

Event Proceedings

Knowledge Seminar on Integrated Water Resources Management
Water Crisis or Water Management Crisis?



Jakarta, Indonesia

16 May 2016





Knowledge Seminar on Integrated Water Resources Management

Indonesia, 16 May 2016



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In particular, the organizers would like to thank the following people for their valuable contributions:

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Seminar Summary

On 16 May 2016 the IDB and ICBA organized the seminar on IWRM titled “Water crisis or water management crisis?” during the 41st Annual Meeting of the IDB Group in Jakarta, Indonesia.

The seminar brought together over 100 participants, including government officials, researchers, academics, from different countries working in and on water resources management to discuss past and current challenges of IWRM planning and implementation.

The main objectives included:

- Understanding, sharing and raising awareness of the IWRM concept and principles vis-à-vis the energy-food-water nexus concept
- Sharing the best practices and key success factors in the areas of development and implementation of the IWRM plan
- Experience in the water sector and lessons learned to channel investments

- Lessons learned for the IWRM plan development and implementation and its potential replication in IDB member countries

The seminar highlighted IDB’s and ICBA’s contributions and experiences in the water sector as well as the experiences of the Government of Indonesia and other member countries. In particular, participants shared lessons learned in the water sector in IDB member countries in terms of the challenges facing water resources planning and implementation. Discussions were also held on advantages and contributions of IWRM to the development sector, experiences in planning and prioritizing investments in the water sector as well as other cross-cutting sectors that require water resources, IWRM approaches in member countries and the challenges faced during implementation.

Overall, the seminar helped to shed light on how a renewed agenda for water resources might contribute to the United Nations Sustainable Development Goals.



Background

Past and current water management practices around the world have caused negative externalities and the opportunity cost of water has risen to unsustainable levels as a result. As competing demands for scarce water resources increase, new sources of water need to be secured, often at greater cost with greater ecological and social consequences. Efficient and optimum use of water resources, development and management remain at the heart of sustainable development and environmental protection. Poor water management practices lead to poor water productivity, depletion of aquifers and pollution of water bodies. Artificially low water prices fail to encourage conservation and efficiency, and allow wasteful practices and inefficient operations to continue.

The concept of IWRM has evolved since the United Nations Water Conference in 1977, with governments committing only in 2002 to the application of IWRM by developing IWRM and water efficiency plans. By 2012, more than 80% of countries had made good progress towards meeting this target, and yet IWRM, as the common and galvanizing mission for water resources management, is still under scrutiny. And the question remains: Is there a lack of real action on IWRM implementation?

Water efficiency and IWRM planning are just one step in the process of improved water resources management. At the World Summit on Sustainable Development in Johannesburg in 2002, the international community took an important step towards more sustainable patterns of water management by including in the Sustainable Development Plan of Implementation a call for all countries to develop IWRM and water efficiency plans. Today many countries are taking the World Summit target very seriously and are now embarking on or accelerating their national IWRM processes. Moreover, the issue is directly linked to the IDB 10-year Strategy.

In recent years, new directions for water management have emerged, particularly climate change adaptation and the water-energy-food security nexus. IWRM should make changes to water management in complex social and political contexts manageable. The conventional change model for IWRM has been based on four practical elements: (i) policies, laws and plans; (ii) an institutional framework; (iii) use of management and technical instruments; and (v) investments in water infrastructure. Currently, national planning and implementation progress on IWRM is focused on planning and policy reforms.



Opening Statements



***Dr. Osman El Fiel, Acting Director,
Agriculture and Rural Development
Department, IDB***

Ir. Mudjiadi, Director General, Water Resources, Ministry of Public Works and Housing of Indonesia

Prof. Abdulrahman Sultan Alsharhan, Chairman of the Board of Directors, International Center for Biosaline Agriculture

Distinguished guests, brothers and sisters,

Assalamualaikum warahmatullahi wabarakatuh,

It is my privilege to welcome you on this important event on water. The event is a collaborative effort with the International Center for Biosaline Agriculture and is aimed at strategic water management by adopting the Integrated Water Resources Management (IWRM) approach. We would like to thank the ICBA Board Chairman and management for joining forces with the IDB for organizing this important event.

Water sustains life on the Earth and is a precious resource. Ancient civilizations settled close to water resources for their survival. An essential resource for all human activities. Agriculture, industry, energy, transport, social and economic development. Humanity depends on how best we treat this resource.

Industrial revolution, population growth, economic development, climate change, changing patterns of water consumption, and environmental pollution have created a havoc and serious imbalance between water supply and demand.

Through rapidly increasing natural disasters, water also brings devastation, death, poverty, droughts, floods, and epidemics.

The IDB member states are dispersed geographically around the globe with widely varying climatic conditions and individual water challenges. Some are endowed with plentiful water resources, whereas the others face highly stressed water and drought situations. In some countries water is over extracted, the others are polluted to a dangerous extent.

The member states treat less than 15% of their wastewater compared to over 75% in developed countries. The increasing trend of population from 19% (1990) to over 25% (2030) will affect negatively the safe water availability. In Sub-Saharan Africa, very high annual variability of rainfall and runoff create great risks to industries and cities, thus discouraging investment incentives in agricultural and industrial modernization. Clean water availability and increasing desertification remain a critical factor for member states.

Water crisis or water management crisis: we are here today with eminent scientists, practitioners and experts to look at strategies which can provide a holistic approach to the water management challenges being faced.

The seminar is aimed at developing an understanding of the IWRM concept and its principles in securing water. The event will provide us with an opportunity to learn from the experts about their experience on IWRM planning and implementation challenges, lessons learned and future courses of action for water security.

Water challenges are complex with many factors contributing to its security including infrastructural, biophysical, institutional, political, social and financial. Water security lies at the center of many other areas that are intricately linked to water. Meeting the water security goal requires interdisciplinary cross-sectoral collaboration, community participation, and cross-border cooperation, to avoid the competition and potential conflicts over water resources.

