

# **WORLD** **WATER** **WEEK**

**in Stockholm**



## **Report on the Seminar on Financing Water Infrastructure**

**Stockholm, 15 August 2004**

**Organized by the World Bank and the Stockholm International Water Institute**

STOCKHOLM INTERNATIONAL WATER INSTITUTE, SIWI

HANTVERKARGATAN 5, SE-112 21 STOCKHOLM, SWEDEN ♦ PHONE +46 8 522 139 60 ♦ FAX +46 8 522 139 61 ♦ [siwi@siwi.org](mailto:siwi@siwi.org) ♦ [www.siwi.org](http://www.siwi.org)

## Table of Contents

<i>Executive Summary</i> .....		3
<i>Section I</i> .....		5
<b>I.1</b>	<b>Introduction</b> .....	5
<b>I.2</b>	<b>Rationale and Objectives</b> .....	5
<b>I.3</b>	<b>Water and Economic Growth (Block 1)</b> .....	6
<b>I.4</b>	<b>Financing Options for Water Infrastructure (Block 2)</b> .....	7
<b>I.5</b>	<b>Challenges for Private Investments (Block 3)</b> .....	9
<i>Section II</i> .....		11
<b>II.1</b>	<b>Block 1: Water and Economic Growth</b> .....	11
II.1.1	Importance of Boosting Water Infrastructure in a Developing Country ..	11
II.1.2	Need for Strategic Investment in Water Infrastructure in SADC Region	12
II.1.3	Investments in Water Infrastructure: Boosting Benefits, Sharing Risks ..	13
II.1.4	Economy Wide Impacts of Water Resources Development .....	14
<b>II.2</b>	<b>Block 2: Financing Options for Water Infrastructure</b> .....	16
II.2.1	Financing Options for Hydropower Projects - Uganda's Experience .....	16
II.2.2	Nile Equatorial Lakes Subsidiary Action Program (NELSAP) .....	17
II.2.3	Financing Mechanism: Current Trends and Key Questions .....	17
II.2.4	Financing Hydropower Schemes in Nepal .....	18
<b>II.3</b>	<b>Block 3: Challenges for Private Investments</b> .....	20
II.3.1	Challenges for Private Sector Investments in Infrastructure - Lessons for the Zambezi River Basin .....	20
II.3.2	Creating a Conducive Environment for Private Sector Involvement .....	21
II.3.3	Increasing Water Demand and Hydraulic Infrastructure for Urban and Industrial Growth in Mexico .....	22
II.3.4	Risks of Water Scarcity .....	22

## Executive Summary

As pressure on water resources increases, in terms of both quality and quantity, and water resources systems are driven up against their natural limits, the reliance on water infrastructure grows – not only to meet daily requirements, but also to provide security against extreme and often cyclical hydrological events (droughts and floods). Water infrastructure in many developing countries has been neglected and underinvested, and its impact on economic growth is often underestimated.

A seminar during the World Water Week in Stockholm (August 2004) was organized jointly by the World Bank and the Stockholm International Water Institute<sup>1</sup>. The seminar had multiple objectives. The objective of the seminar was to highlight the linkages between water resources management and the development of the different sectors that fuel the economy. In addition, it was organized with an aim of assessing and evaluating the different financing options for water infrastructure in high risk environments, and finding viable means of alleviating and mitigating the challenges to private and public investment.

The seminar was chaired by Mrs. Ruth Jacobi, Director General for International Development, Ministry of Foreign Affairs, Sweden. The participation was varied and ranged from academic, private, public, non-profit and international development organizations. The speakers at the Seminar included Ministers, Hydraulic Specialists, Water Resources Managers and Specialists, and Academic Scholars.

The Seminar highlighted a very strong link between the effective management of water resources (for energy, food, industrial and domestic supply) and economic and social development. There is also a strong link with protection of the natural environment, in a situation where water sources are coming under extreme pressure from abstractions and pollution.

Against a background of increasing pressure on water resources brought about by population expansion, urbanization and industrialization, there is no “business-as-usual” option. Action will need to be taken or the situation will continue to deteriorate. The cost of inaction will be very high, both directly in terms of the communities affected but also more widely in terms of economic and political stability. The scale of such

---

<sup>1</sup> The seminar was co-sponsored by the World Bank, the Bank Netherlands Water Partnership Program (BNWPP), the Stockholm International Water Institute (SIWI) and the Transboundary River Basin Initiative of the United Nations Development Programme (UNDP/TRIB). The working group who organized the seminar consisted of World Bank staff: Len Abrams, Sr. Water Resources Management Specialist, Jakob Granit, Sr. Water Resources Management Specialist; Alessandro Palmieri, Lead Dam Specialist; Christina Leb, Operations Analyst; and Johan Kuylenstierna, Project Director, SIWI. The report was co-authored by Sunanda Kishore and Christopher Head, Independent Consultants working with the World Bank.

infrastructure varies depending on the size of the catchment, from small-scale to large-scale.

The financing of large-scale water infrastructure was traditionally left to the public sector, but in many countries it is unlikely that future demands can be met from this source alone. It is important to find mechanisms for accessing funds more widely, particularly from the private sector, and to be aware of the serious consequences of a failure to find adequate funding in this area.

