

INDICATORS FOR MEASURING IWRM PROGRESS AT NATIONAL LEVEL

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ABSTRACT

Over the past 15-20 years consensus has to a large degree been achieved on the importance of implementing Integrated Water Resources Management (IWRM). Today governments and organizations are increasingly interested in how well the implementation of IWRM progresses and where the bottlenecks are. This paper presents and discusses experiences from:

1. A pilot country study done in Zambia to develop indicators to help determine and document the effects of IWRM policy reforms.
2. Efforts to develop indicators for monitoring national IWRM progress as well as key performance indicators for water management institutions in Uganda

In addition this paper discusses lessons learned from these studies and proposes new activities to develop the methodology on indicator-based IWRM monitoring.

Introduction

This paper describes activities by DHI in cooperation with global and national water stakeholders in particular from Zambia, Bangladesh and Uganda on development of indicators for monitoring the implementation of Integrated Water Resource Management (IWRM) and

tracking progress towards IWRM at global, national and institutional level.

A set of 16 IWRM indicators were developed and tested in Zambia and Bangladesh. These were later adapted to the national environment and development plans. Based on these experiences a similar approach was taken in Uganda and operational indicators were proposed to monitor performance of water management institutions.

Finally, options for indicator development and use in other settings are discussed.

In addition to the indicator development described in this paper, DHI is involved in other initiatives that focus on development of indicators. The UNEP-DHI Centre is coordinating the development of status indicators for transboundary river basins on behalf of the Transboundary Waters Assessment Programme.

Global activities on IWRM

IWRM has been an international priority since the beginning of the 1990's. An important step forward was taken in 2002 during the World Summit for Sustainable Development (WSSD) in Johannesburg. Adding to the Millennium Development Goals (MDG's) a target was set for countries to develop

Integrated Water Resources Management plans by 2005. This target demonstrated international endorsement of IWRM as an efficient instrument in improving water management towards a more effective, equitable and sustainable use and protection of water resources.

Implementation of IWRM is at very different stages globally and it was decided by UN Water¹ and international organizations like Global Water Partnership to carry out global surveys to track progress towards achieving the 2005-target on implementing IWRM.

Based on the input from global, regional and national surveys made by organizations like Global Water Partnership and the UNEP-DHI Centre the first global assessment was presented to the Commission on Sustainable Development in 2008. The assessment² was based on questionnaires prepared by the UN Water Task Force on IWRM monitoring and reporting, highly inspired by and building on the methodology developed by the UNEP-DHI Centre and GWP. The Status Report recommended that countries need to prioritize development of IWRM and start implementation once plans are developed, and that experiences should be evaluated, monitored and shared.

Too often, however, IWRM indicators are defined as indicators from different sub-sectors pooled together. Lack of useful indicators was seen as a constraining factor for enhanced

¹ UN-organisation coordinating the effort of several UN bodies working on water management,

² The Status Report can be found on <http://www.unwater.org/indicators.html>

progress on IWRM, and DHI was asked to assist UN Water in developing a set of relevant indicators for monitoring of national progress towards IWRM to be presented for the 3rd World Water Development Report. From the outset the assistance was built on the experience gained from participation in the global surveys. It was decided by DHI and UN Water to supplement the global surveys with sets of indicators that had undergone a pilot testing in selected, relevant countries. The purpose of this was to examine the challenges related to tailoring the indicators to circumstances in the different countries and their specific conditions.



Figure 1: Stakeholders in Zambia discuss indicators

Development of global IWRM indicators

Indicator development was based on DHI's experiences as described above combined with a general screening of available indicators for water management. This resulted in a list of 50 indicators to be tested for relevance and applicability. The analytical framework includes four orders of IWRM indicators measuring consecutively more consolidated and effective levels of IWRM:

- (i) 1st order: Process indicators – IWRM is implemented on paper;
- (ii) 2nd order: Efficiency in the process – IWRM reforms take place;
- (iii) 3rd order: Impacts happening – IWRM has hit the ground and water is better managed;
- (iv) 4th order: Sustainability achieved – economical, environmental and equity concerns balanced.

1st order is the stage where IWRM has been adopted. This can be in the form of a reform plan, a policy or a legislation including key elements of IWRM.

2nd order is when reforms are being implemented such as building river basin organisations for decentralised water management or institutions to manage water across sectors.

3rd order is when reforms have been implemented, necessary institutions have been established and water is being managed according to IWRM principles.

4th order is the aim of the process: sustainability in water management, difficult to see fully realized, but still the goal to strive towards and eventually reach.

Development of indicators until now has focused on 1st and 2nd order indicators, because these are the stages most countries have reached until now. In the further process 3rd order and regular performance of organizations will be more relevant as more countries are moving towards actual implementation of IWRM.

