as a relatively clean, renewable, reliable and economic alternative energy form in comparison with non-renewable, limited and polluting traditional fossil-fuel and nuclear power plants. Hydropower was accepted as a most preferable renewable energy resource for the future with the exclusion of its environmental side-effects.

Storage and Water-Food-Energy Nexus

Throughout the Forum, especially during the High Level Panel, the panellists drew attention to "storage" as the common issue in water-food-energy nexus. Prof. Luis BERGA, Hon. President of the International Commission on Large Dams (ICOLD) remarked during the Panel that the storage is a useful tool to increase the natural accessible water resources, to expand irrigated areas, as well as, to satisfy the energy demand. Besides the multiple benefits of dam construction such as hydropower, water supply, irrigation, flood risk management, etc.; its role in "stored" energy with "stored" water also recognizes its thought provoking detrimental impacts to the environment. Dam construction for the purpose of hydropower generation prompts a condition that severely impact inhabitants. In order to achieve energy security, in some cases, local communities are requested to be relocated. The existence of such perturbation is also taken into consideration including in environmental impact assessment and points out the importance of EIA.

As Prof. BERGA indicated, large hydropower plants with large dams storing water as Prof. BERGA said are multipurpose. However, it was also stressed during the Forum that just like large hydropower plants, small hydropower plants also pose negative effects on environment. Another matter derived from HEPP construction is prevention of access to water on behalf of ecosystem services in the frame of micro hydroelectric power plants. A response from audiences in the Forum during the Water for Energy Thematic session argued that all ecosystem services possess the right to access to water despite the water deduction resulting from the capturing of water in a pipe for the purpose of micro HEPP. In addition to that, transfer of operating rights span approximately

for 40-50 years which means that the HEPP management leases the river for 40-50 years. In this sense, the EIA report as well as the surveillance after the construction of power plant play a critical role in protecting ecosystem services.

The International Association for Impact Assessment (IAIA) defines EIA as a process that focuses on identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of a project, with the inclusion of major identifications and commitments. However, EIA process does not always work properly. It was inferred from the Forum that in such cases, local communities refuse to be a part of the meetings which are compulsory for the process of EIA, rather than being a part of the EIA process and the surveillance mechanism.

Political Will

"The emotion rich political landscape is more determining than science knowledge"

Prof. Tony ALLAN

Many projects are improved to reduce their environmental impacts; all technical approaches are totally predictable in a perfect world. In the Water for Energy Thematic Sessions, Mr. Selami OĞUZ, Turkish Water Foundation, addressed that "in order to achieve successful projects, more engineering and technical skills should be utilized." It would not be possible to take all of the variables, predictable and unpredictable ones, in nature into account. If decisions were made only based on data and engineering solutions, we would be living in a technically perfect world. However, engineering solutions are not the merely criteria for decision makers. Socio-economic conditions should also be considered. Prof. BERGA also supported this idea by adding that "the projections cannot provide decision-makers with exact information of the rate of future changes, but they can offer very useful general information, and could serve as preliminary and initial assessment."

"Energy security is a critical precondition for the continuity in economic development. In order to support their progress in economy, developing countries are facing crucial challenges deriving from establishing effective energy infrastructures" (IWG). The vision of decision makers is of primary importance and they are expected to consider every aspect of the circumstances. Governments consider the socio-economic status, as well as, the environmental implications of water bodies. In this regard,

based on the report published by Water Information System for Europe, heavily modified or artificial water bodies are required to achieve "good ecological potential" instead of "good ecological status" (WISE, 2008).

Political will was indicated as the key element which is defined by Prof. Craig CHARNEY, President of Charney Research, as the combination of three factors: opinion, intensity and salience (2009). During the 5th World Water Forum in Istanbul, the enhancement of the coordination of water and energy policies was highlighted "Water and energy policies are rarely well coordinated. Increasingly, agencies are taking a broader approach to the impacts of water on energy policy and vice-versa. Far better coordination is required to establish markets and investment conditions and regulatory mechanisms, which optimize water and energy use and reuse" (Istanbul Water Guide, Article 39).

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The Nexus

The preparatory meetings of the 2nd Istanbul International Water Forum were organized with the intent to grasp the water priorities of the In-and-Around Turkey Region, which in turn shaped the Forum's agenda with a bottom-up approach. Hence, the main objective of the Forum was to reflect the perspective of the Region's representatives in water- related challenges of their own regions.

The demand for water, food and energy is increasing rapidly due to population growth, urbanization and economic growth. Water is the common source to achieve energy and food securities. Fresh water is a scarce, limited resource in many regions of the world, especially in the Forum's area of focus. Therefore, quantity related water challenges, especially in the Middle East and Central Asia, were presented as the number one priorities at the Forum. On the other hand, water quality related issues were to a certain extent neglected in comparison to quantity problems.

The Forum, in essence, dealt with water related issues from perspectives of different sectors: water, food and energy. Prof. Veysel EROĞLU, Turkish Minister of Environment and Forestry* formulated the issue during the Ministerial Meeting: "Sustainable development, achieving water and food security require good management which can only be achieved through equitable sharing of water among these sectors." In this regard, the relation of water with food and energy, and management of water in an integrated manner for these sectors, is the main focus of this nexus.

* Currently the Minister of Forestry & Water Affairs

"Business as usual" approach is no longer applicable in meeting the growing needs of the region. High Level Panels, "Water-Food-Energy Nexus" and "Integrated Water Resources Management" and "Urban Water Services", have provided the insight to think of water in regional terms. Topics of the Nexus can be summarized in key terms; access to safe drinking water and sanitation, irrigation, hydropower development, and cooperation. The outcome is noteworthy, since a nexus approach for different regions, for example Western Europe, would presumably bring different results.