The problem with private financing hinges on the fact that large-scale water infrastructure is a long-term investment with generally weak financial returns. This poses a particular challenge in trying to access funds, and it also reflects in the cost of private money. It is recognized that there will be certain essential services to the poorer communities that will always remain a government responsibility using a minimal-subsidy public financing approach.

Other sectors, such as hydropower, have a stronger cash flow and should be able to attract private finance in larger amounts than at present. Over the last ten years there has been much interest in private hydro, but the results have generally been disappointing, with sponsors preferring to invest in thermal power stations. There is a need to develop alternative financing models that make it more attractive for the private sector to finance essential water infrastructure such as dams. This will inevitably mean reducing the risk exposure of the private investor.

There is no single financing model that will suit all projects, but there are certain common factors that will limit the risk:

- Increased use of local financing to reduce exposure to the risk of currency devaluation;
- Mechanisms for facilitating the refinancing of projects after completion once the main construction risk is past;
- Guarantees and similar credit-enhancement mechanisms provided by the multilateral development banks (MDBs).

Most agreed that the Multilateral Development Banks (MDBs) will have a very important role in leveraging maximum support from the private sector in the future, if the high level of investment needed is to be achieved and to provide necessary public financing.

In involving the private sector, it is important for governments to understand the different perspectives and constraints under which a private company has to operate. In the end the private investor has to be focused on short-term financial viability of his investment, whereas the public sector should take a wider and longer-term view.

Finally, the workshop also concluded with the observation that investment in water resources infrastructure has to be viewed in a holistic manner taking into account all the cross-sectoral benefits and above all, the economic, social and environmental costs

of not making the investment at all. Water infrastructure should be seen as a means to an end – with the end being sustainable development.

## **Section I**

### **I.1 Introduction**

A need for increasing infrastructure financing for water resources management and development has been recognized as critical for the growth of developing countries and for achieving the United Nations' Millennium Development Goals (MDGs). Keeping pace with present day challenges, the World Bank has been actively involved in understanding and addressing this gap. The new and recent Water Resources Sector Strategy, the Infrastructure Action Plan and the Report on the World Panel on Financing Water Infrastructure all bear testimony to this fact. The Seminar on "Financing of Water Infrastructure" was organized at the World Water Week on August 15, 2004 by the World Bank in partnership with the Stockholm International Water Institute (SIWI). It was the second such initiative following the workshop on "Enabling Framework for Increased Investment in Water Resources Infrastructure for Multi-purpose Use" at the Water Week in Washington DC in April 2004.

### **I.2 Rationale and Objectives**

Following the main conclusions of the first workshop organized in Washington DC, a need for raising finances for water infrastructure projects (dams for hydropower, irrigation, flood and drought protection, water storage and water transfers) in high-risk environments was recognized as a critical challenge. Since these infrastructure projects in developing countries are highly capital intensive and have long gestation periods, and often weak financial returns, financing options tend to be limited. The Seminar on "Financing of Water Infrastructure" was organized to address this overarching gap in the development of water resources, which in turn directly affects economic growth in developing countries.

The overall aim of this Seminar was to establish a common understanding of the challenges to implementing highly needed water resources infrastructure projects in developing countries, and find ways to mitigate them. The more specific objectives of the Seminar were set out to:

- Highlight the linkages between water resources management and development to support key sectors of the economy (agriculture, energy, manufacturing, environment and tourism);
- Present project financing options in the high risk environment (e.g. political risks, financing risks, technical risks) surrounding water infrastructure;
- Explore how to address challenges to increased willingness of the private sector to invest in water development projects.

The Seminar was organized in the three different blocks with presentations focusing on: Water and Economic Growth; Financing Options; and Challenges for Private Investments.

A succinct discussion and the key findings from each Block are presented in this Section I of the paper. Section II includes a more specific report on the individual presentations made by the presenters at the Seminar.

### **1.3 Water and Economic Growth (Block 1)**

This session was addressed by representatives of SADC and Iraq, and the World Bank. It was devoted to establishing and understanding the linkages between water as a critical factor for development and the role that water infrastructure plays in the relationship between water and economic growth.

Water and economic growth are inextricably linked. Water serves not just as an important input into all productive sectors of the economy, but also stands as a strong social and economic indicator of progress. Given the fact that access, use and availability of water continue to be dependent on infrastructure development, the importance of having in place sound financing arrangements can no longer be ignored.

The discussion revolved on the following issues:

- Water management as a source of economic development and stability;
- The importance of boosting the development of water infrastructure in the poorer countries;
- The need to view investment in water infrastructure in its broader context (enhanced benefits and shared risks);
- The economy-wide impacts of water resources development, and the consequences of failure to make investments.

A general consensus from the Seminar is that there is a definite economic cost of inaction from a lack of investment in water infrastructure in developing countries. The costs of investing in water infrastructure is a small price to pay when viewed against the cost of emergency actions and interventions that have had to be taken in several countries to overcome the problem of under investment. Water scarcity, shortage, access and availability are critical issues that have a significant impact at all levels of the economy and in order to mitigate any repercussions, investments such as these are likely to prove very effective.

