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SUSTAINABLE INTEGRATED WATER RESOURCES MANAGEMENT: A CASE STUDY OF LIBYA

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Abstract

Paper is designed to present an overview of integrated water resources management at global, regional, national and local level for sustainable development. It demonstrates that how actions, accords, and commitments by institute industry interaction (3Is) initiative with special reference to water resource efficiency are being debated by using awareness and preparedness for environmental emergencies at local level (APELL) along with numerous both Libyan and UNEP priority initiatives and programs. Based on case studies to recognize some of the most common problems experienced in Integrated Water Resource Management (IWRM) planning and developing options for overcoming them a set of recommendations on how to enhance institutional and legal reforms for its implementation at the national/local levels are briefly outlined. Finally it shows that how lessons learnt and best practices especially from UN agencies are assisting to promote water resource efficiency and sustainable consumption and production of case study pertaining to water resources management in Libya for its wider application in both developed and developing countries.

Keywords: sustainable, integrated water resources management, Libya

1. INTRODUCTION

We live in a world of voices and cries on water security. Water resource management is a complex business. World Water Council way back in 1996 alerts us that, the wars of the next century will be for water, "unless we change the way we manage water. Indeed water is a key driver of economic and social development. It also has a basic function in maintaining the integrity of the natural environment. Bearing in mind that water is only one of a number of vital natural resources, it is imperative that water issues are not considered in isolation. Both public & private sector managers, have to make difficult decisions on water allocation. It requires apportion diminishing supplies between ever-increasing demands. Drivers such as demographic and climatic changes further increase the stress on water resources. The paper shows that how traditional fragmented approach is no longer viable. It needs a comprehensive and more holistic approach to water management including issue of water security.

Water security is rightly defined as an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water- related risks to 'food security' and people, environments and economies. Tackling water security requires reliable access to sufficient supplies using adequate and affordable water resources management. The present paper highlights that how integrated sustainable water resource management is being tackled based on best practice case study in Libya based on needs assessment that assists in framing the issue infrastructure to store and transport water, treat and reuse waste water information and the robust institutions, able to take and implement decisions. It demonstrates that how sound understanding of water security does help to clarify our capacity to predict, plan and cope and support structure to better tackle social issues, poverty goals and thinking about the institutions best able to help us to achieve them. It further shows that how sustainable regional and national development needs assessment helps in promoting water security that in turn contribute to climate change resilience for economic growth and human security.

2. AN APPRAISAL OF EXISTING SITUATION

An overview of the state of the art on African Union Heads of State Sharm el Shelkh Declaration and commitments on water an climate change gave birth to Water, Climate Development Programme (WCDP) November 2011. It is supported by Climate Development Knowledge Network (CDKN). It provides a Strategic Framework for Water Security and Climate Resilient Development that gave a short, easy to use strategic document which outlines how to develop 'no/low regrets' investments strategies. It focuses on how countries can develop 'no/low regrets' investment and financing strategies for water security

and climate resilient development. It shows how to incorporate water security and climate resilience into national development plans, macroeconomic frameworks, MTEF, national budgets and overall economy based on the analytical work in the Technical Background document. Oflate, 9 Water Ministers attended the WCDEP Launch during 2011 Stockholm World Water Week consultation that gave at least 23 countries in Africa from 5 River Basins to Benefit 4 River Basins plus 1 aquifer in North Africa Basin/aquifer approach. It enables the programe to benefit at least 23 countries Limpompo, Volta,Lake Victoria(Kagera),Lake Chad, North-Western Sahara Aquifer System, (Nile Basin -through collaboration with UNEP). In-depth work in some countries has helped to generate lessons, tools, experiences, to share with other countries like Ghana, Burkina Faso,Cameroon, Tunisia,Burundi,Rwanda,Mozambique,Zimbabwe. Other Key Activities involve Identification of priority activities for detailed implementation from 2012 onwards-ongoing Setting up Programme Management structures Setting up WACDEP Africa Coordination Unit AMCOW Secretariat Desk Officer appointed Sub-regional and country structures. Developing a Programme Website in both French and English - www.gwp.org/wacdep Promotion of WACDEP in global climate change processes and the world water week in Stockholm Africa Day