The "Water" chapter covers access to water and sanitation, transboundary cooperation options and urban water services. The chapter defines access to water and sanitation as a basic human need, analyzing legal, urban, and transboundary dimensions of the subject. As the population increases, consumption of water increases. Due to change of consumption habits and lifestyles, per capita consumption also increases. Especially in the urban side of the matter, either the demand needs to be carefully managed or share of water supply should be increased to cope with this growing demand for water. Urban water and sanitation, which was the main focus of the Eastern Europe Regional Meetings, the attention was drawn upon the need for safe, sustainable and adequate infrastructure, in order to achieve good quality water services.

The "Food" chapter unfolds the deeply intertwined link between food security and water security. The conclusion that was conspicuous in Regional Focus Meetings was that especially in Central Asia and Middle East, the priority of the Region in water related challenges is irrigation and food security. Hence, the Forum discussed the issue thoroughly with numerous sessions dedicated to these two topics. In the Region, the biggest constraint in increasing food production was considered to be the amount of water, not land. Agricultural yield would have to be increased by increasing efficiency of water use. To receive more crop per drop, agriculture needs investment, both financial and institutional.

The "Energy" chapter, in turn, deals with the issue from the perspective of hydropower development. It can be readily argued that "Water for Energy" from the perspective of Forum's regional scope, means hydropower; whereas, energy and water link would be articulated in different terms for another region. Due to the fact

that energy demand, especially in Forum's area of focus, is increasing rapidly, the Region's peculiarities point at hydropower as a reliable option to cope with the growing demand. However, dependency on a specific energy source endangers energy security. Countries aim to diversify their energy sources to attain reliable energy supply. Dwindling fossil fuel reserves, and climate change due to increased release of carbon emissions, will force energy production to shift to renewable options. In the Region, where the untapped potential for hydropower is still great, HEPPs were presented as a reliable option in utilizing the potential power of water.

Water-food link discussion was focused around irrigation; whereas water-energy link implied hydropower. Considering the growing demand on water by these sectors, the Region is on the verge of inter-sectorial rivalry for water. Therefore, an integrated approach is an urgent need for efficient exploitation of water resources. An ideal management would point to the "Nexus" approach, "that integrates management and governance across sectors." Water management through nexus approach needs consideration of both quality and quantity of water, without neglecting the ecosystem services. This corresponds to management of a specific kind: Integrated Water Resources Management (IWRM) at basin scale. Yet, basins do not correspond to national borders. In this regard, geography forces governments to cooperate, and the rules of cooperation are defined by bilateral or multilateral agreements. However, mobilizing political will to set the rules is the biggest challenge.

Coping with the sectorial needs of water In-and-Around Turkey, the nature of transboundary basins directs states to cooperate, and creates the need to reach to an agreement in order to manage water more efficiently. Keeping in mind that every region and basin has its own individual characteristics, cooperation mechanisms will have to adhere to the characteristics of the basin or the region, as the "Water" chapter articulates. That being said, riparian countries will have to carve out political will to come up with their unique mechanisms that respect regional features for IWRM.

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Appendices

A. 2nd Istanbul International Water Forum Ministerial Meeting Chair's Summary

3 May 2011

Conrad Istanbul Hotel

Ministers and high level decision makers gathered at the Ministerial Meeting to share their visions on common water challenges. During this meeting, Ministers, representatives of international institutions and top level water executives discussed the topics essential in overcoming global, regional and local water challenges. This chair's summary aims to give a compilation of shared ideas, regional concerns and suggested solutions in this Ministerial Meeting at the 2nd Istanbul International Water Forum.

Prof. Veysel EROĞLU, Minister of Environment and Forestry, opened the meeting by welcoming Ministers and high level representatives from 15 countries, Food and Agriculture Organization (FAO), Organization of the Islamic Conference (OIC) and the World Water Council (WWC). Indicating that the Ministerial Meeting was dedicated to enhance regional cooperation, he stated that the outcomes of the 2nd Istanbul International Forum will be carried to the 6th World Water Forum in Marsailles, France on 12-17 March 2012.

Minister EROĞLU referred to water as an indispensable natural

resource and a precondition of human life. Drawing upon the water target in the Environmental Sustainability chapter of the Millennium Development Goals, he indicated that sustainable development, achieving water security and food security require good water management which can only be achieved through equitable sharing of water among different sectors. He indicated that integrated water management and basin wide planning that are so crucial to good water management cannot be applied on a global scale due to lack of basic technology and infrastructure.

Minister EROĞLU identified the 5th World Water Forum as a good example of regional cooperation, indicating that the Istanbul Water Consensus has been signed by 900 mayors from 52 countries. He underlined the significance of cooperative regional projects for disaster management and mitigation due to climate change. Counting wastewater treatment technologies, drinking water, irrigation technologies, early flood warning systems, capacity building, technology transfer and exchange of experience among neighbors as means of cooperation, he gave examples from the region. Turkey has been cooperating with Syria, Georgia, Russia, Greece and Israel on forest fires, dust storms and wind erosion. The foundation of the Dostluk Dam on Asi (Orontes) River has been recently laid with Syria and a joint dam project is in the works on the Tunca River with Bulgaria. Early flood warning systems have been developed on Meriç (Maritza), Asi (Orontes) and Çoruh Rivers.