Water resources management in the past has been viewed insularly without gauging the necessary cross-sectoral impacts it has on the economy. The seminar clearly

concluded that water must be viewed through a larger macro-economic lens incorporating a holistic perspective on implementation given its clear linkages to economic development and growth. As such, water infrastructure should be seen as a means to an end – with the end being sustainable development.

Mechanisms that encourage benefit sharing and where benefits percolate down to all major stakeholders in these investments schemes are concluded as critical to the success of water infrastructure projects. This is one of the salient lessons that must be incorporated.

#### **1.4 Financing Options for Water Infrastructure (Block 2)**

The second Block of the Seminar addressed some of the issues that arise in the financing of water infrastructure based on past experience, and consideration of options for the future. In recognizing the limitations on public sector funding and the growing importance of private financing, the session drew on the experience in the hydropower sector where there has been considerable activity in private financing in recent years.

The discussion revolved around the following:

- Financing options for hydropower projects, with an emphasis on Uganda's experience;
- The Nile Basin Initiative and the Nile Equatorial Lakes Subsidiary Action Program (NELSAP), one of two investment programs of the initiative;
- Financing mechanism: current trends and key questions;
- Financing hydropower schemes in Nepal.

The *New Water Resources Sector Strategy* of the World Bank (published in 2003) was recognized as a step in the right direction. However there was wide concern that there are still serious problems to be overcome in attracting sufficient funding for the projects that are necessary to bring about significant change. For example, the Nile Basin Initiative has identified water resources development, and particularly hydropower, as one of the main engines of change but this implies a very large investment far beyond the region's resources. A similar picture was presented for Nepal where the domestic requirement for hydropower over the next decade or so exceeds \$1 billion.

There is wide recognition that the sums of money needed for water infrastructure cannot come from the public sector alone. But the private sector does not generally find investment in water infrastructure an attractive proposition because the risks involved are too great, pay-back periods are too long, and many projects are financially not viable in the private sector.

Experience in the hydropower sector, where the 100% private ownership (BOOT) model has been widely attempted, reveals that:

- Most private projects need a high level of public support to succeed, and in the end many of the risks are migrating back to the public sector;
- Private financing is more expensive than public financing, and this reflects in higher tariffs cost;
- There is a lack of credible sponsors and host governments often fail to understand the commercial constraints under which the private sector operates.

No single financing model can suit all circumstances. The arrangements have to be tailored to the situation, but certain generalized conclusions can be drawn:

1. Water infrastructure projects have a revenue stream in local currency, which makes them difficult to finance from offshore using hard currency due to the risk of devaluation. The government ultimately ends up carrying the exchange rate exposure. A much better solution is to fund in local currency where possible, as a substantial amount of the cost is local civil works. There is, therefore, an urgent need to build up domestic capital markets to reduce dependency on foreign financing.
2. Most of the risk on water infrastructure projects occurs at the construction stage. A completed project is generally a very secure investment, especially suitable for long-term bond financing. More attention needs to be given to mechanisms for facilitating the refinancing of projects after completion, preferably again in the domestic capital markets.
3. Many water projects, especially those serving poorer communities, are not suitable for private financing. There will be a continuing need for a high level of public investment in some areas of water infrastructure, but it is important to create conditions that leverage as much private sector support as possible. The Multilateral Development Banks (MDBs) have an important role to play through their loans, credit enhancement mechanisms and other facilities.
4. The cost and availability of private financing is inextricably linked with the financier's perception of risk. This can take many forms - site conditions, political, market, regulatory, impartial arbitration etc. In some countries the legal framework and past record is not sufficiently mature to provide the degree of confidence required. When formulating financing models, it may sometimes be preferable for the public partner to assume more risk in the interest of reducing costs and increasing the availability of funds.

It is important to appreciate the fundamental difference between the financial and economic viability of a project. This is essentially the difference between viewing it through the eyes of the private developer, as opposed to the host government. Financial viability is the measure of the project's ability to service its debts and pay dividends, and is necessarily measured on a short time horizon. In selecting the preferred project, the host government should use the longer-term, more holistic perspective of economic viability. This might not always favor the same project, so Governments need to guard against the fact that the need to make private projects financially viable can sometimes distort priorities when it comes to the selection of projects.

In conclusion, there is a need to explore alternative financing models, to understand the implications inherent in each and the key issues that affect the different stakeholders in terms of such issues as cost, access to finance, risk allocation, etc. And there is a need for these issues to be more widely understood by all parties, especially the host Governments.

### **I.5 Challenges for Private Investments (Block 3)**

The challenges for the private sector are large. There are not only the obvious short-term concerns of the financial viability and project risk, but there are longer-term concerns over increasingly severe water shortages and water quality problems. Block 3 highlights and addresses some of the critical issues.

The discussion was based on the following themes:

- Challenges for private sector investments in infrastructure with lessons highlighted from the Zambezi River Basin;
- Creating a conducive environment for private sector involvement;
- Increasing water demand and hydraulic infrastructure for urban and industrial growth in Mexico;
- Risks that accrue from water scarcity.

The private sector does not generally find investment in water infrastructure an attractive proposition because the risks involved are too great, pay-back periods are too long, and many projects are financially not viable in that they are unable to sustain the level of returns needed by the private sector. The public sector must recognize the realities of the constraints under which the private sector operates, in order to be able to structure for meaningful private participation.