It is established that water and sanitation are critical for poverty reduction and sustainable development. The IDB Vision and 10-Year Strategy are clearly driven by poverty reduction and sustainable development. Therefore, dealing with reducing pollution, raising water use efficiency, and protecting ecosystems are among the top agenda of the IDB water interventions.

The objective of today's side event is to look at how the IWRM approach is being used to achieve the ambitious target of water management and water security. The event will present an opportunity to learn the experience of IWRM implementation from presenters from various regions and institutions. Continuing with the panel discussions that will focus on the challenges faced in planning and implementing IWRM in various settings to minimize the impacts of intrinsically complicated variables affecting water.

I would like to thank the collaboration of the Directorate of Water, Indonesia, panelists and speakers from Indonesia, Australia, UNDP Water Governance Facility at SIWI and ICBA who joined us today in this collaborative effort.

Let us join hands in this effort to secure water for our future generations who will face immense challenges of population growth and climate change in the times to come.

I look forward to your proposals and reflections during the discussion and wish all the participants the best for a productive and useful day of interaction.



**Prof. Abdulrahman Sultan Alsharhan,
Chairman of the Board of Directors,
ICBA**

Excellencies,

Ladies and gentlemen,

Good morning!

It is a pleasure for me to welcome you all to this event organized jointly by the Islamic Development Bank and the International Center for Biosaline Agriculture on how to better manage water resources in an integrated and sustainable way.

Water resources are under growing pressure globally as a result of many factors, including population growth. So there is a need for joint actions and approaches to promote and ensure sustainable and equitable use and management of water resources.

In this context, it is important to promote and adopt the approach and processes of Integrated Water Resources Management. It is a holistic approach which helps to maximize the economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

Most of the Islamic Development Bank member countries have started the implementation of this approach. However, it has been difficult to convert the strategic plans on water management into a more holistic approach in the implementation of water management projects. This is partly due to the fragmentation of responsibilities at the multiple institutional levels, as well as a refocus of priorities towards the Sustainable Development Goals.

We believe that the Integrated Water Resources Management approach is one of the ways forward to achieve the Sustainable Development Goals.

We are very happy to see the Islamic Development Bank give a renewed impetus to promote this approach.

With this seminar and our future plans, we hope to achieve a renewed interest in an approach that we believe is the most complete in water management to achieve economic and social welfare in an equitable manner. I am confident that experiences that will be shared and meaningful discussions held will enrich this seminar and strengthen collaboration.

I would like to thank all the distinguished delegates, experts and members of the Organizing Committee who have made this important meeting possible.

I wish you a successful meeting and fruitful deliberations!

Thank you very much for your attention!



***Ir. Mudjiadi, M.Sc., Director General,
Water Resources, Ministry of Public
Works and Housing of Indonesia***

Honorable Dr. Osman El Fiel, Acting Director of the Agriculture and Rural Development Department of the Islamic Development Bank,

Prof. Abdulrahman Sultan Alsharhan, Chairman of the Board of Directors, International Center for Biosaline Agriculture (ICBA),

Honorable speakers, please accept my apology for not mentioning your name one by one,

All participants,

Ladies and gentlemen,

Good morning!

Assalamu'alaikum warahmatullaahi wabarakatuh!

It is my great pleasure to be with you here in glorious place and event, the Islamic Development Bank joint knowledge seminar on integrated water resources management, which will be held today. I believe that this event will become a great moment for all of us from different countries, different backgrounds, and different expertise, to share knowledge and experiences. The experiences which will be shared across hopefully might help others facing similar challenges.

Ladies and gentlemen,

Water is essential for human life. As the population grows, demand for water is on the rise. There is no nature, no health and no life without water, and also there is no environment, no ecosystem and no economic development without water. It is a precondition for humanity. Water is crucial to everything around us.

The question is then: "How do we manage the water?". Indonesia has 3.9 billion cu. m. of potential water to be managed. The challenge is that potential water is not evenly distributed among all islands in Indonesia. There are islands with abundant potential water, such as Kalimantan and Papua, but with less population, so the water availability per capita per year is very high. On the other hand, there are islands with low potential water, but a very high population, so the water availability per capita per year is low, some even have what we call water crisis, such as in Java, Bali, and Nusa Tenggara.

Ladies and gentlemen,

It is the challenge for us to manage water properly so people could have water as they need. Today, water management in Indonesia is in a way integrated water resources management: integrated between upstream and downstream, quantity and quality, surface and underground water, among sectors, stakeholders, and administration. Several coordination boards have been established at national, provincial, or even at river-basin levels. However, some issues still remain and lead to improper water services, for instance water availability, floods and droughts, conflict among water users, and others.

Therefore, the Government of Indonesia has included food security, energy security and water security in the strategic national development agenda in the next five years, which is commonly known as the food-energy-water nexus.

Ladies and gentlemen,

With regard to food security, 85% of rice production comes from irrigation. However, cropping intensity continues to decline due to the decrease of river flow during the dry season. In order to cope with this condition, we need to build new dams to guarantee water availability for irrigation, so that we can increase service areas as well as cropping intensity and also develop new irrigation schemes.

With regard to energy security, today Indonesia has the total installed capacity of 53,000 MW, of which 10% is from hydropower. Large dams are potential sources for hydropower, and some have produced hydropower, including Jatiluhur, Cirata, Wonogiri, Sempor, Wadas Lintang, and many more.

As far as water security is concerned, today Indonesia has 208 large dams with the total reservoir capacity of about 12.4 billion cu. m. More than half of the existing dams are located in Java. This total reservoir capacity gives a ratio of storage per capita of only 50 cu. m. per year. We realize that this number is still far from adequate to cope with the demand.