Minister EROĞLU concluded his opening speech by stating his expectation to learn from each other through this Ministerial Meeting by enabling exchange of opinions and thus increasing regional cooperation.

The Head of the Palestinian Water Authority, Dr. Shaddad ATTILI, described the water problems of the West Bank and Gaza. He said that because of climate change, Palestinian Authority faces water security and food security problems that culminate in migration. He stated their inability to exploit water resources in the region effectively due to political problems, declaring that they had already called for help in the 5th World Water Forum to no avail. Saying that God created water for people and for nature, he affirmed their commitment to cooperation on water projects like the Red Sea – Dead Sea Conveyance. Dr. ATTILI further described their current situation by explaining that the Palestinian Water Authority is unable to provide continuous safe drinking water and that the sanitation system is non-existing. He called for assistance in dealing with this water crisis, inquiring after past projects for transferring water to the region like the Peace Water Project. He also indicated that 60% of the water comes

from outside the Arab region but that although not an Arab country, they do not perceive Turkey as a threat for Euphrates and Tigris. Dr. ATTILI ended his words by emphasizing the importance of cooperation and lack thereof even in the Mediterranean Region.

Mr. Sultan RAHIMOV, First Deputy Minister for Soil Improvement Affairs and Water Resources of Tajikistan, said that there are more than 270 transboundary water resources; however, not every country receives an equitable share from these natural resources. He pointed out that water resources of the region are under stress from climate change and urged for regional cooperation. He identified bilateral agreements and/or cooperation among neighboring countries as inadequate for instituting efficient water management. Mr. RAHIMOV urged for cooperation and concerted action with the participation of all the countries in the region and declared Tajikistan's readiness for it. He continued his speech by underlining that water security and energy security should be taken into account together. Mr. RAHIMOV argued that the existing water potential can cover the needs of Central Asia and a lack of cooperation and concerted action in Central Asia constitutes the main cause of inefficient water management. Moreover, he added that Tajikistan alone has a hydropower potential three times higher than the total requirement of Central Asia and that Tajikistan can supply irrigation water for 4 million hectares of land. He finished his speech by indicating that Tajikistan has the potential but without cooperation including national policies, water challenges in Central Asia cannot be overcome.

In his speech Mr. Ziyadin JAMALDINOV, Chief of State Committee for Water Management and Land Improvement of Kyrgyzstan, asserted that efficient water use is an important issue for Kyrgyzstan, an agricultural country and referred to the problems regarding decision making and implementation in water management. He underlined the need for a holistic approach in basin management and stated that parties should abide by rules and regulations codified in regional and international agreements. He proceeded by referring to the agreement signed between Kyrgyzstan, Uzbekistan and Kazakhstan in 1998 for cooperation on Syr Darya Basin which serves as an example for regional cooperation and advocated that other countries should also cooperate like Kyrgyzstan. Mr. JAMALDINOV stressed that water also is an important source of energy generation and energy security is a priority issue for Bishkek in order to meet the rising demand. He complained that Central Asian countries are acting on an individual basis for their own benefit and warned for more severe problems in the future due to population increase. Mr.

JAMALDINOV ended his remarks by emphasizing that regional solidarity in water management with new policies and good intentions should replace individual actions of countries in the region.

Mr. Javad AMIN-MANSOUR, Head of the Department for Trade Negotiations and Energy at the Ministry of Foreign Affairs of Iran, explained that Iran, which has 80% of its population concentrated in arid and semi-arid areas, faces a number of water challenges. These problems include worsening environmental conditions such as dust storms, climate change, global warming, population growth and decreases in precipitation. Mr. AMIN-MANSOUR indicated that the volume of Lake Urmia has decreased significantly in last ten years due to climate change and the lake is expected to dry out in the near future. Subsequently, Mr. AMIN-MANSOUR described Iran's plans for overcoming the twin water challenges of growing demand and diminishing supplies: public awareness campaigns to encourage lesser water use, implementation of modern irrigation systems, new production technologies for water use in industry and the prevention of pollution of surface waters through wastewater management. Mr. AMIN-MANSOUR also noted that Iran is taking regional actions to promote better water management. Iran has already established two regional water management centers in collaboration with 18 states and 8 international and scientific organizations, including the Regional Center on Urban Water Management (RCUWM) and the International Hydrological Water Management Center. To date, RCUWM has organized 24 workshops and 4 international conferences, and continues to train people every day in efficient water management. Mr. AMIN-MANSOUR stated that Iran invites Asian, African and Middle Eastern countries to the next meeting of RCUWM, in Kabul this September, to further improve cooperation in the region. Mr. AMIN-MANSOUR concluded his remarks by mentioning that Iran will be actively participating in the next World Water Forum.

Director General of the National Center for Water Resources of Iraq, Mr. Aoun Diab ABDULLAH, praised Turkey's strong political, historical, religious and economic ties with Iraq and expressed Iraq's gratitude to Turkey for its support in political and technical issues. He recalled the Istanbul Meetings* held in 2009 by Turkey, Syria and Iraq, where challenges in water security, disaster mitigation and desertification were discussed. He remembered it as having been a productive meeting in defining basic principles for regional cooperation regarding the use of the

* These meetings are the Joint Technical Committee meetings between Turkey, Syria and Iraq. They were re-initiated by Turkey in 2007 and are being held regularly.