The private sector does not generally find investment in water infrastructure an attractive proposition because the risks involved are too great, pay-back periods are too long, and many projects are financially not viable in that they are unable to sustain the level of returns needed by the private sector. The public sector must recognize the realities of the constraints under which the private sector operates, in order to be able to structure for meaningful private participation.

The risks arising from water scarcity and from floods are very serious, and will ultimately affect both the private and public sectors. They not only impact the people most directly concerned on the ground, but they are also increasingly impacting on businesses and their financial backers around the world. Against a background of increasing globalization, water availability is becoming an issue of strategic importance.

The private sector in turn sees several challenges preventing it from major investments in water infrastructure. The challenges include the obvious concerns of overcoming water shortages and water quality problems, but there is also a clear need to improve institutional and managerial capability in the sector – and to address more widely stakeholder concerns at all levels. Financial institutions can exercise a very large influence over projects in which they are involved, and through this influence they can determine whether a development takes place in a healthy, sustainable and efficient manner, or otherwise. It is very important that the financing institutions see the wider picture, and look beyond the immediate financing issues to the longer-term risks of not building the project at all and encourage private sector participation.

These longer-term risks include constraints on economic growth and expansion, and the increased cost of maintaining even the existing level of supplies as the quality of the resource diminishes. There is also the problem of the deterioration of existing infrastructure assets. And overshadowing all of this is the risk of environmental liabilities arising from growing pressure on water resources in the absence of an adequate infrastructure for their management.

Until now risk assessment has focused almost exclusively on what happens if the project goes ahead. There is now a need to incorporate a Water Scarcity Risk Assessment into the project planning process, to evaluate the consequences of not proceeding with the investment. This is a very important new approach to planning. Water scarcity is obviously a developmental challenge, but it is also a business opportunity. In particular financing institutions should see it as a means of imposing improvements in operational performance and efficiency of water use.

## Section II

### II.1 Block 1: Water and Economic Growth

#### II.1.1 Importance of Boosting Water Infrastructure in a Developing Country

The Opening Speech by H.E. Mr. Abdulatif Mohamed Jamal Rashid - Minister of Irrigation, Iraq, on the “Importance of Boosting Water Infrastructure in a Developing Country”, underlined the impact water has socially, economically and politically. While providing some background, he stressed that in the past Iraq had better water resources infrastructure which has been ignored by the political system. The lack of maintenance, management and environmental considerations from the State has led to a situation of severe water scarcity in many parts of the country. This situation has been exacerbated by increased abstractions upstream of the international border on the Euphrates where flows have been reduced from about 30 billion m<sup>3</sup>/yr to about 10 billion m<sup>3</sup>/yr. Low water-use efficiency, particularly in the irrigation sector, and the lack of investment in water infrastructure within the country and within neighboring countries dependant on the same source, has further aggravated the problem. Hydroelectric output continues to be low. Water is not used efficiently and the demand for irrigation exceeds the available capacity drastically. These factors have a direct impact on the economy and require solutions that encompass a holistic perspective.

The Minister highlighted the role that multilateral institutions can play in attaining water sufficiency and security. First, he urged the World Bank and other multilateral organizations to provide financial assistance through loans and grants for water infrastructure projects. He stressed that although these investments were a priority, the lack of available resources was a big deterrent for many poor and developing countries. Second, with the emergence of water as a regional agenda and a potential source of conflict between countries, as is the case in Iraq, it was imperative that the international and donor community plays the role of a catalyst to encourage mediation and good practice in shared river basin management.

The Minister emphasized that water resources management initiatives are critically dependant on good governance and political will. His conviction that economic growth will be conducive to creating a stable political system in Iraq is also the key to such investments being "inexpensive over the long term". Concluding his speech, with “water structures are expensive, but they are worth it”, he encouraged private enterprises, multilateral organizations and independent governments to revisit country priorities and invest strategically in water projects to encourage sustained growth.

## II.1.2 Need for Strategic Investment in Water Infrastructure in SADC Region

The presentation made by Mr. Phera Ramoeli, Head, Water Sector, Southern African Development Community (SADC), underlined regional co-dependence on and the need for strategic planning and investments in water resources. The SADC Region includes 13 member states of varied socio-economic, territorial and climatic conditions. The seasonal dry weather for 6 months along with the dependence on shared water from transboundary rivers between member states is characteristic of the SADC region. Of the available fresh water resource in the region, almost 57% comes from the Democratic Republic of Congo (DRC), which remains largely underexploited. In many countries a lack of available resources and commitment to investments in water resources has exacerbated the already inadequate and poor state of water infrastructure. With all productive sectors linked directly to water, the impact on economic growth is obvious. The issue of drought resulting from the severity of the dry season in the region and the lack of storage capacities to counter these climactic and rainfall variations has exacerbated water shortage, scarcity and stress.

The lack of infrastructure development is an established fact. With a need for strategic planning in the region, the SADC Secretariat perceives its role in fostering and providing an enabling environment for financing water resources infrastructure. According to Mr. Ramoeli, SADC sustains the overall strategic umbrella of integrated water resources management through several parallel efforts. The Protocol for Shared Watercourses aims to promote and facilitate the shared management and development of water resources. The Regional Strategic Action Plan of the SADC has been active in identifying some core inadequacies and gaps in water resources management in the region. Inadequate and weak enforcement of water laws; lack of capacity with respect to implementing economic instruments for water resources management; information acquisition, management and dissemination; awareness building and training are highlighted as some of the issues of critical importance.

