Advance Copy

To be launched 19 June 2012, Rio de Janeiro

UN WATER Report

Status Report on
The Application of
Integrated Approaches to

Water Resources Management

2012

UNEP

UNDP

Empowered lives.
Resilient nations.

Global Water Partnership

SIWI

UNEP-DHI CENTRE for Water and Environment

UNEP DHI

UN WATER Reports

UN-Water is the United Nations inter-agency coordination mechanism for all freshwater related issues. Established in 2003, UN-Water fosters greater co-operation and information sharing among UN entities and relevant stakeholders.

UN-Water monitors and reports on the state, utilization and management of the world's freshwater resources and on the situation of sanitation through a series of inter-connected and complementary publications that, together, provide a comprehensive picture and, individually, provide a more in depth analysis of a specific issues or geographic areas.

PERIODIC REPORTS:

World Water Development Report (WWDR)

is coordinated by the World Water Assessment Programme (WWAP) on behalf of UN-Water and published every three years. It provides a global strategic outlook on the state of freshwater resources, trends in use of the resource base in the various sectors (inter alia, agriculture, industry, energy) and management options in different settings and situations (inter alia, in the context of urbanization, natural disasters, and impacts of global climate change). It also includes regional assessments.

- ✓ Strategic outlook
- ✓ State, uses and management of water resources
- ✓ Global
- ✓ Regional assessments
- ✓ Triennial (4th edition)

Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS)

is produced every two years by the World Health Organization (WHO) on behalf of UN-Water. It provides a global update on the policy frameworks, institutional arrangements, human resource base, and international and national finance streams in support of sanitation and drinking water. It is a substantive input into the activities of Sanitation and Water for All (SWA).

- ✓ Strategic outlook
- ✓ Water supply and sanitation
- ✓ Global
- ✓ Regional assessments
- ✓ Biennial (since 2008)

The progress report of the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP)

is produced every two years. The JMP Report is affiliated with UN-Water and presents the results of the global monitoring of progress towards MDG 7 target C: to halve, by 2015, the proportion of the population without sustainable access to safe drinking-water and basic sanitation. Monitoring draws on the findings of household surveys and censuses usually supported by national statistics bureaus in accordance with international criteria.

- ✓ Status and trends
- ✓ Water supply and sanitation
- ✓ Global
- ✓ Regional and national assessments
- ✓ Biennial (since 1990)

In the years 2012 – 2013 UN-Water also publishes:

2012 **UN-Water Report on Integrated Approaches in the Development, Management and Use of Water Resources** is produced by UN-Water for the Rio+20 Summit (UNCSD 2012). A similar status report was produced in 2008 for UNCSD. The report assesses the status and progress of the management of water resources in UN Member States and reports on the outcomes and impacts of improved water resources management.

2013 **UN-Water Country Briefs** pilot project. They provide a strategic outlook on the critical importance of investments in water for human and economic development at country level.

More information on UN-Water Reports at: www.unwater.org/documents.html

Status Report on The Application of Integrated Approaches to Water Resources Management

2012

Acknowledgements
This report is primarily based on substantial contributions of information from UN member states. Government officials from more than 130 countries provided detailed responses to the Level 1 survey, and interviewees in 30 countries provided important additional information through the Level 2 survey. UN-DESA and UN-Water facilitated the roll-out of the Level 1 survey with support from SIWI and UNEP-DHI on data management. The Regional Water Partnerships of the GWP facilitated the Level 2 survey. Data analysis and preparation of the draft report was carried out by a Working Group with the following members: Peter Koefoed Bjørnsen (Coordinator), Paul Glennie, Gareth James Lloyd and Palle Lindgaard-Jørgensen from the UNEP-DHI Centre; Alan Hall from Global Water Partnership; Joakim Harlin from UNDP; Josephine Gustafsson and Jakob Ericsson from Stockholm International Water Institute; Kurt Mørck-Jensen from the Danish Institute for International Studies; and Gordon Young, Paul Taylor and Binay Shah as independent consultants. All the participating organizations provided in-kind support to the survey. External financial support has been received from Danida and from the UN-Water Trust Fund. The Working Group received valuable guidance from a UN-Water Task Force chaired by Thomas Chiramba (UNEP).

Publication: Status Report on The Application of Integrated Approaches to Water Resources Management
ISBN: 978-92-807-3264-1
Job Number: DEP/1532/NA

Suggested citation
UNEP 2012. The UN-Water Status Report on the Application of Integrated Approaches to Water Resources Management.

Design and Layout: UNEP, Division of Communications and Public Information, Nairobi, Kenya.

Table of Contents





FOREWORD v

EXECUTIVE SUMMARY vi

The rationale for a status report on water resources management vi
Key messages and recommendations vi
Specific findings from the survey vii

1 THE SETTING 1

1.1 Water resources under threat: the changing world from Rio to Rio+20 2
1.2 The international response since 1992 3
1.3 Objectives of the global survey on water resources management 4
1.4 Assessment methodology 5
1.5 Country categorization 6
1.6 Response to the survey 6
1.7 Structure of the following chapters 7

2 CREATING THE ENABLING ENVIRONMENT 11

2.1 Policies, laws and plans 12
2.2 Transboundary cooperation 16
2.3 Management constraints 17
2.4 Summary of progress on creating the enabling environment 17

3 ESTABLISHING GOVERNANCE AND INSTITUTIONAL FRAMEWORKS 19

3.1 Institutional frameworks 20
3.2 Stakeholder participation 23
3.3 Capacity building 24
3.4 Management constraints 26
3.5 Summary of progress on establishing governance and institutional frameworks 26

4 APPLYING MANAGEMENT INSTRUMENTS 29

4.1 Progress with management instruments 30
4.2 Management instruments and the integrated approach 35
4.3 Summary of progress on applying management instruments 36

5 DEVELOPING INFRASTRUCTURE 39

5.1 Investment plans and programs 40
5.2 Summary of progress on developing infrastructure 42

6 FINANCING WATER RESOURCES MANAGEMENT AND DEVELOPMENT 45

6.1 Sources of finance 46
6.2 Payment for water resources 47
6.3 Management constraints 48
6.4 Summary of progress on financing for development of water resources 49





7 COUNTRY PERCEPTIONS OF KEY ISSUES 51

7.1 Issues for water development and use 52
7.2 Issues for water resources management 53
7.3 Threats to development 55
7.4 Threats from climate change 57
7.5 Summary of key issues from country perceptions 58

8 MULTIPLE USES OF WATER RESOURCES 61

8.1 Water and the natural environment 62
8.2 Water for food 64
8.3 Water and energy 65
8.4 Efficiency in water use 66
8.5 Summary of multiple uses of water resources 67

9 DEVELOPMENT IMPACTS OF IMPROVED WATER RESOURCES MANAGEMENT 69

9.1 Social impacts 70
9.2 Economic impacts 71
9.3 Environmental impacts 72
9.4 Overall development impacts 72
9.5 Summary of development impacts of improved water resources management 73

10 OVERALL PROGRESS ON INTEGRATED APPROACHES TO WATER RESOURCES MANAGEMENT 75

10.1 Application of integrated approaches to water resources management 76
10.2 Water resources management in a broader development context 77
10.3 A Permanent reporting mechanism on water resources management, development and use 78
10.4 Key messages and recommendations 79

ANNEXES 81

Annex A UN-Water Questionnaire (English version) 81
Annex B Letter to UN member states from UN-DESA 93
Annex C Guidelines for interview survey 94
Annex D Lists of countries participating in Level 1 and Level 2 surveys 102

LIST OF FIGURES 104

LIST OF BOXES 106

(Summarizing responses to the Level 2 Survey)

LIST OF TABLES 106

Foreword

The Rio+20 United Nations Conference on Sustainable Development marks 20 years since the historic Earth Summit[1] that was instrumental in laying the foundations and charting the course for contemporary sustainable development.

This report looks at the issues that pertain to the management, development and use of fresh water resources. Its starting point is in the Earth Summit's Agenda 21 recommendation for an integrated approach to the management of water resources. This report demonstrates that while there is still a long way to go, progress towards the goal of sustainable water resources management is undoubtedly being made.

For example, the report shows that 64% of countries have developed integrated water resources management plans and 34% report an advanced stage of implementation. However, progress appears to have slowed, or even regressed, in low and medium Human Development Index (HDI) countries since the last survey carried out in 2008. Much remains to be done to finance and implement plans in many HDI countries.

The Rio+20 conference has chosen Green Economy in the context of sustainable development and poverty eradication as an overarching theme for realizing transformational change.

One of the challenges, and opportunities, of Rio+20 is to define ways of scaling-up and accelerating the myriads of positive sustainable development actions and initiatives that are flourishing across the globe, including in the area of water resources. It is hoped that the findings and lessons captured herein will help the Rio+20 negotiators set targets and reach agreement on actions to advance more effective management, development and use of this essential resource for peoples (or households), economies and the natural world.

The report is part of the stock-taking needed in the run-up to Rio+20, but is also necessary in order to recalibrate the sustainable development compass to allow Earth's seven billion inhabitants, which will rise to over nine billion by 2050, to prosper and fulfill their full potential. Rio+20 is likely to set a process in motion to deliver a range of new goals for after 2015 aimed at bringing rich and poor nations into more cooperative efforts towards a sustainable 21st century.

This report, rich in analysis and recommendations, can assist in defining how those new transformational goals can be forged – and, more importantly, be met – over the coming years and decades. UN-Water will strive to contribute to this process through improved monitoring and reporting to inform policy-making, advocacy and capacity development, and through more effective coordination across the spectrum of UN agencies involved in water in lending support to countries toward achieving sustainable water resources development and management.

Achim Steiner,
United Nations Under-Secretary General and Executive Director, United Nations Environment Programme

Michel Jarraud,
Secretary-General, World Meteorological Organization and Chair, UN-Water

[1] More formally known as United Nations Conference on Environment and Development

Executive summary

At the request of the UN Commission on Sustainable Development a global survey has been carried out to determine progress towards sustainable management of water resources using integrated approaches. Findings from the analysis of data from over 130 countries show that there has been widespread adoption of integrated approaches with significant impact on development and water management practices at the country level.

The rationale for a status report on water resources management

Agenda 21 of the UN Conference on Environment and Development (UNCED) in 1992 called for "*the application of integrated approaches to the development, management and use of water resources*" (Chapter 18). UNCED recognised the challenges of managing water resources for a multiplicity of uses and threats which are set within the much broader contexts of changes in the economic, social and political landscapes.

UN-Water was asked by the UN Commission on Sustainable Development (UN CSD, at its meeting in 2005) to produce status reports on the progress of water resources management for the UN CSD meetings in 2008 and 2012. UN-Water called upon UNEP to lead a UN-Water Task Force on Water Resources Management and established a Working Group[1] to prepare the present status report for submission to the UN CSD 2012, the Rio+20 conference.

The report follows an earlier UN-Water report presented to the 16th session of the CSD in 2008 which primarily took stock of the development and implementation of Integrated Water Resources Management and Water Efficiency Plans, as required in the 2002 Johannesburg Plan of Implementation (JPoI). The present report is more extensive, covering more countries and addressing the development, management and uses of water resources, as well as the possible outcomes and impacts of integrated approaches. It is based on a 2011 UN-Water survey sent to the governments of all UN member states and a series of complementary interviews in 30 representative countries.

The report is intended to inform decision-making at the Rio+20 conference and follow-up global policy discourses. It will facilitate information exchange to enhance the coherence and impact of national efforts to improve water resources management and related work of the UN and other external support agencies at country level.

Key messages and recommendations

The following key messages and recommendations are based on an assessment of the findings from the survey[2]. The specific findings are summarized further below.

1. **Since 1992, 80% of countries have embarked on reforms to improve the enabling environment for water resources management based on the application of integrated approaches as stated in Agenda 21 and affirmed in the Johannesburg Plan of Implementation.**

   To ensure continued progress and positive outcomes in applying integrated approaches to water resources management, government and external support agencies should learn from experience and increase their efforts. Implementing integrated approaches to water resources management should remain a key component of future development paradigms.

2. **Water-related risks and the competition for water resources are perceived by a majority of countries to have increased over the past 20 years.**

   Given the increasing challenges and risks, it is important that the international community supports countries to operationalize integrated approaches that focus on solutions that address country priorities and needs.

3. **Countries that have adopted integrated approaches report more advanced infrastructure development but further efforts are needed to ensure appropriate levels of coordination.**

   Countries should be supported in adopting integrated approaches to water resources management that are coordinated with the development of infrastructure to achieve growth and sustainable development goals.

4. **Countries report a gradual but positive trend in financing for water resources development and management with more diverse sources of finance, but little progress on payment for water resources services.**

   More effort is needed to increase levels of financing for water resources management and to raise revenues from water resource and ecosystem services. Appropriate recording of financing for water resources development and management is needed in reporting mechanisms.

[1] The UN-Water Working Group comprised members from UNEP, UNEP-DHI Centre, UNDP, SIWI, GWP and independent consultants and was funded from the UN-Water Trust Fund and Danida. The Working Group also drew on inputs from numerous other UN agencies and other organizations.

[2] See footnote 1

5. **Countries report improvements to the institutional framework together with improved policies, laws and systems over the past 20 years. This has led to better water resources management practices bringing important socio-economic benefits.**

   Targeted support is necessary to continue to improve the institutional framework for water resources management with emphasis on the group of countries with a low Human Development Index (HDI)[3].

6. **Integrated approaches to water resources management and development are critical for progress towards a green economy.**

   The integrated approach to water resources management, as defined in Agenda 21, remains relevant and must be a key component of emerging strategies towards a green economy in the context of sustainable development and poverty eradication and a key element in building climate resilience.

7. **The survey has demonstrated the progress made with integrated approaches to water resources management as called for at the UNCED in 1992. To capitalise on this progress and ensure continuity the following target is proposed for the Rio+20 conference to consider:**

   By 2015, each country to develop its specific targets and timeframes for preparing and implementing a programme of action and financing strategy to take its integrated approaches to water resources management forward in accordance with UNCED 1992 and subsequent global agreements.

8 **The high country response to the survey demonstrates the value of reporting and emphasizes the need for a more rigorous, evidence-based, reporting system on progress with water resources development and management. The following target is proposed for the Rio+20 conference to consider:**

   By 2015 a global reporting mechanism on national water resources management be established. UN-Water is committed to facilitate and coordinate this process, drawing on its existing mechanisms.

Specific findings from the survey

The global survey carried out in 2011 has produced a wealth of data on water resources management from a country perspective. The survey report has generated a number of specific findings that can substantially support the process for the Rio+20 Conference.

Creating the enabling environment

- 82% of countries are implementing changes to their water laws in what has been a far-reaching outcome of Agenda 21 proposing integrated approaches for the development, management, and use of water resources.
- 79% of countries report changes in their water policy, however translating policy and legal changes into implementation is a slow process.
- The survey showed that 65% of countries have developed integrated water resources management plans, as called for in the JPoI, and 34% report an advanced stage of implementation, however, progress appears to have slowed or even regressed in low and medium HDI countries since the survey in 2008.
- 67% of countries reported the inclusion of water in national/federal development planning documents. Approximately a quarter of countries reporting on constraints noted obstacles relating to legal frameworks and strategic planning.

Establishing governance and institutional frameworks

- Institutional reforms have been undertaken in many countries, correlating well with countries implementing legal and policy reforms. The aim has been to increase joint decision-making at national level, facilitate management at the basin level (71% of countries) and to legitimize stakeholder structures at community level. Country interviews indicate that institutional reform is slow but is showing efficiency gains.
- A minority of countries indicate progress with stakeholder participation. There are reports from the country interviews that some countries have gained from effective stakeholder participation but more experience needs to be shared on how to get it right to avoid delays and high transaction costs.
- Around 35% of countries have an advanced level of action across most of the capacity building areas however the need for capacity to implement an integrated approach is felt across all of the HDI groups.
- The survey shows that efforts over the past 20 years to improve governance of water resources have been significant but this clearly remains an on-going process for most countries. The benefits in some cases are far reaching.
- Most common constraints to the development of appropriate institutional arrangements relate to mandates; cross-sector coordination; capacity; and participation/ awareness.

[3] The Human Development Index (HDI) is a composite index that measures health, knowledge, and income. Countries are categorized in four HDI bands: "Low", "Medium", "High" and "Very High"

Applying management instruments

- Progress on integrated approaches to water resources management is demonstrated by a strong correlation of the results between progress on the enabling environment of policy, law and plans and a positive impact on management practices.
- Water resources assessment and monitoring systems are being implemented in over 60% of countries.
- Water resources management programmes (includes allocation systems, groundwater management, environmental impact assessment, demand management among others) are being implemented in more than 84% of the highest HDI group countries but only around 40% of other countries.
- Level of development does not seem to be a barrier to improved management of water resources. The survey shows that progress is not constrained, or guaranteed, by HDI status. While very high HDI countries tend to cluster at the top this is not an exclusive space.

Developing infrastructure

- Infrastructure development is at an advanced stage in some important areas with over 65% of countries reporting advanced implementation of water supply and hydropower infrastructure. However, fewer countries report advanced implementation for irrigation, rainwater harvesting. and investment in natural systems.
- The analysis of the survey demonstrated a weak positive relationship between the development of the enabling environment for an integrated approach and progress with infrastructure. However the interview reports indicated that the level of coordination in infrastructure development among sectors could be improved.

Financing for development of water resources

- The responses indicate that a majority of countries report an increasing trend in financing for water resources development and management over the last 20 years from all sources. Slightly more than 50% of low HDI countries indicate an increasing trend for Government budgets and Official Development Assistance.
- Whilst there has been some progress on raising revenues for water resources management from users and polluters, there is still much to do, especially regarding payment for ecosystem services, where the available data indicates that countries have made limited progress.
- Approximately 50% of the total number of countries reporting on constraints noted that they faced management obstacles relating to financing.

Key issues from country perceptions

- Countries consider that all water development issues listed in the questionnaire are of high priority and have increased in significance over the past 20 years. Domestic water supply is clearly ranked by most countries as the highest priority for all HDI groups with water for growing cities ranked second. Water for agriculture is a high priority for many low HDI countries. Water for environment is a priority mainly for the very high HDI countries.
- Countries perceive most water management issues to be a high priority and that they have increased in significance. Many countries give a high priority to infrastructure development/financing, legislation and the financing for water resources management.
- Many countries across all HDI groups consider threats from floods and droughts to be a high priority and that the significance of such threats has increased.
- Climate change is perceived as increasingly significant for many countries although it is considered less of a threat by low HDI countries compared with other water development and management issues.

Multiple uses of water resources

- Sustainable management and development of water resources is the foundation of a green economy and essential for inclusive growth. Water resources management underpins and interacts with all the pillars of the green economy, including environmental protection, food and energy.
- On all questions concerning the environment the very high HDI group consistently registers higher concern than any other HDI group.
- It is clear that most countries register concern with the sustainability of natural ecosystems as well as with food and energy concerns. Many countries are taking an integrated approach to these concerns, but many more still need to do so.
- While water use efficiency is high priority in a good majority of countries, it is clear that introduction and implementation of water efficiency measures is, in general, lagging behind particularly in low HDI countries. In the lowest three HDI categories water efficiency is not perceived to be integrated into water resources management. Even for very high HDI countries less than 50% have advanced implementation or full implementation.

Development impacts of improved water resources management

- 54% of Very High HDI countries, 44% of medium and high HDI countries and 24% of low HDI countries reported high economic impacts from integrated approaches to water resources management. The most common impact for all HDI categories was an increase in productive efficiency related to water use, most commonly for agriculture.

- Very high HDI countries reported by far the greatest positive environmental impacts from improved water resources management, especially related to improved water quality, often due to improved wastewater treatment. Improved flood and drought prevention/management are reported by several countries.
- The country responses across all HDI bands indicate that the main social impact over the past 20 years has been an improvement in water supply access. A number of countries in all HDI categories noted a contribution to improvements in human health, including a reduction in child mortality.

The strengths of the survey

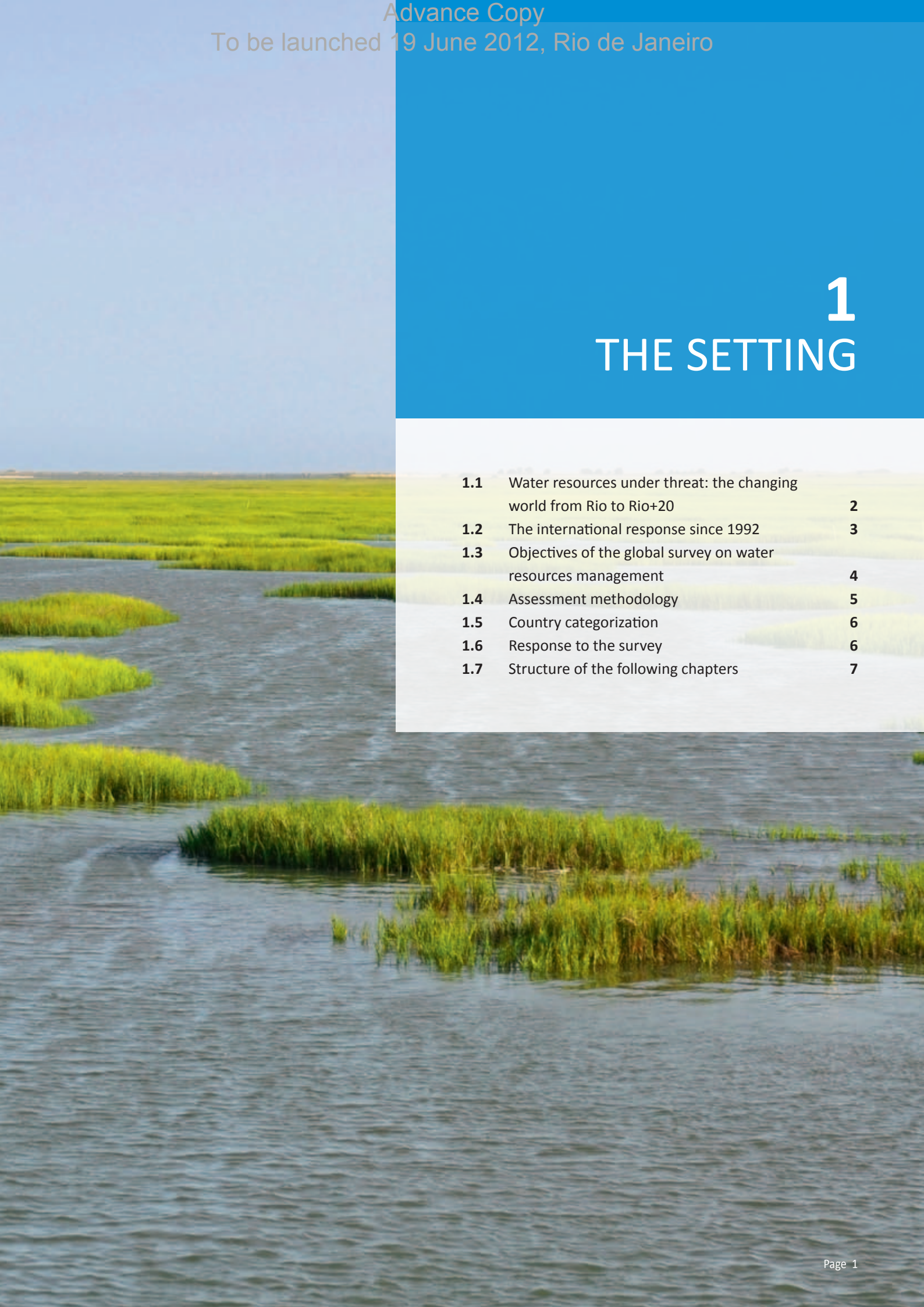
- The high response, with two thirds of all UN member states responding within a short time frame, indicates the interest in the survey and the importance of this issue. The report is based on the most comprehensive survey yet of the status of water resources management and paves the way for a more strategic approach to monitoring and reporting on this critical issue.
- In contrast to the surveys used for the corresponding report for CSD16 in 2008, all countries were simultaneously requested to respond to the same questionnaire covering a wide range of water resources issues, ranging from uses of and threats posed by the resource through description of the enabling environment, measures taken to address issues and the outcomes of actions taken.

The limitations of the survey

- Reporting on an issue of such complexity naturally leads to some shortcomings. These include ensuring equal objectivity in the responses between countries; and getting single responses to characterize a country with diverse circumstances and regions.
- Focusing at the national level may not capture transboundary responsibilities as well as responsibilities at sub-national levels (especially in federal administrations). Finally, focusing on official government responses excludes any check or balance from others' perspectives, although this was partly addressed by interviews in selected countries.

PHOTO: SHUTTERSTOCK

PHOTO: SHUTTERSTOCK



1 THE SETTING

1.1	Water resources under threat: the changing world from Rio to Rio+20	**2**
1.2	The international response since 1992	**3**
1.3	Objectives of the global survey on water resources management	**4**
1.4	Assessment methodology	**5**
1.5	Country categorization	**6**
1.6	Response to the survey	**6**
1.7	Structure of the following chapters	**7**

1.1 Water resources under threat: the changing world from Rio to Rio+20

The challenges of managing water resources for a multiplicity of uses and threats must be set within the much broader contexts of changes in the economic, social and political landscapes. The world has changed dramatically in a number of ways since the Rio Earth Summit in 1992.

Prominent among these changes:

- Demographics – population increased from about 5.3 billion in 1992 to about 7.0 billion today; felt disproportionally strongly in less developed countries. This has been accompanied by increased migrations of populations from rural to urban settings and high refugee movements due to climatic and social disasters with consequences for water resources management and use.
- Demand for water has increased dramatically resulting from, inter alia, increased wealth and increased demand for food and energy;
- Competition between uses has increased resulting in difficult allocation decisions;
- Geo-political realignment – the breakup of states such as the former USSR or Yugoslavia contrast with new groupings such as the European Union that has been expanding over the last two decades. Several countries in East and South Asia have dramatically grown in economic strength leading to changes in international trade having implications for water resources management.
- Climate change – increasing evidence of changes to the earth's climate has prompted concern and controversy. The need to cope with existing variability and to adapt and build resilience brings significant implications for water resources availability and reliability associated with the greater likelihood of extreme events;
- In many regions water availability has been reduced due to mining of groundwater, pollution and abstraction from upstream water sources;
- Economic turmoil – Following a sustained period of growth, the 2008 economic and financial crises is undermining the integrity and stability of financial institutions, slowing down development and reversing gains in poverty reduction.
- Communications advances – radical developments in our ability to communicate using mobile phones, through the internet and other social networking systems has facilitated knowledge sharing and global debate.

These changes, inter alia, form the backdrop against which water resources management must be evaluated. The growing need to address water resources emanates from profound failures in water management over many years, as many studies have shown. The rapidly accelerating pressures on freshwater systems arising from increasing demands and climate change are exacerbated by local management, which is not equipped to adapt and respond adequately. As a result the resilience of water resources and ecosystems is threatened, as is the well-being of communities and the economic growth of countries and industries that are dependent on their related services. These issues are elaborated in a number of other reports and background papers such as the WWDR-4, GEO-5 and the Bonn declaration.

Among the major international water management events of the past few decades the 1992 United Nations Conference on Environment and Development (UNCED) held at Rio de Janeiro stands out as an event of outstanding importance. UNCED covered a very broad range of development issues and from a water resources perspective was informed by the International Conference on Water and the Environment with its highly influential "Dublin Principles". UNCED produced "Agenda 21" which in Section 2 of Chapter 18 on Freshwater Resources emphasized "The holistic management of freshwater… and the integration of sectoral water plans and programmes within the framework of national economic and social policy, are of paramount importance for action in the

PHOTO: SHUTTERSTOCK

1990s and beyond". Chapter 18 called for "**the application of an integrated approach to the development, management and use of water resources".** This "integrated approach", often shortened to IWRM, is now being adopted universally and the results of the adoption of such an approach is the focus for the current survey.

Another major international conference on development was the UN Millennium Assembly in 2000, which resulted in agreement on a set of Millennium Development Goals (MDGs). Water resources management underpins all 8 of the MDGs and is directly linked to the realisation of Goal 7 on ensuring environmental sustainability. The MDGs have had a major strategic influence on development policy in the last decade.

1.2 The international response since 1992

While the Agenda 21 covered most aspects of water resources management, some have assumed much greater importance in the intervening 20 years. Similarly, while improved water resources management and development is fundamental to achieving all the MDGs, it is not specifically mentioned. This has hampered efforts to raise the profile of water resources in policy debates.

Transboundary water issues were given little prominence in 1992; indeed many countries in sensitive transboundary situations were reluctant to discuss such issues. While sensitivities still persist, it is now more readily accepted that upstream-downstream relationships must be more openly discussed as the issues are often critical to the maintenance of peace, good relations and prosperity. The discourse now not only pertains to surface waters but increasingly include transboundary aquifers.

The implications of climate change, while recognized in 1992, have really come to the fore in the past decade. As water is the principle medium through which climate change expresses itself, adaptation to climate change – and the need to build resilience – is increasingly being approached through water management initiatives.

Food security is critically dependent on the adequate quantity and quality of water supply – it has become of paramount importance in many less developed countries of the world. Energy supply is also recognized as of fundamental importance to economic and social development – the supply of energy from several sources is intimately linked to water availability. Water, energy and food linkages are identified as of prime importance in development towards a green economy.