Activities in Developing a Framework for Water Security and Climate Resilience Development find IWRM as a Tool to support implementation Joint publication with UNFCCC on Fresh water resources and climate change adaptation. These activities are helping in Promotion of WACDEP in global climate change processes and the world water week in Stockholm COP 16, Mexico,COP 17, Durban. The Water, Climate Development Day too is helping to support African regional process for the World Water Forum. Global Water Partnership: (GWP) in Africa is designed to Target Coordinator for Climate Change and WACDEP that is central to the Targets for WWF. Global Linkages of WACDEP Part of the GWP Pledge under the UNFCCC's Nairobi Work Programme is officially recognised by UNFCCC as a mechanism in Africa for the user Interface Platform of the Global Framework for Climate Services under WMO. Framework for Water Security & Climate Resilient Development is indeed a useful tool to enable implementation of WACDEP, supported by Climate Development Knowledge Network (CDKN). Technical Background Document Strategic Framework for Water Security and Climate Resilient provides a Development Capacity Building Plan for the Framework Policy Briefs

Technical Background Document to guide robust decision-making in developing practical low or no-regret adaptation measures captures international best practices in defining water security and climate resilient strategies, assessment methods, etc critique on pros/cons of various methods in existence develops/adapts methods for understanding water futures, climate futures and development futures that provides guidance on dealing with uncertainty, increased climate variability & climate information gaps. It provides knowledge on relevant investments required to enhance water security & climate resilience. It also clarifes links between water security, Integrated Water Resource Management (IWRM), CC, develpment Basis for the Strategic Framework on Water Security & Climate Resilient Development.

Strategic Framework for Water Security and Climate Resilient Development provides a short, easy to use strategic document. It outlines how to develop 'no/low regrets' investments strategies focuses on how countries can develop 'no/low regrets' investment and financing strategies for water security and climate resilient development. It also shows that how to incorporate water security and climate resilience into national development plans, macroeconomic frameworks, MTEF, national budgets and overall economy based on the analytical work in the Technical Background document

In order to developing the Framework Milestones 2011 World Water Week-Inception meeting of COP 17 prepared -1st Draft consultations. It helped in developing the Framework CORE TEAM HR Wallingford- lead Oxford University Centre for Environment Oxford Policy Management Institute for Development Studies Associate Partners University of East Anglia Water Security Centre International Office for Water (host of INBO) IWMI-Africa Climate Systems Analysis Group . GWP Experts Review Panel Chair-Prof. Torkil Clausen Alan Hall---- EU FWG Prof. Micheal Scoulos. In the face of climate change, partnerships such as those launched in the Water, Climate and Development Programme with Global Water Partnership represent a good first step'.