Euphrates and Tigris rivers, reclamation of river beds, preventing erosion and encouraging afforestation. Moreover, he emphasized that cooperation should be based both on the quantity and the quality of water and drew attention to the need for constructing dams, reclaiming river beds and preventing floods. Mr. ABDULLAH also declared Iraq's support for the principle of optimum, equitable, reasonable use of transboundary waters benefitting all the people in the region. He continued by explaining that Iraq suffers from an inadequate water supply, and that Iraq's resources are inefficiently exploited. Therefore, Iraq desires a compromise on the optimal use of trans-boundary waters under the conditions stated above. Additionally, Mr. ABDULLAH emphasized the need to further promote the 1997 UN Convention on International Watercourses. He concluded his speech by noting that Iraq utilizes international firms in order to do strategic research on water and agriculture.

Mr. Vladimir NIKANOROV, Deputy Head of the Federal Water Resources Agency of Russia, stated in his speech that although Russia has a successful water management system place, the country is facing hardships from significant decreases in precipitation and a mismatch between the distribution of water resources and the country's population. He also noted that Russia is a party to more than 30 regional agreements in addition to numerous bilateral agreements with its neighbors, including agreements with China, Azerbaijan, Ukraine and Finland. Mr. NIKANOROV completed his speech by stressing the importance of pre-emptive cooperation in the fields of disaster mitigation and management, so that countries are better able to work together when disaster strikes.

Ms. Ivelina VASILEVA, Deputy Minister for the Environment and Water of Bulgaria, indicated that Bulgaria's national legislation has been harmonized with the EU Acquis, and that Bulgaria's river basin management plans are prepared in compliance with the EU Water Framework Directive. She expressed Bulgaria's appreciation for Turkey's efforts for accession to European Union and the need for the development of new cooperation mechanisms. Ms. VASILEVA underlined common action and mutual assistance for good neighboring relations. She suggested that Bulgaria and Turkey cooperate on eco-tourism and share environmental impact assessments and the prevention of pollution in the Black Sea. Ms. VASILEVA explained that an exchange of practices in integrated water management and their adaptation to the regional context are crucial. She mentioned that the operational programme for Black Sea is being prepared and proposed to share best practices and know-how with Turkey. She also expressed that Bulgaria is in favor of

taking practical steps for specific projects within river basin management plans. She concluded her speech by adding that challenges in water management arise from a lack of financial resources in the region and asserted that joint actions can address these challenges.

Dr. Razley Mohd NORDIN, Director General of the Science and Technology Committee of Organization of Islamic Conference (OIC), pointed out that Turkey is the first member country of OIC which organized a World Water Forum. He stated that the idea of the water vision described in the 5th World Water Forum in Istanbul should be taken more seriously and ambitiously. He continued his remarks by noting the construction of a joint dam by Turkey and Syria on Asi (Orontes) River is a good example of cooperation. Dr. NORDIN finalized his speech by presenting ten main areas for cooperation: irrigation, water treatment, alternative water resources and reclamation, climate change, wastewater management, data management in hydro-meteorology, institutional reforms for water resources management, establishment of water management centers like those in Iran, incorporation of common problems into national and international agendas, finance, and technology.

The sub-regional Coordinator for Central Asia in the Food and Agriculture Organization (FAO), Mr. Mustapha SINACEUR, recalled that the 5th World Water Forum was magnificent organization. He underscored the lack of cooperation in Central Asia as the essential difficulty in overcoming water related challenges. However, he did note that the Joint Committee on River Management between Kyrgyzstan and Kazakhstan is a promising exception to the status quo. He also mentioned that the main focus of the 2010 United Nations Regional Consultative Committee meeting in Ashkabad was enhancing dialogue in Central Asia. He concluded his speech by expressing his support for development of cooperation in Aral Sea and Nile River Basin. He stated that FAO established successful funding mechanisms to assist the agricultural sector and already granted around 10 million USD in Central Asia. He furthermore underlined the necessity to continue negotiations and to take initiative for regional cooperation and coordination.

The Albanian Deputy Minister for the Environment, Forests and Water Administration, Mr. Arben DEMETI, stated that despite Albania's rich water resources, the country is facing challenges in treating water. He also added that pressure on water resources is increasing due to population growth and intensive development in agriculture, tourism and industry. In order to address these challenges, Albania has established a Directorate

General for Water to manage all water issues. Mr. DEMETI asserted that Albania already has a regulatory legal framework to improve the sustainable use of water resources and that it is preparing a draft law on international water management in accordance with the EU Water Framework Directive. Furthermore he expressed Albania's willingness for regional cooperation and noted his country's collaboration on cross border issues with Macedonia, Kosovo and Greece, and the upcoming cooperation agreement to be signed between Turkey and Albania.

Professor EROĞLU, Turkish Minister for the Environment and Forestry, took the floor and started his concluding remarks firstly by responding to statements made by the Head of the Palestinian Water Authority. He explained that Turkey is aware of the problems in the West Bank and Gaza. Minister EROĞLU reminded that the Peace Pipeline Project which was developed during the term of Former President of Turkey, Turgut ÖZAL, to transfer freshwater to Middle East from Ceyhan and Seyhan Rivers. The project is currently suspended; however, Minister EROĞLU noted that Turkey has invested nearly 150 million USD into the Manavgat Water Supply Project, which has a capacity to supply 250.000m^3 raw water and 250.000m^3 treated water per day. Due to transportation costs via tankers, there was no demand from the neighboring countries, but Minister EROĞLU proposed that Turkey can still supply water from that plant to the Palestine Authority if Turkey receives a request.