Some of those large dams also serve to reduce the peak flood of rivers, which otherwise are a common cause for natural disaster. During the last five years, incidents of flood have been increasing; there have been more than 40,000 reports. About 20 big cities over the country suffer from flood during rainy seasons. This disaster is aggravated by the increasing occurrence of extreme rainfall.

Ladies and gentlemen,

For the above reasons, in the next five years, we will give priority to plans to build 65 new dams, to develop 1 million hectare of new irrigation schemes, to rehabilitate 3 million hectare of existing irrigation schemes, and to mitigate an area of 200,000 hectares from flooding.

But then, in order to achieve those plans, we also have to tackle the externalities, such as land acquisition, social problems, sustainable budgeting, environmental challenges, and also coordination among related stakeholders.

I presume these challenges will not be easy, but we believe that we can. The role of international cooperation and support, especially from other Islamic countries, will be much appreciated.

Ladies and gentlemen,

In closing my speech, I believe that this meeting will be a good forum for sharing knowledge and experience, and provide innovative perspectives and new ways of perceiving the future technology toward sustainable development and management and water resources in general.

Thank you very much,

Assalamu'alaikum warahmatullaahi wabarakatuh.

Sessions

Session I: Past and Current Challenges of IWRM Planning and Implementation

Pragmatic IWRM approaches to water management and water allocation in the Murray-Darling Basin, Australia - Mr. David Harriss, Murray-Darling Basin, former Water Commissioner of New South Wales, Australia

Thank you very much for the opportunity to participate and present to this forum and to share ideas and experiences.

I appreciate the limited time I have for the presentation on what is a very complex issue and so I will try to provide a broad overview of how Integrated Water Resources Management has been adopted in the Murray-Darling Basin in Australia and how my state, New South Wales, has implemented this.

By way of context, Australia is a federation, and under its constitution, each of the six states and two territories are (mostly) responsible for the management of water resources within their respective jurisdictions.

Up until the past ten years, the Australian Federal Government's role in water resources management had been in broad policy development and funding infrastructure and water management programs. However, in the last ten years the Federal Government has become more active in water management planning.

Australian context:

- Australia is a continent of 7.68 million square kilometers
- Australia has a population of around 24 million people
- Australia is fairly self-sufficient in agricultural produce and exports between 70% and 80% of its agricultural produce
- Australia's rivers and streams have amongst the most variable flows of any in the world.

Many of the inland rivers and streams are naturally ephemeral

The Murray-Darling Basin:

- The Murray-Darling Basin is the food bowl of Australia, covers about 1 million square kilometers
- It has 23 river valleys and 81 groundwater sources
- 75% of Australia's irrigated agriculture occurs in the Murray-Darling Basin
- The basin extends across four states and the Australian Capital Territory
- The water resources of the Murray-Darling Basin are shared under an interstate water sharing agreement that includes the governments of four states, one territory and the Federal Government

As I said previously, the primary involvement of the Federal Government has, until recently, been focused on the development of national water resources policy and in funding large-scale public infrastructure and national programs.

They do this through the Council of Australia Governments (known as COAG) which includes the Prime Minister and Chief Ministers of each state and territory. It is the highest policy forum in Australia. The Federal Government has also been an active participant in the Murray-Darling Basin Agreement. The Federal government is responsible for managing interstate water accounts. In the past decade the Federal Government has also been responsible for developing the Murray-Darling Basin Plan which is the overarching integrated water resources management plan for the Basin.

The Basin Plan was agreed by the Federal Government in 2012 and establishes the requirements for:

- Sustainable Diversion Limits (for each surface water and groundwater source)
 - this will require the reduction of the current extraction of surface water for irrigation and other uses by 2,750 million cu. m. by 2022

- groundwater extraction is typically below sustainable diversion limits
- The rules to ensure water to meet human needs in extreme drought
- The development of an environmental watering plan
- Water quality and salinity targets
- The principles for water trade
- The components of the water resource plans that will be developed by each state and territory for surface water and groundwater sources
- Monitoring and evaluation and reporting on the environmental, social and economic impacts of the Basin Plan

State and territory governments are part of the development of high level national water policy through the Council of Australian Governments (COAG). The state and territory governments are also responsible for implementing the agreed national policies. Pragmatically, the states must do the water sharing planning at the regional level and work cooperatively with neighboring states.

States are also responsible for water sharing between consumptive users and the environment and for the process of allocation of available water between users. I will go into more detail as to how water is allocated within New South Wales in a minute.

States are responsible for implementing policies and programs for water quality and salinity management. In the Murray-Darling Basin salinity management is implemented through the creation of a salinity credit trading platform. Similar programs have been implemented in coastal valleys with salinity issues.

States are responsible for facilitating water trade, which includes the permanent transfer of entitlements, and the annual or longer leasing of available water in any year. State governments maintain registers of water entitlements. Finally, states are responsible for compliance.

New South Wales (NSW) is the most populous state in Australia and NSW is 56 percent of the Murray-Darling Basin. On average NSW uses about 7,000 million cu. m. per year although significantly less in dry years due to our water allocation processes. Of 65,200 sq. km. of agriculture, 940 sq. km. or about 1.5% is irrigated agriculture. The total value of agricultural production is about US\$ 24 billion and irrigated agriculture is about US\$ 8 billion or 30% of that.

NSW has a system of water allocation that is suited to its highly variable climate. All river systems and aquifers have had their sustainable diversion limits determined and the total of all entitlements to divert from a particular river or aquifer will not exceed that sustainable diversion limit over time.

Other than some water for basic human rights, that is typically not for commercial production, all entitlements to extract water from surface water and groundwater systems are volumetric. All irrigators are licensed and all pumps and diversions from a river or from groundwater must be metered.

Volumetric entitlements for irrigation are based on three categories. Regulated rivers, that are part of rivers that are downstream of major public dams. That is about 75% of water used in the state, including the major urban areas around Sydney. Unregulated parts of river systems that are not provided water from major public dams that is about 4% of total water use and groundwater that is about 11% of total water use.