PHOTO: SHUTTERSTOCK

Ten years after the UNCED a major impetus to improving water management through the adoption of the Integrated Water Resources Management (IWRM) approach was provided by governments at the 2002 World Summit on Sustainable Development (WSSD), held in Johannesburg, South Africa. One hundred and ninety three countries agreed to the Johannesburg Plan of Implementation (JPOI), in which Article 25 calls for "the development and implementation of IWRM and water efficiency strategies, plans and programmes at national and at regional levels, with national-level IWRM plans to be developed by 2005".

Under the auspices of UN-Water the first official status report on the WSSD resolution was submitted to the 16th session of the UN CSD in 2008. The report covered 104 countries (77 developing countries/economies in transition; 27 developed countries) in 2007/2008[4] and incorporated surveys carried out by UN-Water, UNEP, GWP and the African Development

[4] Status report: http://www.unwater.org/downloads/UNW_Status_Report_IWRM.pdf

Bank. The consolidated results from several questionnaires[5] indicated that 6 of the 27 developed countries had fully-implemented IWRM plans in effect, with another 10 having such plans in place or partially implemented. Only 38% of the 77 developing countries had completed plans (33% of the Asian countries; 38% of the African countries; 43% of the countries in the Americas) while the implementation level varied greatly. Vital information on the efficiency of water use was often ambiguous or lacking. The survey noted that developed countries were the leaders on issues such as public awareness campaigns and gender mainstreaming, while the Asian countries were the leaders in institutional reform issues. Africa was further advanced among the developing countries in stakeholder participation, microcredit programmes, and subsidy issues; it was however behind the Americas and Asia on other IWRM-related issues.

[5] The relevant questionnaires and surveys were carried out by UN Water, UNEP, Global Water Partnership and the African Development Bank. See: Annexes to the Status Report on Integrated Water Resources Management and Water Efficiency Plans: http://waterwiki.net/images/d/dd/UN-Water_IWRM_Report_for_CSD16_Annexes_1-7.pdf

The Secretary General's input to the current Fourth Implementation Cycle of the CSD stresses that:

"The Integrated Water Resources Management and water efficiency plans that were called for at the 2002 WSSD triggered a process linking water management to national planning, budgeting and priority setting. Now is the time to move beyond this first step to ensure that water managers participate alongside finance and planning managers in national development planning processes….".

1.3 Objectives of the global survey on water resources management

Effective water resources management must be underpinned by knowledge and understanding of the availability of the resource itself, the uses to which water is put and the challenges facing the managers at all levels of government. Countries have a great deal to learn from knowledge of conditions in other countries and the measures being taken elsewhere to address the challenges. Thus the need for global surveys conducted in an objective and consistent manner.

PHOTO: SHUTTERSTOCK

The current report, requested by CSD and overseen by UN-Water, was drafted by a Working Group led by UNEP. While the main purpose of the UN-Water report to the 16th session of the CSD in 2008 was to take stock of the development and implementation of IWRM and Water Efficiency Plans, from the JPOI, the purpose of this report is to focus on progress in the application of integrated approaches to the development, management and use of water resources. The report addresses planning, implementation as well as the possible outcomes and impacts of integrated approaches. It covers a broader range of countries, than the 104 countries whose information was considered in the 2008 report to CSD 16.

This report focuses on the status of the management of water resources in UN member states, identifies the current barriers to progress, and suggests ways in which these barriers can be overcome. Reporting on the outcomes and impacts of the application of integrated approaches to water resources management will inform the global policy discourse and the decision making of Rio+20 in particular. Furthermore, the report contributes to the development of a permanent monitoring and reporting framework to promote more sustainable development and management of freshwater resources after 2012. Finally, the work facilitates information exchange among UN agencies, national governments and civil society in a way that will enhance coherence and impact of the work of the UN at country level.

1.4 Assessment methodology

The UN-Water assessment survey was based on two surveys: A questionnaire-based survey (Level 1 survey) among all UN countries, and an interview-based survey (Level 2 survey) in 30 representative countries. The questionnaire and interview guidelines were developed by the Working Group.

A questionnaire-based survey (Level 1 survey) was sent out in March 2011 through UN-DESA to the governments of all 192 countries on the official UN listing. It is a multiple-choice questionnaire similar to the survey carried out by UN-Water in 2007 (and presented to CSD 16 in 2008), but broadened to cover additional issues.

The questionnaire was broken down into a sequence of sections:

- Context;
- Policy, strategic planning and legal frameworks;
- Governance and institutional frameworks;
- Management instruments;
- Infrastructure development;
- Financing water resources management;
- Outcomes of integrated approaches to water resources management.

The response of Canada illustrates the challenge of including sub-national responsibilities: "Regional diversity (environmental, social, and economical) creates very different needs and scales for IWRM. In particular, implementing an IWM (*sic*) approach in small, rural/remote areas of Canada is challenging. A single national-level approach is difficult and would not necessarily be suitable for a geographically large and varied country such as Canada. Therefore, IWM is primarily addressed at the appropriate local, regional and/or watershed level. Multiple federal jurisdictions with some responsibility or linkage to water resources (whether it be legislative, regulatory, or otherwise) can create challenges for co-ordinating integrated responses in IWRM."

The Level 1 survey provide self-assessment by national governments of concerns regarding uses of water resources and threats posed by extreme events, the enabling environment, aspects of management and development, and the outcomes of actions taken. The simultaneously collected data provide for comparative analysis.

However, a survey of this character has limitations that need to be taken into account when evaluating the conclusions of the report. Important among these are:

- The survey captures the official perspective of governments and may not provide any check or balance from other stakeholder perspectives.
- The difficulty of giving single responses to characterize a whole country when circumstances in different regions of the country are very diverse.
- The difficulty that a survey aimed at national governments may well not represent the management responsibilities at sub-national levels. This may be particularly the case in federal administrations.
- The difficulty of ensuring equal objectivity in the responses between countries.

An interview based survey (Level 2 survey) was carried out in 30 representative countries and was designed to provide a more detailed in depth understanding of country situations. The interviews were conducted by a local consultant identified and contracted through the networks of the Global Water Partnership, World Water Assessment Programme and the United Nations Development Programme.

The Level 2 survey was an extension of Level 1 in the form of questions and issues to be discussed in structured interviews. Four components from Level 1 were included in these interviews:

- Policy and legal frameworks
- Governance and institutional frameworks
- Management instruments
- Infrastructure development

The Level 2 survey further qualified the findings from Level 1 through opinions and experiences from government and non-government stakeholders. The interviewers for Level 2 were given interview guidelines and the response of the Level 1 questionnaire for the country in advance of the task.

The interviews provided a narrative story of the situation in each Level 2 country. It deepens the understanding of outcomes, impacts and remaining priority challenges in water resources management and provides illustrative examples. The result is not a consolidated "country report" on water resources management for each country, but rather a collection of assessments and experiences ordered according to chapters of the global report.

1.5 Country categorization

In the previous report on the status of integrated approaches to water resources management to the UNCSD in 2008, countries were grouped using the Organization for Economic Co-operation and Development (OECD) categorization. This categorization consists of a relatively small group of "developed countries" and a much larger group of "developing countries". In an effort to produce a more nuanced analysis a decision was made to adopt the UNDP Human Development Index (HDI), a categorization that is both widely accepted and used – although like all other indices, it also has its supporters and detractors.

The HDI is a summary composite index that measures a country's average achievements in three basic aspects of human development: health, knowledge, and income. The index was created to emphasize that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone (UNDP 2010). Countries are categorized into four HDI bands:

Figure 1.1 **Human Development Index (HDI) groupings 2011**

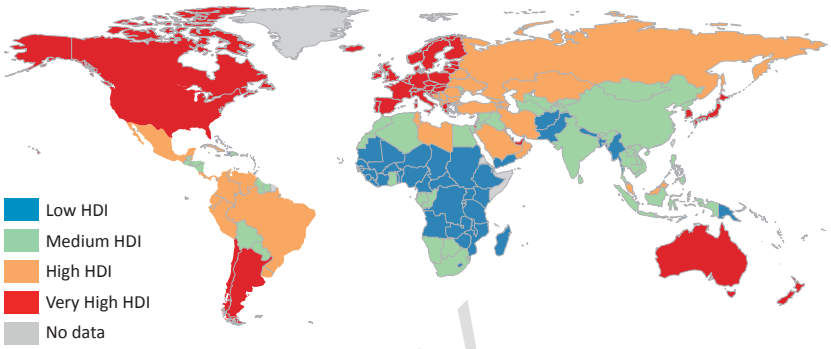
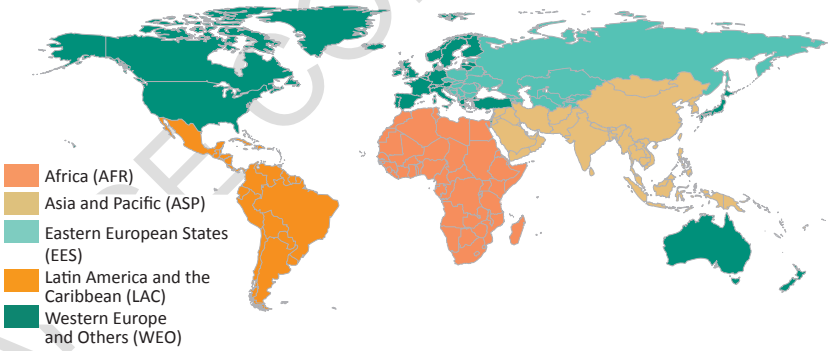


Figure 1.2 **UNCSD Major regions**



"Low HDI", "Medium HDI", "High HDI" and "Very High HDI" (see Figure 1.1 below). The UNCSD Major Regions are shown in Figure 1.2.

1.6 Response to the survey

Countries have responded well to the surveys. 134[6] countries have responded to the Level 1 survey, corresponding to some 70% of UN member states with fairly even distribution among geographical regions and HDI groupings (Figure 1.3 and Table 1.1). The response rate to particular questions was consistently very high at over 95% with very few questions having multiple answers from some countries. Many of the questions are somewhat overlapping in content and thus in many instances our approach has been to amalgamate the responses to groups of similar questions, thereby also increasing the robustness of the data. The Level 2 survey, with responses from 30 countries, representative of the totality of countries, supplement the Level 1 survey and give more in-depth responses to many questions, but are not necessarily completely representative of the views of national governments.

[6] While 134 countries provided responses, one country, India, provided a narrative response to some of the key issues, but did not fill out the questionnaire. Therefore all quantitative analysis in this report is based on the responses of 133 countries, or 69% of the 192 UN member states at the time the questionnaire was distributed.

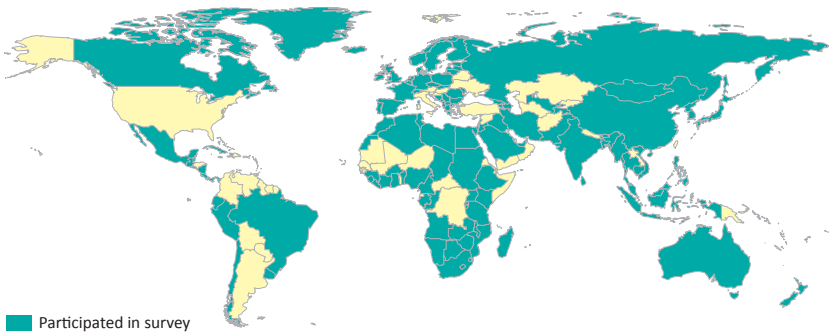
Table 1.1 **Survey response summary**

Level 1 survey responses				Level 2 survey responses
	Number	Percentage responded within each category	Percentage responded of total	Number
Total	133[6]	69%		30
HDI Groupings				
Low HDI	32	71%	24%	8
Medium HDI	31	66%	23%	9
High HDI	36	75%	27%	10
Very High HDI	34	72%	26%	3
Major Regions				
Africa (AFR)	40	75%	17%	10
Asia & Pacific (ASP)	28	60%	21%	7
Eastern European States (EES)	19	70%	30%	4
Latin America & Caribbean (LAC)	22	67%	14%	7
Western European & Other (WEO)	24	75%	18%	2

The full listing of countries which responded to Level 1 and Level 2 are given in Annex D.

A data book is available online in which responses to the Level 1 questionnaire are given in amalgamated form based on HDI groupings and regional breakdowns (www.unepdhi.org).

Figure 1.3 **Questionnaire submission status**



1.7 Structure of the following chapters

In the previous sections the background and rationale for integrated approaches to water resources management has been outlined, following which the basis and approach for reporting to the UNCSD in 2012 has been introduced. In subsequent chapters attention is given to reporting on the progress of countries in developing and implementing integrated approaches in response to the call from UNCSD in Rio in 1992 as follows:

[6] See footnote 6, page 6.

Creating the enabling environment: Chapter 2 reports the extent to which countries have been able to create an enabling environment. This involves developing and implementing the required policy, planning and legal framework needed for guiding and coordinating water resources management, development and use.

Establishing governance and institutional frameworks: Chapter 3 reports the extent to which countries have been able to establish the political, social, economic and administrative systems needed for managing the development and use of water resources.

Applying management instruments: Chapter 4 reports the extent to which countries have been able to apply tools and methods, often referred to as "management instruments" that enable and help decision-makers to make rational and informed choices between alternative actions. Other important management instruments considered in this chapter include the financial ones, which are meant to help to support the sustainability of institutions, infrastructure and resources, as well as the services they provide.

Developing infrastructure: Chapter 5 reports the extent to which countries have been able to develop installations and facilities for water resources management and use.

Financing water resources management and development: Chapter 6 reports the general trends in financing for the development, management and use of water resources over the last 20 years. The results are an indication of the governments' perception of the trends; there is no attempt to examine in detail the levels of financing for each country as this is beyond the scope of the survey.

Country perceptions of key issues: Chapter 7 reports on perceptions of governments on the priorities for their countries and the changes in priorities over the past 20 years.

Multiple uses of water resources: Chapter 8 deals with the challenges of maximizing efficiency in water use. As demand increases, with availability of water decreasing in most places, competition increases necessitating a more integrated approach to water management. This chapter focuses on water for the environment, for food and for energy as being of critical importance for development and argues that efficiency in water use is essential to alleviate demand.

Development impacts of improved water resources management: Chapter 9 examines the impacts of improved water resources management on social and economic development and on environmental impacts.

Overall progress on applying integratedapproaches to water resources management, development and use: Chapter 10 summarises the progress with integrated approaches to water resources management based on the reported response to the questionnaire and interviews as provided in chapters 2 to 9. It reviews briefly the results with comments as to the outcomes of application of integrated approaches assesses the progress on water resources management in a development context and finally assesses the lessons learned from the survey. Lastly, it argues for the need to establish a more permanent monitoring mechanism.

SUSANNA TODOROVIC, SIWI

LOVISA SELANDER, SIWI

2
CREATING THE ENABLING ENVIRONMENT

2.1	Policies, laws and plans	**12**
2.2	Transboundary cooperation	**16**
2.3	Management constraints	**17**
2.4	Summary of progress on creating the enabling environment	**17**

This chapter reports the extent to which countries have been able to create an enabling environment. This involves developing and implementing the policy, planning and legal framework needed for guiding and coordinating water resources management, development and use. It includes sections on:

- Policies, laws and plans;
- Transboundary agreements;
- Management constraints; and
- Summary of progress

2.1 Policies, laws and plans

The adoption of integrated approaches for the management of water resources has required far reaching reforms for many countries with adjustments to water policy, water legislation and water resources planning. For some countries this has been complicated by the fact that water resources are a responsibility of lower administrative levels such as state, province or municipality.

At the global level there is clear evidence of a widespread adoption of the integrated approach with 78% of countries having made changes in their water policy and 50% having reached an advanced stage or fully implemented the policy (Figure 2.1). This is mirrored by changes to water laws that have been revised in 82% of countries with implementation completed or at an advanced stage in 55% (Figure 2.2).

The stacked bar diagrams shown throughout the report provide a graphical presentation of the responses within each of the four HDI bands and in the overall global data set (bottom bar). Each bar shows the distribution of six steps towards implementation stacked from left (not relevant) to right (fully implemented) with the colour codes shown in the legend. As a rapid interpretation of the diagrams, e.g. for comparison between HDI bands or between different questions, the more 'warm colours' (orange-red) relative to 'cold colours' (blue-green), the more advanced is the overall progress towards implementation.

Figure 2.1 **National/Federal Water Resources Policy:** The current status of the main policy instrument in responding countries by HDI groups *(Question 1.1.1a)*

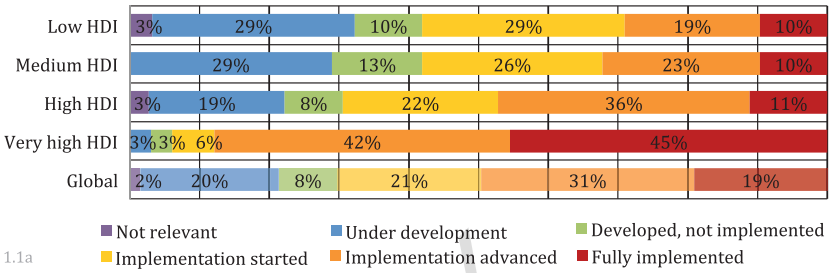
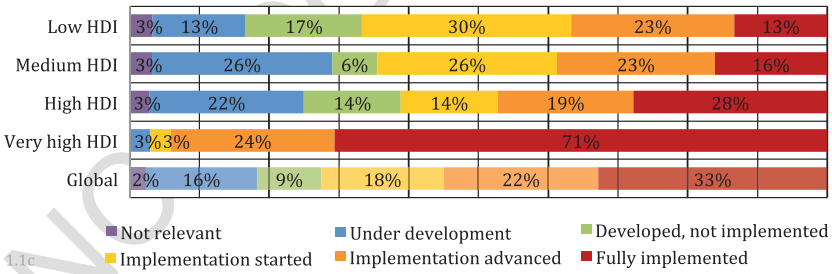


Figure 2.2 **National/Federal Water Law:** The current status of the of the main water law in responding countries by HDI groups *(Question 1.1.1c)*



An important point to note from the figures above is that while countries with a very high HDI status are generally very advanced in development of their water laws and policies progress is also evident at all HDI levels.

National integrated water resources management plans, as agreed in the Johannesburg Plan of Implementation, were developed by some 84 of the 133 countries responding (65%) and, given that plans can be implemented over a long period of time, it is reassuring that a significant percentage have reached an advanced stage of implementation (Figure 2.3). The Western Europe and Others group is far ahead of all other regions in developing national or federal WRM plans or equivalent (Figure 2.4).


FRIDA LANSHAMMAR, SIWI

Figure 2.3 **National/Federal Integrated Water Resources Management Plan(s) or Equivalent:** The current status of the main plans that include integrated approaches to water resources management in responding countries by HDI groups *(Question 1.1.1e)*

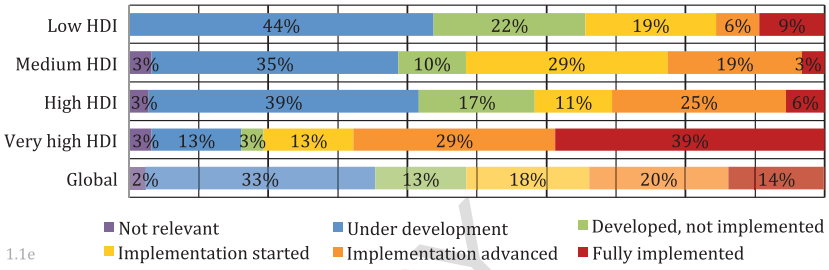
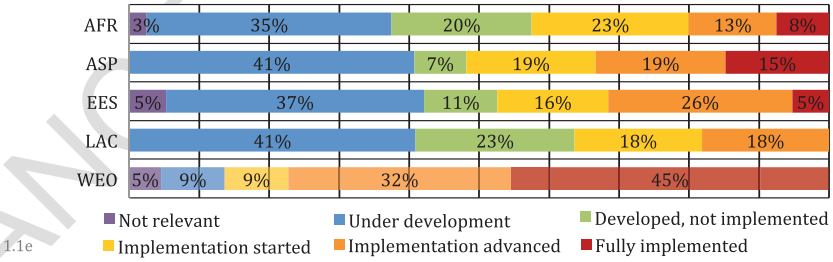


Figure 2.4 **National/Federal Integrated Water Resources Management Plan(s) or Equivalent by Region:** The current status of the main plans that include integrated approaches to water resources management in responding countries by UNCSD major regions *(Question 1.1.1e)*



Key: AFR = Africa; ASP = Asia and Pacific; EES = Eastern European States; LAC = Latin America and the Caribbean; WEO = Western Europe and Others.
(See figure 1.2 for further details)

A comparison of the responses from the 50-65 countries that also responded to similar questions in the previous survey (reported to CSD in 2008) shows that progress with implementation of policies, laws and plans has not been consistent across the HDI bands. Countries with a lower HDI grouping appear to have stalled or even regressed, whereas countries in the higher HDI groups have moved ahead, for example see Figures 2.5 and 2.6 comparing progress in implementing water laws and IWRM plans from 2008 and 2012.

Box 2.1 Water Governance is improving and having impact on the ground

"One of the greatest challenges of the 21st century is governance of water, in a manner that ensures its sustainable and equitable use" (India). In the last 20 years most Governments have made progress with water sector reform to adopt principles of integrated management of water resources (Figures 2.3 and 2.4) and are working through the process from policy to laws, strategies and plans.

Interview reports showed that countries advanced with the policy and legal frameworks were also intensely engaged with implementation of management on the ground.

"Better governance, public participation and dissemination of the planning process and the implementation of the Policy instruments are recognized as major advances in the legal and institutional structure" (Brazil).

"Implementation of the various management instruments for development, management and use of water resources in Uganda is fairly advanced. However, the challenges faced relate to valuing water or water dependent ecosystems as well as employing water demand and water use efficiency measures." (Uganda).

High HDI countries have also been adopting integrated approaches to water resources management and adjusting water policy, water legislation and plans, sometimes driven in part by international agreements (EU Water Framework Directive), but also by the need to address water scarcity, water use efficiency and environmental concerns (Australia, Spain, Albania, Estonia).

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

Figure 2.5 **Progress from 2008 to 2012 on Implementation of National/Federal Water Laws by HDI Groups**: A direct comparison between specific country responses used in the UNCSD16 report in 2008 and for this report for UNCSD20 in 2012 in low and medium HDI countries and in high and very high HDI countries

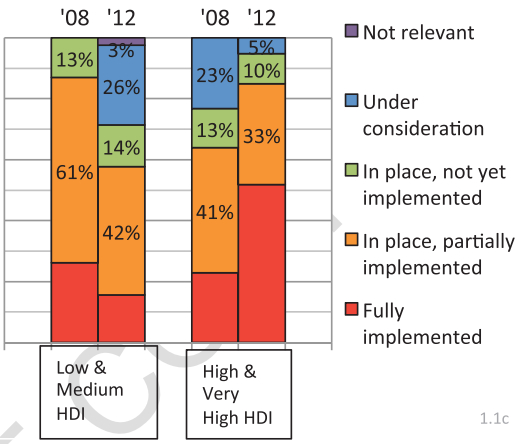
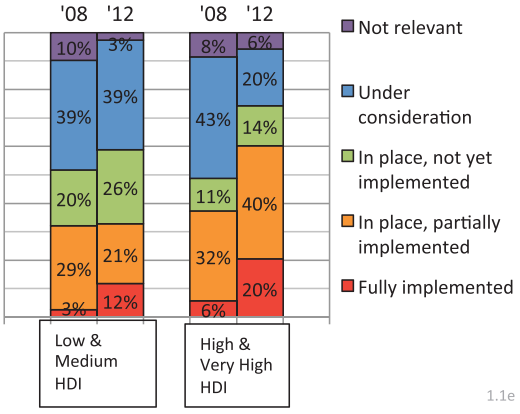


Figure 2.6 **Progress from 2008 to 2012 on implementation of national/federal integrated water resources management plans by HDI Groups**: A direct comparison between specific country responses used in the UNCSD16 report in 2008 and for this report for UNCSD20 in 2012 in low and medium HDI countries and in high and very high HDI countries



Box 2.2 What makes some countries stall?

Some countries face challenges to get agreement on new policies or laws that reflect integrated approaches to water management (Sri Lanka, Pakistan, Namibia, Guatemala, Costa Rica, Cameroon, Antigua and Barbuda) or have adopted new water laws that remain fettered by vested interests (Mexico). Yet others, even with complex federal/state structures have managed to agree and implement sweeping reforms (Brazil, Australia). Countries that have made progress with their water policies and laws may still struggle with full operationalization and particularly with the issue of 'integrating' water resource management across water using agencies and stakeholders. (Jamaica, Bangladesh, Armenia, Tunisia).

"new policy formulation.... contested by the major stakeholders in the water sector, civil society organizations and the political parties. .... not only due to content of the policy document rather due to the approach adopted for consultation" (Sri Lanka).

"The implementation of the National Policy requires a modernization of the legal framework, hence the importance of a new Water Act that allows the creation of institutions necessary .... It is essential to get politicians to internalize and take action, because so far, the IWRM Policy remains a reference document" (Costa Rica).

"Challenges facing the implementation of water policies are interlinked; three major challenges are worth considering: (a) the non integration of water policies leading to the multiplicity of strategies (b) the lack of broad participation of all actors weakening the ownership towards the strategies (c) the limited political engagement for the comprehensive implementation of the strategy, thus leading to fragmented actions" (Tunisia).

Whether getting the enabling environment right or rolling out national systems to manage water resources on the ground, it is common for there to be problems slowing down or even stalling progress. Whether due to inadequate consultation, political priorities, resistance to change or fear of losing benefits these are natural obstacles that have to be overcome. Some countries are already demonstrating that better water management can be achieved while others may need more support and shared lessons to move forward at a faster pace. There is no quick fix for sustainable water management so national and international leaders have to demonstrate their commitment for the long haul.

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

The Level 2 interviews gave some insight into why some countries may have stalled in the progress with adoption of the integrated approach (Box 2.2).

A central objective of the integrated approach to water resources management is to ensure increased coordination in development planning between water managers and the various development planners. An indicator of the adoption of the integrated approach is the extent to which water is included in the various planning documents to be found at national or federal level. Considering three of the most widely used plans (Poverty Reduction Strategies, National Strategy for Sustainable Development and National Environmental Action Plan) and discounting those who said the plan was not relevant, 67 to 79% of countries have included water in these plans.

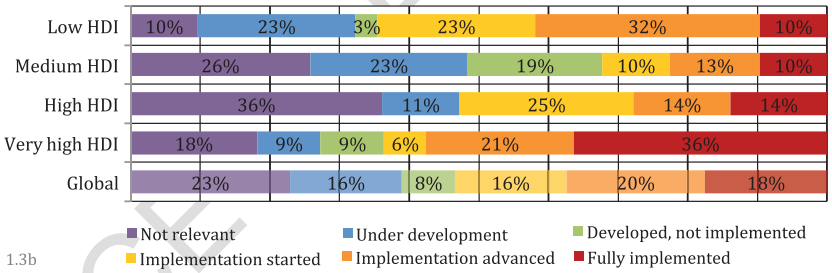
UN PHOTO: FRED NOY

UN PHOTO: / KY CHUNG

2.2 Transboundary cooperation

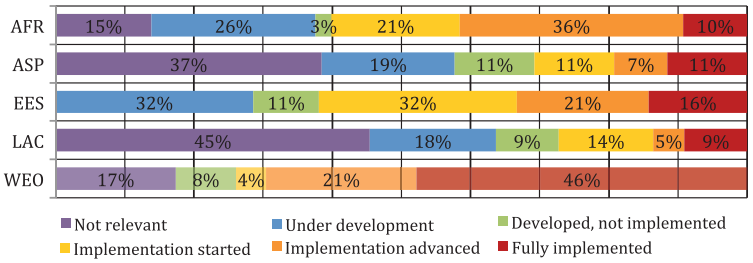
A total of 54% of countries are engaged in implementation of transboundary agreements for specific river basins (Figure 2.7). While there are huge differences in the purpose and detail of such agreements, this does indicate a certain level of attention to transboundary water resources issues. Figure 2.8 shows that transboundary water issues are of less concern to countries in the Latin America and Caribbean and Asia and Pacific regions, probably because of the high number of island states in these regions.

Figure 2.7 **Transboundary water resources management agreements for specific river basins to which countries are party**: The current status in responding countries by HDI Groups *(Question 1.1.3b)*



1.3b

Figure 2.8 **Transboundary water resources management agreements for specific river basins to which countries are party (by region)**: The current status in responding countries by region *(Question 1.1.3b)*



1.3b

2.3 Management constraints

Approximately 25% of the total number of countries reporting on constraints noted that they faced management obstacles relating to legal frameworks (e.g. Mozambique, El Salvador, and Angola and Republic of Korea) and strategic planning (e.g. Congo, Costa Rica and Australia).