Between them the SADC countries have 15 major international watercourses, some of them being shared by as many as 8 member states (e.g. Zambezi). The South Africa Vision for Water in the 21 Century is another strategic document that underlines the importance of an equitable access to water and the need for sustained improvement in water quality and sanitation services. The Regional Indicative Strategic Development Plan (RISDP) provides a region-wide development framework for all overarching developmental issues. The strength of this document lies in including water as a cross-sectoral priority and has a separate chapter devoted to reviewing financing mechanisms to improve water resources management and infrastructure development in the region. The Regional Water Resource Policy and Strategy developed under the SADC provides direction for peace and cooperation among member states over the basin management and transboundary water resources issues. In addition, the strategy also stresses efficient water use through demand side management. A Strategic Water Infrastructure Plan is in the process of being developed. It is expected to provide a comprehensive approach to intra and inter basin management initiatives.

All these programs will only be viable, Mr. Rameoli stressed, if a stronger commitment to strategic investments is undertaken through financing infrastructure projects. The Governments of the member States are already showing a certain level of responsiveness to this issue. He underlined finally, that in order to create an enabling environment for sustainable infrastructure management and for these initiatives to be successful, the emphasis must be on “sharing benefits rather than just sharing water”.

### **II.1.3 Investments in Water Infrastructure: Boosting Benefits, Sharing Risks**

In his presentation Mr. Alessandro Palmieri, Lead Dam Specialist, World Bank, stressed that different countries are confronted with different situations with regard to water availability and abundance. Hence, there is bound to be different perceptions of water. Given that understanding, water infrastructure is not an end but rather a means to achieve the different priorities of different countries and foster an environment for sustained economic growth and development. In the process of developing their economies many European countries like Italy in the past, he stressed, were faced with the same question – whether investments in water infrastructure are important?

A common misconception, he claimed, was the idea that building water infrastructure was predominantly related to building big dams only for hydroelectric generation. Irrigation canals, water transfer schemes and reservoirs for storage are important infrastructure investments that every economy must make in order to secure the economy from water shocks and water scarcity. In order to do so, borrowing from multilateral organization or mobilizing resources from the private sector are feasible options. Citing the example of Italy, which is now a dominant donor, Mr. Palmieri stressed that it was after securing investments through borrowing for water infrastructure and subsequently sealing the economy to water shocks in the earlier stages of its development, that the country did leap forward to a more sustainable path of development.

In the presentation his main focus was to emphasize “Good Practice” in infrastructure project which are sometimes perceived as creating social and environmental problems. Good practice involves sharing benefits as much as sharing the high risks, and this is the key to the success of water infrastructure projects.

The Xiaolangdi, Yellow River project in China, in addition to several others, has proven to be a success story. It is a multi-purpose project bringing benefits like sediment control, energy generation, irrigation, navigation and water supply. Since its inception, the project has produced a definite positive environmental impact on account of the diversified components in the infrastructure schemes. Of the total cost of 3.5 billion dollars, a bulk of 1 billion was spent on resettlement. All these factors not only encouraged a sense of benefit sharing but more importantly, provided a tangible gain to many people.

He also cited a recent example of benefit sharing in China where rural communities accepted shares in a hydropower project affecting their land. Mr. Palmieri emphasized that the key to the success of water resources infrastructure projects was mobilize benefit sharing in an equitable manner among all stakeholders.

#### **II.1.4 Economy Wide Impacts of Water Resources Development**

In his presentation Mr. Leonard Abrams, Senior Water Resources Specialist, World Bank, highlighted that there are severe economy wide impacts from the lack of development of water resources infrastructure. The link between lack of water resources infrastructure, and its possible impacts and repercussions on the economy, are seriously underestimated. He emphasized that the development and management of water resources should be regarded as a means to an end, rather than simply as an end in itself. The perception that impacts on the economy are caused from exogenous factors entirely beyond the control of governments with no connection to the lack of water resources development and infrastructure is a serious concern. He stressed that it is important to understand the vulnerability of the economy to water shocks and the constraints to growth due to under-development of water resources.

Citing an example from the Poverty Reduction Strategy Progress Report of a Southern African country, he highlighted that fluctuating food prices from recurrent drought was a critical reason for poor economic performance in the country. However, the extent to which water resources development was identified as a means to address better agricultural efficiency and reduce such impacts on the economy was non-existent in the policies and plans set forth in the Strategy.

A recently completed sector memorandum in Kenya showed that the occurrence of droughts and floods had had a 16% negative impact on the growth in agriculture and industry. In another example, Mozambique showed a steady growth of 5-6% until 2000 when it was hit by floods, after which growth came to a halt before picking up again. There are many other African countries, he claimed where entire economies had been affected by water shocks, floods and droughts, and where the necessary investments to secure the economy remained low priorities. A lack of concerted efforts towards the development of water resources infrastructure, he felt were proving a severe constraint to the development and growth of developing economies.