For regulated rivers which are those parts of the river system that are below major public dams, we have high security entitlements, general security entitlements and supplementary flows (which is high flows that are above that needed for downstream requirements).

High security entitlements make up about 15% of total entitlements and can be delivered in just about every year based on the climatic and flow conditions that have been recorded over 120 years. High security entitlements are typically used for purposes that need water every year. Such as town water supply, livestock needs, permanent plantings like fruit trees and vineyards, and mines and feedlots.

Having said that, in the west of the state we are now experiencing the longest period of low flow ever, including the longest period of no flow in the Darling River by about six months and, consequently there is no guarantee of full high security entitlements being available in the coming financial year.

General security entitlements receive a proportion of their entitlement depending on how much water is available depending on seasonal conditions.

These entitlements are typically used for annual crops like rice and cotton, and winter cereal crops. The proportion of the entitlement that these holders get increases during each year and depending on how much water is available and likely to become available during the year enables the irrigator to determine how much crop they should plant.

So, for example, if you have an entitlement of 100,000 cu. m., you may start the season with 10% of that. That is, you will have access to 10,000 cu. m. guaranteed. This will increase as rainfall occurs and inflows into the dams occur.

The government provides regular updates of water availability and of the likely increases that may occur under different scenarios (seasonal conditions and inflows).

Water users with general security entitlements understand the variation in water availability as a consequence of seasonal variation and accept this. General security users on regulated rivers may also have access to high flows that occur downstream of the dam and cannot be re-regulated. In the bigger river systems, this may form part of the total entitlement.

These are sections of rivers where water supply does not come from public owned dams. Typically, these users are located above the dam, or on tributaries and anabranches away from the main channel of a river. These users still have volumetric entitlements but are limited to diverting water from the river when flows are low, by conditions of their license that prescribe commence to pump and cease to pump levels, usually linked to gauges at nearby hydrologic stations.

Because of the variability of seasonal conditions in New South Wales, and the consequent variability in stream flows, these users may take two times their entitlement in a year, but must ensure that they take no more than three times their entitlement over three consecutive years.

In many instances, licensed water users on unregulated rivers may pump to on-farm storages.

In some unregulated streams, groups of general security users may adopt a roster system when flows are low for an extended period.

Like surface water entitlements, irrigators with licenses to pump groundwater must have a meter attached to their pumps.

In New South Wales, the water balance for each aquifer is determined. That includes estimating the storage capacity, the average recharge and the interaction between the aquifer and the river. Where there is a high level of aquifer and river interaction the sustainable diversion limit will be linked to the surface water availability for the adjacent river. Where there is a low level of aquifer and river interaction, the sustainable diversion limit is determined as a proportion of the long-term average annual recharge.

The key elements of water management and allocation in New South Wales and the Murray-Darling Basin:

- All rivers and aquifers have sustainable diversion limits established and the total volume of entitlements to water that can be taken from each water source must be within that sustainable diversion limit
- All water users that divert water for consumptive use, other than basin human rights, must be licensed and those licenses are listed on a government register
- Water licenses are separate from land. Anyone can own a license to a share of available water, but to divert that water to land requires a separate license that specifies the conditions for which the water can be used. Those conditions will always include that the diversion of water must be metered but may also include environmental conditions, such as with water being used for rice production must not be put on land that has not have an adequate clay content to minimize seepage to the shallow aquifer
- The costs of delivering water, and of management are collectively borne by licensed users
- In the Murray-Darling Basin it is considered that there is no more surface water available for diversion other than what is licensed to be diverted now and the Federal Government is currently recovering significant volumes of water entitlements for the environment
- We have a highly developed water trading platform that enables the permanent trade of entitlements and the temporary trade of water that is available at a particular time
- The rules that govern access to water and that specify how water will be made available for consumptive use and for the environment for any river system or aquifer are established in statutory Water Sharing Plans that have a 10-year life
- Environmental water is a priority to maintain the health and productivity of our water systems
- There are significant penalties for diverting water without a license or not operating within the terms and conditions of a license. Up to about US\$ 800,000 which is AU\$ 1.1 million for any individual and up to two times that for corporations.

While our water management and allocation of our valuable water resources may appear complicated, it is designed for a highly variable climate and highly variable seasonal water availability and recognizes that limits to water extraction are necessary to maintain sustainability. Our licensed water users understand the allocation system because they see water as a key component of their operations.

Water is highly valued. While the government is responsible for all of the water, through the allocation system we have effectively created a property right for users to access that water. That property right is highly valued and tradeable and is used by water users to secure funding of their operations.

Most importantly, the system we have is designed to protect the health and productivity of our rivers and groundwater for the long term.

We have many countries visit the Murray-Darling Basin to look at the way we manage water in the Australian circumstances and some of the components of our allocation processes and integrated water resources management.

It is suited to Australia and may have elements that could be applied in other countries but I stress that we present this as a case study. Just as some parts of our systems could apply elsewhere, elements of management systems in other countries could also be applied in Australia.

That is why it is important for forums like this to share knowledge and experience and I thank you for the opportunity to participate today.

IWRM implementation in the IDB member states: How far did we get, and how do we measure progress? - Dr. Richard Soppe, Senior Scientist, Management of Marginal Water, ICBA

When we discuss integrated water management resources, we usually refer to the definition provided by the Global Water Partnership in 2000:

“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 eco-systems.”

The emphasis is on “process”, which makes it difficult to measure progress in absolute terms. The domain covered by IWRM is broad as well. One graphical

representation shows the themes of natural resources management, socio-economic systems and administrative and institutional systems overlapping each other, thus covering infrastructure, laws and regulations and impact and demand.