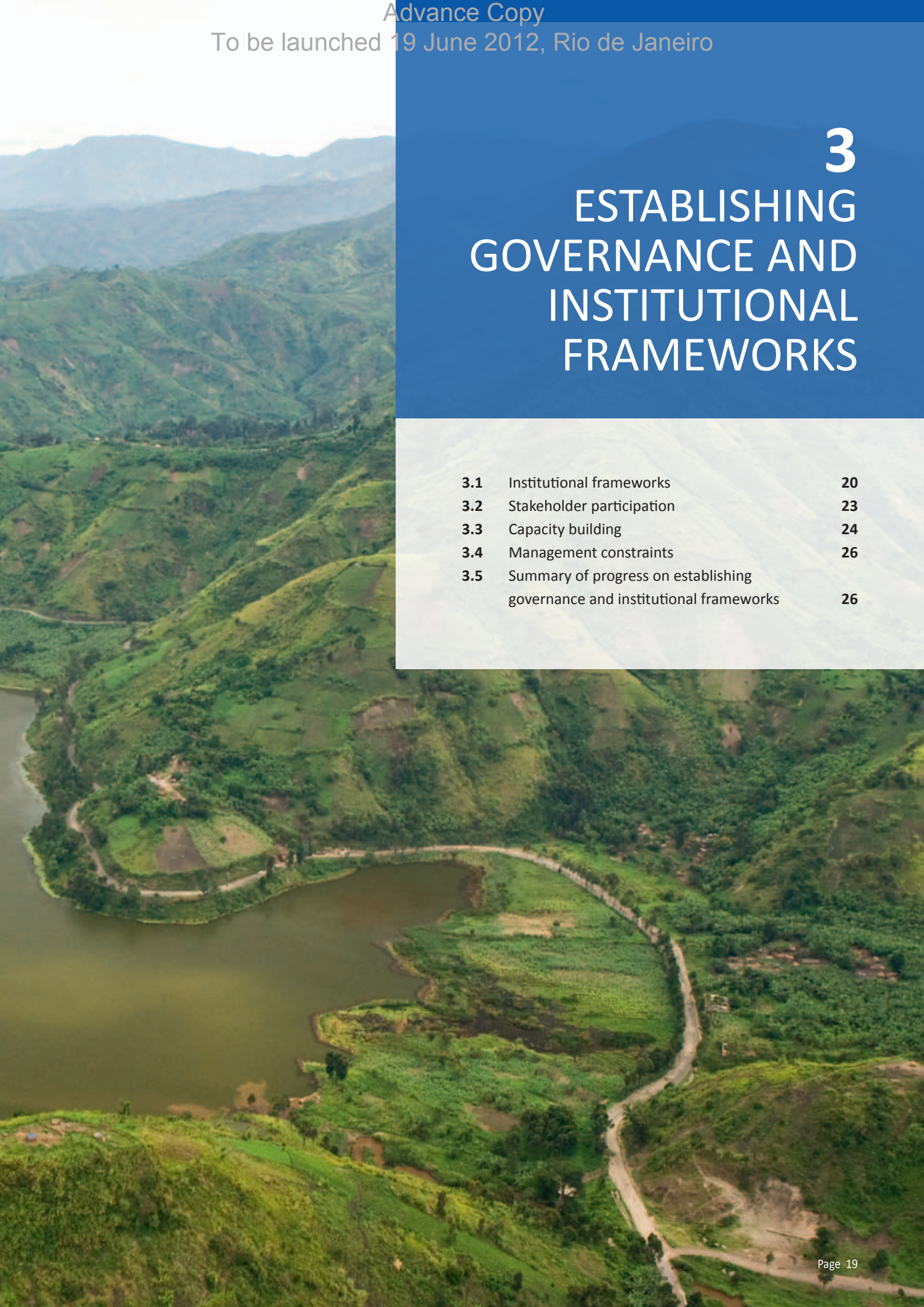
The main problems encountered with legal frameworks are that they are too weak or conflicting. Country experiences range from Albania, which would like to move towards the EU Water Framework Directive but currently has a legal system that has little in common with the EU; to Peru and Samoa, where national laws can conflict with traditional practices and customs.

The main problems encountered with strategic planning, national policies, transboundary agreements and integrated water resources plans, are that they are non-existent or inadequate. For example, Congo reported that it lacks a clearly formulated national water policy; and Azerbaijan, which is heavily reliant on water flow from other countries, reported that it is the only Southern Caucasus country to sign the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki Convention). A number of countries including Denmark, Germany, Lithuania and Portugal reported challenges in balancing agricultural, industrial and environmental interests. These issues relate to allocation and are often addressed in national water efficiency plans.

2.4 Summary of progress on creating the enabling environment

- 82% of countries are implementing changes to their water laws in what has been a far-reaching outcome of Agenda 21 proposing integrated approaches for the development, management, and use of water resources.
- 79% of countries report changes in their water policy, however translating policy and legal changes into implementation is a slow process.
- The survey showed that 65% of countries have developed integrated water resources management plans, as called for in the JPoI, and 34% report an advanced stage of implementation, however, progress appears to have slowed or even regressed in low and medium HDI countries since the survey in 2008.
- 67% of countries reported the inclusion of water in national/federal development planning documents. Approximately a quarter of countries reporting on constraints noted obstacles relating to legal frameworks and strategic planning.

UN PHOTO/ MARIE FLECHON



3 ESTABLISHING GOVERNANCE AND INSTITUTIONAL FRAMEWORKS

3.1	Institutional frameworks	**20**
3.2	Stakeholder participation	**23**
3.3	Capacity building	**24**
3.4	Management constraints	**26**
3.5	Summary of progress on establishing governance and institutional frameworks	**26**

This chapter reports the extent to which countries have been able to establish the political, social, economic and administrative systems needed for managing the development and use of water resources.

It includes sections on:

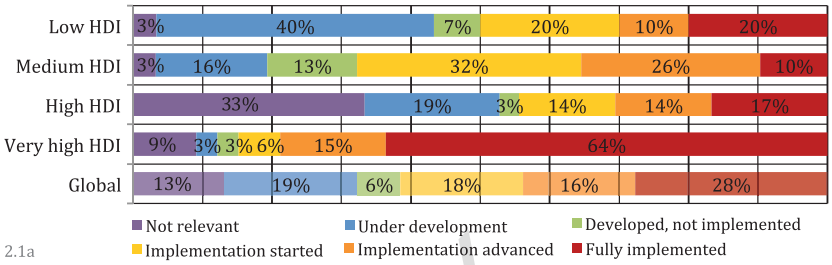
- Institutional frameworks;
- Stakeholder participation;
- Capacity building;
- Management constraints;
- Summary of progress

3.1 Institutional frameworks

A central philosophy of an integrated approach to water resources management is that water should be managed at the lowest appropriate level. This means taking a basin approach where appropriate and decentralizing decision making, usually with increasing input and role for various stakeholders with an interest in how water resources are allocated and management decisions are being made. It is also believed that an integrated approach is necessary both to take into account the different interests, concerns and experience in water resources and management and to improve efficiency in investment decisions. Mechanisms such as water resources commissions and councils have been envisioned as apex bodies to facilitate such cross sector inputs to water resources management.

This survey has shown that management of water resources at the level of the river basin has been adopted widely (Figure 3.1). Discounting the countries that recorded this as not relevant to them (13% of the total), implementation has started in an impressive 71% and is advanced or complete in 51%.

Figure 3.1 **Mechanisms for River Basin Management**: The current status of governance bodies such as commissions and councils in responding countries by HDI groups *(Question 2.1.1a)*



Progress has been made with the institutional environment for cross sector management and decentralized management of water resources (Figures 3.2, 3.3) and over 55% of countries have started implementation (discounting the countries who recorded this as not relevant). The integrated approach has been adopted by countries at all HDI levels however, perhaps unsurprisingly, the very high HDI level countries have been able to take the institutional reforms to full implementation more quickly than others.

The Level 2 country interviews gave a positive picture of the new institutional arrangements and although the new institutions can take a long time to become well established they have already resulted in efficiency gains for some countries.

Figure 3.2 **Mechanisms for cross-sector management of water resources**: The current status in responding countries by HDI Groups *(Question 2.1.1d)*

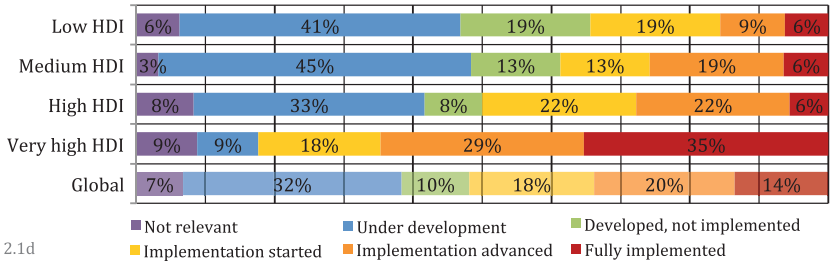
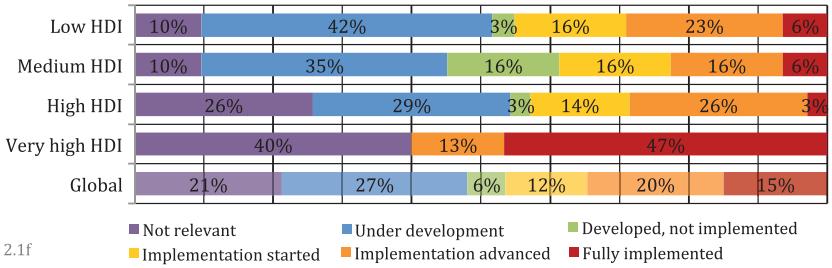
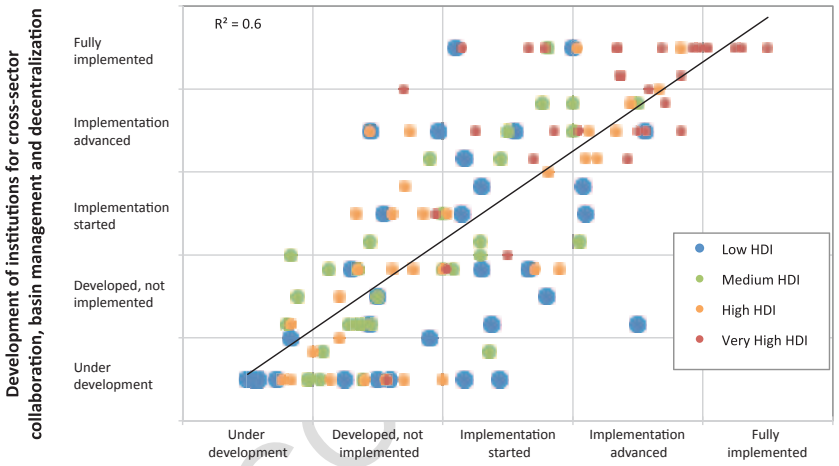


Figure 3.3 **Decentralized structures for water resources management (other than mechanisms for transboundary water resources management)**: The current status in responding countries by HDI Groups



Countries that have progressed with the legal and policy reforms are more likely to have made progress with the institutional arrangements necessary for an integrated approach (Figure 3.4). A logical finding perhaps which verifies that the enabling legal and policy environment as well as the associated political commitment is necessary for institutional reforms to be possible.

Figure 3.4 **The relationship between progress with implementation of legal and policy reform and the development of institutions for cross-sector collaboration, basin management and decentralization**



1vs2.1a,d,f

Box 3.1 Water management institutions becoming more effective

New structures for water management have been put in place in many countries. Usually these have been influenced by the need for integrated approaches to water management and consist of national (and state where relevant) coordinating and regulatory structures, basin management and local water user structures. There are variations according to local circumstances but usually they have been used to decentralise decision-making and to give more voice to stakeholders (see Box 3.3).

New structures and coordination systems take time to establish and become fully operational as reported by several countries (Albania, Uganda, Ghana, United Republic of Tanzania, Brazil, Armenia, Cape Verde). A reasonably good level of integration has been achieved in some cases (Uganda) but not in others (Armenia, Samoa, China). *"The institutional frameworks for water resources management are in place but the coordination between the organizations (government, civil society and the private sector) needs to be strengthened, supported by the availability of expertise and resources to pursue effective integration"* (Samoa).

Experience shows efficiency gains (Estonia, Samoa), the need for political will and support from community leaders for success (United Republic of Tanzania) but also shows that structures are most effective at the lower level and so should be built from the bottom up (Brazil). *"Increased awareness and a decline in adverse agricultural practices have resulted from improved collaboration with the agriculture sector. There is still room however for improved dialogue between the water resources and agricultural sectors e.g clarity over watershed management roles."* Samoa *"The environmental board with 6 regional offices after the reorganization has solved a lot of problems connected to the implementation of the river basin management plans. Involvement of public and NGO-s in different stages of elaboration of the river basin management plans was improved and made the plans more realistic"* (Estonia).

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

Box 3.2 Is there really an "integrated approach"?

Integrated water resources management requires cooperation between various government agencies, and others, with a stake in water. One of the most common practical issues arising from the ground is the challenge of integration whether it is reluctance to share information between ministries or the tendency for resource management and planning to be sector driven (Jamaica, Bangladesh, Armenia, Tunisia, Samoa, China, Jordan).
"Other clear steps towards cross-sectoral coordination that are functional include the Parliamentary Water Committee and the Boards of the Water Authority of Jordan and the Jordan Valley Authority that include representatives from all related Ministries, farmer's representatives, external experts..." (Jordan).

"There must be a system of generation and evaluation of data, where all institutions are required to share information." (Costa Rica). *"The most part of agencies still do not accept the idea of fully "open" data. Currently the "data availability" is not widely applied at the government and every department decides on its own whether to exchange data or not"* (Armenia).

There are success stories (Uganda, Mozambique flood and drought management, Brazil, Australia) but it seems that integrated approaches do not arise by decree but from mutual trust, appropriate mechanisms and gradual acknowledgement of the benefits. Cooperation at the national level is often more difficult than at the lower levels of basin management and this was recognised by Australia which felt it *"necessary to develop a national agenda to encourage a cooperative approach between all tiers of government and various stakeholders. The Council of Australian Governments, the nation's peak intergovernmental forum, was selected to initiate the development of a framework for a national IWRM agenda alongside consultations with the wider Australian and international communities. This has proven effective, with the generation of the Australian National Water Initiative (NWI), with the policy progress of States scrutinized by both the National Water Commission (NWC) and the National Competition Council."*

However decentralisation of decision making may confuse established communication systems if not carefully managed (Spain): *"One consequence of this decentralization process is a lack of coordination between all Public Administrations involved in water management. It means less efficiency in water management and no response to critical issues in this subject. The Spanish experience on decentralization points out that it is very important to be specific about the objectives and the roles of all the Administrations involved."*

Integration at a transboundary level of water management is even more challenging and long term (Cambodia)

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

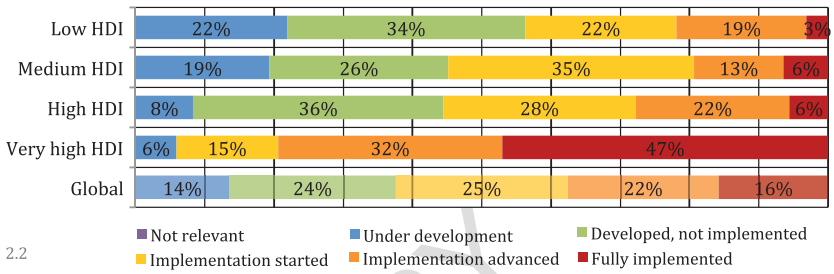
PHOTO: SHUTTERSTOCK

3.2 Stakeholder participation

The survey considered stakeholder participation from several aspects varying from access to information through to involvement of the general public and private sector in water resources management at the national or river basin levels. The overall result is not very reassuring with most countries, except for countries with very high HDI, making only very slow progress on this issue (Figure 3.5), and Africa falling behind other regions (Figure 3.6). However, on a more positive note, all countries consider access to information as relevant and have taken initiatives to further improve this, and most countries have started implementation. Almost all very high HDI countries have advanced or fully implemented stakeholders access to information. This is noteworthy as access to information is often seen as an essential condition for active stakeholder engagement in water resources management. Countries that have experience with stakeholder processes gave a generally positive view of the results in the Level 2 interviews although with a caution that it is a process that needs to be carefully managed to avoid excessive transaction costs (Box 3.3).

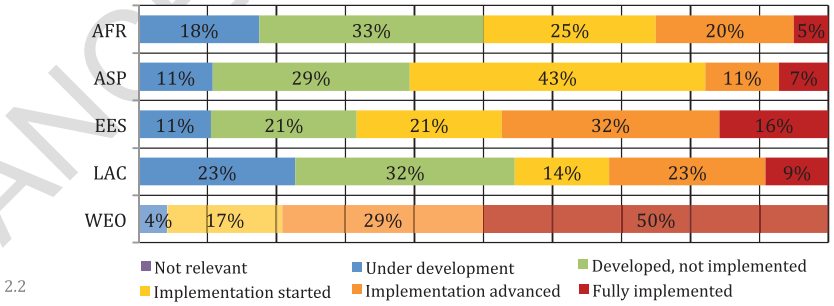
Given the historical focus on gender issues in relation to water resources management it is perhaps surprising that 22% of countries thought that gender mainstreaming in water resources management is not relevant in their context. Only 21% of countries have reached the stage of advanced or full implementation.

Figure 3.5 **Progress on stakeholder participation (including access to information, involvement of different stakeholder groups including the private sector, and gender mainstreaming)**: The current status in responding countries by HDI Groups *(Amalgamation of questions 2.1.2a-g)*[7]



2.2

Figure 3.6 **Stakeholder participation (including access to information, involvement of different stakeholder groups including the private sector, and gender mainstreaming) by region**: The current status in responding countries by region *(Amalgamation of questions 2.1.2a-g)*



2.2

[7] Note that for all figures showing an amalgamation of questions, the 'not relevant' category for each question has been removed from the calculations so as not to pull the average down in a misleading way

Box 3.3 Stakeholders have more influence – but not yet enough?

Evidence emerged from the interviews that stakeholder involvement leads to improved outcomes (Bangladesh, Brazil, Estonia, Ghana, United Republic of Tanzania) but getting it right is not easy (Australian indigenous communities; Brazil, Cambodia). Any stakeholder involvement may be a threat to existing power relations (Pakistan) and limiting participation to a consultative role (Mozambique) rather than a deliberative role (Tanzania) may not be enough.

"Numerous evaluations on the improved performance of water development projects .... have concluded that improved governance by ensuring people's participation not only improved the project performance in terms of efficiency and gaining equitable benefits from service area but also helped in reducing the yearly operation and maintenance burden from the implementing agency" (Bangladesh).

"The process of empowering the users to participate effectively in the management has just started, in the two basins that are ahead of others there is already general awareness on many issues: people are demanding fair allocation, upstream and downstream are now communicating and policing themselves; number of conflicts are reported to have decreased and willingness to pay user fee is seen in the areas where it was difficult to agree on the concept" (United Republic of Tanzania).

"The fact that communities are prepared to participate and take responsibility for their water and sanitation problems through their Water and Sanitation Committees and Water and Sanitation Development Boards is an indication of the extent of change of attitude among individuals and institutions" (Ghana).

"Specifically, implementing a decentralized and participatory governance system requires consistent strategies to promote effective and knowledgeable participation of communities' representatives. Experience so far has shown that without an adequate strategy there is a tendency to the loss of focus and high transactional costs..." (Brazil).

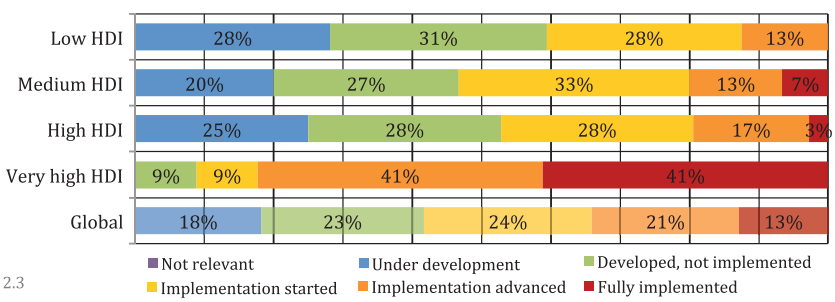
Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

3.3 Capacity building

Capacity development is a long and complex process made more so by the greater involvement of stakeholders in an integrated approach to water resources management. Box 3.4 gives some impression of the range of issues being raised and addressed by countries and it is difficult through a questionnaire to effectively measure progress. From a combination of questions covering capacity needs at national and sub-national levels, capacity building programmes for institutions and individuals and research programmes a perspective is given that progress is being made. Approximately 35% have an advanced level of action across most of the capacity building areas (Figure 3.7) whilst the remainder may be active in only a few capacity building areas.

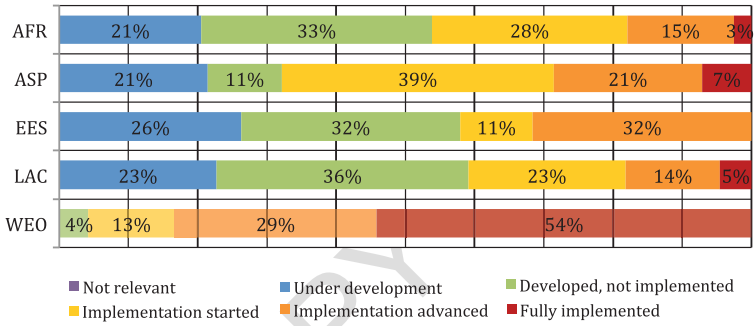
The need for capacity to implement an integrated approach is felt across all of the HDI groups and only few countries feel that their capacity development programmes are being fully implemented.

Figure 3.7 **Progress on capacity building (including assessment of capacity needs, programs for capacity development, programs for training, education and research)**: The current status in responding countries by HDI Groups *(Amalgamation of questions 2.1.3a-g)*



2.3

Figure 3.8 **Progress on capacity building (including assessment of capacity needs, programs for capacity development, programs for training, education and research) by region**: The current status in responding countries by region *(Amalgamation of questions 2.1.3a-g)*



2.3

Box 3.4 Capacity challenges need long term commitment

Sustainable management of water resources will not be achieved until the required capacity is available among the various actors responsible. Capacity constraints emerge repeatedly from the interview responses (Albania, Armenia, Costa Rica, Guatemala, Bangladesh, Ghana, Namibia, Rwanda) and while capacity building is a part of most programmes it is clear that capacity development is a slow process and needs to be better linked to performance. The sheer scale of water sector reforms (Bangladesh has so far formed 6896 stakeholder water management organizations including direct participation from almost 300,000 members) gives an idea of the task involved.

Some countries recognize that rolling out new institutions, establishing new/ improved management systems, and empowering stakeholders with the knowledge to make effective contribution to water management all have to be done in a managed process that is consistent with development of the necessary capacity. Other countries, rather than taking a stepwise approach, aim to implement changes more rapidly with the expectation that performance will gradually improve over time. To help manage this process, and target capacity building actions, it is important to be able to measure any progress being made (see box on information management and box on indicators). A question may justifiably be asked as to who provides the capacity development service when "*The Universities lack training and educational programs teaching the elements of water resources management*" (Armenia).

*"The enforcement of the EU (*Water Framework Directive*) legislation is the main challenge as it requires a number of well trained staff, both administrative and technical, and appropriate equipment to implement, among others, the river basin management plans. Capacity needs to be significantly reinforced and existing gaps need to be covered. A clear definition of responsibilities among competent institutions is also critical, ... As more responsibilities have been shifted to local authorities in the context of decentralization, their capacity needs to be reinforced to ensure they discharge their responsibilities accordingly"* (Albania).

"Implementing a rather complex governance system such as the one imposed by the National Water Resources Policy Law requires continuous capacity building and strong coordination" (Brazil).

"Without sufficient capacity to ensure enforcement and compliance, it is difficult to ascertain the extent to which the management instruments are being effective. However, the involvement of stakeholders in executing some of the management instruments (e.g. monitoring and revenue collection and WDM implementation) has shown success in some cases" (Namibia).

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

3.4 Management constraints

Countries reported the following management constraints relating to establishment of governance and institutional frameworks:

i) management mandates;
ii) coordination and cooperation;
iii) capacity; and
iv) participation/awareness.

Problems with management mandates related to overlapping or unclear responsibilities between various management organizations (e.g. Benin, El Salvador, Botswana and Montenegro, Brazil, Guinea, Panama and Tajikistan).

Some countries reported that overlapping or unclear responsibilities may lead to competition and management conflicts. In terms of administrative boundaries, problems of spatial 'fit' often arise from efforts to manage water resources based on the river basin, while existing political-administrative territories often have different boundaries.

Even when mandates are relatively clear coordination and cooperation between management organizations can still be a challenge, as reported by almost one quarter of countries reporting on constraints, including Cambodia, Greece, Uganda and Panama. Coordination and cooperation constraints can occur for a number of reasons, such as inadequate planning, insufficient resources, a lack of awareness, and the conflicting stakeholder agendas, which may lead to the prevalence of partisan or sectoral approaches. One of the results of a lack of coordination and cooperation that countries reported is fragmented approaches to water resources management.

Insufficient capacity was a problem for many countries (e.g. Algeria, Bosnia and Herzegovina, China, Guinea, Libya, Nicaragua, Saudi Arabia and Serbia). Typical problems related to a broad lack of human capacity both in numbers and knowledge to plan and manage. A number of other countries reported a lack of sufficient or appropriate equipment, and several mentioned the need for advanced technology transfer. One of the many consequences of a lack of capacity is the inability to regulate and enforce.

Almost one third of the countries reporting on management constraints noted inadequate participation and awareness of decision makers, users and other key stakeholders. (e.g. Egypt, Bangladesh, Gabon, Uruguay, Mexico, Indonesia and United Republic of Tanzania). Lack of participation can take multiple forms and have numerous consequences, including but certainly not limited to, a lack of important decision-making, poor project implementation, insufficient cost recovery and resource degradation.

3.5 Summary of progress on establishing governance and institutional frameworks

- Institutional reforms have been undertaken in many countries, correlating well with countries implementing legal and policy reforms. The aim has been to increase joint decision-making at national level, facilitate management at the basin level (71% of countries) and to legitimize stakeholder structures at community level. Country interviews indicate that institutional reform is slow but is showing efficiency gains.
- A minority of countries indicate progress with stakeholder participation. There are reports from the country interviews that some countries have gained from effective stakeholder participation but more experience needs to be shared on how to get it right to avoid delays and high transaction costs.
- Around 35% of countries have an advanced level of action across most of the capacity building areas however the need for capacity to implement an integrated approach is felt across all of the HDI groups.
- The survey shows that efforts over the past 20 years to improve governance of water resources have been significant but this clearly remains an on-going process for most countries. The benefits in some cases are far reaching.
- Most common constraints to the development of appropriate institutional arrangements relate to mandates; cross-sector coordination; capacity; and participation/ awareness.

UN PHOTO / JOHN ISAAC

MANFRED MATZ, SIWI

4 APPLYING MANAGEMENT INSTRUMENTS

4.1	Progress with management instruments	**30**
4.2	Management instruments and the integrated approach	**35**
4.3	Summary of progress on applying management instruments	**36**

This chapter reports the extent to which countries have been able to apply tools and methods, often referred to as "management instruments" that enable and help decision-makers to make rational and informed choices between alternative actions. Other important management instruments considered in this chapter include the financial ones, which are meant to help to support the sustainability of institutions, infrastructure and resources, as well as the services they provide.

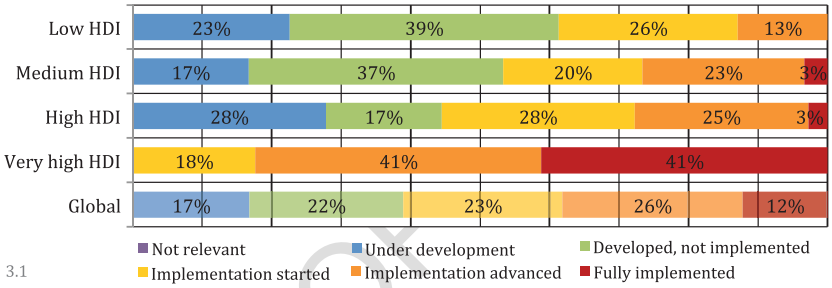
4.1 Progress with management instruments

The range of management instruments is very large and cannot all be encompassed in one questionnaire. The Level 2 interviews gave an additional perspective on the process to roll out these many management tools and instruments and the financial and capacity constraints that accompany implementation. The responses to the survey have been analysed by HDI status, as a global summary and in correlation with enabling water legislation to provide further insight about factors that influence improved water resources management.

When examining progress with the development and application of management instruments it is evident that there is progress in all HDI groups. Not surprisingly the highest HDI group has consistently achieved a greater level of implementation while of interest is the apparent similarity of progress across all of the other HDI categories. Constraints reported by countries included insufficient or missing management instruments compounded by a lack of modern tools and techniques, as well as a lack of designation of fees or fines.

Some management instruments attract a higher priority than others. For example water resources assessment is being implemented by over 60% of countries. However over 50% of low and medium HDI countries do not have any management systems for assessment of their water resources (Figure 4.1).