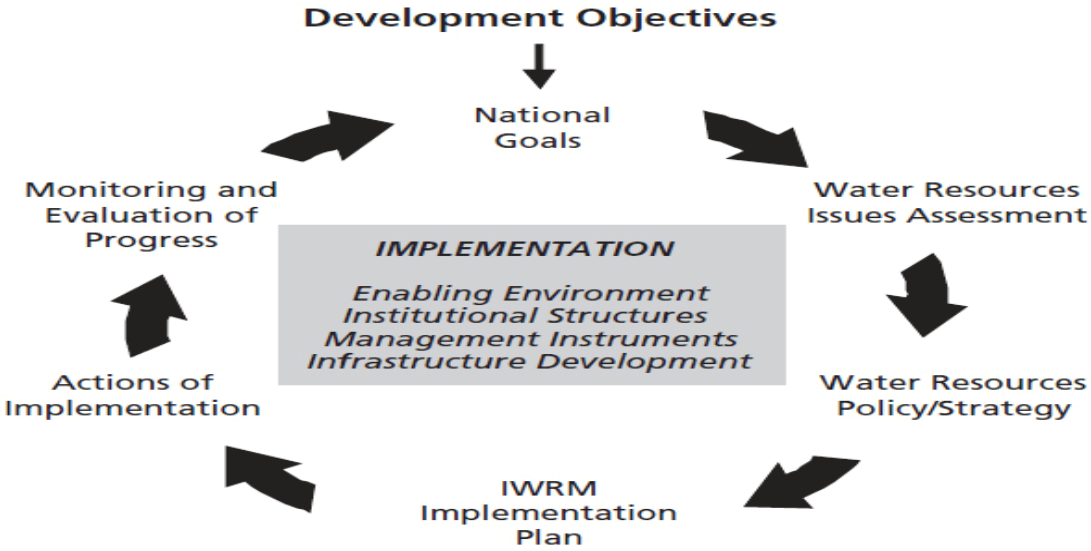
3. CASE STUDIES RELATED TO WATER RESOURCES MANAGEMENT OF LIBYAN COASTAL AREAS

Libya has 2000 km coast line. All most all Mangroves have been destroyed. Untreated & Under treated Domestic sewage & industrial effluents being discharged into Sea. Coastal Road is undertaken in violation of CRZ. Cement Projects will have serious adverse impact. Precautionary Principle requires

adoption of Risk based approach asks “how much damage is acceptable or can we get away with?”The system sets numerical limits to allow that much damage to occur, but we end up with more than acceptable damage. Under Precautionary Principle we ask “how little damage is possible?. Precautionary system urges a “Better Safe Than Sorry” approach decisions. Seas are polluted when relationships between Plankton & Light, Plankton & other Marine Organism and Sea Bed & Surface are damaged. The message is let us not play with Seas & Oceans as “Life on earth is sustained by the existence of Sea, since life began in Sea about 2.5 billion years ago”

4. UNITED NATIONS & WATER

Figure below by United Nations shows the rationale for the Integrated Water Resources Management (IWRM) approach. It is the way forward for efficient, equitable and sustainable development and management of the world's limited water resources and for coping with conflicting demands.



Stages In IWRM Planning And Implementation

Global overview shows that there are great differences in water availability from region to region - from the extremes of deserts to tropical forests. In addition there is variability of supply through time as a result both of seasonal variation and inter-annual variation. All too often the magnitude of variability and the timing and duration of periods of high and low supply are not predictable; this equates to unreliability of the resource which poses great challenges not only to water managers but also to societies as a whole. Most developed countries have, in large measure, artificially overcome natural variability by supply-side infrastructure to assure reliable supply and reduce risks, albeit at high cost and often with negative impacts on the environment and sometimes on human health and livelihoods. Many less developed countries, and some developed countries, are now finding that supply-side solutions alone are not adequate to address the ever increasing demands from demographic, economic and climatic pressures; waste-water treatment, water recycling and demand management measures are being introduced to counter the challenges of inadequate supply. In addition to problems of water quantity there are also problems of water quality. Pollution of water sources is posing major problems for water users as well as for maintaining natural ecosystems.
Overview further shows that in many regions the availability of water in both quantity and quality is being severely affected by climate variability and climate change, with more or less precipitation in different regions and more extreme weather events. In many regions, too, demand is increasing as a result of population growth and other demographic changes (in particular urbanization) and agricultural and industrial expansion following changes in consumption and production patterns. As a result some regions are now in a perpetual state of demand outstripping supply and in many more regions that is the case at critical times of the year or in years of low water availability

In summary, IWRM is an empirical concept built up from the on-the-ground experience of practitioners. Although many parts of the concept have been around for several decades - in fact since the first global water conference in Mar del Plata in 1977 - it was not until after Agenda 21 and the World

Summit on Sustainable Development in 1992 in Rio that the concept became both the object of debate and practice. The Global Water Partnership's definition of IWRM is widely accepted. It states: 'IWRM is a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

5. SOME SALIENT UN SPONSORED ACTIVITIES FOR WATER USE EFFICIENCY

In 2006 a Task Force on IWRM was created by UN-Water, with members drawn from UN-Water agencies and from partner organizations. In May 2008, the Task Force on IWRM completed its mandate when it presented the 'Status Report on Integrated Water Resources Management and Water Efficiency Plans' at the sixteenth session of the Commission on Sustainable Development. In 2008, UN-Water combined the Task Force on IWRM and the Task Force on Monitoring to establish the Task Force on Indicators, Monitoring and Reporting.

UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC) was first launched in 2010. World Water Assessment Programme (WWAP), DHI Water Policy, UNEP-DHI Centre for Water and Environment was set up in 2009. It helped to set out how to explore some of the practical aspects of the implementation of Integrated Water Resources Management (IWRM). It covers the following aspects: 1) the relevance of IWRM for a number of key development issues, 2) the key characteristics of the concept, 3) the global status of IWRM, 4) practical implementation - the challenges, 5) practical implementation - case studies showing successful applications to problematic management scenarios, and 6) how IWRM programmes are being linked with the **Millennium** Development Goals and adaptation to climate change by the setting of achievement milestones.

World Water Assessment Programme (WWAP) report first published by UNESCO-International Hydrological Programme (IHP), 2009 reviews currently available information on cases related to IWRM and Integrated River Basin Management (IRBM. It summarizes these findings with some conclusions and recommendations. **UN-Water. 2008** Report aims to illustrate progress made on meeting the target to "Develop integrated water resources management and water efficiency plans by 2005, with support to developing countries, through actions at all levels" agreed at the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002, through the Johannesburg Plan of Implementation. The Report is based on a survey covering 104 countries of which 77 are developing or countries in transition and 27 are developed. **Cap-Net, United Nations Development Programme (UNDP) in 2008** provided a framework of IWRM. The manual provides the necessary general information and specific tools in a user-friendly way so that any water resource stakeholder may be able to resolve existing or head-off impending disputes in a way agreeable to all parties. The emphasis is on Alternative Dispute Resolution (ADR), in particular, principled negotiation - an approach that seeks to embed outcomes and processes that serve sustainable, equitable and efficient long-term social needs.

UN-Water, Global Water Partnership (GWP) in 2007 assisted in preparing statement to support countries in their efforts to improve water management through an IWRM approach, and to stimulate the development of a robust framework for monitoring, evaluating and reporting on the outcomes of such an approach. **Cap-Net, United Nations Development Programme (UNDP), Global Water Partnership (GWP) in 2005** prepared a training material for a 3-4 day course on how to achieve a water resources management plan that brings in the principles of IWRM. Useful tools are identified to support the planning process in each step. While the material is targeted for national IWRM plans it is readily adaptable for basin level planning and trainers. **Food and Agriculture Organization of the United Nations (FAO) in 2004** provided a background document that gives a brief overview of the development of the concept of Integrated Water Resources Management. **World Water Assessment Programme (WWAP), UNESCO-International Hydrological Programme (IHP) in 2009 gave** Guidelines to help provide information to help practitioners implement IWRM in line with their own set of circumstances. These guidelines consist of the fundamental concepts of IWRM as well as provide insights into the perspectives of various stakeholders with regard to water issues, keys for success for overcoming problems, and good examples where such keys for success were applied. This first publication serves as an introduction to the Guidelines and outlines the main points contained within them. **UNESCO-International Hydrological Programme (IHP), World Water Assessment Programme (WWAP), Network of Asian River Basin Organizations (NARBO) in 2009** issued Part 1 of the Guidelines that provides basic principles of IWRM and explains the benefits of

IWRM at river basin level and the need to promote it at the policy level. It also proposes a spiral model of IWRM, which illustrates the evolving and dynamic nature of the IWRM process.

UNESCO-International Hydrological Programme (IHP), World Water Assessment Programme (WWAP), Network of Asian River Basin Organizations (NARBO) in 2009 issued Guidelines for IWRM Coordination' intended for practitioners involved in IWRM coordination. It can be used as introductory guidance for those tackling IWRM for the first time, or as training material for intermediary practitioners and trainers of IWRM. For IWRM experts, it can be used as a reference guide to tackle the various issues and problems they face in their IWRM activities. **UNESCO-International Hydrological Programme (IHP), World Water Assessment Programme (WWAP), Network of Asian River Basin Organizations (NARBO). In 2009** also issued Guidelines for Flood Management. It' is intended for IWRM practitioners of flood management. It is recommended to be used as introductory guidance for those tackling IWRM for the first time, or as training material for intermediary practitioners and trainers of IWRM. For IWRM experts, it can be used as a reference guide to tackle the various issues and problems they face in their IWRM activities. **UNESCO-International Hydrological Programme (IHP), World Water Assessment Programme (WWAP), Network of Asian River Basin Organizations (NARBO) during 2009** gave good practices for Irrigation Practitioners' on how to tackling irrigation planning. It consists of three parts: 1) sectoral perspectives, 2) key for success, and 3) IWRM process. **Cap-Net, United Nations Development Programme (UNDP) in 2008** developed a training material to improve efficiency and effectiveness in the application of integrated water resources management (IWRM) for sustainable management and development of water resources. The training is particularly targeted at the staff of river basin organisations (RBOs).