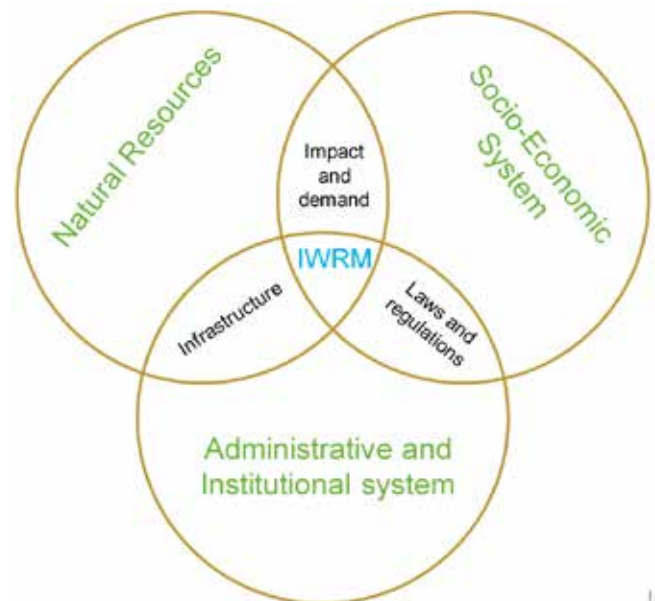


Figure 1: A framework showing interaction between natural resources, socio-economic systems and administrative and institutional systems.

IWRM is a process that we use in water management to ensure that, for example, the infrastructure that we build will provide the services that are required by target groups and society as a whole. It also ensures that the system for operation and maintenance is in place, that environmental impact is either positive or that negative impact is reduced to a minimum, and that the impact on geographically separated users is minimized as well.

The IWRM framework is sometimes seen as very theoretical. However, by providing country or location specific descriptions of the different themes, we can make application easier. The natural resources, for example, can be specified as certain landscapes, watersheds or groundwater basins. The socio-economic system can be described e.g. by the local fruit and vegetable market, households, health status, youth, or international trade systems. Examples of the administrative and institutional system are the national or regional ministry of agriculture, water, energy, finance etc., water users groups, drinking water supply companies etc.

It was mentioned that IWRM progress is difficult to measure. However, there are certain basic sets of water related data that help us identify the impact of water management. Total renewable water resources, for example. The total renewable water resources per capita provide us with an indication of what

resources we have available for each person of the population. An independency indicator provides us with information at the national level of how dependent a country's water availability is on cross-boundary rainfall. A high dependency would require a transboundary water management system as part of the institutional environment. Laws and regulations can be assessed in a country to see the enabling legal environment. To assess the feasibility of investment on groundwater pumping requires knowledge of the legal framework related to national groundwater management. With surface water extractions for agriculture, it is important to know if there are rules on water sharing, allocated volumes, etc.

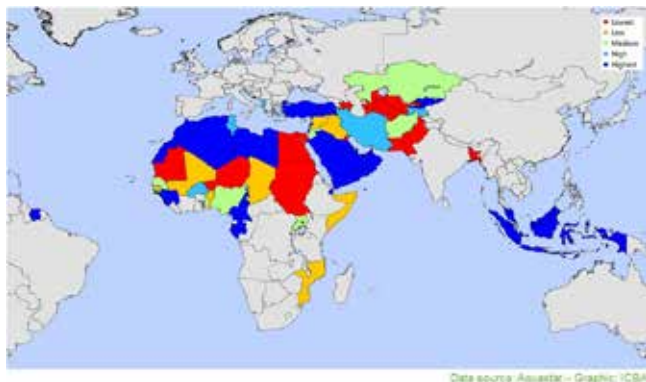


Figure 2: Independency factor. A low independency factor means that there is a strong requirement to interact with other nations to ensure water availability.

One important issue when investing in water management infrastructure is the question of ownership and buy-in of local stakeholders and governments. When we try to measure the progress of the IWRM process, do we have methods to measure actual buy-in and stakeholder ownership of the project? And do all stakeholders need the same level of buy-in?

One method to evaluate this is to map stakeholders against the strength of support (or opposition) to a project versus the power of each stakeholder to implement the project. This can aid in targeting or adjusting those stakeholders that either have a large power to implement, or a strong support or opposition.

Other questions that should be asked when trying to measure the level of IWRM related to an infrastructure investment are the level of social and economic welfare, and ensuring the benefits are equitably distributed. These objectives:

- Are linked to political objectives (enabling environments)
- Are preferably achieved through technically efficient systems

- Are traditionally obtained through investments in infrastructure
- Should be linked with locally shared long and medium term visions
- Should include a recognition of process-oriented progress involving stakeholders
- Are developed through creation of shared willingness to compromise between implementers and recipients

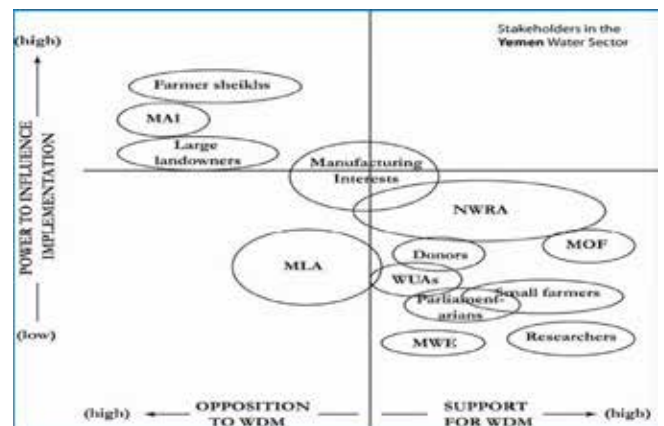


Figure 3: Stakeholder mapping of support level and power to influence implementation for the Yemen water sector. Based on an analysis by A. Zeitoun (2009).

In conclusion, it is difficult to measure the progress of an IWRM process in a country. Having a strategy alone is insufficient. We suggested several aspects that should be included in IWRM monitoring. Although only technical water data is currently widely available, it is generally agreed that IWRM needs a broader data set for evaluation. Investments in water infrastructure should consider these aspects to ensure maximum benefits for society on the investments.