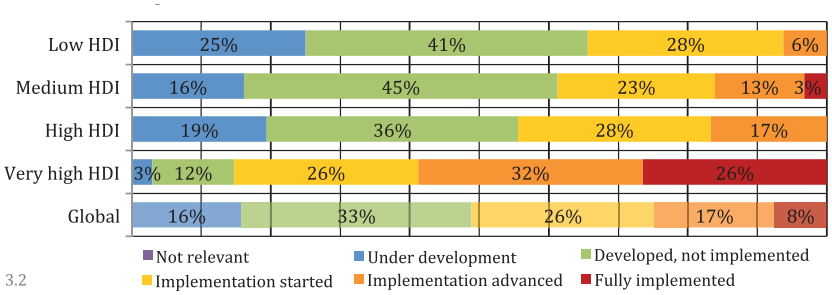
Figure 4.1 **Water resources assessment and development guidelines (including basin studies for long-term development and management of water resources, periodical assessment of water resources, regulatory norms and guidelines for sustainable development of water resources and programs to value water-related or dependent ecosystem services):** The current status in responding countries by HDI Groups *(Amalgamation of questions 3.1.1a-d)*



3.1

Combining responses to 13 questions about various water resources management programmes for example groundwater management, surface water management, and allocation shows that there are some programmes in place and being implemented but in many cases implementation is not being fully achieved (Figures 4.2 and 4.3).

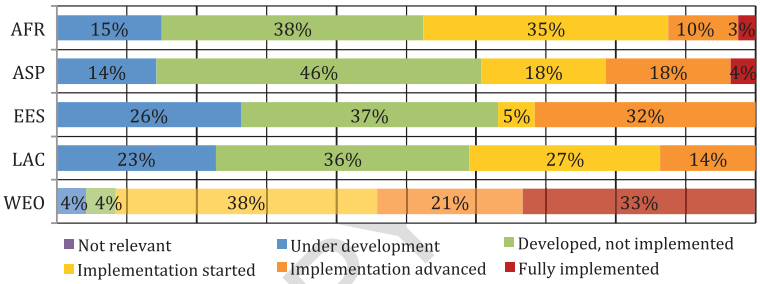
Figure 4.2 **Water resources management programmes (an amalgamation of 13 questions including programs relating to allocation, management of a variety of hydrological components and environmental considerations):** The current status in responding countries by HDI Groups *(Amalgamation of questions 3.1.2a-m)*



3.2

PHOTO: SHUTTERSTOCK

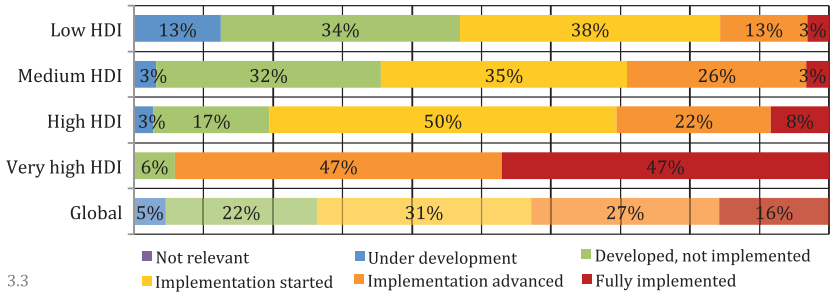
Figure 4.3 **Water resources management programmes (an amalgamation of 13 questions including programs relating to allocation, management of a variety of hydrological components and environmental considerations) by region:** The current status in responding countries by region *(Amalgamation of questions 3.1.2a-m)*



3.2

Combining responses to 9 questions on monitoring systems shows that monitoring systems are being implemented widely (Figure 4.4). However only the high HDI countries have an advanced implementation of the full range of monitoring systems. Countries reported problems with monitoring which typically include inappropriate technology as well as incomplete or a total absence of monitoring networks.

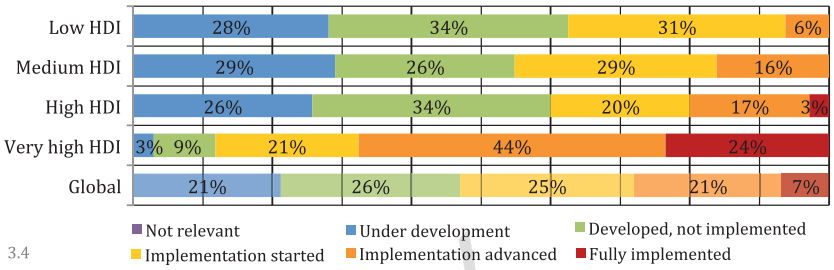
Figure 4.4 **Monitoring and information management (an amalgamation of 9 questions including monitoring of water quality, quantity, aquatic ecosystems, water use and efficiency and early warning systems)**: The current status in responding countries by HDI Groups *(Amalgamation of questions 3.1.3a-i)*



3.3

Mechanisms for sharing knowledge are not well advanced and thus present a constraint to development of an integrated approach in all except the very high HDI countries (Figure 4.5). Constraints to knowledge sharing reported by countries included a scarcity of information, often from a lack of research, and challenges in data management, including archiving, dissemination and access.

Figure 4.5 **Knowledge sharing (an amalgamation of 4 questions relating to knowledge sharing and dissemination)**: The current status in responding countries by HDI Groups *(Amalgamation of questions 3.1.4a-d)*



3.4

Box 4.1 Recognizing the need for better information management

Information is the foundation of good decision making and planning. Many countries have made progress with more coordinated information management (Uruguay) and established a national water resources information system with very positive outcomes (Brazil, Estonia, Mozambique (for flood and drought management)) but priority may not always be given to developing data collection to the extent necessary for decision making (Benin, Costa Rica) or there may be other reasons for the lack of key information for decision making. Systems for information sharing are often available to the public and other agencies but may not be widely known or used as a basis for decision making at the lower levels (Costa Rica, Armenia). Even if there is a good water resource information base, management will be less effective if there is no means to measure performance of management instruments (China). Mechanisms for knowledge management and information sharing should be introduced (Estonia, Costa Rica) to reduce the resistance to sharing information and help integrate decision-making across all agencies (Bangladesh, Uganda, Armenia, Samoa).

"The first action to improve the management of water resources was reorganization of monitoring network, data collection and data management on surface and groundwater quality and quantity as well as water abstraction and wastewater discharges. Reorganization .... enabled to publish every year periodical reports on the status of water resources, water abstraction and wastewater discharges. Also the hot spots were indicated as well as proposals to improve the data collection and water resource management system" (Estonia).

"This database is continuously updated and is in digital on the website of the Directorate of Water. Thus, anyone can access it. ..... However, a majority of people are unaware of such information. .... Another challenge is the use of this information at the basin level, to take decisions related with water use rights by concession, permits for the location of treatment plants and waste water discharge, etc. This will reduce conflicts over competing uses of water" (Costa Rica).

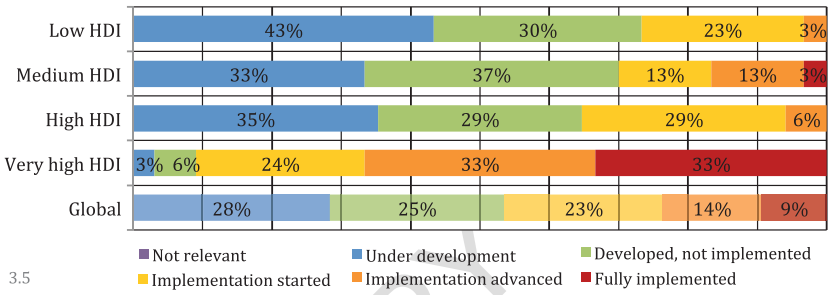
"Information or data sharing should be mandated in the core policies, e.g water for life sector policy and further reinforced through formal agreements drawn up between the relevant agencies.
Capacity building in data analysis has not been high on the training agenda and should be highlighted for future development programmes" (Samoa).

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

Financing instruments for water resources management are being implemented in less than 50% of countries although there is a big difference by HDI group. Less than 10% of the 'low' and 'high' HDI groups have reached an advanced stage of implementing financial instruments. Chapter 6 gives further insight into issues of financing and cost recovery in the water sector.

Box 4.2, with comments from the Level 2 survey demonstrates that introducing payments for water supply can be used as an effective economic instrument.

Figure 4.6 **Financing of water resources management (including cost recovery mechanisms, subsidies and charges for water resources management)**: The current status in responding countries by HDI Groups *(Amalgamation of questions 3.1.5a-c)*



3.5

Box 4.2 Payment as an economic instrument

In some countries payment for water is used as an economic instrument to change water use practices. Charges can help to promote better practices, make more effective use of scarce finance and to raise revenues to supplement budgets. There has been limited progress over the past 20 years which suggests that much greater attention should be given to support country actions.

Water tariffs as part of the national program for water saving in agriculture, have contributed to increase water efficiency in Tunisia and whilst they do not fully cover O & M costs, they do send signals and there are some positive outcomes: *"87% of irrigated areas are equipped with water saving techniques leading to efficiency improvement and yield increases. Water tariffs in agriculture cover only 60% of the operation costs on average. Maintenance operations are thus often neglected"* (Tunisia).

In Estonia water charges led to improved water use efficiency and reduced pollution. *"The implemented water resource and pollution taxes had a significant influence to economic water use. The overall water use (in industry, agriculture and municipalities) during the last 20 years was reduced about 5 times and the reduction of pollution load to the Baltic Sea in the same order."* (Estonia).

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

Box 4.3 provides some insight from the level 2 interviews on the development of management instruments and the processes and constraints involved in implementation.

Box 4.3 Management instruments put water policy into practice

Water policies and laws are put into practice through the application of management instruments on the ground and the effectiveness of the policy and the law is largely seen from the effectiveness of the management instruments. Responses show that improvements to water resources management are intended to be far reaching with many new or improved management instruments being applied.

In some countries the first step has been to address the lack of basic information (resource base, water quality, users) in order to implement water management systems and apply various management instruments (Cameroon, Estonia) and it is not unusual that monitoring systems are better established than allocation or environmental controls (Jordan).
"The monitoring of water resources in Cameroon witnessed abandonment for a long time now since the economic crises of the 1980s. As a concrete example, barely 10% of 408 rain gauges and 36% of 74 flow measurement stations were functional throughout the national territory" (Cameroon).

Some countries have various management instruments in place but lack capacity to implement them effectively (Pakistan, Namibia, Cape Verde, Ghana) or the instruments are sector specific (Cameroon, Uzbekistan) or lacking (Benin, political reasons; Albania, pending new water laws). Countries who have not adopted an integrated approach recognize the need for more management instruments (Guatemala) but experience shows they should be introduced in a progressive way with one leading to the evidence of need for another (Brazil). *"Several management instruments (e.g. issuing of permits, licensing and monitoring) have been developed and introduced, however; human capacity remains a major challenge. This results in limited compliance to permit conditions and inadequate pollution control. ... Only 50-60% of permit holders report their abstraction figures"* (Namibia).

Armenia, Ghana and China have many management instruments in place and identified areas for improvement that will take place over time (Armenia, Ghana) or lack indicators to assess performance of the instruments (China). This lack of monitoring tools to assess the performance of indicators will continue to impact the ability to measure progress with water resources management and was a major component of the water sector reforms in Australia. *"Water Resources Plans also provide the monitoring and reporting requirements to measure progress towards stated outcomes"* (Australia).

Management instruments include country or situation specific tools such as preparedness for water related disasters (code of practice on dam safety, Sri Lanka; drought management, Spain; flood management, Mozambique) which have reduced impact of disasters and improved decision making (Mozambique, Spain) but systems may be impacted by lack of data or info exchange (Mozambique) or by underperforming institutions (Sri Lanka).

Overall the indications are that it takes time to get management instruments effectively implemented as they are impacted by many issues including human and financial resources for implementation, lack of performance assessment systems and stakeholder engagement. *"If adequate resources are not made available – attitudes and habits will take a long time to change and enforcement and compliance with regulations can be a severe barrier to water resources management"* (Ghana).

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

4.2 Management instruments and the integrated approach

Figure 4.7 demonstrates that present water resources management practices are well correlated with the adoption of the integrated approach. It can clearly be seen that increased adoption and implementation of water resources management instruments has followed the strengthening of the enabling environment. While there is at present no measure of performance of water resources management available, the greater application of management tools is an intermediary indicator for improved water resources management on the ground. As has been identified in the Level 2 interviews the application of management instruments is not easy, demands financial resources and human capacity and may take a long time before the full results can be achieved.

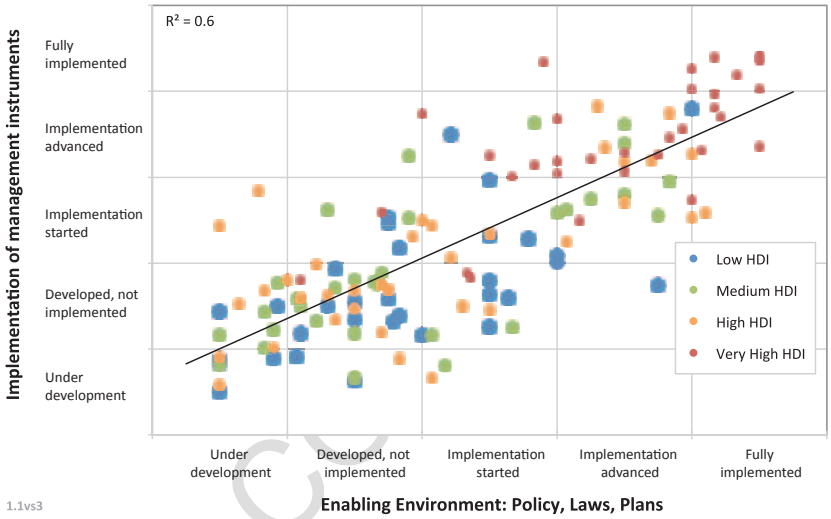
The correlation in Figure 4.7 uses a combination of all of the answers on management instruments in this section but the same relationship holds for each of the 5 categories when plotted separately. Two immediate observations flow from this figure:

1. Integrated approaches to water resources have not only been widely adopted by countries at all levels of development, but they are also having a far reaching impact on the way water is being managed. Further monitoring is required to determine whether the desired outcome of more sustainable water resources management and development is being achieved.

2. Level of development is not a barrier to improved management of water resources. The distribution of HDI countries along the line shows that progress is not constrained, or guaranteed, by HDI status. While very high HDI countries tend to cluster at the top this is not an exclusive space.

To be noted from the analysis of the responses to the questionnaire is the number of countries yet to make significant progress in the application of various water management

Figure 4.7 **The relationship between progress with implementation of the enabling environment of policy, law and plans (chapter 2.2) and implementation of management instruments (chapter 2.4)**



instruments. There are situations where certain instruments and tools may not be necessary but at the present time we do not have enough knowledge to determine whether the lack of management systems on the ground is because they are not needed, a lack of political priority or due to a management failure.

The Level 2 interview also included a checklist to determine what indicators were currently being used at country level for the monitoring and measurement of performance of the water resources management system.

The indicator checklist consisted of 42 indicators spread across the following categories:

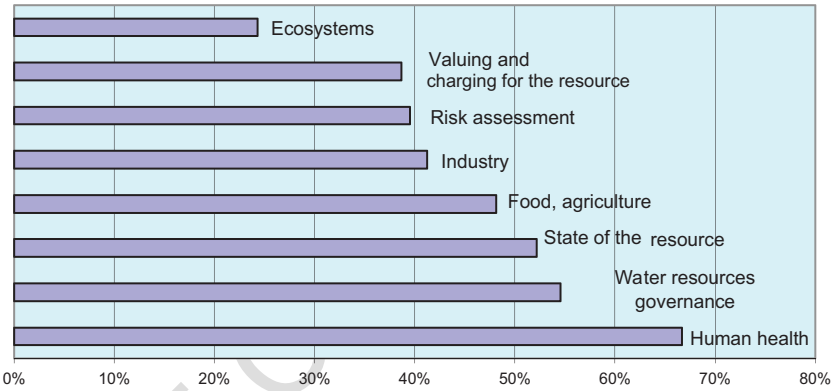
- Water resources governance (2)
- State of the resource (13)
- Ecosystems (5)
- Human health (4)
- Food, agriculture and rural livelihoods (4)
- Industry (6)
- Risk assessment (3)
- Valuing and charging for the resource (5)

Of the 42 indicators on the checklist the very high HDI countries reported using 32 of them regularly while the other HDI categories used considerably fewer (Low HDI = 14; Medium HDI = 20; High HDI = 18). There is a limited use of indicators at country level suggesting that water resources management systems are poorly monitored.


PHOTO: SHUTTERSTOCK

Fig 4.8 shows which of the indicators, by group, were used regularly by countries. The health group of indicators is used most often (most likely by health officials monitoring water and sanitation services) and the environmental indicators are used least often.

Figure 4.8 **Percentage of water indicators by category being used regularly by countries which were subject to Level 2 interviews (30 countries)**



4.3 Summary of progress on applying management instruments

- Progress on integrated approaches to water resources management is demonstrated by a strong correlation of the results between progress on the enabling environment of policy, law and plans and a positive impact on management practices.
- Water resources assessment and monitoring systems are being implemented in over 60% of countries.
- Water resources management programmes (includes allocation systems, groundwater management, environmental impact assessment, demand management among others) are being implemented in 84% of the highest HDI group countries but only around 40% of other countries.
- Level of development does not seem to be a barrier to improved management of water resources. The survey shows that progress is not constrained, or guaranteed, by HDI status. While very high HDI countries tend to cluster at the top this is not an exclusive space.

UN PHOTO / KIBA PARK

PHOTO: SHUTTERSTOCK

5 DEVELOPING INFRASTRUCTURE

5.1	Investment plans and programs	**40**
5.2	Summary of progress on developing infrastructure	**42**

This chapter reports the extent to which countries have been able to develop infrastructure for water resources management and use. The survey included questions on investment plans and programs and on the mobilization of financing for water resources infrastructure.

5.1 Investment plans and programs

As shown in Figures 5.1, 5.2 and 5.3, water infrastructure, and the necessary finance, has been included or is in the process of being included in national infrastructure investment plans in more than 70% of countries surveyed although this is more likely to be the case for very high HDI countries than other HDI groups.

Progress with actual infrastructure development is at an advanced or fully implemented level in a high proportion of countries for water supply (67%) and energy/ hydropower (53%) and a low propotion of countries for rainwater harvesting (19%) and natural systems (22%) (Figure 5.4).

Figure 5.1 **Water resources included in national infrastructure investment plans:** The current status in responding countries by HDI Groups *(Question 4.1.1a)*

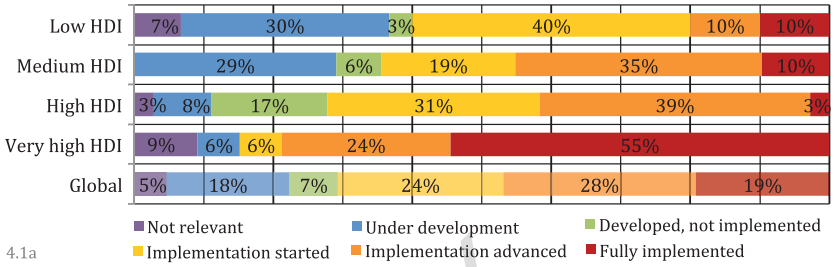


Figure 5.2 **Water resources included in national infrastructure investment plans by region**: The current status in responding countries by region *(Question 4.1.1a)*

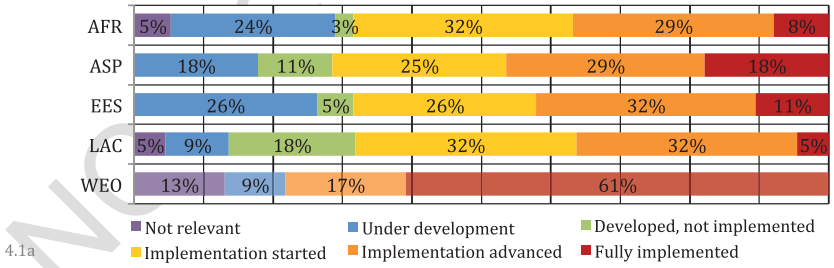


Figure 5.3 **Mobilizing financing for water resources infrastructure – financing for water resources included in national investment plans**: The current status in responding countries by HDI Groups *(Question 4.1.2a)*

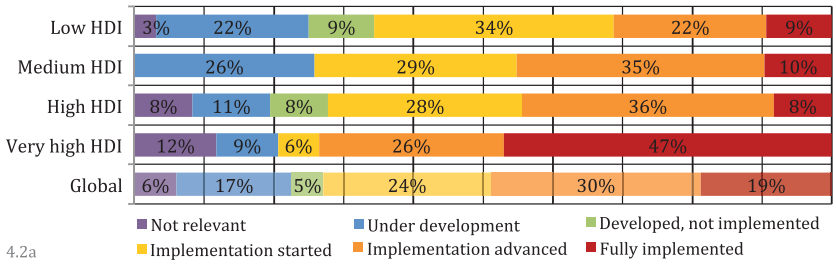



PHOTO: SHUTTERSTOCK


PHOTO: SHUTTERSTOCK

Figure 5.4 **Progress with infrastructure development for various water related purposes (including irrigation, energy, groundwater recovery, flood management, water supply, wastewater treatment, desalination, rainwater harvesting and for natural systems (e.g. wetlands, floodplains and catchment restoration):** The current status in responding countries as a global average *(Questions 4.1.1b to j)*

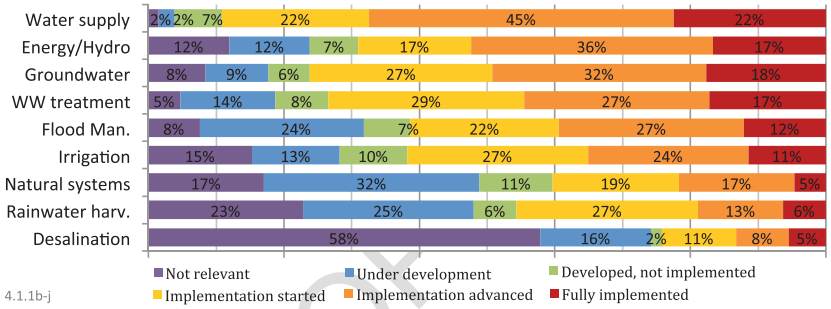
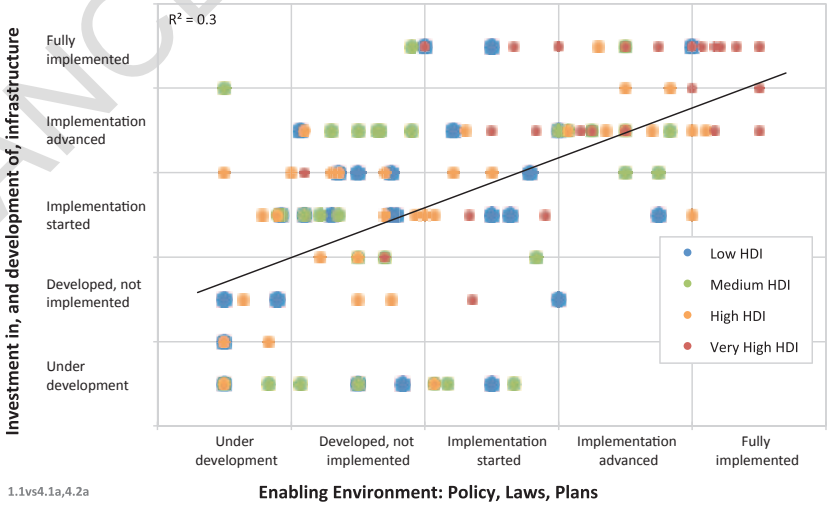


Figure 5.5 looks at the relationship between infrastructure development and the country progress with creation of an enabling environment of water policies, laws and plans. This shows that there is a rather weak correlation between water sector reforms and support to infrastructure development. The information coming from country interviews also suggests that there is as yet little evidence of a fully integrated approach to infrastructure development although awareness is increasing (Box 5.1). Whilst water is being included in national plans for infrastructure (Chapter 2) there is still little evidence that these plans are being implemented using an integrated approach.

Figure 5.5 **The relationship between progress with implementation of the enabling environment of policy, law and plans (chapter 2) and investment and development of infrastructure (chapter 5)**



Box 5.1 Infrastructure development: a lot of investment but more coordination needed

Some countries are making specific attempts to consider multiple uses when prioritizing water infrastructure development (Uruguay, Sri Lanka, Rwanda, and Mexico) but other countries identify coordination as an ongoing challenge. *"Nowadays, an integrated approach to the development of multipurpose projects and the incorporation of climate change impacts in the design of infrastructure can increasingly be observed"* (Mexico).

Level 2 interviews seem to show that decisions on infrastructure development continues much as previously with investment in priority development areas Agriculture (Sri Lanka, Uzbekistan, Pakistan), Hydropower (Costa Rica), Water and Sanitation (Jamaica, Guatemala, Estonia) while reforms to water resources management processes are ongoing. This would be consistent with the slow pace of integration already identified (Box 7) and a general reluctance to share information and power or large sectoral power imbalances. *"There is no equity in water resources planning at the basin level, since the hydroelectric sector has much more technical and economic capacity and this capacity is not poured into other sectors, but only in their own sector "* (Costa Rica).

Funding is a constraint (Uganda, Spain, Jordan) and integration of water into national investment plans has been one means to ensure support for critical investments (Tunisia, Jordan). *"It can be easily observed that there have been improvements on the coordination of investment and financing of water-related projects through a creation of common fund for water investment."* (Mozambique).*"Further mainstreaming of water considerations into other sectors' plans (like environment, agriculture) will assist with increasing the available financing through cross-sectoral activities"* (Jordan).
Deliberate mechanisms established to facilitate coordinated infrastructure development have not been systematically identified in the present level 2 or level 1 surveys and few examples emerge as clearly as Brazil: *"In 2007, the Federal Government launched the Program for Accelerating Development (PAC) based on strong coordination of public expenditure priorities, including actions to enlarge the water supply, sanitation, irrigation and energy infrastructures, as well as other water-resources related actions, among others"* (Brazil).

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

5.2 Summary of progress on developing infrastructure

- Infrastructure development is at an advanced stage in some important areas with over 65% of countries reporting advanced implementation of water supply infrastructure. However, fewer countries report advanced implementation for areas such as flood management, irrigation, rainwater harvesting and investment in natural systems.
- The analysis of the survey demonstrated a weak positive relationship between the development of the enabling environment for an integrated approach and progress with infrastructure. However the interview reports indicated that the level of coordination in infrastructure development among sectors could be improved.

PHOTO: SUMSUNG TECHWIN

UN PHOTO: / KIBAE PARK

6 FINANCING WATER RESOURCES MANAGEMENT AND DEVELOPMENT

6.1	Sources of finance	**46**
6.2	Payment for water resources	**47**
6.3	Management constraints	**48**
6.4	Summary of progress on financing for development of water resources	**49**

This chapter reports the general trends in financing for the development, management and use of water resources in countries over the last 20 years. The response rate for this section of the questionnaire was lower than for the other sections but still better than 90%. The results are an indication of the governments' perception of the trends, and there is no attempt to examine in detail the actual levels of financing for each country as this is beyond the scope of the survey.

The chapter includes sections on:

- Sources of finance;
- Payment for water resources;
- Management constraints;
- Summary of progress on financing for development of water resources.

Note: Somewhat fewer countries responded to the set of questions on financing than to other questions; however this does not affect the quality of the results.

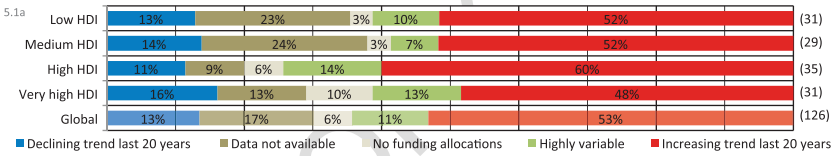
Present official reporting mechanisms do not include financing for water resources management and development as a specific category[8]. This makes it difficult to determine trends from official statistics and this survey thus represents the first and most comprehensive attempt to assess progress worldwide.

The survey covers two aspects of financing: the sources of finance and user charges for water resources management. This section complements Chapter 4 (Management Instruments) and Chapter 5 (Water Resources Infrastructure) and informs Chapters 7-8 on outcomes and impacts. The survey results are supported by evidence from interviews in selected countries as shown in below.

6.1 Sources of finance

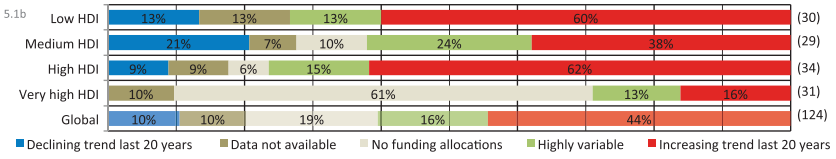
As shown in Figure 6.1, there is a notable increase in allocation of government expenditures on WR development in the past 20 years in over 50% of all countries. A small minority of countries (approximately 10-15% in all categories) report a declining trend in financing. A significant number of low and medium HDI countries report a lack of data.