The initial testing of the 50 indicators at 1st and 2nd stage was done in Zambia and Bangladesh³ in cooperation with

³Zambia and Bangladesh were chosen as case countries for the 3rd World Water Development Report. The case studies was facilitated by DHI

national water management institutions. Based on feedback from the participants the 50 indicators were narrowed down to a more easily applicable set of 16 indicators (see Figure 2) designed to be globally applicable. The **SMART** criteria were used for testing in the countries whether participants found the indicators to be **Specific, Measurable, Attainable, Relevant/Realistic and Timely**. These indicators can be used for monitoring IWRM at the governance level, where the focus is on adoption and implementation of reforms.

High Priority	Indicator (screening made using SMART criteria)
1	IWRM principles in the national water policy
2	IWRM in national budgets
3	IWRM reflected in legislation & regulations
4	Gender mainstreaming
5	Stakeholder involvement
6	Institutional analysis and plans
7	IWRM & climate adaptation, vulnerability and risks
8	IWRM status (vision, roadmap, action portfolio, degree of implementation) and assessment of water resources
9	Information management requirements
10	Cost recovery
11	Stakeholder awareness
12	IWRM in other plans
13	Impact assessments and mitigation procedures to protect water resources
14	Capacity building
15	IWRM infrastructure implementation projects
16	Decentralisation

Figure 2: Priority IWRM indicators for global use, tested in Zambia and Bangladesh

The indicator titles seen in Figure 2 are a description of the areas to be monitored. Each indicator is further described in terms of a more detailed explanation and specific guidance on how to apply the indicator in practice (see Figure 3), typically through interviews or stakeholder workshops.

as part of the assistance to UN Water. Results from Zambia are shown in this paper. Full case studies can be found at www.unesco.org/water/wwap

No.	Indicator	Explanation	Measurement
1	IWRM principles in the national water policy	The core principles of IWRM relating to equity, environment and economics are contained in the national water policy (either explicitly or implicitly).	<p>Check the national water policy for clear statements on</p> <ul style="list-style-type: none"> • Equity - Everybody can apply for water abstraction under the same set of rules and supply for domestic use applies social criteria in the water charges ? • Environmental sustainability – Environment is considered as a sector with its own right to water having same priority as domestic use (environmental reserve) ? • Economic efficiency – water resources are used to support a development of economic sectors ? <p>Check that Dublin principles are reflected in water policy:</p> <ul style="list-style-type: none"> • “Water is a finite and vulnerable resource” Are there clear statements on conservation and protection ? • “Participatory Approach” Mechanism/rules/practice for stakeholder involvement ? Are the decision processes decentralized so it is easier to involve stakeholders? River Basin Management Unit ? • “Womens’ central role” Proportion of women in decision making fora ? Are there mechanisms in place that ensure that equal representation will become the rule of the day ? • “Water as an economic good” – Is the economic value of water taken into account during decisions on priority in for instance allocation decisions ?

Figure 3: Example of indicator specification

Monitoring of the indicator is done using a spreadsheet and is based on a set of guiding questions to establish an overview of the status and progress in the country being monitored. Answering the questions related to these 16 indicators gives a good overview of the IWRM status in the country.

The 16 governance indicators serve three purposes:

- *Global overview:* Facilitating global scale monitoring of the countries’ progress towards IWRM
- *National overview:* Presenting the results nationally to demonstrate progress on IWRM implementation along with an analysis of needs and gaps.
- *Sector performance:* Facilitating national understanding of key elements in IWRM and the development of a national and local framework for monitoring of national water sector performance

Indicator adaptation to national settings in Zambia and Uganda

Zambia

During the consultations in Zambia and Bangladesh regarding the indicator development it was realized that there was a need, as in many other countries, to improve existing frameworks for water resource management monitoring. In Zambia a number of indicators existed for water as part of a nationally adopted monitoring framework:

- Number of monitoring boreholes constructed and rehabilitated in a year
- Number of hydrometric monitoring stations constructed and rehabilitated in a year
- Number of dams constructed and rehabilitated in a year
- Database for water resources established and upgraded
- Population with access to safe water
- Population with adequate sanitary facilities

The indicators relate to water supply and sanitation and partly to infrastructure development, but indicators for progress on IWRM are not included within this monitoring framework and there was a need to develop this further. In order to realise the full development impact of improving water management, it was also considered important to link the IWRM indicators to the National Development Plan and the general monitoring framework in Zambia. Eight indicators of particular relevance for national development in Zambia were

then proposed as part of the case study conducted by DHI. The eight indicators were tested using two different methods:

1. Qualitative interviews assessing the status in Zambia related to these 8 topics of IWRM
2. Ranking of the indicators according to the SMART criteria.