IWRM: making a difference where the problems are... - Dr. Phillia Restiani, Program Manager, UNDP Water Governance Facility at SIWI

Water is a core element of UNDP's vision of eradication of poverty and significant reduction of inequity. Specifically, the UNDP Water and Ocean Vision is "to achieve integrated, climate-resilient, sustainable and equitable management of water and ocean resources, and universal access to safe water supply and sanitation, through improved water and ocean governance". Four thematic areas within the UNDP WOGP are: 1) climate-resilient access to water supply and sanitation; 2) climate-resilient integrated water resources and coastal management; 3) protection of transboundary surface and groundwater in a changing climate; and 4) sustainable management of oceans

in a changing climate. Two delivery mechanisms to undertake the program are the UNDP Water Governance Facility (WGF) at Stockholm International Water Institute (SIWI) and Cap-Net UNDP as an international network for capacity development in sustainable water management.

The UNDP WGF at SIWI carries out three program areas:

1. Policy support and program coordination, e.g. Shared Water Partnership, GoAL WaSH, Every Drop Matters, UNICEF accountability to sustainability, and Source to Sea
2. Water Governance Knowledge Development, on issues such as water integrity capacity development, human rights based approach, gender in program and water development, and indigenous people
3. Contribution to international processes, such as UN Water World Water Development, OECD Water Governance Initiative, and Stockholm World Water Week

IWRM implementation challenges

The IWRM concept highlights the shift from a previously fragmented approach in sustainable water management to a holistic approach, which requires an enabling environment, institutional roles, and management instruments to meet different needs of water for people, food security, industry, the environment and other uses. Some of the main challenges in IWRM implementation are the importance of coordination across ministries and actors (water users), the issues of weak governance and integrity risks, as well the existence of large informal water economy in developing countries, in which influential actors, informal institutions, norms and practices might be very different than the formal water governance institutions.

Three case studies from UNDP WGF at SIWI on IWRM implementation challenges and how the programs address these issues successfully.

Case Study 1: GoAL WaSH in Kyrgyzstan

The Governance and Leadership in Water, Sanitation and Hygiene (GoAL WaSH) program in Kyrgyzstan was run in 2013-2015 and it addressed three aspects of IWRM: participation, women, and coordination across ministries and actors. The main problem that the program tackled was the poor supply of rural WaSH services as characterized by lack of information on infrastructure status, low participation of rural communities in the management of WaSH services, and lack of coordination among water authorities,

operators and local communities. The program's main solutions were developing a participatory reporting mechanism and demonstration projects as well as strengthen coordination among water authorities and users. The program has resulted in higher resilient access to rural water supply and sanitation through capacity building of local communities with a 47% women participation rate, increased local co-financing and collection rate of water services, and an established coordinating council and legal framework at the national level.

Case Study 2: Source to Sea

A Source to Sea system consists of a chain of geographical segments that are closely connected by a number of key flows (ecosystem services, water, sediment, pollutants, biota and material). Changes in these flows along the chain bring about effects further down in the Source to Sea system and ultimately affect the return flows and impacts. Today, no marine area is unaffected by both land-based and marine-based human pressures. With increasing competition over resources in the future and climate change pressures, there will be more critical trade-offs between user needs along and between the Source to Sea systems. The main IWRM issue is the lack or non-existence of coordination between upstream and downstream water resources as well as the governance of linkages of these resources. The Action Platform on Source to Sea Management was formally established with the mission to support coordinated and innovative approaches to governance and management from source to sea. Its members include a number of UN agencies, research institutions and river basin organizations. The Action Platform has developed a concept and recommendations to Global Environment Facility for better investments concerning Source to Sea systems as well as stronger programming that avoids neglecting Source to Sea connections.

Case Study 3: Water Integrity Capacity Development in MENA Region

Integrity is the opposite of corruption, which is the abuse of entrusted power for private gain. The water sector is vulnerable to corruption, especially in large-scale construction projects and large flows of public money, due to the great need for water, reinforced by the power positions of suppliers – commonly monopoly providers. The program is implemented from 2014 to 2017 and is highly relevant to all four principles of IWRM, with a focus on weak governance that allows persistent corruption risks and complicates challenging regional cooperation. Specifically, the program addresses water scarcity issues that are

exacerbated by the persistence of water governance gaps. These issues are tackled through developing the capacities of stakeholder groups to improve transparency and accountability practices in water resources management. The results of the program by the end of 2015 are: nationally adapted integrity modules and training events have been conducted, there is an improved network and trust among national and regional stakeholders, and the empowerment of female water practitioners.

Way forward

- Understanding critical bottlenecks and identifying necessary incentives for behavioral change to improve institutional arrangements of water management and governance in practice
- Improving participation of stakeholders is necessary for getting a broad consensus on the type, scope, and timeframe of interventions to be taken with the available limited resources
- Ensuring integrity in the implementation of any water investments is the key for successful interventions of any kind of IWRM implementation
- Enhancing transparency and accountability renders higher efficacy in both planning and implementation of IWRM, especially in the context of developing countries, to ensure that investments deliver the intended benefits

IDB Strategic Investments in Water Sector - Mr. Sami A. Faruqi, Division Manager, Water Resources and Environment, Agriculture and Rural Development, IDB

Water is about life and human society development. The IDB Vision 1440H emphasizes comprehensive human development and its mission is focused on alleviating poverty, and improving health and people prospering. This directly relates to water and the performance of the water sector in the IDB member countries. Water significantly contributes to poverty alleviation, improving health, people prospering and the development of cross-cutting sectors in the economies and thus to the human development. The strategic implementation of the IDB Vision is translated into the IDB 10-year Strategy, 3-year Medium-Term Plan and one-year annual operating plans.