Minister EROĞLU emphasized that water is a basic human need. In this context the Turkish International Cooperation and Development Agency (TIKA) and Directorate General for State Hydraulic Works (DSI) have drilled 108 drinking water wells in Niger and Turkey has undertaken projects to supply water for 150.000 people in developing world worth 1,5 billion USD. For example, in Burkino Faso, Turkey has drilled 14 wells and 16 more are to be drilled soon. Minister EROĞLU clearly stated that if there is a request for assistance, Turkey will always try to help. He added that helping is a duty of humanity recalling that Turkey was the first country assisting Israel during a forest fire last year. He further explained that Turkey is providing assistance also to Russia, Georgia and Syria in case of forest fires. Minister EROĞLU declared political disputes and lack of communication as central obstacles to overcoming water challenges in Central Asia. He gave Uzbekistan's contradictions on the construction of Rogun Dam in Tajikistan as an example. He also stated that Tajikistan is rich in water resources. Minister EROĞLU drew attention to the importance of cooperation within the basin boundaries and integrated river basin management and he congratulated Kyrgyzstan and Kazakhstan for the initiative of cooperation.

Minister EROĞLU also showed how that Turkey is a devoted defender of regional cooperation and gave examples of cooperation of Turkey with her neighbors. For instance, Turkey and Iran have held several productive meetings on undertaking common action against dust storms. He also mentioned the Memorandum of Understanding signed with Bulgaria and cooperation on preventing pollution in the Black Sea.

Minister EROĞLU continued his remarks by mentioning the trilateral mechanism between Turkey, Syria and Iraq on the Euphrates and Tigris Rivers. He emphasized that Turkey believes in the equitable use of waters and pointed out that Turkey supplied its neighbors with 550-600 m^3/sec of water at Turkey's expense during the drought in 2008-2009. Minister EROĞLU also added that up to 65-70% of water in Iraq is wasted due to inefficient systems in need of rehabilitation.

Minister EROĞLU also emphasized the need for cooperation among members of the Organization of the Islamic Conference regarding water issues. He also underscored the need for efficient water management and food production programs and offered to establish a water fund for financing projects to help supply water in impoverished regions.

Before concluding, Minister EROĞLU described the current situation in water management in Turkey. He stated that hydropower potential of Turkey is being developed through build-operate-transfer (BOT) projects in collaboration with the private sector. He explained that water management plans for all urban settlements until 2050 have been devised and that Turkey has established a fund of USD 5 billion to supply water to villages. Minister EROĞLU mentioned Turkey's agreements on environmental, water supply, dams and forestry issues with many countries, including Greece, Bulgaria, Iraq and Syria, and Turkey's offers to share its experience on dams, irrigation techniques and wastewater management. He encouraged countries that are interested in developing their hydropower potential to contact the Turkish General Directorate of State Hydraulic Works (DSI) for assistance. Minister EROĞLU also noted that Turkey proposed forest conservation efforts to combat climate change at the UN climate change summits in Cancun and Copenhagen. He also offered Turkey's financial and technical support to establish a fund for afforestation.

Minister EROĞLU concluded his remarks by proposing to establish a global water supply fund to provide finance from high and middle income countries to water supply projects in poor countries, and urged participants to discuss this issue in detail at the 6th World Water Forum.

B. Middle East Regional Focus Meeting Chair's Summary,

Key discussion topics and messages of the Middle East Regional Focus Meeting are listed as follows:

1. Water scarcity in the Middle East

The Middle East is an arid region and water is getting scarcer every day. Overpopulation leads to higher water demand and climate change results in more water scarcity. Agriculture is the main water consumer, but brings low economic return. Currently, about 80% of the total water resources in the region are used to produce food. However, available water for agriculture is declining while more food is needed for growing populations. Severe water poverty is near. There is a need for a shift of focus from development to better management of water through utilizing non-conventional methods for water use efficiency (e.g. reuse, desalinization, rain water harvesting, transfers between basins and across borders, virtual water trade, and alternative irrigation practices).

2. Water use efficiency

The threat of a water-short future necessitates fundamentally new management paradigms to increase water use efficiency. One new method is Regulated Deficit Irrigation (RDI), which allows the farmer to control the time and amount of irrigation water – a strategy that maximizes economic returns, minimizes water losses and provides savings at the farm level. Governmental incentives, insurance systems and capacity building are necessary to make such new methods become widespread.

At national level, virtual water trade is another new paradigm. Water is the concern of the whole globe and countries should accept water and food security as a national security issue. Water-scarce countries should cooperate in trading products that consume high amount of water, instead of producing them domestically. Countries generally abstain from depending on each other, but there is already a considerable food trade between Arab countries and

Turkey, which should be managed in a cooperationwise way in terms of virtual water exchange. The concept should be applied within a basin instead of a single country and opportunities for virtual water trade should first be sought within the region.

Reuse of water is a new concept in the region, but will become widespread in time.

There is lack of cooperation and coordination both at national and regional levels for an integrated

approach to water resources management (IWRM). A demand management system is needed for water use efficiency. IWRM should involve a participatory process where all actors are involved and work in unity. Transparency should be granted and information and data exchange between countries should be the primary object for capacity building.

3. Regional cooperation

The region mostly has similar challenges and threats on water resources; therefore they have to find some common solutions. Regional cooperation can achieve economic benefits, secure water resources and safeguard equitable access to water. Cooperation should be geared to long term goals. However, the fact that some countries in the region are still in conflict with each other makes cooperation difficult. Political will and trust building is indispensible for the cooperation process. Countries in the region should constitute a regional stability to create common regulations. Regional cooperation should involve information and data sharing, standardization of data collection and presentation, monitoring, development of regional databases, cooperation in joint scientific research projects, training, technical assistance and technology transfer. Transparency in sharing water data is a sensitive issue because of the delicate political situation in the region. Some neutral agencies may serve as negotiators in the process.