The following indicators received the highest scores from the respondents, on a scale from 0 to 30:

No.	Indicator name	Indicator description	Score
1	IWRM principles in the national water policy	The core principles of IWRM relating to equity, environment and economics are contained in the national water policy either explicitly or implicitly.	24,0
2	IWRM in national budgets	The national budget contains budget lines that detail planned expenditures that support the application of IWRM.	22,2
5	Stakeholder involvement	Framework/mechanisms for stakeholder participation established	21,8
13	Capacity building	Management potential and constraints considered, with a plan developed that addresses how gaps can be addressed.	21,4
4	Gender mainstreaming	Role of women in water management supported by law.	20,2

Figure 4: Assessment of test indicators in Zambia

Indicators 4, 5 and 13 are within the present monitoring framework for the National Development Plan in Zambia. The high score for indicators 1 and 2 might suggest that these be considered for future water sector monitoring in Zambia. Other indicators with a high score were: climate change adaptation, cost recovery, and impact assessment and procedures to protect water resources.

The result of this case study in Zambia was a proposal for a set of national IWRM indicators to be used for monitoring of annual IWRM progress in the country. The Water SAG (Sector Advisory Group) on Monitoring and Evaluation is currently considering the incorporation of these indicators in the monitoring framework for the 6th National Development Plan under preparation.

Uganda

The monitoring of water in Uganda is done within a framework with 11 key so-called “golden” indicators, out of which 9 are related to water supply and sanitation. It was decided to develop similar indicators for the environment and for water resource management. DHI facilitated development of IWRM indicators following a two-step approach.

First, the global 16 governance indicators developed under the case study in Zambia were used to get a general overview of the situation in terms of IWRM status in the country.

The analysis presented the different elements of IWRM, the areas that are well functioning, and those with gaps and needs to be addressed in IWRM planning and in the monitoring framework.

Next, as a result of this process 10 governance indicators were proposed (see Figure 5), based on the 16 global governance indicators, but adapted to the context in Uganda and with particular attention to areas where the previous analysis demonstrated gaps and needs. The 10 indicators were linked to basic IWRM functions as perceived in the country:

Function	Objective
Monitoring and Assessment	1. Water resources information system in place
	2. Assessment of Uganda’s water resources completed
	3. Water resources management data and information available to the public
Planning and Regulation	4. National and regional water resources management and development strategies in place
	5. Water efficiency and sustainability achieved through application of economic tools
	6. Sustainable water use - abstractions and discharges
Policy, Advice and Facilitation	7. IWRM policies and laws fully in place
	8. Securing effective cross-sectoral coordination at all administrative levels
	9. Water resources management at the lowest appropriate level with full stakeholder involvement
	10. Effective transboundary coordination through Nile Basin Initiative and Lake Victoria Basin Commission

Figure 5: Proposed IWRM governance indicators for Uganda

The above governance indicators can serve the overall purpose of monitoring IWRM progress, but in the process it became clear that there was a demand for performance indicators at a more operational level in order to oversee the performance of the water management institutions and to demonstrate progress

towards meeting the actual challenges and issues within the sector.

Such performance indicators for Uganda were developed in cooperation with the Directorate for Water Resource Management (DWRM) in Uganda and were based upon the gaps and needs

identified for the governance indicators and then linked this to annual work plans and the targets set for activities.

The purpose is to monitor progress towards targets set within water management institutions.

1.	% of present monitoring stations that are operational, data collected at given intervals and providing reliable data for the Water Resources Management Information System
2.	% completion of the national and regional assessments
3.	Number of requests for water resources data and information
4.	Number of national and regional water resources management and development plans developed with concrete project concepts
5.	Annual revenue from tariffs from water supply systems
6.	% of water abstraction and discharge permit holders complying with permit conditions
7.	Number of catchments plans following guidelines for environmental flow requirements, economic efficiency and social goals
8.	% of recommendations from Water Policy Committee meetings being implemented
9.	Number of decentralised Water Management Zones and stakeholder-lead Catchment Management Organisations established annually
10.	Number of transboundary projects developed and initiated

Figure 6: Proposed water sector performance indicators for Uganda

The proposed indicators are currently considered as part of the structure of the monitoring framework for water resources and their management in Uganda.

This process of indicator development at governance and performance level may inspire other water management agencies in search of a monitoring framework based on international experiences, but also closely linked to management functions and daily activities in the related organizations.

Options for further indicator development

During the process of developing indicators for water resource management DHI has developed:

1. 16 governance indicators to monitor countries' progress towards IWRM on a global scale
2. A framework for monitoring national IWRM progress
3. Tools to adapt general governance indicators to national settings
4. Tools for monitoring of water sector performance at national and institutional level

The tools and indicators have benefitted from being tested in three different national settings, but this is still work in progress and further testing may improve the applicability of these tools for other countries. The indicators will also benefit from further refinement in their description, but are now ready to use for global or national IWRM surveys, bearing in mind the need to account for the national context.

Further testing, and refinement of the indicators based on the testing, along with inclusion of a framework for monitoring social and economic benefits from improving water management will be among the challenges for future activities related to indicator development.