The IDB strategic direction in the water sector also goes in line with the Sustainable Development Goals (SDG), in particular SDG 6 on increasing water use efficiency across all sectors and ensuring sustainable

withdrawal and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity, implementing Integrated Water Resources Management at all levels, including through transboundary cooperation as appropriate and protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

Being under the umbrella of the Organization of Islamic Cooperation (OIC), IDB's activities are in line with the OIC Water Vision: "Working together for a water-secure future. Maximizing the productive use of water and minimizing its destructive impacts is a common and major challenge, despite great diversity of water environment." IDB is committed to implementing the water goals of OIC and IDB member states.

Water sectors in IDB member states have a wide range of variability in terms of geographical stretch and water resources availability and offer a bigger challenge for having a uniform development strategy. Countries rich in total renewable water resources (TRWR) such as Indonesia, Bangladesh or Malaysia, have more of water management challenges whereas countries like Kuwait, Maldives, Qatar etc. are challenged with both water resources as well as water management issues.

Similarly, the non-renewable water resources in IDB member countries are over-exploited and the underground aquifers are under stress because of over-extraction.

The water dependency ratio of the member states stands at 27.4% which is the highest when compared with the developed countries ratio of 6.7%, non-member developing states of 24.1% and the world average of 21.5%. This adds to the water exploitation beyond proportions in member states. The variability among the member states regionally covers a wide range of dependency ratio and is 0.0%, 8.1%, 86.5%, 9.4%, 36.1%, and 24% in East Asia, Latin America, South Asia, Europe and Central Asia, MENA, and Sub-Saharan Africa regions respectively. The water demand is expected to rise by 40% when compared to the demand of 3,300 billion cu. m. in 1995 to 4,700 billion cu. m. in 2025. This is mainly due to the out-of-proportion population growth. The IDB member states will have an increase of population from 19.4% of the world population share in 1990 to 25.8% in 2025 compared to the average developed countries share which will decrease from 16.5% to 12.9% and the non-member developing states figures of 64.1 to 61.3%. The population growth trend in member states is clearly a big challenge to tackle in the water sector.

The water challenge for the OIC and IDB member states is further aggravated by the over-extraction of water. The member states have the highest rate of water extraction as a percentage of total freshwater resources, and the rate stands at 12.2% compared to that of non-member states of 5.3% and 9.1% in developed countries. The MENA member states have the highest rate of 79.6%. Coupled with this is the low water storage capacity in the member countries which stands at 697 cu. m. per inhabitant compared to 806 and 1,894 in the non-member states and developed countries respectively.

A total of 26 IDB member countries are water stressed. Enough water is available in the member states. However, the crisis is mainly because of the growing demand, increasing population, growing economies, urbanization, rising income levels, economic scarcity, lack of investment and physical scarcity. The irrigation sub-sector is distorted because of subsidies in irrigation, distorted financial and economic systems for irrigation, low irrigation water efficiency, floods, scarce water resources, institutional capacity, limited decision-making authority, environmental issues, and lack of IWRM approaches at the river basin level.

The IDB is mandated to ensure human development. So it has strategically positioned itself to take up this challenge and invest strategically in infrastructure, capacity building, strategic advisory and institutional set-ups to address the economic scarcity of water. The areas of IDB investments include water security and water for food security with direct interventions in water resources and environment management, water and sanitation, irrigation and drainage, water transmission, water harvesting, infrastructure development and capacity building. The IDB covers flood protection projects, coastal protection, environmental protection projects as well as urban and rural wastewater treatment and environmental management.

The IDB is fully committed to the water cause in its member states. The IDB has steadily increased its investment since its inception and invested over US\$ 10 billion in the water sector, allocating for urban water and sanitation over US\$ 6.45 billion and for water resources management US\$ 4.02 billion.

The IDB has actively taken its role in introducing the concepts of IWRM in its projects to holistically address the water balance in a river basin. The Ghareeso Zarigol Irrigation Network Project in Iran is one good example of IWRM being financed by the IDB in the country.

The objective of the proposed project is to supplement Iran's efforts on water resources

management using IWRM at the river basin level by: increased agricultural production, participatory water management mechanism, increased irrigation efficiency by using new water conserving technologies; upper watershed management; environmental protection of the Gorgan River Basin; and water quality monitoring and reservoir operation. The project key outcomes include irrigation of 16,600 ha, increased agricultural production from 33,000 tons to 88,000 tons per year; increased irrigation water efficiency from 33% to 70%; reduced sediment flow to the Kaboodval dam from 40,000 tons to 30,000 tons per year.

Well aware of the water crisis and water management crisis challenges, IDB has become a key player in addressing the problems of water being faced by the member countries. IDB focuses on water management through the IWRM approach and constantly strives for and supports introducing new technologies and concepts.

Session II: Panel Discussion on Responding to IWRM Implementation Challenges in IDB Member Countries

Focused on ways to deal with challenges of IWRM implementation in IDB member countries, the panel discussion included five high-level panelists. The discussion was moderated by Mr. Ahmed Hariri, IDB.

Mr. Hariri put the first question to Dr. Harriss, inviting him to share experiences on implementation challenges in Australia. Dr. Harriss said IWRM implementation began in the 1990s in the country. He noted that there were considerable investments into infrastructure at the beginning. One challenge was getting people to understand issues upstream and downstream, he added. It was important to raise stakeholder awareness. Adopting legislation was also critical, he said. The Federal Government decreed that every jurisdiction apply IWRM in 1994. Another problem was engagement of water users. It took four years to ensure stakeholder engagement through legislation and convey the benefits of water-sharing plans.

Mr. Hariri then asked Dr. Agus Suprpto, the Ministry of Public Works and Housing of Indonesia, about challenges and experiences in Indonesia. Dr. Suprpto said that there is a misconception that there is no water scarcity in Indonesia. He said that there is in fact water scarcity in Java as water distribution remains a major problem. He pointed that in 2004 the country

adopted a new law to implement IWRM. As a result, water basin territories were revised, identifying 128 river basin territories. One of the main challenges, he said, is that stakeholders have conflicting interests and it is hard to find a compromise. To address water-related problems, the country plans to build 65 dams in the coming years. But financing is a problem, he added.