4. The role of public diplomacy

The recent revolution in Egypt has shown the power of the civil society and that the NGOs can affect policy makers. Public diplomacy can really make a difference in cooperation and should be the essential instrument for civil dialogue. Public diplomacy involves the process of dialogue, cooperation and partnership between civil society organizations, the media, private sector, local communities and others, but governments. It is about forming a public opinion through building networks among different actors and pursues dignity and social justice for all.

C. Central Asia Regional Focus Meeting Chair's Summary

The Central Asia RFM themed *"Agricultural Challenges focusing Food Security from Regional and National Perspectives"* concluded that water security is the key for regional food security. A more efficient allocation and integrated management of water resources based on regional cooperation and agrarian specialization, institutional and legal reforms, affordable technologies, finance are the top priorities for water security.
In terms of efficiency in water use, Central Asia is in a very poor condition. The main conflict in allocation of water is between agriculture and energy sectors. Upstream countries' (Kyrgyzstan and Tajikistan) priority is energy production, whereas downstream countries need water for irrigation; thus, one has to analyze the current situation carefully to increase productivity, efficiency and come up with new strategies for distributing water. In the attempt to increase efficiency, three basic aspects should be attended very carefully: social equity, economic efficiency and environmental stability.

Key themes and topics discussed:

- Change in cropping patterns
- Low agriculture productivity
- Poor irrigation systems (water user associations (WUAs) with low budget, no measurements, no records, old pumping stations, high electricity bills)
- Deterioration of water quality
- Population growth
- Lack of mid- and long-term national agricultural policy
- Expensive credit resources and insufficient government support
- Weak-training and consulting services to farmers
- Unsustainable water resources management due to the non-coordinated planning and lack of Integrated Water Resource Management (IWRM)

General recommendations:

- IWRM and Water Governance System which provide horizontal integration among different sectors and actors such as the governments, agencies and farmers
- Extending Water Users Associations (WUA) around the world
- Regional Framework Agreement for cooperation for the efficient allocation of resources and management of water
- Regional division of production for agricultural products in order to ensure food security
- Changing the way of defining the farmers. Farmers are managers of economic units, whereas peasants keep repeating the routine for survival.

• Being creative in doing things such as new crops, new water management strategies, new tariffs
• Development of national policies in agricultural sector and investment
• Development of financial and monetary systems
• Development of training-consulting services
• Enhancement of rainwater and nutrient use efficiency to improve crop productivity
• Shift of water-thirsty crops to areas with lower water requirements
• Compliance with the European Union standards in IWRM (the case of Georgia)
• Increase in water prices when the actual consumption of water exceeds the biological consumption level
• Installation of drainage in irrigated areas
• Efficient irrigation methods in order to prevent water losses
• Improvement of hydroenergy efficiency (the case of Tajikistan)

Governments may sometimes be very critical of new and creative approaches. There is absence of participatory mechanisms. Special advisory bodies for governance of water resources can be helpful. Public-private partnership (PPP) can also be a solution that should be explored thoroughly.

Technical cooperation can be the first step for regional cooperation. The Rhine River Commission is a successful example of joint research and technological data sharing between countries. Cooperating in other areas than water that can be achieved more easily might create a spillover effect to water cooperation.

National representatives of this meeting shared the views of international representatives and committed to deal with problems together.

The messages of the Central Asia Regional Focus Meeting will motivate the academic studies of Turkish Water Institute. The Turkish Water Institute that is to be established in the near future will aim to be a think tank and database focusing on the regions around Turkey.

The conclusions of this meeting will be presented to the 6th World Water Forum and other relevant water events.

D. Eastern Europe Regional Focus Meeting Declaration *
Integrated Water Resources Management (IWRM) in Eastern Europe

Integrated Water Resources Management (IWRM) is a process, which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.
IWRM takes into consideration the global environmental issues, considers measures to improve human health, fosters economic growth, sustainable agricultural development, and promotes democratic participation in governance.

Challenges:
• Common disasters and issues that are frequently faced and pose major threats, i.e. floods, droughts, water scarcity, hydromorphological alterations, organic/ nutrient/hazardous substances pollution and pollution caused by human activities
• Creating and improving national legislation in the water management sector harmonized with EU Water Directives where applicable
• National and transboundary water issues
• Lack of financial resources and limited budgets allocated by governments for water issues
• Lack of political will and support (unresolved political status in some areas), lack of technical support
• Inadequate water, river basin strategies and management plans
• Outdated bylaws and regulations

To address these issues, an economical analysis should be made and standard measures should be revised in order to increase human and financial resources to address and provide more technical support.
All areas, including energy, production, agriculture, fisheries, finance, environment, tourism, industry, healthcare are dependent on water.

Ongoing actions:
• Ensuring high-quality monitoring level
• Improving warning systems
• Enhancing capacity building

* The Eastern Europe Regional Focus Meeting Declaration was adopted by the meeting participants and Chair Sumru Noyan.