Figure 6.1 **Government budget allocation (% of GDP) for water resources development:** The current status in responding countries by HDI Groups *(Question 5.1a)*



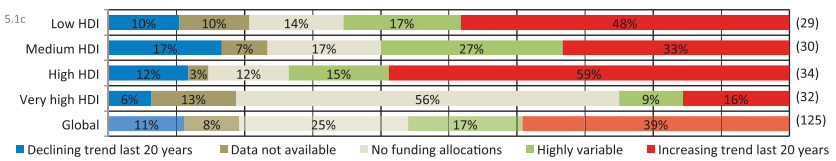
As shown in Figure 6.2, 60% of the low HDI countries indicate an increase in grants and loans from aid agencies for water resources management and development. The medium HDI group of countries shows the most variation with only 38% indicating an increasing trend, 21% a decline and 24% no clear trend. Surprisingly, 62% of the high HDI countries indicate an increase. These results may suggest a focus on countries with the most severe WRM challenges (e.g. for flood control). The result from the very high HDI countries is not pertinent for this indicator.

Figure 6.2 **Grants and loans from aid agencies for water resources development:** The current status in responding countries by HDI Groups *(Question 5.1b)*



As shown in Figure 6.3, for low and high HDI countries there are more countries indicating an increasing trend in financing from International Finance Institutions (IFI) (approximately 50% increasing versus 10% decreasing). The medium HDI countries however show the most variation (33% increasing, 17% decreasing and 27% no clear trend). This is similar to the findings for grant aid (see above). Overall a significant number of countries indicate no clear trend/no allocations (17%). As would be expected few very high HDI countries indicate financing from IFIs.

Figure 6.3 **Investments from International Financing Institutions (e.g. World Bank) for water resources development:** The current status in responding countries by HDI Groups *(Question 5.1c)*



[8] Although the OECD-DAC aid statistics do not have a code for WRM they do give some indication of bilateral aid for water resources policy, water resources protection, river development and waste disposal as well as categories for different sectoral water uses.

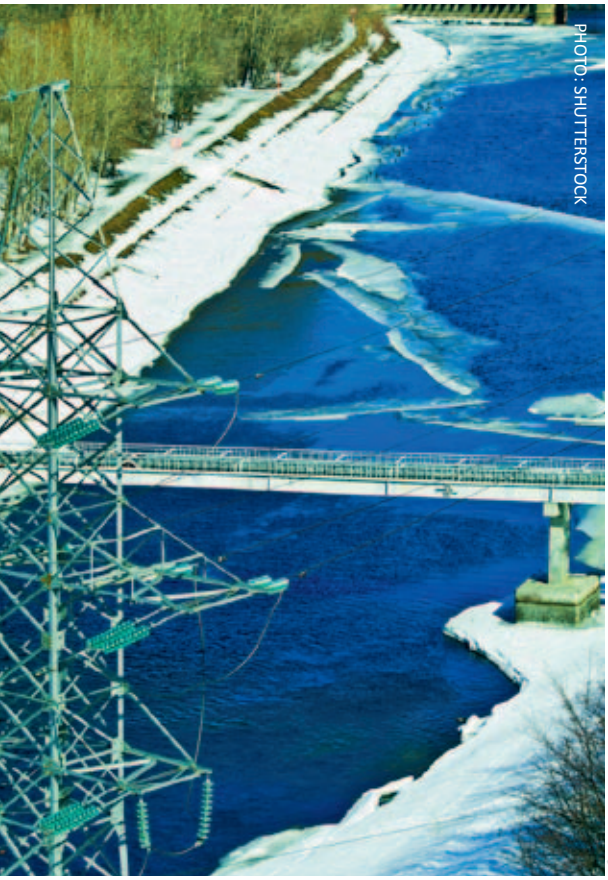
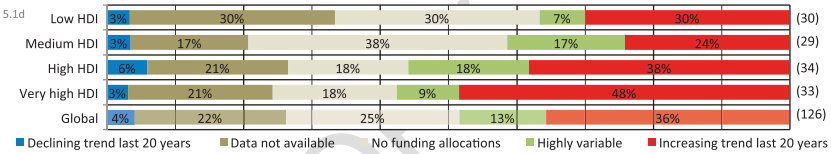


PHOTO: SHUTTERSTOCK

As shown in Figure 6.4, private sources include commercial banks and not for profit sources. Many countries indicate a lack of data on private sources of finance (e.g. 30% for low HDI group). A significant number of countries (24%-48%) in the four HDI groupings show an increasing trend, whilst only a small minority show decreases (3%-6%). There is a need for better monitoring of private sources of finance for water resources management and development.

Figure 6.4 **Investments from private sources (e.g. banks and private operators, non-profit) for water resources development:** The current status in responding countries by HDI Groups *(Question 5.1d)*

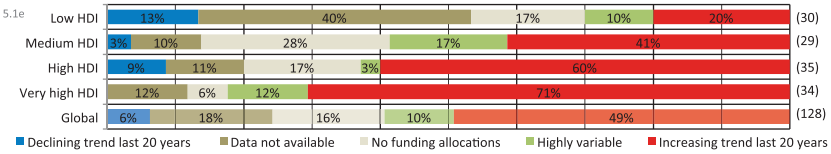


6.2 Payment for water resources

The payment by users for various water resource management and development benefits (such as pollution charges) is relatively new and difficult to measure. The survey aimed to get a perception of the trend in various countries but was not able to get details of the specific charges made.

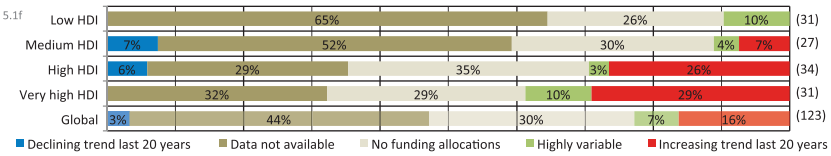
There is a notable increased trend in revenue-raising for a majority of countries (ranging from 20% in low HDI countries to 71% in very high HDI countries. Clearly, paying for water resources evolves with increased development. In the low HDI countries 40% have no data available and 13% record declining trends.

Figure 6.5 **Revenues (e.g. water use charges/tariffs) used for water resources development:** The current status in responding countries by HDI Groups *(Question 5.1e)*



For the majority of countries (especially the low HDI at 96%) either data are not available or no payments are made. There is a marked correlation between level of development and ecosystem payments. Progress has been made in high and very high HDI countries with 23-30% recording an increase in payments for ecosystem services.

Figure 6.6 **Payments for ecosystem services and related benefit/cost transfer schemes:** The current status in responding countries by HDI Groups *(Question 5.1f)*



Box 6.1 Payment for water resources management: some way to go

Many countries have adopted policies and laws recognizing that water users and polluters should pay for the benefits they receive and for the costs they impose on society. Governments are working to put these laws and policies into practice with systems of payment for water resources management services, such as supply of raw water and pollution management.

While revenue collection at the federal level in Brazil has been considered a success and covers agency costs, it is a bigger challenge at the basin level; *"At the basin level, there are only a few cases where water tariffs were implemented, with varying degree of success, mainly due to legal, institutional and bureaucratic restrictions that are still requiring efforts to ensure the full application of this instrument."* (Brazil).

Some countries reported an absence of payment systems (e.g. Guatemala, Jamaica) for water resource management but most have made legal provision for payment for water used, even though it may be difficult to apply (e.g. Samoa).

Water revenues, where collected, do not make a significant financial contribution (e.g. Bangladesh, Ghana, Spain, Rwanda) with a few exceptions where they are making an increasingly important contribution to water resources management (e.g. Brazil, Mozambique) or are planned to do so (e.g. Cape Verde 40% by 2020). *"It is acknowledged that three out of five ARAs* (river basin organizations) *show positive increases on their revenues, and this is mainly due to: i) investments in water infrastructure which has attracted more development investments; ii) increasing registration of water users in the basin organizations' jurisdictions; iii) water users have been strongly sensitized on the economic value of water and the need to pay in line with the current water legislation; and iv) the revision of water tariffs"* (Mozambique).

Costa Rica, took the step of allocating 50% of revenues from water use charges to protecting the resource. *"In Costa Rica in the last 60 years there has been a charge for water use, ... and has increased the fee for water use, resulting in an increase over 1000%. The country has taken a step further and defines that this funding should be linked to resource protection, so the Ministry approved that 50% of these funds will be used to protect water resources, in the public and private protected areas of the country."* (Costa Rica).

The low level of revenue generation is cited as one reason for the lack of financial resources and the need to rely on government budgets (e.g. Pakistan, Namibia) and this also extends into the problems with O&M due to lack of funds (e.g. Namibia, Ghana) and the frequent need for replacement infrastructure (e.g. Jamaica).

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

6.3 Management constraints

Approximately 50% of the total number of countries reporting on constraints noted that they faced management obstacles relating to financing (e.g. Armenia, Australia, Belize, Burundi, Cuba, Lebanon, Republic of Korea and Timor-Leste). Most countries did not elaborate beyond stating that there exist financial constraints, however those that did, referred to problems with cost recovery, limited allocations from national budgets, and with accessing and coordinating donor funding.

Box 6.2 Payment as an economic instrument

In some countries payment for water is used as an economic instrument to change water use practices. Charges can help to promote better practices, make more effective use of scarce finance and to raise revenues to supplement budgets. There has been limited progress over the past 20 years suggesting that much greater attention should be given to support country actions.

Water tariffs have been used to increase water efficiency in agriculture (e.g Tunisia) and whilst they may not directly affect demand and do not fully cover operation and maintenance costs, they do send signals and there are some positive outcomes: *"87% of irrigated areas are equipped with water saving techniques leading to efficiency improvement and yield increases. Water tariffs in agriculture cover only 60% of the operation costs on average. Maintenance operations are thus often neglected."* (Tunisia).

In Estonia water charges led to improved water use efficiency and reduced pollution. *"The implemented water resource and pollution taxes had a significant influence to economic water use. The water use during the last 20 years was reduced about 5 times and the reduction of pollution load to the Baltic Sea in the same order."* (Estonia).

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

6.4 Summary of progress on financing for development of water resources

- The responses indicate that a majority of countries report an increasing trend in financing for water resources development and management over the last 20 years from all sources. Slightly more than 50% of low HDI countries indicate an increasing trend for Government budgets and Official Development Assistance.
- Whilst there has been some progress on raising revenues for water resources management from users and polluters, there is still much to do, especially regarding payment for eco-system services, where the available data indicates that countries have made limited progress.
- Approximately 50% of the total number of countries reporting on constraints noted that they faced management obstacles relating to financing.

PHOTO: SHUTTERSTOCK

PHOTO: SHUTTERSTOCK

7 COUNTRY PERCEPTIONS OF KEY ISSUES

7.1	Issues for water development and use	**52**
7.2	Issues for water resource management	**53**
7.3	Threats to development	**55**
7.4	Threats from climate change	**57**
7.5	Summary of key issues from country perceptions	**58**

This chapter is based on survey responses to the series of questions in part 7 of the questionnaire. It gives the perceptions of government officials on the priorities for their countries and the changes in priorities over the past 20 years. The chapter provides the following four perspectives:

- Issues for water development and use
- Issues for water resource management
- Threats to development
- Threats from climate change

This chapter provides a global overview but recognises that importance of different issues will of course vary from country to country. The overview thus shows trends but does not give specific policy guidance for individual countries.

PHOTO: SHUTTERSTOCK

7.1 Issues for water development and use

This section considers a selection of the major uses to which water is put and how priorities have changed in the past 20 years. The specific issues of water for agriculture, energy and environment are considered in more detail in Chapter 8.

Figure 7.1 **Priority issues for water development and use**: The current status in responding countries by HDI Groups *(Questions 7.1.1a-f)*

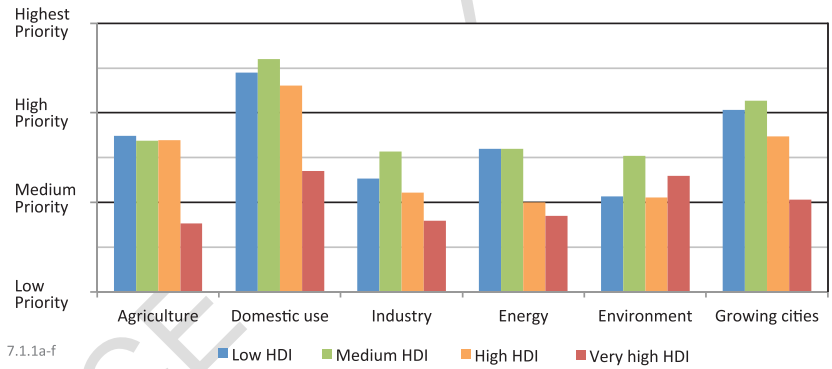
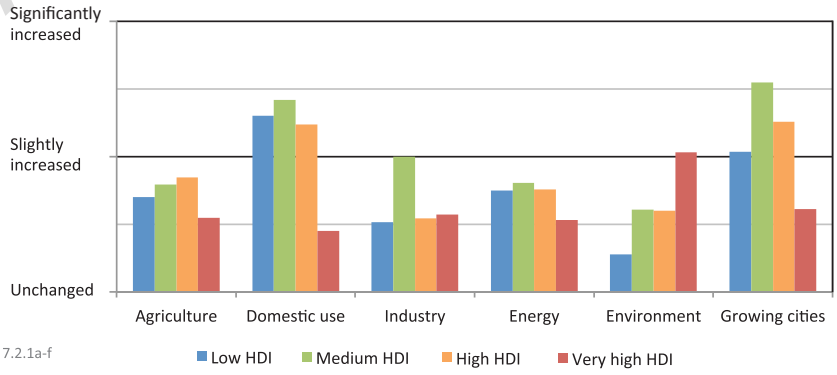


Figure 7.2 **Change in priority issues for water development and use over the past 20 years:** The current status in responding countries by HDI Groups *(Questions 7.2.1a-f)*



Domestic water supply is of critical importance for basic human well-being and is ranked highest by all HDI groups (e.g. 90% of low and 93% of medium HDI countries rated it high or highest priority). The related issue of *water for growing cities* is ranked second in priority for low and medium HDI countries (81-87%). Very few countries considered these two issues as 'not a problem'. *Water for agriculture* is also a high priority in low, medium and high HDI countries (71-75%). Only the low HDI group considered *energy* as a water use challenge a high or highest priority with 67%. *Water for environment* is a priority for the very high HDI countries (53% and equal to domestic water) but for the low, medium and high HDI groups this was rated as the lowest priority with 48-68% considering it a medium or low priority.

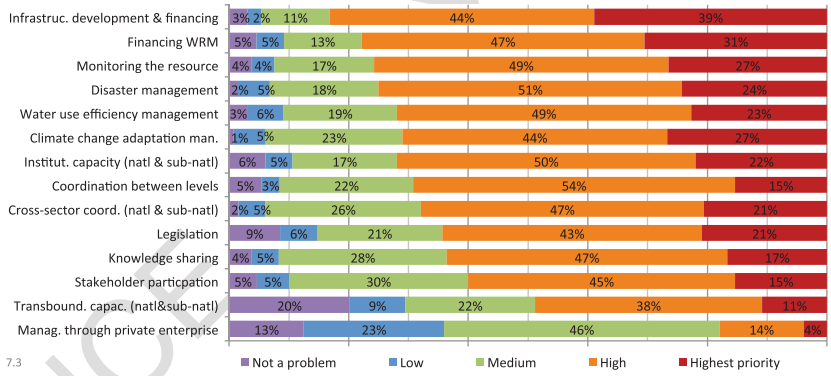
All the development issues are considered by most countries to be more significant now than 20 years ago. *Domestic water* and *growing cities* have increased most in importance, especially for the medium and high HDI groups. *Agriculture* has also increased in priority for low, medium and high HDI groups. The environment is the issue with the least significant change since 1992 except for the very high HDI group. This is of concern given the importance of sustainable development in Agenda 21 and the threats identified in sections 7.3 and 7.4 below.

The increased significance in domestic water most likely reflects the drive to meet the MDG target. It may also reflect the area of responsibility of those responding to the questionnaire.

7.2 Issues for water resources management

This section identifies the water management issues that countries perceive to be most important and how they have changed in the last 20 years. Altogether a list of 18 issues were listed in the questionnaire, with 6 of these being amalgamated in Figure 7.3.

Figure 7.3 **Key global management challenges**: The current status in responding countries as global averages *(Questions 7.3.1e-g, 7.3.3a-d, 7.3.4a-b, 7.3.5a-c, with amalgamations of questions 7.3.1a-b, 7.3.1c-d, 7.3.2a-b)*

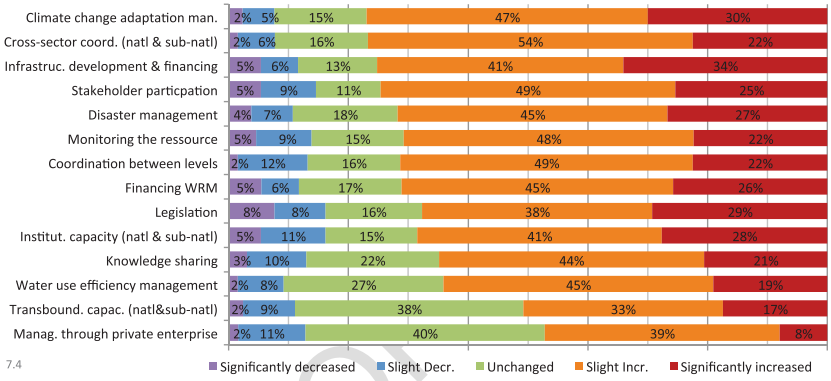


The responses showed considerable similarity among all HDI groups (data not shown). The two issues most often cited as 'high' or 'highest priority' for all groups are *infrastructure development/financing (83% of all countries)* and *financing for water resources management (78%). Monitoring* (76%) is also ranked as a high priority for many countries, particularly by the very high HDI group. *Disaster management* and *climate change adaptation management* are discussed in sections 7.3 and 7.4 respectively.

Four further issues are rated as high priorities by many countries but with more variation between HDI groups: *water use efficiency* (mainly low and high HDI, and discussed further in section 8.4 below), *institutional capacity* (mainly low and medium HDI) and *Coordination between levels/sectors* (mainly low and medium HDI). Finally, the lowest priority for most countries from all groups is *private enterprise* (only 18% of all countries rated this as a high or highest priority).


PHOTO: SHUTTERSTOCK

Figure 7.4 **Change over the past 20 years in key global management challenges**: The current status in responding countries as global averages *(Questions 7.4.1e-g, 7.4.3a-d, 7.4.4a-b, 7.4.5a-c, with amalgamations of questions 7.4.1a-b, 7.4.1c-d, 7.4.2a-b)*



The issues perceived to have significantly increased over the last 20 years varied across the HDI groups. Almost all of the issues listed are considered to have increased in significance. *Coordination between sectors* (76% – particularly by the low and very high HDI groups), *infrastructure development/financing* (75%) and *Stakeholder participation* (74% – particularly by the very high HDI groups) are the three most frequently cited as significantly increased since 1992. *Disaster management* and *climate change adaptation management* are discussed in sections 7.3 and 7.4 respectively.

Just over 70% of countries also considered the following issues to have increased in significance since 1992: *Coordination between levels* (particularly from the low and medium HDI groups), *Monitoring* (particularly from the high HDI group) and *financing water resources management*.

Only 47% consider *private enterprise* to have slightly or significantly increased over the last 20 years. This questions the excessive amount of debate that has been generated on this issue.

It is notable that all the issues listed (except private enterprise) are considered as a high or the highest priority by a majority of countries indicating that there is a need to address a very wide range of issues and setting water management priorities is clearly challenging. This may result in indecision or constantly shifting policy directions. The responses to the various issues suggests that countries recognise that in order to make progress they need to address water resource management issues in parallel with infrastructure development and these have to take place simultaneously and not sequentially.

Box 7.1 Water resources development and management issues

Development Issues:
Scarcity and overexploitation of water resources were highlighted as key issues by several countries in the interviews (Antigua and Barbuda, Jamaica, Jordan, Mozambique, Mexico, United Republic of Tanzania, Samoa, Rwanda, Tunisia). Pollution, including of groundwater, was also mentioned by several (Armenia, Brazil, Jamaica, Pakistan, Uganda, Australia, Spain, Estonia, Jordan, Mexico, Tunisia, Uzbekistan). A lack of attention to water quality in planning was mentioned by Australia and Mexico and water use efficiency by Armenia and Guatemala.

Only two of the 30 countries of Level 2 mentioned climate change impacts (Bangladesh, Australia) although it was considered a high priority in many countries in the Level 1 survey. Two countries raised issues not listed in the survey questions: China highlighted the need for more advanced technologies and Mexico expressed concern that vested interests have limited the impact of the new water law.

Management issues:
The lack of attention given to Water Resources Management was a concern in many Level 2 countries (Antigua and Barbuda, Cameroon, Costa Rica, Namibia, Pakistan, Uzbekistan). Also, the need to further roll out and improve policy and implementation and compliance with management instruments was stressed by many countries (Armenia, Brazil, Cape Verde, Mozambique, United Republic of Tanzania, Spain [for agriculture], Ghana, Samoa) as well as capacity challenges by Armenia, Cape Verde, Namibia, and Uruguay.

A selection of other management issues raised in the interviews include: improved groundwater management (Armenia, Pakistan, Australia, Tunisia); a monitoring and evaluation process (Rwanda); improved inter-ministerial coordination (Jordan); improvements to decentralized management and stakeholder participation (Tunisia); and improved regulation of transboundary rivers (Uzbekistan).

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

7.3 Threats to development

This section determines the countries perception of the most important threats to development from water and how they have changed since 1992, as illustrated in Figures 7.5 to 7.9.

Figure 7.5 **Key global threats to development from water (including extreme events, water scarcity and water quality)**: The current status in responding countries by HDI Groups *(Questions 7.1.2a-f)*

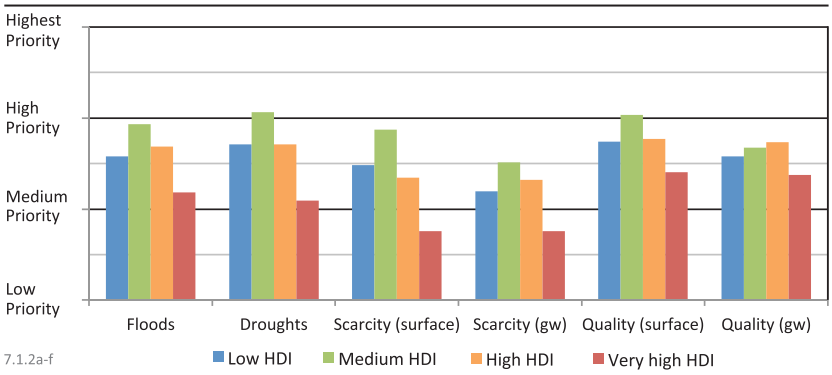
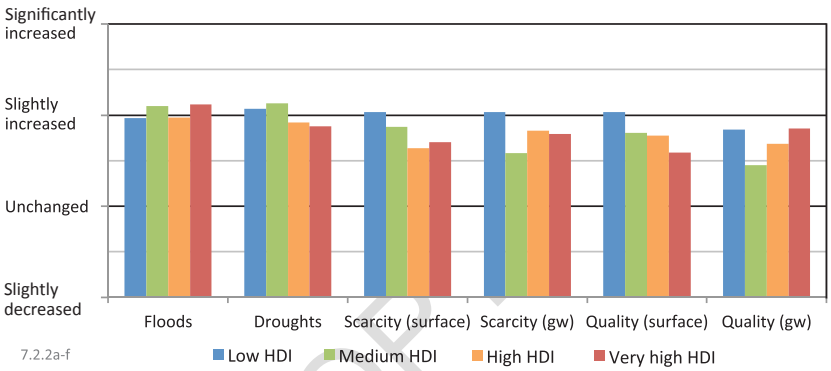



PHOTO: SHUTTERSTOCK

Figure 7.6 **Perceived change over the past 20 years to key global threats to development from water (including extreme events, water scarcity and water quality)**: The current status in responding countries by HDI Groups *(Questions 7.2.2a-f)*

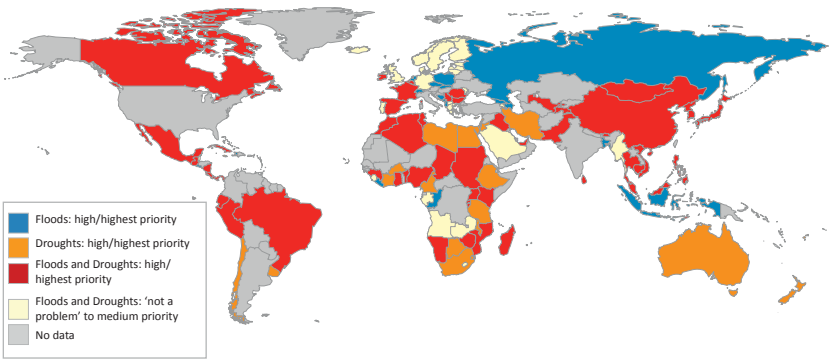


The survey clearly indicates an increase in the importance of all the threats by all HDI groups. A few countries report a decline in some threats. This confirms the need for improved water resources management, and contradicts to some extent the lack of priority given to 'the environment' in section 7.1 above, which may indicate a lack of appreciation of how the environment links to development more broadly. This discussed further in chapter 8.

The low HDI countries consider drought and surface water quality to be key threats and all threats have increased with more countries citing scarcity of surface and groundwater as the ones that have become more significant in the last 20 years.

Drought and water scarcity are considered less of a threat in the very high HDI countries possibly because many of these countries are in mild climates with fairly consistent precipitation throughout the year and most of these countries have well-developed hydraulic infrastructure. The very high HDI countries identified flooding and water quality (surface and groundwater) as having the highest priority, with flooding having increased most significantly.

Figure 7.7 **Map of global threats from floods and droughts**



The increased perception of the above threats is also reflected in the response to questions on disaster management. This is rated as a high or highest priority for a majority of countries (59-87%) and all HDI groups consider it has increased in significance (Figure 7.8 and Figure 7.9).

Figure 7.8 **The importance of disaster management:** The current status in responding countries by HDI Groups *(Question 7.3.5a)*

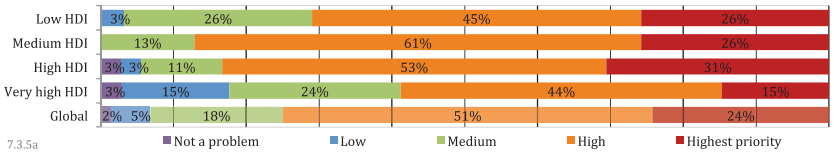
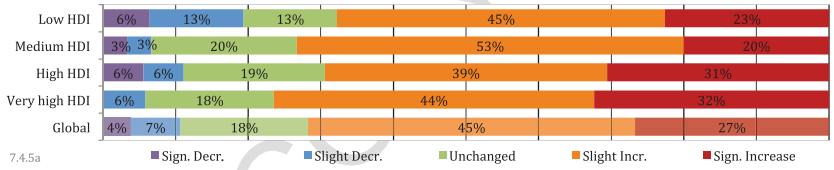


Figure 7.9 **Perceived change over the past 20 years in the importance of disaster management:** The current status in responding countries by HDI Groups *(Question 7.4.5a)*



7.4 Threats from climate change

Climate change will have significant impact on water resources and thus directly affect human activities, human well-being and the natural environment. The effects will be mostly through changes in the availability of water and through intensification of extreme events of floods and droughts. Figures 7.10 to 7.12 illustrate countries' perception of the threat and the status of programmes to address the issue.

As noted above, many countries consider risks from floods and droughts have increased over the past 20 years. Some countries, such as China, Algeria and Spain, rated both floods *and* droughts as of highest priority. Climate change may increase such risks in the future.

Climate change is cited as a high priority in a majority of countries (71% overall), and particularly for the medium HDI group with 90% giving this as a high or highest priority. 77% of all countries considered that the threat has increased. The low and high HDI countries consider climate change to be less of a priority (71 and 62% respectively of countries rate it a high/highest priority) compared with many of the water management issues and threats discussed in sections 7.2 and 7.3 above.

Figure 7.10 **The importance of climate change adaptation:** The current status in responding countries by HDI Groups *(Question 7.3.5b)*

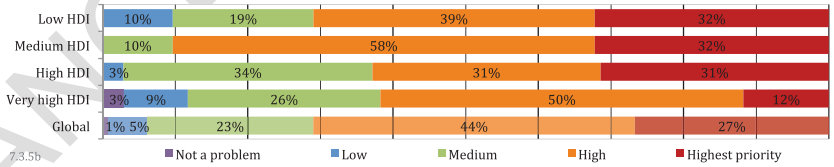


Figure 7.11 **Perceived change over the past 20 years in the importance of climate change adaptation:** The current status in responding countries by HDI Groups *(Question 7.4.5b)*

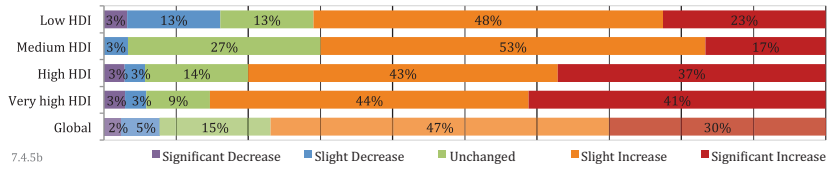
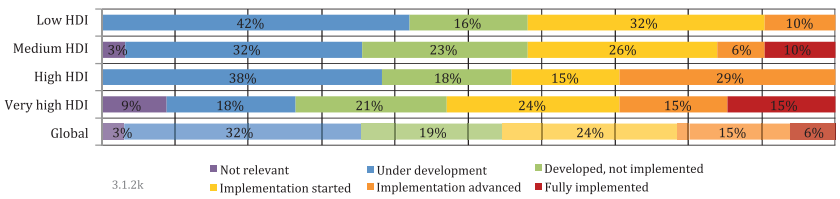


Figure 7.12 **Programs to address climate change adaptation through water resources management:** The current status in responding countries by HDI Groups *(Question 3.1.2k)*



Almost all countries in all HDI groups report that they have climate adaptation programmes under development and just under half (42% low and medium to 54% very high HDI) have some adaptation programmes started, advanced or implemented.