Speaking to Dr. Soppe, Mr. Hariri inquired if IWRM is a one-size-fits-all solution to problems in Organization of Islamic Cooperation countries. Dr. Soppe noted that IWRM can serve as a single approach but it needs to be adapted to specific regions. He said that, for example, the IWRM approach in Central Asia is different from that in Latin America. However, he added, as a concept, IWRM is valuable and does offer tools and solutions for governments. He also said that capacity building and community participation are important to ensure IWRM implementation success.

For her part, Dr. Restiani spoke about the importance of institutional tools for a participatory approach in IWRM implementation. She gave the example of a manual on water governance assessment, which includes and profiles a lot of different tools for the participatory approach. She noted that there is

no lack of tools. What is important and necessary though, she said, is establishing institutional mechanisms to ensure participation during planning, implementation and monitoring.

Speaking of UNDP's experiences, Dr. Dmitry Mariyasin, UNDP, shared lessons learned from projects implemented in Central Asia. Dr. Mariyasin highlighted the role of partnerships as critical to solving water crises in the region. He said one level of partnership is related to transboundary water management. Through an EU-funded project on IWRM in 2009-2012, UNDP worked on concrete mechanisms on cross-boundary dialogue. Another level of partnership is between sectors like energy and agriculture, he added. He noted that it is also important to ensure partnerships between stakeholders on the ground and policymakers. There should be policies to incentivize communities, for example, to save water, he remarked. Finally, there should be partnerships between researchers, capacity-building specialists, policymakers and international financial institutions like IDB. Participation of major financial institutions is critical for scaling up proven solutions developed in the region, which can improve the livelihoods of millions of people.

Q&A Summary

Following the panel discussion, Mr. Hariri invited participants to ask questions and make comments. An officer from the Infrastructure Department at IDB commented that situations in the IDB countries vary and require different IWRM approaches. He gave the example of the MENA region, where there are countries that can desalinate water for consumption, while in Africa things are different. He added that it is important to ensure water governance and institutional settings for IWRM to succeed. He also noted that it is important to focus not only on quantity but also quality of water.

A delegate from Malaysia suggested that IDB should focus on water-related problems more. He said the fact that water is free is a big problem. He noted that end users should be taught to really value water. To this comment, Dr. Harriss said that although water is free in Australia, services are paid. Water users are charged for such things as delivery and maintenance of infrastructure in Australia, he added.

A participant from Sudan said that all African countries face two issues with regard to water resources management systems. One is how to incorporate rain within management systems and integrate losses through irrigation and water transportation systems. The other is how to put monitoring systems into place and how to ensure

practices are adhered to. Dr. Soppe said that the issue of monitoring is an important one. However, he said, monitoring is an expensive exercise and therefore should be targeted. It is also important to collect data for operational purposes only.

Following the Q&A session, Mr. Hariri asked the panelists to share their key takeaways from the seminar and discussions.

Dr. Mariyasin said that the key takeaway for him is building the capacity of people. Dr. Restiani echoed his words, and added that it is important to build institutional and governance capacity to manage water resources. It is also necessary to link policy with on-the-ground reality, she added.

Dr. Suprpto also agreed on the importance of capacity building and good governance. He added that it is also necessary to raise public awareness.

For his part, Dr. Harriss commented that the role of government and stakeholders should be clearly defined.

Dr. Soppe concluded by saying that there are a lot of similarities and a lot can be learned from others' experiences. He added that trust is also critical for IWRM implementation.

Closing Statement



Ms. Seta Tutundjian, Director of Partnerships and Knowledge Management Division, ICBA

Excellencies,

Esteemed participants,

Ladies and gentlemen,

I would like to express my sincere thanks for your contributions and participation during this seminar.

I was pleased to learn about wide-ranging experiences and valuable opinions on the seminar topics.

The approach in the Murray Darling Basin is one good example of how, despite the conflicts between stakeholders, a compromise in water management has been reached to maximize water's benefits.

We have seen how variable the water and water management conditions between the IDB member countries are. The IWRM approach in Indonesia shows that with a large volume of water available, an integrated approach towards management is very important.

Even for countries with less available surface water, and higher reliance on groundwater resources, the approach of integrated water resources management is needed.

Conflicts do not only rise between current water users and stakeholders. Conflicts, less vocal but still important, arise between current generations and future generations of water users and stakeholders.

We discussed the strong need for stakeholder involvement, and discussed some methods of how this participation can be supported. We focused on the need to be pragmatic and take action where it is most effective.

As Prof. Abdulrahman mentioned in his opening remarks, this seminar on IWRM is not a starting point, nor an ending point.

With this seminar we want to support and revitalize the ongoing efforts on integrated water resources management. We do not have a choice other than to focus on maintaining or improving the sustainability of water resources for current and future generations. To achieve this, institutions at all levels need to be broad-minded and think outside the box that our educational background has put us in.

Not only do we need to be holistic in our water management, we also need to see our water management approaches within the water-energy-food nexus. Decisions we make on allocation of water resources will have an impact on the demand or supply of energy and the production of food. Today, however, we mainly focused on the water management theme. In addition to building reservoirs, canals or irrigation systems to store and transport water, we need to think of this infrastructure in the light of providing and distributing social and economic welfare.

Today was another step on the path towards using the IWRM approach in water management, and more hard work is needed in the coming years. The team of the IDB and ICBA is very willing to support the member countries in their efforts to continue on the IWRM path.

In conclusion, I would like to thank all of you for your participation and for making this seminar a success. I would also like to thank the Organizing Committee for all their efforts to arrange this seminar.

Thank you very much!



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