• Harmonization, revision and modernization of current legislations
• Safe sanitation

Future plans/solutions:

• Implementing proper IWRM systems, including the EU Water Directive, more effectively
• Considering water storage
• Ensuring bilateral and international cooperation
• Completing strategic and legal frameworks
• Creating a single coordination and management authority within every country
• Encouraging stakeholder involvement
• Demanding interactive policy development
• Planning interactively
• Finding a balance between an integrated approach and a sectoral approach
• Developing public participation for ensuring cooperation in the decision-making process
• Raising public awareness by various means such as media, internet etc.
• Balancing economic interests with environmental needs
• Making use of research and development in the decision making process

A Turkish Water Institute that is to be established in the near future will be a long-lasting project. Regional Focus Meetings are very important and will be used by the Turkish Water Institute, which will serve as a think-tank and data base for collection of information and data, focusing on the neighboring countries such as those in Eastern Europe, the Middle East and Central Asia. Cooperation and contacts with the participants of the Focus Meetings will continue.
The conclusions of this meeting will be presented to the 6th World Water Forum and other relevant water events.

E. Turkey Focus Meeting Chair's Summary

The Turkey Focus Meeting themed "Agricultural Water Management and Food Safety" identified the following water problems, initiatives and recommendations:

Problems:

The most significant problem in agricultural water management is the inefficient use of water.

• Evaporation, leakage and water losses cause inefficiency in traditional irrigation systems

• Overexploitation and illegal wells cause diminishment in quantity and quality of groundwater

• Chemical agricultural inputs result in degradation of water quality. Use of lowquality ground and surface waters in irrigation threatens food safety

• Inadequate residual controls

• Problems in attaining sufficient and qualified information at basin level

• Coordination and information sharing among public institutions are not at desired levels

Initiatives:

• Ministry of Agriculture and Rural Affairs provides grants and interest-free credits in order to achieve food safety

• Action plans and strategies for drought management are enforced

• Law on irrigation unions that has been put into effect recently has filled the legal gap and enhanced the participation of water users

Recommendations:

• Agriculture and water basins should coincide with each other and "a national data bank" of land and water resources should be created • A holistic approach should be adopted in agricultural water management and participation should be taken as a priority principle

• A "National Food Safety Strategy" based on the EU's "*from the farm to the fork*" approach should be adopted. Turkey's approach on food safety should be transparent and risk-based

• Residual controls for water and food should be improved and residual limits should be established

• Wastewater should not be used in irrigation without proper treatment

• The high potential of organic agriculture should be put into good use

• Nationwide agricultural production planning should be devised, drought-resistant crops should be developed and crop patterns should be

determined in accordance with regional characteristics
• Modern irrigation techniques should be encouraged
• Pricing of water should be based on amount of the water used; if not possible, on the number of water deliveries
• Irrigation projects should be carried out by experts
• Farmers should be educated on how to use water efficiently
• On small-scale irrigation fields, irrigation cooperative model should be encouraged in agricultural water management

Abbreviations

BO	Build Operate
BOT	Build-Operate Transfer
DSI	General Directorate of State Hydraulic Works
ECA	Europe and Central Asia
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EGEC	European Geothermal Energy Council
EU	European Union
EUFD	European Union Framework Directive
FAO	Food and Agriculture Organization
GHG	General Healthcare Group
GWP CACENA	Global Water Partnership Caucasus & Central Asia
HEPP	Hydroelectric Power Plants
HLP	High Level Panel
IAGS	Institute for the Analysis of Global Security
IAIA	International Association for Impact Assessment
ICOLD	International Commission on Large Dams
ICPDR	International Commission for the Protection of the Danube River

IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IHA	International Hydropower Association
IIWF-2	2nd Istanbul International Water Forum
INTMENA	The Environment for Women's Entrepreneurship in the Middle East and North Africa
ISKI	Istanbul Water and Sewerage Administration
IUCN	International Union for Conservation of Nature
IUSF	Istanbul International Water Forum
IWW	Istanbul Water Consensus
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
MENA	Middle East and North Africa
NGO	Non-Governmental Organization
OIC	Organization of the Islamic Conference
PPP	Public-Private Partnership
RCUWM	Regional Center on Urban Water Management
RDI	Regulated Deficit Irrigation
RFM	Regional Focus Meeting
RTWS	Right to Water and Sanitation
SIC-ICWC	Scientific-Information Centre of the Interstate Commission for Water Coordination of Central Asia
SIWI	Stockholm International Water Institute
SUEN	Turkish Water Institute
TIKA	Turkish International Cooperation and Development Agency
UN	United Nations
UNCESCR	United Nations Committee on Economic, Social and

	Cultural Rights
UNECE	United Nations Economic Commission for Europe
UNESCO-IHE	UNESCO Institute for Water Education
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNRCCA	United Nations Regional Center for Preventive Diplomacy for Central Asia
UNSGAB	United Nations Secretary-General's Advisory Board on Water and Sanitation
USA	United States of America
USAID	United States Agency International Development
WBCSD	World Business Council for Sustainable Development
WFP	World Food Program
WGC	World Geothermal Congress- Bali/Indonesia
WSSD	World Summit for Sustainable Development
WssTP	Water Supply & Sanitation Technology Platform
WUA	Water Users' Association
WWC	World Water Council
WWDR-3	The United Nations 3rd World Water Development Report
WWF-5	5th World Water Forum