In his presentation, Mr. Abrams identified three primary areas where greater awareness and higher involvement was required - shocks of droughts and floods, underinvestment in water infrastructures, and the deterioration of current assets. The important question to be asked is what is the cost of not developing water resources. The costs of development need to be viewed against the costs of emergency actions and interventions in the short term in the event of extreme hydrological conditions, and the cost to the economy in the long-term through lost growth opportunities.

In dealing with water infrastructure projects, which may include high social and environmental costs, he stressed that the ethical dimension of such investments need to be considered. A question that must be answered is what comprises a 'good' dam, both from a technical/economic perspective and a moral perspective? There is currently no ethical basis on which to find common agreement to such a question. However, it was important to lay a strong groundwork to enable a clear dialogue on this ethical debate.

## II.2 Block 2: Financing Options for Water Infrastructure

### II.2.1 Financing Options for Hydropower Projects - Uganda's Experience

The opening speech in the session was to be given by H.E. Hon. Daudi Migereko, Minister of State for Energy, Republic of Uganda, but he was unfortunately unable to be present. However, his written presentation was made available. HE started by welcoming the 2003 *New Water Resources Sector Strategy* of the World Bank, saying that it should provide a badly needed catalyst for development of hydro resources in the Least Developed Countries (LDCs) particularly Africa where only 5% of hydro resources are being utilized. Substantial investment will be needed for a wide variety of water projects if meaningful development is to take place.

In Uganda hydropower has traditionally been financed in the public sector - the original Owen Falls project (1950s) was funded by government borrowing, and its recent extension was financed by a combination of bilateral and multilateral lending. In the 1990s, legislative reforms paved the way for independent power producers (IPPs) to sell power to the public utility. Various international companies initially showed interest, but the results have been disappointing. In particular, the government spent seven years negotiating one project on the Nile (Bugagali HEP) with a US company which eventually pulled out having spent many tens of millions of dollars carrying out project development work including environmental mitigation and resettlement. The key reason for the project's failure were the delays associated with resolving environmental issues and the financing arrangements, which were intended to be wholly based on private debt and equity.

The Bugagali experience mirrors the problems elsewhere with private hydro projects. To overcome these there is a clear need to look at alternative financing models. One option is to increase public participation under different forms of Public-Private Partnership, and to maximize access to all sources of funding, both public and private. In this context Multilateral Development Banks (MDBs) have a central role to play in making private investment in developing countries more attractive through the appropriate credit enhancement mechanisms and other investment vehicles. Given the difficulties of international financing, it is important for LDCs to mobilize local funding where it is available, and to build up domestic capital markets based upon long term financing from Social Security Funds and the like, as happens in China. In summary, there is no simple, single formula for project financing, but there is a need for all parties - governments, financing institutions and project sponsors - to work together to evolve innovative financing arrangements.

## **II.2.2 Nile Equatorial Lakes Subsidiary Action Program (NELSAP)**

Mr. Jérôme Ciza, Chef de Service Equipements Electricité, REGISIDO, Burundi described the Nile Basin Initiative (NBI), which was established in 1999 by the ten Nile riparian countries to fight poverty and promote socio-economic development through equitable utilization of shared water resources. Within the NBI the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) promotes investments in development projects that target power development, transmission and interconnection (for power trading) and water resources development, agriculture and fisheries.

The NELSAP power development program is in its preparatory phase, with an emphasis on the social and environmental assessment of different power development options, together with technical and other studies on transmission and interconnection. Within this phase, the Strategic/Sectoral Social and Environmental Assessment (SSEA) process is to allow informed and transparent decisions on national and regional projects based upon a rigorous analysis of the options by all stakeholders. This is regarded as an important prerequisite to building investor confidence when it comes to the financing stage.

The important distinction between the SSEA and past practice (which tended to look at prospective projects on a much narrower basis and only from the national viewpoint) is the holistic approach of SSEA. This includes an assessment of the legal and administrative framework in each country, and the identification and ranking of regional power options on a wide range of criteria to evolve an overall development plan that will have regional support. The first stage of the SSEA covering Burundi, Rwanda and Western Tanzania (population 20 million), which together have a current load of about 200MW is anticipating that by 2020 the urban load will increase five-fold and the rural load by 14 times. This has very heavy financing implications. SSEA is an important tool for the evaluation of projects leading to transparent decision making at both national and regional level. It is a slow and difficult process at a time when the needs of the region are very large, but it is hoped that it will pay off in building confidence when it comes to developing and financing projects.

## **II.2.3 Financing Mechanism: Current Trends and Key Questions**

Mr. Chris Head, an Independent Consultant who is the author of the World Bank Discussion Paper no.420, entitled "*Financing of Private Hydropower Projects*" reviewed the experience in the hydropower sector, where independent power producers have been financing projects using the Build-Own-Operate-Transfer (BOOT) model, but with generally disappointing results. The BOOT model involves setting up a stand-alone privately controlled company (in which there might be some public equity) and financing the project on the basis of equity and debt, typically in the ratio 30% to 70%. The essential feature is that the project company is a self-contained entity that has no recourse to other sources of money if things go wrong, so that all risks are internalized. The study revealed that:

- Most private hydro projects need a high level of public support to succeed, and in the end many of the risks are migrating back to the public sector in order to make the projects bankable;
- Private financing is more expensive than public financing and debt repayment periods are shorter, which is reflected in significantly higher tariffs costs that have to be passed on to the consumer;
- Financial viability (seen from the viewpoint of the private investor) tends to compete with economic considerations and can distort priorities when selecting projects for private development;
- There is a lack of credible sponsors to take on private hydro projects, and host governments often fail to understand the commercial constraints under which the private sector operates.