7.5 Summary of key issues from country perceptions

- Countries consider that all water development issues listed in the questionnaire are of high priority and have increased in significance over the past 20 years. Domestic water supply is clearly ranked by most countries as the highest priority for all HDI groups with water for growing cities ranked second. Water for agriculture is a high priority for many low HDI countries. Water for environment is a priority mainly for the very high HDI countries.
- Countries perceive most water management issues to be a high priority and that they have increased in significance. Many countries give a high priority to infrastructure development/financing, legislation and financing for water resources management.
- Many countries across all HDI groups consider threats from floods and droughts to be a high priority and that the significance of such threats has increased.
- Climate change is perceived as increasingly significant for many countries although it is considered less of a threat by low HDI countries compared with other water development and management issues.

MANFRED MATZ, SIWI (2004)

JAKOB GRANIT, SIWI

8
MULTIPLE USES OF WATER RESOURCES

8.1	Water and the natural environment	**62**
8.2	Water for food	**64**
8.3	Water and energy	**65**
8.4	Efficiency in water use	**66**
8.5	Summary of multiple uses of water resources	**67**

As demand increases competition increases necessitating a more integrated approach to water management. Water plays a key role within the green economy. It is put to many uses and when demand outstrips supply then decisions have to be made on preferential allocation. Availability may be variable within regions and through time due to seasonal and inter-annual variations in climatic inputs. Deterioration of water quality may also limit effective availability for particular uses. Demand may also vary through time – demand for agriculture may peak during the growing season, demand for energy production may be higher at certain times of day and from season to season. Spatial variability may be critical – water for growing cities is cited by many in the survey as a priority issue as it increases demand for domestic supplies and industry. Water for sustaining the natural environment, critical for maintaining all life systems, must also be ensured.

Thus, in a growing number of situations, there is increasing competition between water users. Managers have to make decisions, often very difficult, on allocation between the different users. Integrated approaches, as proposed in Agenda 21, aim to resolve the conflicts between multiple users of water. This chapter analyses the responses from countries on three key uses – water for the natural environment, water for food production and water for energy. Of key importance to resolving allocation decisions are measures to reduce water demand including those to increase efficiency of water use.

8.1 Water and the natural environment

The preservation of freshwater ecosystems is fundamental to the concept of sustainable development as they provide services that are crucial for human survival. As well as providing clean water for household use, agriculture and industry, they support fisheries, recycle nutrients, remove waste, replenish groundwater, help prevent soil erosion, and protect against floods. This is particularly the case for the world's poor, as they often depend directly on water and other ecosystem services provided by rivers, lakes and wetlands for their livelihoods.

Figure 8.1 shows that over 50% of countries world-wide rank water for the environment as of medium to low priority with a small percentage ranking it as 'not a problem'. Figure 8.2 indicates the extent to which water for the environment has changed in importance over the past 20 years; it is apparent that some 35% of Very High HDI countries regard water for the environment as significantly increasing in importance with 30% regarding it as of slightly increased importance. These percentages decrease progressively with decrease in HDI index; less than 10% of Low HDI countries regard water for the environment as of significantly increased importance, with about 30% regarding it as of slightly increased importance.

Figure 8.1 **The importance of water for ecosystems / environment:** The current status in responding countries by HDI Groups *(Question 7.1.1e)*

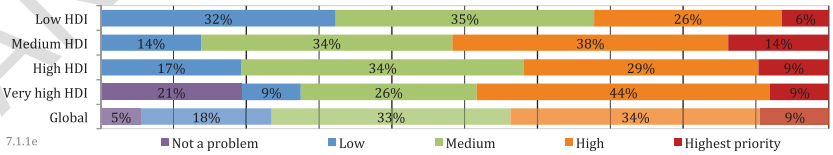
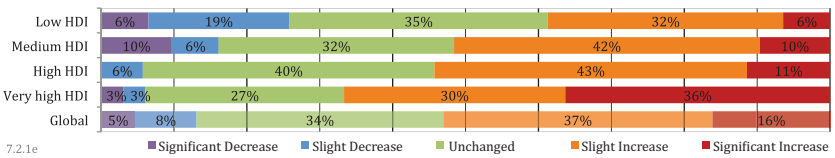


Figure 8.2 **Perceived change over the past 20 years in the importance of water for ecosystems / environment:** The current status in responding countries by HDI Groups *(Question 7.2.1e)*



Figures 8.3 and 8.4 show the answers to 10 survey questions relating to the natural environment. They are placed in the order they appear in the survey.

It is clear that the very high HDI group of countries on average regard environmental concerns as of high priority; the priority decreases progressively with lowering in HDI ranking except that the low HDI countries rank environmental concerns as equal to or higher than medium HDI countries.

45% of countries have either advanced or fully implemented programmes to evaluate environmental impacts on water projects; 36% of countries have advanced or fully implemented programs for the monitoring of aquatic ecosystems. On the other hand only 15% of countries have advanced or fully implemented programmes to evaluate water-related or dependent ecosystems (Figure 8.3).

UN PHOTO: / KY CHUNG

Figure 8.3 **Global responses to a range of questions on water for the environment:** The current status in responding countries as global averages *(Comprises questions 1.1.2e,j,k; 3.1.1d; 3.1.2f,i,m; 3.1.3e; 4.1.1j; 4.1.2j)*

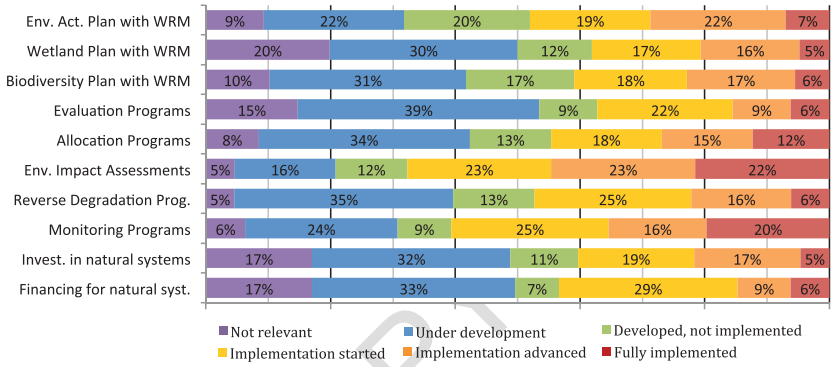
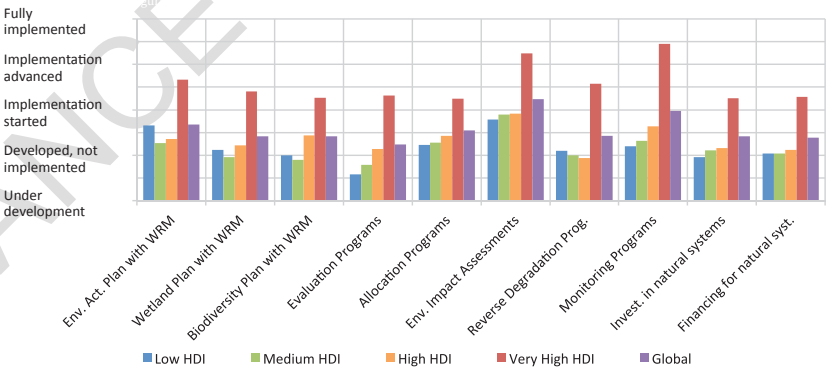


Figure 8.4 **Global responses to a range of questions on water for the environment (Average scores within HDI groups)** *(Comprises questions 1.1.2e,j,k; 3.1.1d; 3.1.2f,i,m; 3.1.3e; 4.1.1j; 4.1.2j)*



Legend for Figures 8.3 and 8.4

Env. Act. Plan with WRM: National Environmental Action Plan with WRM component
Wetland Plan with WRM: National Wetland policy/strategy/plan with WRM component
Biodiversity Plan with WRM: National Biodiversity policy/strategy/plan with WRM component
Evaluation Programs: Programs to value water-related or dependent ecosystem services
Allocation Programs: Programs for allocating water resources that include environmental considerations
Env. Impact Assessments: Programs to evaluate environmental impacts of water projects
Reverse Degradation Prog.: Programs to reverse environmental/ecosystem degradation
Monitoring Programs: Monitoring aquatic ecosystems
Invest. in natural systems: Investment plans and programs for natural systems (e.g. wetlands, floodplains and catchment restoration)
Financing for natural syst.: Financing for natural systems.

8.2 Water for food

Food prodution plays a critical role in sustainable development and provides employment for 40% of the global population. It also accounts for 70% of global water withdrawals thus impacting on water security. Therefore, food security for an expanding population will have to be achieved using less water resources.

As populations grow the global demand for food will increase dramatically in the next decades – this is particularly the case in those developing nations with annual population growth rates in excess of 3%. It will be a major challenge to accomplish the necessary increase in food production while keeping the increase in water use to a minimum. Changes in diet, with significant implications for increased water demand, will exacerbate the challenges of providing more food. Plans for food production must take adequate account of water resources and must be carefully prepared to guide farmers in appropriate practices. There will be needs, in many countries, to invest in modernization of infrastructure, to restructure institutions and to upgrade the technical capacities of water managers and farmers. Water use efficiency, producing more 'crop per drop', will be a major challenge.

Figure 8.5 indicates that for more than 65% of very high HDI countries water for agriculture is of medium priority or lower (probably as a result of the majority of these countries being in water secure regions or with developed economies). For all other HDI groups some 65-71% of countries regard water for agriculture as of high or very high priority, reflecting the challenge of feeding usually rapidly increasing populations with, in many cases, decreasing water supplies.

Figure 8.6, showing the changes in priorities in the past 20 years, reflects similar responses as in Figure 8.5 with just over 40% of very high HDI countries indicating an increase in importance of water for agriculture while some 60% of all other groupings indicate increase in its importance.

Figure 8.5 **The importance of water for agriculture**: The current status in responding countries by HDI Groups *(Question 7.1.1a)*

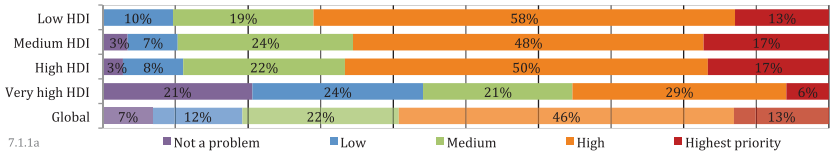


Figure 8.6 **Perceived change over the past 20 years in the importance of water for agriculture:** The current status in responding countries by HDI Groups *(Question 7.2.1a)*

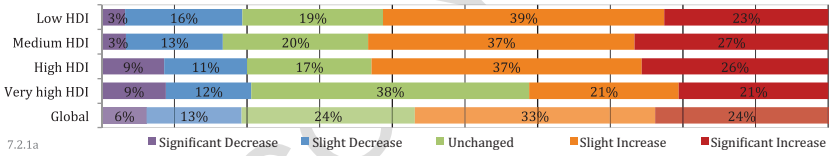


Figure 8.7 shows that some 50% of very high HDI countries have either advanced implementation or full implementation of national agricultural plans with a water resources management component; these proportions in general decrease progressively with lower HDI rankings.

Figure 8.7 **National agricultural plan with water resources management component:** The current status in responding countries by HDI Groups *(Question 1.1.2g)*

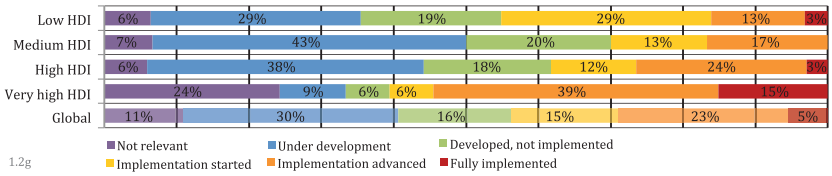
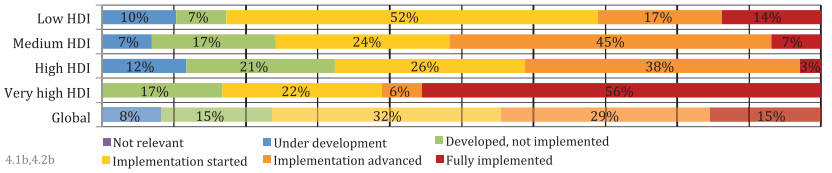


Figure 8.8 shows there is still some way to go towards implementing investment plans and mobilizing financing for irrigation, particularly for low HDI countries, where irrigated agriculture may play a critical role in the national economy.

Figure 8.8 **Infrastructure development and mobilizing financing for irrigation:** The current status in responding countries by HDI Groups *(Amalgamation of questions 4.1.1b and 4.1.2b)*



8.3 Water and energy

Energy availability is of fundamental importance for economic and social development. Water and energy are very highly interconnected. Water is essential in energy production – for hydro-power and for water cooling in thermal and nuclear power plants. Conversely, pumping of water from groundwater sources and through pipelines to consumers particularly in cities uses considerable energy. Thus water conservation can lead to large savings in energy.

Despite the fact that energy availability is, to a considerable extent dependent on water, it is somewhat surprising that a majority of countries regard water for energy as only of medium or lower priority (Figure 8.9). However, on average there has been significant increase in the priority of water for energy over the past 20 years (Figure 8.10).

Figure 8.9 **The importance of water for energy:** The current status in responding countries by HDI Groups *(Question 7.1.1d)*

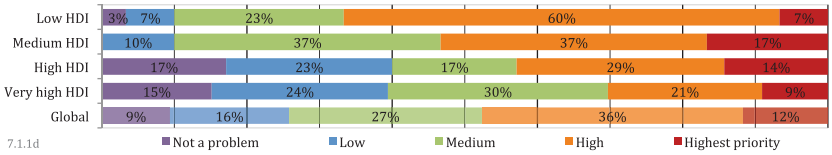
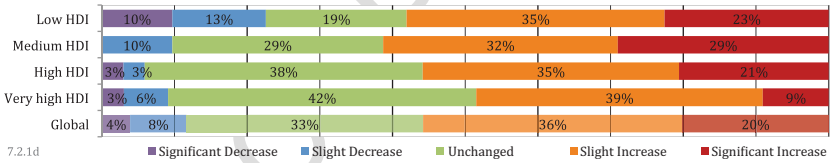


Figure 8.10 **Perceived change over the past 20 years in the importance of water for energy:** The current status in responding countries by HDI Groups *(Question 7.2.1d)*



Not surprisingly the very high HDI countries are far more advanced than the other HDI groupings of countries, 23% of them having fully implemented national energy plans with a water resources management component and 50% having fully implemented investment plans and financing for energy/ hydropower (Figures 8.11 and 8.12).

Figure 8.11 **National energy policy/strategy/plan with water resources management component:** The current status in responding countries by HDI Groups *(Question 1.1.2h)*

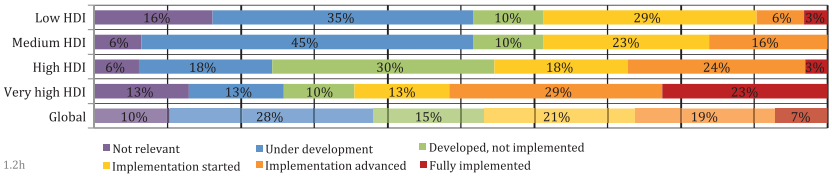
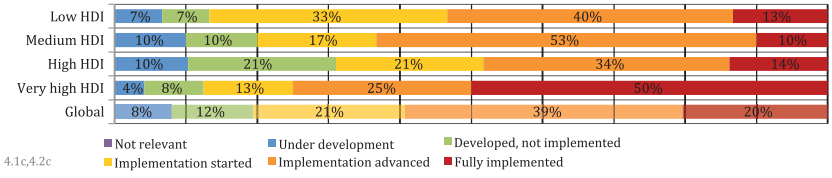


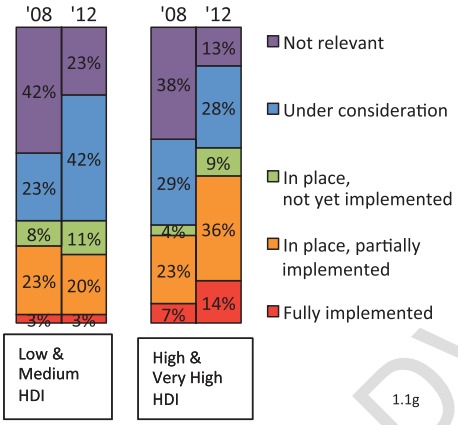
Figure 8.12 **Infrastructure development and mobilizing financing for energy / hydropower:** The current status in responding countries by HDI Groups *(Amalgamation of questions 4.1.1c and 4.1.2c)*



8.4 Efficiency in water use

The Johannesburg Plan of Implementation (JPoI) requested developing countries with support from donors to develop national IWRM and Water Efficiency plans. The global survey shows that there has been progress since 2008 in preparing these plans, in particularly in the higher HDI countries (Figure 8.13).

Figure 8.13 **Change in water efficiency in integrated water resources management plan or equivalent 2008-2012:** Breakdown by HDI group of the 57 countries that responded to both the 2008 and 2012 surveys *(Question 1.1.1g)*



However, only 50% of the plans have addressed water efficiency at all and implementation has started in less than 40% of these countries. Even for very high HDI countries less than 50% have advanced implementation. Measures to support the implementation of water efficiency measures are lagging behind other water management reforms. This is despite the high level of priority given to water use efficiency by more than 70% of all countries and the perceived increase in challenge over the last 20 years (Figures 8.14 and 8.15).

Figure 8.14 **The importance of water use efficiency management:** The current status in responding countries by HDI Groups *(Question 7.3.5c)*

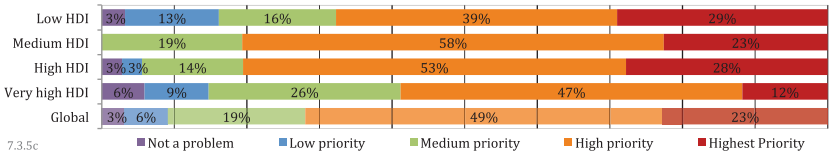
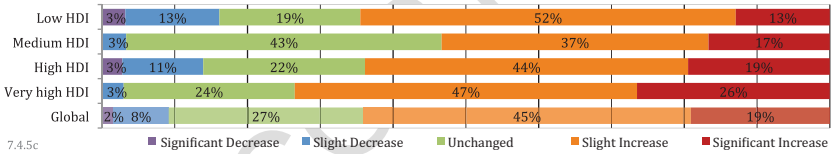


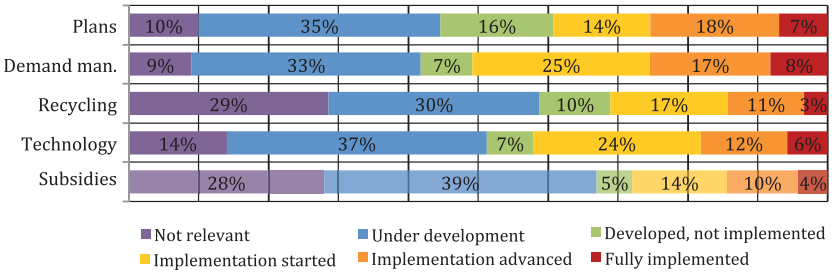
Figure 8.15 **Perceived change over the past 20 years in the importance of water use efficiency management:** The current status in responding countries by HDI Groups *(Question 7.4.5c)*



Only 50% of countries have initiated demand management measures to increase water use efficiency and only a few high and very high HDI countries have fully implemented such programs. Programmes for re-use or recycling of water lag way behind, with some 30% of countries considering such measures as 'not relevant' and only some 3% of countries having fully implemented plans (Figure 8.16).

Similarly, programs for transferring cost effective water saving technologies are at their very early stages in most countries (42% of countries have started implementation) (Figure 8.16). Subsidies for promoting water efficiency are either perceived as not relevant or are at a very early stage of implementation and only very few countries (4%) have fully implemented such programs (Figure 8.16).

Figure 8.16 **Measures to improve water efficiency (including through plans, either separate or in integrated water resources management plan or equivalent, through demand management, through programs for re-use or recycling of water, through programs for transferring improved and cost effective water saving technologies or through subsidies for promoting water efficiency):** The current status in responding countries by HDI Groups *(Questions 1.1.1f & g(max), 3.1.2g,h, 3.1.4c,3.1.5b)*



8.5 Summary of multiple uses of water resources

- Sustainable management and development of water resources is the foundation of a green economy and essential for inclusive growth. Water resources management underpins and interacts with all the pillars of the green economy, including environmental protection, food and energy.
- On all questions concerning the environment the very high HDI group consistently registers higher concern than any other HDI group.
- It is clear that most countries register concern with the sustainability of natural ecosystems as well as with food and energy concerns. Many countries are taking an integrated approach to these concerns, but many more still need to do so.
- While water use efficiency is high priority in a good majority of countries, it is clear that introduction and implementation of water efficiency measures is, in general, lagging behind particularly in low HDI countries. In the lowest three HDI categories water efficiency is not perceived to be integrated into water resources management. Even for very high HDI countries less than 50% have advanced implementation or full implementation.

PHOTO: UNDP

PHOTO: SHUTTERSTOCK

9 DEVELOPMENT IMPACTS OF IMPROVED WATER RESOURCES MANAGEMENT

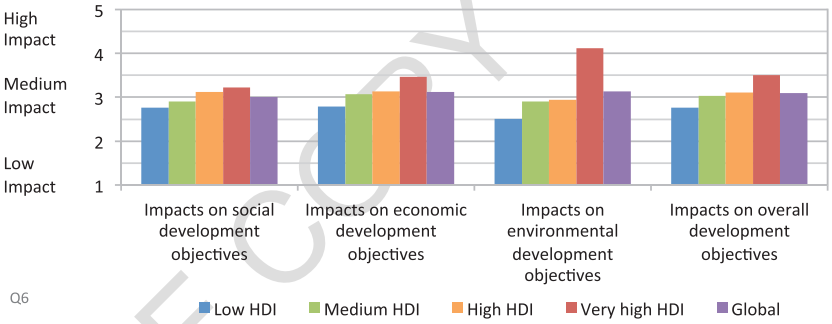
9.1	Social impacts	**70**
9.2	Economic impacts	**71**
9.3	Environmental impacts	**72**
9.4	Overall development impacts	**72**
9.5	Summary of development impacts of improved water resources management	**73**

Having considered the results of on-going reforms to adopt more integrated approaches within the field of water resources management in the previous chapters, in this chapter attention will be given to the positive perceived outcomes and impacts of the reforms of the past 20 years[9]. It is difficult to capture and attribute development impact to improved water resources management in general and it should be kept in mind that the findings reported here are based on survey responses and interviews mainly with people at national level directly involved in water resources management.

In order to obtain a broad picture of the current results, countries were asked to reflect on the impacts of integrated approaches to water resources management in terms of social, economic and environmental development as well as overall national development over the past 20 years on a scale of 1 (low) to 5 (high)[10]. Countries were also invited to provide narrative input as to what they regarded as the main outcomes and key results from improved water resources management. The input received was sorted between the four HDI categories. The magnitude of these various impacts is dependent on the situation of individual countries and difficult to capture in a global report.

On average countries gave positive responses that support a general conclusion that integrated approaches to water resources management have led to positive development impacts (Figure 9.1). In the following subsections the extent to which integrated approaches to water resources management has impacted social, economic, environmental and overall development aspects will be further elaborated.

Figure 9.1 **The Impacts of improved water resources management on development over the past 20 years:** Breakdown by HDI group

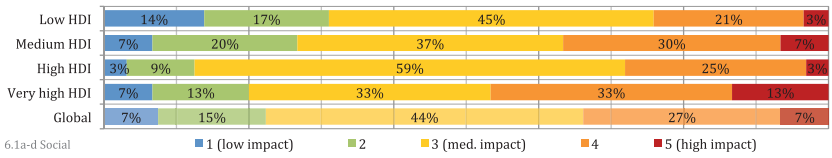


Countries rated the impacts of integrated approaches to water resources management on development objectives on a scale of 1 (low) to 5 (high).

9.1 Social impacts

The responses by countries on the perceived impacts on social development over the past 20 years were generally positive and with a broadly similar average spread between HDI categories. Perhaps the most notable difference between the four HDI categories was the fact that the very high HDI countries reported the highest impact.

Figure 9.2 **Impacts of improved water resources management on social development over the past 20 years:** The current status in responding countries by HDI Groups



By analysing the rich amount of narrative input regarding main outcomes and key results from improved water resources management, as well as the number of countries reporting them, it was seen that the most common social impact reported is an improvement in water supply access. This was seen for all HDI categories of countries (e.g. Timor-Leste, Benin, Chile and Estonia).

[9] It is important to clarify that people directly involved in water resources management have primarily been responsible for responding to survey questions. Although these people are typically very much aware of the broader relevance of water resources management, they may not necessarily be able to provide complete and detailed key results related to national development objectives. As with the rest of the report, this is an analysis of country perceptions.

[10] Water resources management is just one of many contributing factors that influence development. Definitions of the different development aspects are as follows:
Economic development objectives relating to economic growth, wealth, management of monetary assets, and economic sector development.
Social development objectives relating to human development, gender considerations, poverty alleviation, health, education, and job creation.
Environmental objectives relating to the conservation and sustainable use of natural resources, such as water, pollution control, nature, land, forest, and fisheries.

More specific examples include Chad which has increased access from about 15% in 1990 to 50% in 2011, and both South Africa and China reported having met MDG target 7C well ahead of schedule[11].

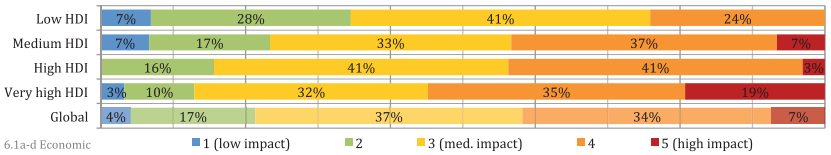
Even though stakeholder participation is an area where relatively slow progress was reported, the second most common social impact for all HDI categories is improved stakeholder participation by civil society in water resources management processes. Participation was reported as often being through non-government groups, community based organizations and meetings, as well as water user associations (e.g. Singapore, Namibia, Bangladesh, New Zealand, Cambodia and Grenada, as well as France and Germany).

A number of countries in all HDI categories noted a contribution to improvements in human health, including a reduction in child mortality (e.g. Albania and the Solomon Islands). In terms of other social impact responses, Ghana and Zambia reported a contribution to conflict resolution/avoidance, and both Peru and New Zealand noted important cultural contributions in their societies.

9.2 Economic impacts

The responses by countries on the perceived impacts on economic development over the last 20 years were generally positive, although again low HDI countries typically gave lower ratings, with no low HDI countries giving a maximum rating.

Figure 9.3 **Impacts of improved water resources management on economic development over the past 20 years:** The current status in responding countries by HDI Groups



From the narrative responses it is interesting to note that many of the responding countries are strongly influenced by limited water availability compared to demands. The most common impact for all HDI categories was an increase in productive efficiency. The 14 countries reporting increased productive efficiency included Sudan, Egypt, Libya, Saudi Arabia, and Cyprus. Also, Uzbekistan reported improving prospects for agriculture in the longer term in the economically important Fergana Valley. Several countries reported increased sectoral production (but not necessarily more efficient water use) including Ghana, Democratic People's Republic of Korea, Guatemala, and Morocco. Most of the production increases were related to agriculture.

The second most common economic impact was recycling/reuse, with larger scale agriculture being one of the main beneficiaries (e.g. in Libya, Tunisia and Cyprus), although Mexico has achieved positive results at the household level, and Singapore has been able to meet varied needs including industrial demand.

Countries including China and Ghana reported that they have been able to better harness hydropower potential, with Guatemala's generation capacity almost doubling between 1982 and 2011. Five countries, including Mauritius, Albania and the United Arab Emirates, reported that improved water resources management was making a positive contribution to economic growth.

[11] MDG Target 7C: Reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation

9.3 Environmental impacts

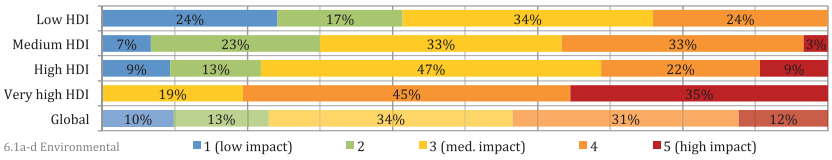
Very high HDI countries reported by far the greatest positive environmental impacts from improved water resources management over the last 20 years, giving an average rating of more than 4 on a scale of 1 (low) to 5 (high). A total of 24% of the low HDI countries gave the lowest possible rating to impacts on environmental development and none gave the highest.