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Forum Programme

		Room Name	HALIC	KAGITHANE	EYUP	AYVANSARAY	AYNALIKAVAK I
		Room No.		1	2	3	4
Day 1 - Tuesday May 3, 2011	08:30-09:30		REGISTRATION				
	09:30-10:00		INSTRUMENTAL TURKISH CLASSICAL MUSIC				
	10:00-13:15		OPENING CEREMONY				
	LUNCH 13:15-14:00						
	14:00-15:45			REGIONAL TECHNICAL COOPERATION ON WATER I	GLOBAL CLIMATE CHANGE & WATER "Hydrometeorological Disasters"	WATER RESOURCES MANAGEMENT "IWRM - Surface Water Resources"	WATER RESOURCES MANAGEMEN "Water & Culture I"
	16:15-18:00			REGIONAL TECHNICAL COOPERATION ON WATER II	GLOBAL CLIMATE CHANGE & WATER "Water Resources & Climate Change"	WATER RESOURCES MANAGEMENT "IWRM - Groundwater Resources"	WATER RESOURCES MANAGEMEN "Water & Culture II"
	18:15-18:45			THEME 1 WRAP-UP	THEME 4 WRAP-UP	THEME 6 WRAP-UP	
	19:00-20:00		ISTANBUL LIVE PRODUCTION MUSICAL PERFORMANCE				
Day 2 - Wednesday May 4, 2011	09:00-10:45		HIGH LEVEL PANEL "Integrated Water Resources Management"	WATER FOR ENERGY I "Development of Water Energy Potential: Legislation & Policies"	AGRICULTURAL WATER MANAGEMENT I "Irrigation Management Practices"	WATER RESOURCES MANAGEMENT "Geothermal Energy & Water Culture I"	SIDE EVENT: "Role of Biotic Regulation of Continental Water Stock" (Ecological Movement "BIOM")
	11:15-12:30			WATER FOR ENERGY II "Interactions between Water, Energy and Environment"	AGRICULTURAL WATER MANAGEMENT II "Irrigation Structures: Challenges & Solutions"	WATER RESOURCES MANAGEMENT "Geothermal Energy & Water Culture II"	SIDE EVENT: "Innovation & New Technologie (Private entrepreneurs)
	12:45-13:15						
	LUNCH 13:15-14:00						
	14:00-15:45			WATER FOR ENERGY III "Challenges & Solutions on the Development of Water Energy"	AGRICULTURAL WATER MANAGEMENT III "Much, Less or Virtual Water?"	URBAN WATER MANAGEMENT III "Urban Wastewater Management I"	GLOBAL CLIMATE CHANGE & WAT "Urban Adaptation to Climate Change and Water Resources"
	16:15-18:00				AGRICULTURE WATER MANAGEMENT IV "Is Participatory Irrigation Management (PIM) a Dream?"	URBAN WATER MANAGEMENT IV "Urban Wastewater Management II"	GLOBAL CLIMATE CHANGE & WAT "Water & Tourism"
	18:15-18:45			THEME 2 WRAP-UP	THEME 3 WRAP-UP	THEME 5 WRAP-UP	THEME 4 WRAP-UP
	19:00-20:00		DOSTANE				
Day 3 - Thursday May 5, 2011	09:00-10:45		HIGH LEVEL PANEL "Water-Food-Energy Nexus"	SIDE EVENT: "Operation and Maintanence Practices in Agricultural Water Management " (DSI)	SPECIAL EVENT: "Istanbul Water Consensus and Water Applications" (ISKI)	HIGH LEVEL PANEL "Urban Water Services"	
	11:15-12:30						SIDE EVENT: "Creating a New Habitat fo the Bats of İnboğazı Cave" (DSI)
	12:45-13:15						
	13-15-14:00		CLOSING				
	14:00-18:00						

THEMES
Theme 1. Regional Technical Cooperation on Water
Theme 2. Water for Energy
Theme 3. Agricultural Water Management
Theme 4. Global Climate Change and Water
Theme 5. Urban Water Management
Theme 6. Water Resources Management and Water Culture

	AYNALIKAVAK II - III	KASIMPASA II	KASIMPASA III	KASIMPASA IV - V	HASKOY	BALAT
	5	6	7	8	9	10
					SIDE EVENT: "How to Prepare for the Next World Water Forum" (World Water Council)	
NT	SIDE EVENT: omen and Water Policies" roptimist Int'l Turkey and BPW)	TURKEY FOCUS MEETING (Closed Meeting)	CENTRAL ASIA FOCUS MEETING (Closed Meeting)			
NT				SIDE EVENT: "Water-Related Adaptation in Seyhan River Basin under Changing Climate" (UN Joint Programme)		
	SIDE EVENT: ater Framework Directive" nistry of Environment and Forestry of Turkey)	SIDE EVENT: "Productivity in Water Use" (National Productivity Centre)	SIDE EVENT: "PPP Model and the Management of Water Resources" (ACTECON Consultancy)	SIDE EVENT: "Effects of Global Climate Change on Water Resources" (Women & Water Platform of Turkey)	URBAN WATER MANAGEMENT I "Urban Water Challenges around the World and in Turkey"	
es"	SIDE EVENT: kish-Dutch Cooperation" tch Ministry of Economic Affairs, Agriculture & Innovation)				URBAN WATER MANAGEMENT II "Solutions Related to Wastewater"	
ER	SPECIAL EVENT: er Issues and Case Studies in Turkey" (DSI)	EASTERN EUROPE FOCUS MEETING (Closed Meeting)	MIDDLE EAST FOCUS MEETING (Closed Meeting)	SIDE EVENT: "Water as an Engine for Growth" (Korean Government (MLTM, PCGG, K-Water) and World Water Council)	SIDE EVENT: "Matchmaking E-Tools" (GWOPA/UN-Habitat)	URBAN WATER MANAGEMENT V "Urban Domestic Water Management I"
ER						URBAN WATER MANAGEMENT VI "Urban Domestic Water Management II"
	SIDE EVENT: ABITAT WOP-SEE Steering Committee Meeting (Closed Meeting)					
r						
	URS & FIELD VISITS					

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