Four case studies were reviewed to demonstrate the different models that can be used in the financing of water infrastructure. These ranged from projects that were totally privately owned (Ismit Bulk Water Supply, Turkey) to concessions (Guerdane irrigation Scheme, Morocco) and private projects with a majority public ownership (Theun Hinboune HEP, Lao PDR). Another example was the San Roque multi-purpose project in the Philippines, where financing was achieved by dividing the project into public and private elements. This secured financing in a situation where private sector funding was not viable for the whole project, and it was unlikely to be developed by the public sector on its own.

No single financing arrangement will suit all situations, but there is clearly a need to develop new financing models that make it easier to access private money at competitive rates. This might mean accessing private financing for what are essentially public projects. The Multilateral Development Banks (MDBs) have a major role to play, in assisting this process, not only through credit enhancement and other credit mechanisms for leveraging private funding, but also through assisting host governments in the structuring of projects to make them more attractive to the private sector.

#### **II.2.4 Financing Hydropower Schemes in Nepal**

This paper was prepared by Dr. Janak Lai Karmacharya of the Nepal Electricity Authority (NEA), although he was unable to be present in person. Dr Karmacharya pointed out that Nepal is rich in hydro resources and sandwiched between China and India who both have energy deficits. With its favorable topography and hydrology Nepal is able to produce hydro energy at an average cost of about USC3/kwh, which compares favorably with the cost of Indian hydro-generation that falls in the range USC 4 - 5/kwh. Export potential is therefore large, but the weak financial position of the State Electricity Boards (SEB) in India is a serious problem because without an investment grade rating they would need sovereign guarantees to back their payment obligations.

In the past NEA has traditionally relied upon public sector financing for new hydropower projects, generally through soft loans from multilateral or bilateral donors

made direct to the government, which then on-lends to the utility at commercial rates (currently 10.25%). This creates a healthy revenue stream for the government, so that in effect electricity is subsidizing other social sectors such as health and education. The generation investment requirement of NEA up to 2011/12 is projected to be \$1.2bn, with much of this being in projects where there is a significant private element. Most new projects are likely to be developed within the ambit of some sort of Public-Private Partnership in which NEA works alongside private Joint Ventures (JVs) as a minority shareholder in the project company, as well as being the purchaser of the energy generated. For such projects NEA will need to find \$120m for its equity over the next few years if it is to take a 30% share in the projects. Another option under consideration for export projects would be a company with equity participation by the public sector enterprises of both Nepal and India. Such a company could be financed on the local capital markets in India, and therefore avoid the exchange rate risk that comes with financing projects in one currency when the revenue stream is another. Preliminary discussions on such an arrangement have already been held in the context of the 300MW Upper Karnali project.

The financial viability of NEA is crucial to investor confidence. At present about 44% of the revenue generated by NEA goes to payment for power from the private independent power producers (IPPS) (who represent about 23% of capacity). This places a heavy burden on the utility, which is negotiating with the government to lower its on-lending rate. In addition to partnerships with the private sector, NEA has a number of other strategies for financing new projects, including plans to raise money by floating a power bond in the local markets to construct medium sized hydro schemas. This will eliminate dependence of international financing and reduce foreign exchange risk. In order to bring all the Nepalese population above the poverty line by 2027, the World Bank has calculated that 8% GDP growth is needed; in order to sustain this growth hydropower will have to play a pivotal role with a target of 22,000 MW to be developed. An effective means of financing will be crucial to achieve the objective of growth-orientated, sustainable poverty alleviation.

## II.3 Block 3: Challenges for Private Investments

### II.3.1 Challenges for Private Sector Investments in Infrastructure - Lessons for the Zambezi River Basin

In his presentation, Mr. Mangwengwende, Head of ZESA, Zimbabwe, highlighted the investment opportunities and the main challenges to these investments that exist in the Zambezi River Basin. The basin covers 1 million sq km over 8 countries and provides a home to 31 million people. With an annual flow of 40,750 ml cubic meters, the basin has a potential to generate 14,000 MW of electricity. There are 13 planned development projects in the basin and of late the Zambezi Watercourse Commission has expanded the focus to explore energy, tourism, food security, transport and trade through several development projects.

Despite this potential, he underlined that there are several investment challenges including —investment security, financial viability and past historic experiences relating to water infrastructure that need to be addressed. He emphasized that investments are secure if they are bound by private property rights, an independent and efficient judiciary, credible regulations, well-functioning financing markets and a transparent private sector. He added that economic affirmative action could be an effective tool to promote private sector participants from previously marginalized groups.

The poor financial performance of existing infrastructure investments, due partially to under-pricing, inhibits further new investments. He agreed that under-pricing is generally attributed to legal and regulatory deficiencies and stressed that investments in infrastructure cannot be expected from people who did not have money. As such, a mechanism to gather financial support for water investments was required.