A number of countries in all HDI categories were able to identify positive impacts on the environment (e.g. Swaziland, Mauritius, Mexico, and Germany), including decreasing rates of ecosystem degradation (e.g. Netherlands, Malawi, and Portugal) and improvements in environmental flows (e.g. Nigeria). The most commonly acknowledged environmental impact is improved water quality, often as a result of improved waste water treatment (e.g. Rwanda, Azerbaijan, Bahamas, Brazil, Latvia, Tonga, Andorra, Belgium, Ireland and Sweden).

Improved flood and drought prevention/management is a result reported by countries including Cuba, Malaysia, Portugal, Democratic People's Republic of Korea and Republic of Korea, as well as Ghana, where work has been undertaken as part of national climate change adaptation measures.

UN PHOTO: ESKINDER DEBEBE

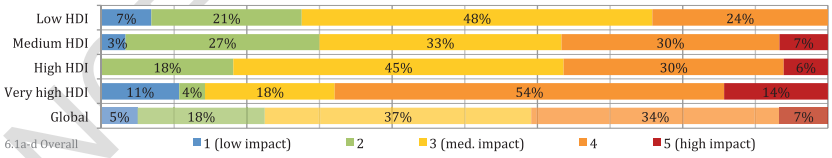
Figure 9.4 **Impacts of improved water resources management on environmental development over the past 20 years:** The current status in responding countries by HDI Groups



9.4 Overall development impacts

The perceived impact on overall development over the last 20 years increases significantly from low to very high HDI, with only 24% of low HDI countries giving a score or 4 or 5 compared to 68% for very high HDI countries.

Figure 9.5 **Impacts of improved water resources management on overall development over the past 20 years:** The current status in responding countries by HDI Groups



The responses received indicated that, in contrast to their more developed counterparts, low HDI countries are currently experiencing comparatively moderate impacts on overall development as a result of improved water resources management. However, there are some notable exceptions including Cambodia, Malawi, Albania, Peru and Panama, which were amongst those countries that reported that integrated approaches to water resources management have made a positive contribution to poverty alleviation/livelihoods.

A total of 12 counties from a mixture of all four HDI categories reported improvements in efficient allocation in terms of balancing the available water resources between competing demands (e.g. Bangladesh, Sudan, Costa Rica Mauritius, Saint Lucia, Cyprus and New Zealand), which is one of the key objectives of water resources management reforms.

Another key objective of water resources management reforms is sustainability. Again a total of 12 countries noted a positive contribution towards sustainability (e.g. Botswana, Uganda, Mexico, Tonga, Cyprus and Singapore), although most did not elaborate further.

It is significant that 90% of the countries that responded to the survey reported a range of positive development impacts from integrated approaches to water resources management following reforms undertaken within the last 20 years (see Box 9.1). It takes time before integrated approaches show tangible results and approximately 20% of countries, spread over all HDI categories, indicated in the narrative response on impacts that it is too early

to elaborate on detailed outcomes and key results achieved through the improvements undertaken or being undertaken.

9.5 Summary of development impacts of improved water resources management

- 54% of very high HDI countries, 44% of medium and high HDI countries and 24% of low HDI countries reported high economic impacts from integrated approaches to water resources management. The most common impact for all HDI categories was an increase in productive efficiency related to water use, most commonly for agriculture.
- Very high HDI countries reported by far the greatest positive environmental impacts from improved water resources management, especially related to improved water quality, often due to improved wastewater treatment. Improved flood and drought prevention/management are reported by several countries.
- The country responses across all HDI bands indicate that the main social impact over the past 20 years has been an improvement in access to water supply. A number of countries in all HDI categories noted a contribution to improvements in human health, including a reduction in child mortality.

Box 9.1 Improved water resources management and development has had great impact

Progress has been made over the last 20 years to improve water policies, plans and laws and remains an ongoing process. The benefits are not always easy to quantify but based on the sample of 30 countries there has been significant impact as illustrated in the sample below as reported in the Level 2 interviews:

Impact on water resources management

- China reported 90% efficiency gains in terms of water use/unit of GDP as well as integrated system for urban flood control, wastewater discharge, water source protection and water environment;
- Mexico reported many accomplishments including a comprehensive legal system, a national water authority, a functioning water rights system, and incipient water markets;
- New governance processes and improved coordination has been implemented across government agencies in Brazil with a strong role for stakeholders;
- Samoa reported improved coordination across government agencies;
- Rwanda has established decentralized environmental clubs that enforce adherence to environmental laws;
- In Australia, water markets have been effective to improve efficiency and flexibility while maintaining environmental flow objectives. Also, a rules-based approach has been established to ensure water development and environmental objectives are met.
- In Mozambique and Estonia stakeholder participation has resulted in greater commitment to improved water resources management;
- Private sector involvement has brought increased financial flows in Armenia and Mozambique; and
- New state water databases have been established in Armenia and Estonia.

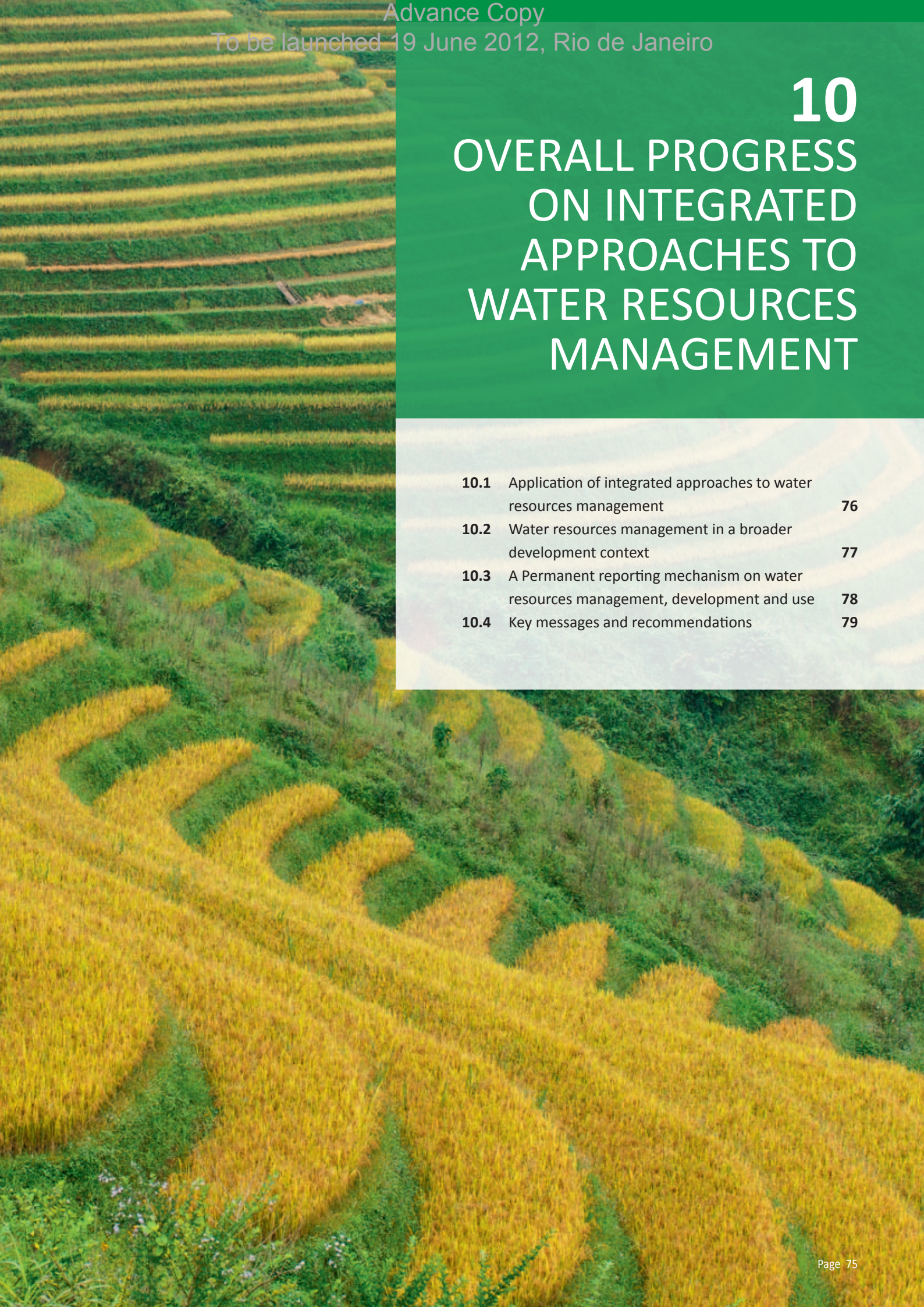
Impact on water users

- Many countries reported improved access to water supply, including Albania, Armenia, Benin, Cap Verde, Ghana, Guatemala, Jamaica, Namibia, Samoa, Tunisia, and Uganda;
- Wastewater management reforms in Spain have reduced costs;
- Water use efficiency has improved with system losses reducing from 30 to 17% in Estonia;
- Uganda and Costa Rica reported improved protection from pollution and overexploitation with associated health gains;
- All municipalities and 90% of rural settlements in Estonia have wastewater treatment facilities;
- 110 wastewater treatment plants have been built in Tunisia;
- Ghana has rehabilitated 40% of irrigation schemes for more effective water use and productivity;
- In Uzbekistan, cropping patterns have been changed and irrigation infrastructure upgraded with significant water efficiency gains; and
- Irrigated area and hydropower has increased in Guatemala and Uganda bringing many people out of poverty.

Note: this box derives from the Level 2 survey and represents government and other stakeholder views.

PHOTO: SHUTTERSTOCK

10 OVERALL PROGRESS ON INTEGRATED APPROACHES TO WATER RESOURCES MANAGEMENT



10.1	Application of integrated approaches to water resources management	**76**
10.2	Water resources management in a broader development context	**77**
10.3	A Permanent reporting mechanism on water resources management, development and use	**78**
10.4	Key messages and recommendations	**79**

This chapter summarises the progress with integrated approaches to water resources management based on the reported response to the questionnaire and interviews as provided in chapters 2 to 9. It reviews briefly the results with some comments as to the outcomes of application of integrated approaches (10.1), assesses the progress on water resources management in a development context (10.2), assesses the lessons learnt from the survey and argues for the need to establish a more permanent monitoring mechanism (10.3), and provides key messages and recommendations.

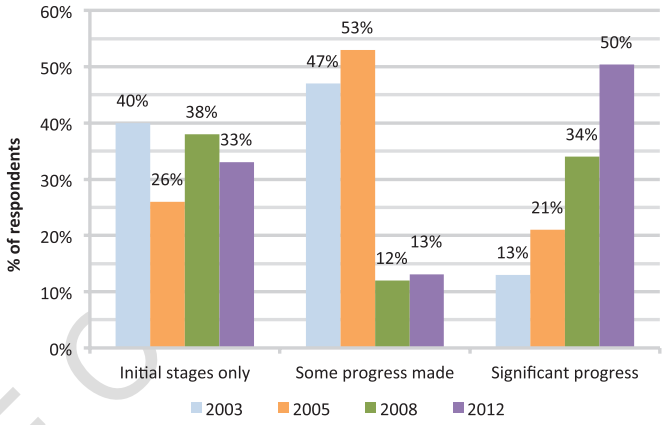
10.1 Application of integrated approaches to water resources management

Agenda 21, of the United Nations Conference on Environment and Development (Earth Summit), Rio de Janeiro 1992, called for the application of integrated approaches to the development, management and use of water resources. In response to the call for institutional, legal and financial mechanisms there have been global impacts with over 80% of countries having made changes to the enabling environment for water resources management (Chapter 2). Changes to water policy, water law and the development of water resources management plans have been widespread. Most effective have been changes to policies and laws that have taken place in countries of all development categories as defined by the Human Development Index.

The scale of the global response to Agenda 21 is considerable when considering the number of countries that report that their adoption of the integrated approach is still under development. However, it is clear that current slow progress and even stalled progress in some cases (when compared with the survey of 2008) requires renewed or continued country commitment to Agenda 21.

The results of various surveys and reports carried out between 2003 and 2012 to assess progress towards developing and implementing integrated water resources management plans are summarised in Figure 10.1. The number of countries reporting for each survey differs (for example GWP did not include very high HDI countries) so the comparison is only illustrative but the results provide indicative trends. It is clear that countries continue to make progress. The latest survey indicates that almost 50% of countries report significant progress on advancing implementation of integrated water resources management plans. It is however also evident that progress for the remaining countries has slowed and further efforts are needed to address the various constraints that they are experiencing. This requires continued international and country commitment to Agenda 21. The detailed analysis of the 2012 survey given above and summarised below provides insight to the elements of water resources management where progress is being made and those areas where extra effort is needed.

Figure 10.1 **Progress towards developing and implementing integrated water resources management plans**



To compare the 4 surveys, responses were placed into the following 3 categories:

	Initial stages only	Some progress made	Significant progress
2003	... had hardly made any progress.	... had taken some steps in this direction....	made good progress towards a more integrated approach and were on track to meet the target.
2005	Countries that have taken only initial steps in the process towards preparing national strategies or plans and have not yet fully embraced the requirements of an IWRM approach.	Countries that are in the process of preparing national strategies or plans but require further work to live up to the requirements of an IWRM approach.	Countries that have plans/strategies in place, or a process well underway, and that incorporate the main elements of an IWRM approach.
2008	Under consideration	In place but not yet implemented	In place but partially implemented; Fully implemented
2012	Under development	Developed but not implemented	Implementation started; Implementation advanced; Fully implemented

Chapters 2-5 show how changes to the enabling environment – the legal and policy environment – has led to far reaching changes in water management institutions, systems and development.

Agenda 21 stated that integrated water resources management should be carried out at the level of the basin or sub-basin. Twenty years on we can see that this approach has been adopted in the majority of countries with around half being at an advanced stage of implementation (Chapter 3). These changes have been accompanied by other decentralized structures, often with mechanisms for representation of stakeholders. However, the country response is mixed and in many cases unclear with regard to stakeholder participation. It is reported that stakeholder participation requires careful planning to ensure that benefits are achieved without incurring excessive transaction costs for governments, stakeholders and communities.

Often basin management structures provide a mechanism and means for good coordination and integration to take place but country responses suggest that formal structures are not enough; coordination also requires trust and willingness to share information and resources. It is evident from the survey that a truly integrated approach is a long term process that requires on-going political commitment.

Lack of capacity is an issue that cuts across all aspects of water resources management from having enough technical professionals to participation of informed stakeholders and commitment from informed politicians. The scale of changes being experienced in water management cannot be underestimated. Managing such a process, and ensuring that the skills and knowledge are available in the right place at the right time, can make the difference between success or failure in moving towards a more integrated approach to water resources management.

The use of management instruments (Chapter 4) for water resources has increased in correlation with the adoption of integrated approaches implying that water resources management is improving as more management tools are being applied on the ground. Many important tools still remain at an early stage of adoption and countries report the slow process to roll out these tools nationally. There is clearly a move to follow through the legislative and policy changes with action on the ground but more effort and support is needed to operationalize improvements to water resources management.

From the range of questions on infrastructure development it is clear that most countries are prioritizing infrastructure for water supply and hydropower (Chapter 5). Infrastructure development is most advanced in countries where the enabling environment for water resources management is in place. This suggests that well documented and predictable water policies and practices are conducive to investment. Financing for water resources is reported by most countries as increasing (Chapter 6). This applies to financing from government sources as well as from bilateral assistance, international finance institutions and the private sector. Only limited progress has been made with revenue generation through payment for water resources management services although a trend of increasing revenue generation was reported. Very few countries report any payments for ecosystem services.

10.2 Water resources management in a broader development context

Most countries consider that all water *development* issues listed are a high priority and have increased in significance in the last 20 years. Domestic water supply (reflecting health, social and equity concerns) is clearly ranked by most countries as the highest priority for all HDI groups with water for growing cities ranked second. Water for agriculture is a high priority for many low HDI countries (noting that most low HDI countries are found in sub-Saharan Africa). Water for environment is a priority mainly for the very high HDI countries.

Most countries perceive most water *management* issues to be a high priority and that they have increased in significance. Many countries give a high priority to infrastructure development and financing, financing for water resources management and monitoring.

However, the need to address such a wide range of management and development issues makes setting priorities difficult and can result in indecision or constantly shifting policy directions. The responses to the various development and management issues suggest that countries recognise the importance of an integrated approach and the need to address water resource management issues in parallel with infrastructure development.

Most countries in all HDI groups consider threats from floods and droughts to be a high priority and that the significance of such threats has increased. Climate change, with the increased probability of more frequent and more intense extreme events, is perceived as increasingly significant for many countries; however, it is considered less of a threat by low HDI countries compared with other water development and management issues including floods and droughts.

It is generally recognized that sustainable management and development of water resources is fundamental to poverty alleviation and inclusive growth. Furthermore, water resources management underpins and interacts with all the pillars of the green economy, including environmental protection, food and energy. Findings from the survey provide information and lessons directly relevant to building a green economy and they affirm the message from 134 countries that keeping a spotlight on improving water resources management is essential to poverty eradication and for reaching sustainable development goals.

It is clear that most countries register concern with the sustainability of natural ecosystems as well as with food and energy concerns. Many countries are taking an integrated approach to these concerns, helping to give environmental concerns a voice, but many more still need to do so.

While water use efficiency is high priority in a good majority of countries, it is clear that introduction and implementation of water efficiency measures is, in general, lagging behind other water management reforms, particularly in low HDI countries. In the lowest three HDI categories water efficiency is not perceived to be integrated into water resources management plans. Even for very high HDI countries less than 50% have advanced implementation or full implementation.

This survey re-confirms that improved water resources management results in beneficial economic, social and environmental impacts.

54% of very high HDI countries, 44% of medium and high HDI countries and 24% of low HDI countries reported high economic impacts from integrated approaches to water resources management. The most common impact for all HDI categories was an increase in productive efficiency related to water use, most commonly for agriculture.

The country responses indicate that the main social impact over the past 20 years for all categories of countries has been an improvement in water supply access. A number of countries in all HDI categories noted a contribution to improvements in human health, including a reduction in child mortality.

Very high HDI countries reported by far the greatest positive environmental impacts from improved water resources management, especially related to improved water quality, often due to improved wastewater treatment. Improved prevention of floods and droughts through better management are reported by several countries.

10.3 A permanent reporting mechanism on water resources management, development and use

With 134 countries responding to the UN-Water survey questionnaire countries have demonstrated the need and relevance of reporting on the progress of water resources management as well as priorities and the challenges they face.

The countries' response to the UN-Water survey underscored the relevance and local realities of the threats and increased demands on the world's water resources as briefly set out in chapter 1. Many countries have expressed the need for better information on water resources so that decision-makers can chart a sustainable future for water resources management and development. This is essential for securing the stewardship of the water resource itself, ensuring the ecosystems that depend on water as well as enabling reliable supplies for productive uses for people and economic growth. Regular reporting on water resources and their management is also important for decision-making related to increasing resilience to climate variability and change, including protection from water related threats.

At both the CSD13 (2005) and CSD16 (2008) UN member states have asked for reports on water resources and on each occasion this has been provided in a report based on surveys developed especially to answer this demand. The lack of a formal reporting mechanism has hampered the political profile of water resources in the international arena and thus weakened support to governments. Moreover, inadequate information, or any standardized and comprehensive system to provide that information, suggests a lack of prioritization given to this issue. Whilst this may have been the case in the past it is no longer possible to ignore the need for better reporting on water resources management.

There is currently no global mechanism in place whereby countries can report on their progress on water resources management, development and use. As a result there is a lack of systematic data covering all aspects of water resources management from enabling environment (laws, policies, plans) to implementation. The analysis of survey data as presented in this report is a first step towards rectifying this lack of information and development of a more permanent monitoring framework.

The survey and analysis provides a valuable experience and the lessons learned can provide inputs for developing a permanent water resources management reporting mechanism. These include the strengths and limitations of the survey listed in the Executive Summary of this report.

A global water resources reporting system would thus be useful to UN member states, both developed and developing, and their external support agencies. It would also provide quality information to the research community to help develop solutions for the increasing water resources challenges.

The beneficiaries of such a reporting system would include UN member states, UN bodies involved in water, external support agencies (for example, on deciding aid priorities) and private investors deciding on investments that depend on reliable water supplies. A global reporting system would be a support to and not a replacement for national systems and would help governments to learn from each other. Governments would also need to establish or improve their

national systems and capacity to assess progress so they are fully aware of the needs of their own country.

10.4 Key messages and recommendations

The following key messages and recommendations are based on an assessment of the findings from the survey[12].

1. **Since 1992, 80% of countries have embarked on reforms to improve the enabling environment for water resources management based on the application of integrated approaches as stated in Agenda 21 and affirmed in the Johannesburg Plan of Implementation.**

   To ensure continued progress and positive outcomes in applying integrated approaches to water resources management, governments and external support agencies should learn from experience and increase their efforts. The introduction of new development agendas should not distract from making progress on implementing integrated approaches for water resources reform.

2. **Water-related risks and the competition for water resources are perceived by a majority of countries to have increased over the past 20 years.**

   Given the increasing challenges and risks, it is important that the international community supports countries to operationalize integrated approaches that focus on solutions that address country priorities and needs.

3. **Countries that have adopted integrated approaches report more advanced infrastructure development but further efforts are needed to ensure appropriate levels of coordination.**

   Countries should be supported in adopting integrated approaches to water resources management that are coordinated with the development of infrastructure to achieve growth and sustainable development goals.

4. **Countries report a gradual but positive trend in financing for water resources development and management with more diverse sources of finance, but little progress on payment for water resources services.**

   More effort is needed to increase levels of financing for water resources management and to raise revenues from water resource and ecosystem services. Appropriate recording of financing for water resources development and management is needed in reporting mechanisms.

5. **Countries report improvements to the institutional framework together with improved policies, laws and systems over the past 20 years. This has led to better water resources management practices bringing important socio-economic benefits.**

   Targeted support is necessary to continue to improve the institutional framework for water resources management with emphasis on the group of countries with a low Human Development Index (HDI)[13].

6. **Integrated approaches to water resources management and development are still relevant and critical to achieving sustainable development.**

   The integrated approach to water resources management, as defined in Agenda 21, remains relevant and must be a key component of emerging strategies towards a green economy in the context of sustainable development and poverty eradication and a key element in building climate resilience.

7. **The survey has demonstrated the progress made with integrated approaches to water resources management as called for at the UNCED.** To capitalise on this progress and ensure continuity the following target is proposed for the Rio+20 conference to consider:

   By 2015, each country to develop its specific targets and timeframes for preparing and implementing a programme of action and financing strategy to take its integrated approaches to water resources management forward in accordance with UNCED 1992 and subsequent global agreements.

8 **The high country response to the survey demonstrates the value of reporting and emphasizes the need for a more rigorous, evidence-based, reporting system on progress with water resources development and management.** The following target is proposed for the Rio+20 conference to consider:

   By 2015 a global reporting mechanism on national water resources management be established. UN-Water is committed to facilitate and coordinate this process, drawing on its existing mechanisms.

[12] See footnote 1

[13] The Human Development Index (HDI) is a composite index that measures health, knowledge, and income. Countries are categorized in four HDI bands: "Low", "Medium", "High" and "Very High"

Advance Copy
To be launched 19 June 2012, Rio de Janeiro

ANNEX A – QUESTIONNAIRE TO UN MEMBER COUNTRIES

On Integrated Approaches in the Development, Management and Use of Water Resources for UNCSD 2012

While it is important that approaches to water resources management are suited to the individual circumstance of a country and a local region, it has been widely recognized that traditionally fragmented or purely sectoral approaches are no longer viable. This is due to the challenges created by increasing and often conflicting demands on water resources that are further complicated by climate change. The best management practices are those based on integrated approaches that try to combine and balance both societal and environmental needs.

The purpose of this survey is to generate input to a status report on integrated approaches in the development, management and use of water resources. The report will be used as the basis for informed decision-making by the United Nations Commission on Sustainable Development and national governments, and will include lessons learned and recommendations, as well as focus areas for action. Moreover, the knowledge gained will be used to help develop a process for establishing a regular international monitoring and reporting framework to promote sustainable water resources management.

Should you have any questions regarding the contents of the questionnaire, please contact:
Ms. Josephine Gustafsson
E-mail: UNWRio2012@siwi.org
Phone: +46 (0)8 522 139 60
Fax: +46 (0)8 522 139 61
Skype: siwi.josephine.gustafsson

Please send your completed questionnaire no later than April 18th 2011 to (in order of preference):

1) Online through http://www.surveymonkey.com/s/UNWaterReport2012
Or, if not possible,
2) Send the filled out questionnaire in word-format by email to UNWRio2012@siwi.org
Or, as a last option if the above are not possible,
3) Send the filled out questionnaire to:
Ms. Josephine Gustafsson
Stockholm International Water Institute
Drottninggatan 33
SE – 111 51 Stockholm
SWEDEN
Fax: +46(0)8 522 139 61

Please complete

Country	
Date	

1. Policy, Strategic Planning and Legal Framework

Please indicate the current status of key policy making, strategic planning and legal frameworks for the development, management and use of water resources in your country, by checking one of the six columns for each line.

1.1 Enabling environment for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
1.1.1 Main national/federal[14] instruments for water resources management							
a.	National/federal water resources policy						
b.	Sub-national/provincial/state water resources policy						
c.	National/federal water laws						
d.	Sub-national/provincial/state water law						
e.	National or federal integrated water resources management plan/s or equivalent strategic plan document/s						
f.	Separate national or federal water efficiency plan/s						
g.	Water efficiency in integrated water resources management plan or equivalent						
1.1.2 Other national/federal instruments that may incorporate water resources management							
a.	Integrated national policy/strategy/plan for land and water resources management						
b.	Poverty Reduction Strategy (PRS) with water resources management component						
c.	National Strategy for Sustainable Development						
d.	National Development Plan with water resources management component						
e.	National Environmental Action Plan water resources management component						
f.	National climate change adaptation policy/strategy/plan with water resources management component						
g.	National Agricultural Plan with water resources management component						
h.	National energy policy/strategy/plan with water resources management component						
i.	National desertification policy/strategy/plan with water resources management component						
j.	National wetland policy/strategy/plan with water resources management component						
k.	National biodiversity policy/strategy/plan with water resources management component						

[14] Federal states may complete the questions in this section from a state perspective

1.1.3 International agreements on water resources management to which your country is party							
a.	Regional/sub-regional water resources management agreements						
b.	Transboundary water resources management agreements for specific river basins						

2. Governance and Institutional Frameworks

Please indicate the current status of governance and institutional frameworks for the development, management and use of water resources in your country, by checking one of the six columns for each line.

2.1 Governance systems for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
2.1.1 Institutional Frameworks							
a.	Mechanisms (e.g. commissions, councils) for river basin management						
b.	Mechanisms for management of groundwater						
c.	Mechanisms for management of lakes						
d.	Mechanisms for cross-sector management of water resources						
e.	Mechanisms for transboundary water resources management						
f.	Decentralized structures for water resources management (other than above)						
2.1.2 Stakeholder Participation							
a.	Stakeholders have access to information on national water resources management and development						
b.	Public awareness campaigns on water resources management and development						
c.	Involvement of general public, civil society organizations and non-government organizations in water resources management and development at the national level						
d.	Involvement of the private sector in water resources management and development at the national level						
e.	Involvement of general public, civil society organizations and non-government organizations in water resources management and development at the basin level						
f.	Involvement of the private sector in water resources management and development at the basin level						
g.	Gender mainstreaming in water resources management and development						

2.1.3 Capacity Building							
a.	Assessment of capacity needs in water resources management at national level						
b.	Assessment of capacity needs in water resources management at sub- national level						
c.	Programs for capacity development in water resources management institutions/organizations at national level						
d.	Programs for capacity development in water resources management institutions/organizations at sub-national levels						
e.	Programs for in-service training of staff/ professionals in water resources management						
f.	Water resources management in the technical/ higher education curriculum						
g.	Research programs in water resources management						

3. Management Instruments

Please indicate the current status of management instruments for the development, management and use of water resources in your country, by checking one of the six columns for each line.