United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2003 issued a manual as an introduction to the principles underlying the integrated water resources management concept. The focus is on the approaches and management tools that facilitate its application, taking into account the size of the territory, whether it is national and international basins or sub-basins of local interest. This manual is destined first to trainers who, through a national or a regional seminar, would bring the participants to produce a diagnosis of their basin and an action plan. The manual is divided into two sections. The first one, of a more conceptual nature, presents a review of several definitions and some of the most pressing issues related to integrated basin-wide management. The second section of the manual, aimed at training, takes the reader and the trainer through the steps of the management framework.

ACP-EU, United Nations Environment Programme (UNEP), UNEP-DHI Centre for Water and Environment, Global Water Partnership (GWP) published case studies to recognize some of the most common problems experienced in IWRM planning and developing options for overcoming them. Each case study considers the following aspects: 1) problems of water resources management that need to be addressed, 2) context in which the problems and solutions need to take place, 3) decisions and actions taken in order to execute the roadmap process, 4) outcomes of the decisions and actions taken, 5) lessons learnt that will be of value to others involved in similar situation, and 6) relevance of the case to IWRM.

United Nations Economic and Social Commission for Western Asia (UNESCWA) in 2007 made a study to help provide ESCWA member countries with guidelines on how to implement Integrated Water Resources Management national strategies, with particular focus on institutional and legal dimensions. The study: (a) assesses the status of institutional and legislative settings; (b) evaluates the progress towards implementing institutional reforms within IWRM national strategies as well as challenges, constraints and gaps; (c) proposes scenarios for the implementation of legal and institutional reforms; (d) reviews institutional and legislative measures taken by developed and developing countries; and (e) presents a set of recommendations to ESCWA member countries on how to enhance institutional and legal reforms in order to implement IWRM at the national/local levels.

United Nations Economic and Social Commission for Western Asia (UNESCWA) in 2004 presented an overview report that introduces the process of Integrated Water Resources Management (IWRM) to senior policy and decision makers with the aim of mobilizing political and decision support to implement IWRM at the basin, national and regional levels.

6. LIBYAN INITIATIVE

Libya based academies, universities, high institutes and Research Centers have launched initiative to reduce, reuse & recycle resources product and services (3Is) for rebuilding the country to combat climate change impacts induced by 2011 Libyan crisis. The country is engaged in preparing actions, accords, ideas

and best practices to mitigate the impact of projected extreme events and weather by considering **low carbon**, **resource efficient** measures and enhanced use of renewable to tackle impending climate change. 28 hot spots in Libya are identified to convert them to bright spots by using awareness and preparedness for environmental emergencies at local level (APELL) along with numerous both Libyan and UNEP priority initiatives and programs.

7. CONCLUDING REMARKS

After highlighting, appraisal of global, regional, national and local issues related to water resources management paper demonstrates that how actions, accords, and commitments by 3Is initiative with special reference to water resource efficiency are being debated by using awareness and preparedness for environmental emergencies at local level (APELL) along with numerous both Libyan and UNEP priority initiatives and programs. Based on case studies to recognize some of the most common problems experienced in IWRM planning and developing options for overcoming them a set of recommendations on how to enhance institutional and legal reforms for its implementation at the national/local levels are briefly outlined. Finally it shows that how lessons learnt and best practices especially from UN agencies are assisting to promote integrated water resource management and sustainable consumption and production of water in Libya for its wider application in both developed and developing countries.

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