He reminded the audience that poverty reduction was the main goal and that provision of water and developing other water infrastructure was a means of strengthening poverty reduction strategies. His assertion that people need to be economically empowered is an important point. For that reason, an equal focus must exist on quantifying costs and understanding affordability in these projects. Quantitative measures for affordability must be developed such that these strategies can support mechanisms to financially empower the end-user in infrastructure projects.

Highlighting the Kariba experience, he stressed that the displaced Tonga and Korekora communities derived little or no benefits from past power projects. Tourism instead was preferred to power projects as they accrued better local community benefits. In order to address these challenges, measures are required to mitigate the adverse economic, social and environmental impacts of past projects by incorporating these costs into new projects.

In his concluding statement he highlighted that a strong business sector was needed to ensure investment security. Projects needed to include explicit poverty reduction strategies and finally, project costs should include reparations for past impacts. Private sector involvement combined with strong political support, projects with a poverty reduction focus, and compensation and involvement of local communities are the keys to the sustainable development and management of water resources.

### **II.3.2 Creating a Conducive Environment for Private Sector Involvement**

Mr. Gerald Boehm from Voith/Siemens provided an interesting insight into the prerequisites that create a conducive environment for private sector involvement in financing water infrastructure projects.

He highlighted the different risk categories: political, financial, performance related and reputational risks. Mr. Boehm stressed that many countries developing countries did not have an enforceable legal framework on which to base sound financial investments. The financial institutions rated projects according to their investment grade which included the anticipated rate of return and risk, as well as the financial robustness of the project, and inevitably most private investors were strongly influenced by these ratings.. Citing an example from India, he stressed that the rate of return that any foreign investor would be seeking in the country for water infrastructure projects is perhaps 20% or more, but since that would directly affect the tariff structure and there are few customers in a position to pay high tariffs, private investors were discouraged from making such investments.

With regard to performance risk, project completion guarantees posed a serious problem for both the contractors and the investor. The liquidated damages that a contractor could sensibly bear in relation to the size of his contract were not always sufficient for the sponsors to take the risk of investing in a hydropower project. Finally, he stressed that environmental impact assessments were integral to water infrastructure projects, and these also pose problems for private sector involvement, even when clearances have apparently been obtained, because of the potential for objections later and the possible reluctance of the bankers to get involved with controversial projects. .

In defense of the private sector, he closed by stating that “although water is critical as a scarce commodity, so is money” and since the private sector’s main staple is to provide money and financing to commercially viable projects, the risks have to be sensibly handled and allocated through collaboration between the public and private sectors.

### **II.3.3 Increasing Water Demand and Hydraulic Infrastructure for Urban and Industrial Growth in Mexico**

Mrs. Maria Antonieta Gomez Balandra of the Instituto Mexicano de Tecnologia del Agua, pointed out that the need for new hydraulic infrastructure for water supply in a number of major cities in Mexico was becoming very urgent. Demand-supply management measures such as reducing leakage and developing more efficient systems of irrigation, had not been sufficient to stave off water shortages which are leading to depletion of groundwater reserves and serious reduction in surface water storage. Against this background it has become necessary to embark upon a program involving the construction of dams (some with HEP), long pipelines, pumping stations and treatment plants. An important consideration was how to get such works accepted for financing with a minimum of delay.

The approach hinged upon the use of improved criteria for selecting projects based upon the Sustainability Guidelines issued recently by the International Hydropower Association (IHA). The National Water Act requires that public funds should only be used to promote projects that are sustainable and meet certain defined environmental standards. It also requires that where possible private investment should be used to finance infrastructure. Accordingly Environmental Impact Statements are being used for each project to identify and, where possible, mitigate environmental and social impacts. These statements form an important part of the overall review and authorization of the project by the Environment Ministry. In turn the social and environmental inputs are required by the Federal Expenditure Program to secure approval for the funding of a project.

### **II.3.4 Risks of Water Scarcity**

Mr. Albert Pacheco, Project Manager of the UNEP Finance Initiative spoke of the risks of water scarcity and the ultimate impact this would have on financial institutions, and the influence that such institutions can have in managing a proactive approach to combat the problems of water scarcity. He pointed out that the UNEP Finance Initiative had been founded with the aim of specifically addressing the issue of water scarcity and the role that financial institutions can have in contributing to sustainable development through active engagement in mitigating the risk.

Financial institutions can exercise a very large influence over projects in which they are involved, and through this they can determine whether a proposed development takes place in a healthy, sustainable and efficient manner - or otherwise. It is very important that such institutions see the wider picture, and look beyond the immediate financing issues to the longer-term risks of not building the project at all. These longer-term, macro risks include the increased cost of maintaining even the existing water supplies as the quality of the resource diminishes, and constraints on growth lead to deterioration in the value of assets. Overshadowing all of this is the risk of

environmental liabilities arising from increasing pressure on resources in the absence of an adequate infrastructure for the management of water in a sustainable manner.

Until now risk assessment has focused almost exclusively on what happens if a project goes ahead. There is now a need to incorporate a Water Scarcity Risk Assessment into project planning decision, to evaluate the consequences of not proceeding with the project. This is a very important new approach to the planning and evaluation of water infrastructure projects. Water scarcity is obviously a challenge in developmental terms, but it is also a business opportunity. In particular financing institutions should see it as a means of imposing improvements in operational performance and efficiency in water use.

-----