3.1 Management instruments for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
3.1.1 Water Resources Development							
a.	Basin studies for long-term development and management of water resources						
b.	Periodical assessment of water resources						
c.	Regulatory norms and guidelines for sustainable development of water resources						
d.	Programs to value water-related or dependent ecosystem services						
3.1.2 Water Resources Management Programs							
a.	Groundwater management program						
b.	Surface water management program						
c.	Linked ground and surface water management program						

3.1 Management instruments for the development, management and use of water resources		Not relevant	Under development	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
3.1.2 Water Resources Management Programs							
d.	Programs for efficient allocation of water resources among competing uses						
e.	Land/natural resources management programs that include water resources management components						
f.	Programs for allocating water resources that include environmental considerations						
g.	Demand management measures to improve water use efficiency in all sectors						
h.	Program for re-use or recycling of water						
i.	Programs to evaluate environmental impacts of water projects						
j.	Programs to address water-related disasters (e.g. floods and droughts)						
k.	Programs to address climate change adaptation through water resources management						
l.	Cooperative programs managing transboundary water resources						
m.	Programs to reverse environmental/ecosystem degradation						
3.1.3 Monitoring and Information Management							
a.	Government responsibility for hydro-meteorological monitoring adequately addressed in national legislation						
b.	Monitoring of surface water quantity						
c.	Monitoring of ground water quantity						
d.	Monitoring of water quality						
e.	Monitoring of aquatic ecosystems						
f.	Monitoring of water use						
g.	Monitoring of water use efficiency						
h.	Water resources information system						
i.	Forecasting and early warning systems						
3.1.4 Knowledge Sharing							
a.	Programs for information exchange and knowledge sharing of good practices						
b.	Programs for providing advisory (extension) services on water management issues to end users						

c.	Programs for transferring improved and cost effective water saving technologies						
d.	Mechanisms for exchanging information between countries						
3.1.5 Financing of Water Resources Management							
a.	Cost recovery mechanisms/progressive tariff structures for all water uses						
b.	Subsidies for promoting water efficiency						
c.	Charges for water resource management (e.g. pollution charges)						

4. Infrastructure Development and Financing

Please indicate the current status of infrastructure development and financing for the development, management and use of water resources in your country, by checking one of the six columns for each line.

4.1 Infrastructure development for the development, management and use of water resources		Not relevant	Under developmen	Developed but implementation not yet started	Implementation started	Implementation advanced	Fully implemented
4.1.1 Investment plans and programs							
a.	Water resources included in national infrastructure investment plans						
b.	Irrigation						
c.	Energy/hydropower						
d.	Groundwater (e.g. boreholes, pumps and treatment)						
e.	Flood management						
f.	Water supply (domestic and industrial)						
g.	Wastewater treatment						
h.	Desalination of seawater						
i.	Rainwater harvesting						
j.	Natural systems (e.g. wetlands, floodplains and catchment restoration)						
4.1.2 Mobilizing financing for water resources infrastructure							
a.	Financing for water resources included in national investment plans						
b.	Financing for irrigation						
c.	Financing for energy/hydropower						
d.	Financing for groundwater (e.g. boreholes, pumps and treatment)						

e.	Financing for flood management						
f.	Financing for water supply (domestic and industrial)						
g.	Financing for wastewater treatment						
h.	Financing for desalination of seawater						
i.	Financing for rainwater harvesting						
j.	Financing for natural systems (e.g. wetlands, floodplains and catchment restoration)						

5. Sources of Financing for the Development of Water Resources

Please indicate sources of financing as well as financing trends over the last 20 years for the development of water resources in your country, by checking one or more appropriate columns for each line.

5.1 Sources of financing for the development of water resources		Data not available or not recorded	No funding allocations made	Declining trend over last 20 years	Increasing trend over last 20 years	Highly variable and no clear trends
a.	Government budget allocation (as % of GDP) for water resources development					
b.	Grants and loans from aid agencies for water resources development					
c.	Investments from International Financing Institutions (e.g. World Bank) for water resources development					
d.	Investments from private sources (e.g. banks and private operators, non-profit) for water resources development					
e.	Revenues (e.g. from water use charges/tariffs) used for water resources development					
f.	Payments for ecosystem services and related benefit/cost transfer schemes					

6. Outcomes and Impacts

Please indicate to what extent improved water resources management has impacted economic, social, environmental and overall national objectives in the past 20 years in your country, by checking the appropriate columns for each line.

6.1 Improved Water Resources Management		Economic development objectives[15] impact in past 20 years	Social development objectives[16] impact in past 20 years	Environmental objectives[17] impact in past 20 years	Overall national development impact in past 20 years
		1-5 Low to high	1-5 Low to high	1-5 Low to high	1-5 Low to high
a.	Improved policy, strategic planning and legal frameworks				
b.	Improved governance and institutional frameworks				
c.	Improved management instruments				
d.	Improved infrastructure development				

6.2 Key outcomes and impacts from water resources management measures

(a) List the outcomes and key results achieved as a result of implementing integrated approaches to the development, management and use of water resources.

Please provide text.

15 Economic development objectives relating to economic growth, wealth, management of monetary assets, and economic sector development.

16 Social development objectives relating to human development, gender considerations, such as poverty alleviation, health, education, and job creation.

17 Environmental objectives relating to the conservation and sustainable use of natural resources, such as water, pollution control, nature, agricultural land, forest, and fisheries.

(b) Briefly list the constraints or obstacles that your country has experienced in implementing integrated approaches to water resources management.

Please provide text.

7. Priority challenges

What are the priority <u>water resources</u> challenge areas in your country and how have they changed? Please indicate the level of importance of priority issues by checking one of the five columns for each challenge, and then indicating to what extent the challenge has changed in the past 20 years. Please add lines if necessary.

7.1 Priority water resources challenge areas		Current challenge level				
		Not a Problem	Low Priority	Medium Priority	High Priority	Highest Priority
7.1.1 Water Uses						
a.	Water for agriculture					
b.	Water for domestic use					
c.	Water for industry					
d.	Water for energy					
e.	Water for ecosystems / environment					
f.	Water for growing cities					
7.1.2 Threats to the resource						
a.	Floods					
b.	Droughts					
c.	Water scarcity (surface water)					
d.	Water scarcity (groundwater)					
e.	Water quality (surface water)					
f.	Water quality (groundwater)					

7.2 Priority water resources challenge changes		In the past 20 years, how has the challenge changed?				
		Significantly decreased	Slightly decreased	Unchanged	Slightly increased	Significantly increased
7.2.1 Water Uses						
a.	Water for agriculture					
b.	Water for domestic use					
c.	Water for industry					
d.	Water for energy					
e.	Water for ecosystems / environment					
f.	Water for growing cities					
7.2.2 Threats to the resource						
a.	Floods					
b.	Droughts					
c.	Water scarcity (surface water)					
d.	Water scarcity (groundwater)					
e.	Water quality (surface water)					
f.	Water quality (groundwater)					

What are the priority water <u>management</u> challenge areas in your country and how have they changed? Please indicate the level of importance of priority issues by checking one of the five columns for each challenge, and then indicating to what extent the challenge has changed in the past 20 years. Please add lines if necessary.

7.3 Priority water management challenge areas		Current challenge level				
		Not a Problem	Low Priority	Medium Priority	High Priority	Highest Priority
7.3.1 Levels of management						
a.	Institutional capacity at national level					
b.	Institutional capacity at sub-national level					
c.	Transboundary capacity at international level					
d.	Transboundary capacity at national/sub-national level					
e.	Management through private enterprise					
f.	Stakeholder participation					
g.	Coordination between levels and types of management					

7.3 Priority water management challenge areas		Current challenge level				
		Not a Problem	Low Priority	Medium Priority	High Priority	Highest Priority
7.3.2 Management between sectors						
a.	Coordination between sectors at national level					
b.	Coordination between sectors at sub-national level					
7.3.3 Other governance issues						
a.	Legislation					
b.	Infrastructure development					
c.	Financing of water resources management					
d.	Financing of infrastructure					
7.3.4 Managing resource information						
a.	Monitoring the resource					
b.	Knowledge sharing					
7.3.5 Specific types of management						
a.	Disaster management					
b.	Climate change adaptation management					
c.	Water use efficiency management					

7.4 Priority water management challenge areas			In the past 20 years, how has the challenge changed?			
		Significantly decreased	Slightly decreased	Unchanged	Slightly increased	Significantly increased
7.4.1 Levels of management						
a.	Institutional capacity at national level					
b.	Institutional capacity at sub-national level					
c.	Transboundary capacity at international level					
d.	Transboundary capacity at national/sub-national level					
e.	Management through private enterprise					
f.	Stakeholder participation					
g.	Coordination between levels and types of management					

7.4.2 Management between sectors						
7.4 Priority water management challenge areas			In the past 20 years, how has the challenge changed?			
		Significantly decreased	Slightly decreased	Unchanged	Slightly increased	Significantly increased
a.	Coordination between sectors at national level					
b.	Coordination between sectors at sub-national level					
7.4.3 Other governance issues						
a.	Legislation					
b.	Infrastructure development					
c.	Financing of water resources management					
d.	Financing of infrastructure					
7.4.4 Managing resource information						
a.	Monitoring the resource					
b.	Knowledge sharing					
7.4.5 Specific types of management						
a.	Disaster management					
b.	Climate change adaptation management					
c.	Water use efficiency management					

Additional comments

If relevant, please list additional comments in relation to the survey instrument. Suggestions for improvements to the questionnaire and aspects not covered or considered less relevant are also most welcome.

Please provide text.

	Respondent 1	Respondent 2 (if necessary)
Name		
Email address		
Job title		
Ministry/Department		
Telephone number		
Address		

Thank you for completing the questionnaire!

Annex B – Letter to UN member states from UN-DESA

United Nations Nations Unies
OFFICE OF THE UNDER-SECRETARY-GENERAL
DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS (DESA)
ROOM DC2-2308, 2 UN PLAZA, NEW YORK, NEW YORK 10017
TEL.: 1 (212) 963 5064 • FAX: 1 (212) 963 1010

17 March 2011

Excellency,

Please be informed that UN-Water (the United Nations' inter-agency coordination mechanism on water) is planning to undertake a global survey to assess the status of implementation of internationally agreed commitments in the area of water resources management.

This survey is planned especially to support the implementation of decisions taken during the 13th Session of the Commission on Sustainable Development (CSD-13) in 2005. Also, the report aims to assess gaps in implementation of commitments made in Agenda 21 and Johannesburg Plan of Implementation (JPoI) with regard to management of freshwater resources.

The analysis and results of this survey will provide important inputs to the preparatory process of the United Nations Conference on Sustainable Development (UNCSD or Rio 2012) which will take place from 4-6 June 2012 in Rio, Brazil.

To undertake this survey, UN-Water has prepared the following three documents: (1) a questionnaire to seek information and data on the status of implementation of commitments in the area of water resources management, and (2) a guidance note for submission of filled in questionnaire. (3) To ensure that the questionnaire is sent to the right person/institution in each country, UN-Water has also identified a list of focal points responsible for water resources management at the country level and we would like to ask you to send the questionnaire to this contact person in your country as indicated in the attached list. All these documents are attached herewith and could also be accessed through the following link:
http://www.unwater.org/rio2012/report

All Permanent Missions to the
United Nations
New York

I would appreciate if these documents are forwarded to your national focal points requesting them to follow the instructions for submitting the questionnaires as provided in the attached guidance note.

Please accept, Excellency, the assurances of my highest consideration.

Thomas Stelzer
Assistant Secretary-General for
Policy Coordination and Inter-agency Affairs

Annex C – Guidelines for interview survey

Level 2: Interview Guide

Input to the report to the UNCSD 2012 (Rio 2012) conference on the application of integrated approaches to the development, management and use of water resources5

March 11th 2011

1. Purpose of this note

The purpose of this note is to inform and guide interviewers from UN Development Programme (UNDP) in the background and processes relating to the interviews they will undertake with key national stakeholders. These interviews will help to provide a deeper qualitative understanding of individual country experiences in the application of integrated approaches to the development, management and use of water resources. It is the intention that this note contributes to ensuring a common understanding and a uniform approach. This note is a Guide for the appointed interviewers to complete the Level 2 survey in selected countries.

2. Background

The UN Commission on Sustainable Development (CSD) at its 13th Session in 2005 decided to call on Governments and the UN System to take actions related to water resources management and decided to monitor and follow-up the implementation of decisions in both 2008 and 2012.

At CSD-16 in 2008 UN-Water delivered a Status Report on Integrated Water Resources Management and Water Efficiency Plans based on surveys carried out by UN-DESA, GWP and the UNEP-DHI Centre. This initiative will provide input for an important new benchmark report at CSD-20 in 2012.

CSD-20 will mark 20 years after the Rio Earth Summit, 10 years after the Johannesburg Summit and 40 years after the Stockholm Conference. The UNCSD 2012 Summit thus provides a unique opportunity to strengthen the commitment from Governments and the international community to promote and implement integrated approaches to the sustainable management of water resources, as called for in Rio 1992 (Chapter 18 of Agenda 21) and in Johannesburg 2002 (the Johannesburg Plan of Implementation).

The goal of the UN Water Resources UNCSD 2012 Report is to support countries in the sustainable development and management of water resources. The report will be based on a global survey which will assess progress and outcomes on the application of integrated approaches to the development, management and use of water resources. This report will form the basis for informed decision-making by the CSD and national governments. Moreover, the knowledge gained will be used develop a process for establishing a regular international monitoring and reporting framework to promote sustainable water resources management. The survey has been divided into two parts, labelled Level 1 and Level 2:

Level 1: All countries are surveyed by means of a questionnaire that is comparatively quick and easy to complete. Level 1 will provide a global and regional overview and may also be used to assess general development trends. It is similar to a questionnaire carried out in 2008, but simplified by giving more focus on questions and less on text. It is assumed that this simplified approach would allow countries to fill in the data rapidly without any assistance. Level 1 will be carried out by a government official of the country and NOT by the UNDP.

Level 2: Approximately 25-30 countries will be covered in more detail in the form of a guided interview in order to gain a deeper situational understanding. The interviews will provide qualitative information of country specific experiences based on the responses to the Level 1 questionnaire, as well as information on the national indicators currently in use.

Level 2 is very important for the outcome of the UNCSD 2012 process because it provides the opportunity to qualify the general findings from Level 1 and supplement the data collected. In so doing it is important that a uniform procedure for the Level 2 survey is adopted and that the facilitators in different countries have a common understanding and approach to conducting the Level 2 survey.

3. Use of outputs

The outputs from the interview processes will be consolidated in an Interview Report Outline (see annex 1). The narrative detail from these interview reports will be used to supplement statistical information in an important UN-Water report to the UNCSD 2012. This report will form the basis for informed decision-making by the United Nations Commission

on Sustainable Development and national governments. Moreover, the knowledge gained will be used to help develop a process for establishing a regular international monitoring and reporting framework that will help to promote sustainable water resources management.

4. Profile of interviewers

Interviewers are expected to be experienced and professionally respected individuals with a detailed appreciation of national priorities and experiences in water resources development, management and use. They are also expected to have an understanding of the background and purpose of this initiative. For background reference the interviewer can refer to the report that was prepared in May 2008 for the 16th Session of the Commission on Sustainable Development (CSD16)[18].

5. Letter of reference

In order to both introduce and to provide legitimacy to the interviewer for this assignment, a letter of introduction will be provided. This letter will explain the background of the Level 2 interviews, refer to the Level 1 questionnaire, and will introduce the interviewer and briefly explain his/her role and responsibilities. In addition, the interviewer can contact a special helpline for any further explanations or discussion of problems in completing the task:

Ms. Josephine Gustafsson, Stockholm International Water Institute
E-mail:UNWRio2012@siwi.org ;
Telephone: +46 (0)8 522 139 60
Skype: siwi.josephine.gustafsson

Or

Mr Joakim Harlin
Sr Water Resource Advisor, UNDP
E-mail: joakim.harlin@undp.org
Skype: joakim.harlin

6. Process guide for interviewers

Step 1: Familiarization with task: Become familiar with the completed level 1 survey and the background and purpose of this initiative, refer if necessary to the earlier report for CSD16 (see above), and the Interview Report Outline included as annex 1 to this note. Begin to fill out the table on national indicators for water resources and water resources management and give the reference to the document/report where these indicators are presented (see annex 1).

Step 2: Identify significant responses: Obtain a copy of the completed Level 1 questionnaire from the government focal person listed in the attached contact database. Using a combination of local knowledge and experience, identify the most significant responses from each of the main sections of the questionnaire:

1) Policy, strategic planning and legal framework
2) Governance and institutional frameworks
3) Management instruments
4) Infrastructure development and financing
5) Sources of financing for the development of water resources
6) Outcomes and impacts of water resources management over the last 20 years
7) Priority challenges in the development, management and use of water resources

Significant responses may not necessarily be the most extreme (high or low) scores, and may be grounded in either good or bad experiences, as well as progress or lack of progress. It is important that the interviewer gets the most "added value" from the survey by focusing on and learning from a few characteristic issues from each country, rather than formulating a broad summary. The aim will be to produce an Interview Report consisting of ½-1 page assessment of country experiences focusing on one key issue for each of the headings above, as well as a table of national indicators. The assessment of experiences should identify where progress has been made, where it is stalled, and if possible why.

Step 3: Identify interviewees: Identify and contact the people you believe are both necessary and relevant to discuss the most significant Level 1 responses as input to the Interview Report that you will prepare. The interviewees will probably include:

1) The person who completed the Level 1 questionnaire
2) Representatives from ministries with dominant water use such as Agriculture, Energy and Environment
3) Representatives from non-government organizations (NGOs) and community based organizations (CBOs)
4) Representatives from the private sector

It can be expected that interviews will vary in scope, depth and time needed.

Step 4: Conduct the interviews: Conduct the interviews using the Interview Report Outline (included as annex 1 to this note) for guidance. The following questions may also provide inspiration (the 'measures' referred to below could be any action, policy or plan etc., which has been taken over the last 20 years):

The interviewees should also be able to provide you with information to complete the table on national indicators. Please remember to ask about these.

[18] "Status Report on Integrated Water Resources Management and Water Efficiency Plans" available here: http://www.unwater.org/downloads/UNW_Status_Report_IWRM.pdf

Question types	Example questions
Relevance	What was the relevance of the measures undertaken over the last 20 years?
Efficiency	Were the measures undertaken in an efficient manner? For example, have resources been used cost effectively? Do the quantitative and qualitative results justify the resources expended?
Effectiveness	To what extent have anticipated results been achieved and are contributing to changes in behavior, among relevant institutions & individuals and in relationships or activities? What is the evidence?
Impact	What evidence is there that the measure is potentially contributing to improved water resources management?
Sustainability	To what extent is the measure contributing to building an enabling environment f or integrated approaches to the development, management and use of water resources?
Lessons learned	To what extent is the measure replicable? Might its approaches, methods, and/or content have potential value in other countries or regions or for other subjects?
Ownership	What is the level of participation (by gender) of stakeholders in the implementation of the measure? To what extent does the measure strengthen ownership among stakeholders?
Barriers	What were the significant barriers to implementation of the measure? How were the barriers overcome?

Step 5: Prepare and send the Interview Report: Prepare a report as described in Annex 1 on the most significant aspects from your discussions with the interviewees. The report will be between 4 and 8 pages long. Please send a draft of the completed Interview Report to:

Ms. Josephine Gustafsson, Stockholm International Water Institute
E-mail: UNWRio2012@siwi.org ;

with copy to

Mr. Joakim Harlin
E-mail: joakim.harlin@undp.org

UN-Water and UNDP will review the draft and contact the author if they have any comments or questions of clarificatiZon. The final report should then be sent to the above contact persons.

7. Estimated time required

The interviewer will be remunerated on a lump-sum basis. It is anticipated that approximately 7 to 10 working days is needed to complete this assignment:

Reading of documents and analysis of Level 1 results	1 day
Identification of stakeholders to be interviewed and setting up interviews	1 day
Conducting interviews	2-3 days
Reporting	3-5 days

8. Annex 1: Interview Report Outline

Country

Name of interviewer

Position/job title(s)

Email address

Phone number (s)

Address

People interviewed:

Name	Organization	Job title	Email address	Telephone number	Date(s) interviewed

1. Policy, strategic planning and legal framework:

Using the most significant responses under the corresponding section of the Level 1 questionnaire as a starting point, please prepare a ½ -1 page narrative assessment of country experiences. Please focus on just 1 key issue within this area, rather than making a broad summary.

The assessment should be based on the following format:

1. Challenges (very briefly)
2. Actions taken from a policy, strategic planning and legal perspective
3. Results of actions taken
4. Lessons to be learned

2. Governance and institutional frameworks

Using the most significant responses under the corresponding section of the Level 1 questionnaire as a starting point, please prepare a ½ -1 page narrative assessment of country experiences. Please focus on just 1 key issue within this area, rather than making a broad summary.

The assessment should be based on the following format:

1. Challenges (very briefly)
2. Actions taken from a governance and institutional (see level 1 survey for examples) perspective
3. Results of actions taken
4. Lessons to be learned

3. Management instruments

Using the most significant responses under the corresponding section of the Level 1 questionnaire as a starting point, please prepare a ½ -1 page narrative assessment of country experiences. Please focus on just 1 key issue within this area, rather than making a broad summary.

The assessment should be based on the following format:

1. Challenges (very briefly)
2. Actions taken in terms of management instruments (see the level 1 survey for examples) developed and introduced
3. Results of actions taken
4. Lessons to be learned

4. Infrastructure development and financing

Using the most significant responses under the corresponding section of the Level 1 questionnaire as a starting point, please prepare a ½ -1 page narrative assessment of country experiences. Please focus on just 1 key issue within this area, rather than making a broad summary.

The assessment should be based on the following format:

1. Challenges (very briefly)
2. Actions taken for infrastructure development and financing
3. Results of actions taken
4. Lessons to be learned

5. Sources of financing for the development of water resources

Using the most significant responses under the corresponding section of the Level 1 questionnaire as a starting point, please prepare a ½ -1 page narrative assessment of country experiences. Please focus on 1-2 key issues within this area, rather than making a broad summary.

The assessment should be based on the following format:

1. Challenges (very briefly)
2. Actions taken in terms of financing for the development of water resources
3. Results of actions taken
4. Lessons to be learned

6. Outcomes and impacts of water resources management over the last 20 years

Using the most significant responses under the corresponding section of the Level 1 questionnaire as a starting point, please prepare a ½ -1 page narrative assessment of outcomes and impacts over the past 20 years.

The assessment should be based on the following format:

1. How water resources management has impacted national objectives over the past 20 years
2. Key results achieved form implementing integrated approaches to the development, management and use of water resources
3. The constraints or obstacles experiences
4. Lessons to be learned

7. Priority challenges in the development, management and use of water resources

Using the most significant responses under the corresponding section of the Level 1 questionnaire as a starting point, please prepare a ½ -1 page narrative assessment of priority challenges.

The assessment should be based on the following format:

1. Current water resource challenges and how they have changed in the past 20 years
2. Current water resource management challenges and how they have changed in the past 20 years
3. Lessons to be learned

8. **Comment on the Level 1 survey results**

Please provide your own general comment on the responses to level 1 (use ½ -1 page)

Please check the following list to show whether an indicator is whether the following indicators are currently in use in the country from the list below. Please contact the persons listed above if any question or concept is unclear.

(Please add lines to the table as necessary)

Indicator	Not Used	Used irregularly	Used regularly	Comments
Water resources governance				
Progress towards planning and implementing integrated water resources management – national scale				
Progress towards planning and implementing integrated water resources management – sub-national scale				
State of the resource				
Total renewable water resources				
Total non-renewable water resources				
Precipitation				
Surface water as share of total actual renewable water resources				
Inflow from other countries as share of total actual renewable water resources				
Outflow to other countries as share of total actual renewable water resources				
Total use as share of total actual renewable water resources				
Groundwater development as share of total actual renewable water resources				
Total surface water withdrawals				
Total groundwater withdrawals				
Water withdrawals by sector				
Water withdrawals by source				
Dam capacity				
Ecosystems				
Fragmentation and flow regulation of rivers				
Nutrient pollution				
Biodiversity and habitat loss				

Freshwater species population trends index				
Ecosystem valuation				
Human health				
Access to safe drinking water				
Population affected by water related diseases				
Treated waste water as a share of total waste water produced				
Access to improved sanitation				
Food, agriculture and rural livelihoods				
Irrigated land as a percentage of cultivated land				
Agriculture water withdrawals as share of total water withdrawals				
Extent of land salinized by irrigation				
Groundwater use as share of total irrigation				
Industry				
Trends in industrial water use				
Water use by major industrial sector				
Pollution emissions by industrial sector				
Industrial water productivity				
Volume of desalinated water produced				
Capability for hydropower generation				
Risk assessment				
Disaster Risk				
Risk and policy assessment				

Climate vulnerability				
Valuing and charging for the resource				
Water sector share in total public spending				
Ratio of actual to desired level of public investment in drinking water Supply				
Ratio of actual to desired level of public investment in basic sanitation				
Rate of cost recovery				
Domestic water charges as percentage of household income				

(Please add lines to the table as necessary)

Please send the completed Interview Report to:

Ms. Josephine Gustafsson, Stockholm International Water Institute
E-mail: UNWRio2012@siwi.org

With copy to Mr Joakim Harlin, UNDP
E-mail: joakim.harlin@undp.org

PHOTO: SHUTTERSTOCK

Annex D UN-member countries that responded to the Level 1 survey

UN-member countries that responded to the Level 1 survey

1. Albania
2. Algeria
3. Andorra
4. Angola
5. Antigua and Barbuda
6. Armenia
7. Australia
8. Azerbaijan
9. Bahamas
10. Bangladesh
11. Barbados
12. Belgium
13. Belize
14. Benin
15. Bhutan
16. Bosnia and Herzegovina
17. Botswana
18. Brazil
19. Bulgaria
20. Burkina Faso
21. Burundi
22. Cambodia
23. Cameroon
24. Canada
25. Cape Verde
26. Chad
27. Chile
28. China
29. Congo
30. Costa Rica
31. Côte D'Ivoire
32. Cuba
33. Cyprus
34. Czech Republic
35. Democratic People's Republic of Korea
36. Denmark
37. Dominica
38. Ecuador
39. Egypt
40. El Salvador
41. Estonia
42. Ethiopia
43. Fiji
44. Finland
45. France
46. Gabon
47. Gambia
48. Georgia
49. Germany
50. Ghana
51. Greece
52. Grenada
53. Guatemala
54. Guinea
55. Haiti
56. Iceland
57. India
58. Indonesia
59. Iran (Islamic Republic of)
60. Iraq
61. Ireland
62. Israel
63. Jamaica
64. Japan
65. Jordan
66. Kenya
67. Latvia
68. Lebanon
69. Lesotho
70. Liberia
71. Libya
72. Lithuania
73. Madagascar
74. Malawi
75. Malaysia
76. Marshall Islands
77. Mauritius
78. Mexico
79. Monaco
80. Mongolia
81. Montenegro
82. Morocco
83. Mozambique
84. Myanmar
85. Namibia
86. Netherlands
87. New Zealand
88. Nicaragua
89. Nigeria

90. Norway
91. Pakistan
92. Panama
93. Peru
94. Philippines
95. Poland
96. Portugal
97. Republic of Korea
98. Republic of Moldova
99. Romania
100. Russian Federation
101. Rwanda
102. Saint Kitts and Nevis
103. Saint Lucia
104. Samoa
105. Sao Tome and Principe
106. Saudi Arabia
107. Serbia
108. Sierra Leone
109. Singapore
110. Slovakia
111. Solomon Islands
112. South Africa
113. Spain
114. Sri Lanka
115. Sudan
116. Swaziland
117. Sweden
118. Switzerland
119. Tajikistan
120. Thailand
121. The former Yugoslav Republic of Macedonia
122. Timor-Leste
123. Tonga
124. Togo
125. Tunisia
126. Uganda
127. United Arab Emirates
128. United Kingdom of Great Britain and Northern Ireland
129. United Republic of Tanzania
130. Uruguay
131. Uzbekistan
132. Viet Nam
133. Zambia
134. Zimbabwe

UN-member countries that responded to the Level 2 survey

1. Albania
2. Antigua and Barbuda
3. Armenia
4. Australia
5. Bangladesh
6. Benin
7. Brazil
8. Cambodia
9. Cameroon
10. Cape Verde
11. China
12. Costa Rica
13. Estonia
14. Ghana
15. Guatemala
16. Jamaica
17. Jordan
18. Mexico
19. Mozambique
20. Namibia
21. Pakistan
22. Rwanda
23. Samoa
24. Spain
25. Sri Lanka
26. Tunisia
27. Uganda
28. United Republic of Tanzania
29. Uruguay
30. Uzbekistan

List of Figures

Figure 1.1	Human Development Index (HDI) groupings 2011	6
Figure 1.2	UNCSD Major regions	6
Figure 1.3	Questionnaire submission status	7
Figure 2.1	National/Federal Water Resources Policy	12
Figure 2.2	National/Federal Water Law:	12
Figure 2.3	National/Federal Integrated Water Resources Management Plan(s) or Equivalent	13
Figure 2.4	National/Federal Integrated Water Resources Management Plan(s) or Equivalent by Region	13
Figure 2.5	Progress from 2008 to 2012 on Implementation of National/Federal Water Laws by HDI Groups	14
Figure 2.6	Progress from 2008 to 2012 on implementation of national/federal integrated water resources management plans by HDI Groups	14
Figure 2.7	Transboundary water resources management agreements for specific river basins to which countries are party	16
Figure 2.8	Transboundary water resources management agreements for specific river basins to which countries are party (by region)	16
Figure 3.1	Mechanisms for River Basin Management	20
Figure 3.2	Mechanisms for cross-sector management of water resources	20
Figure 3.3	Decentralized structures for water resources management (other than mechanisms for transboundary water resources management)	20
Figure 3.4	The relationship between progress with implementation of legal and policy reform and the development of institutions for cross-sector collaboration, basin management and decentralization	21
Figure 3.5	Progress on stakeholder participation (including access to information, involvement of different stakeholder groups including the private sector, and gender mainstreaming)	23
Figure 3.6	Stakeholder participation (including access to information, involvement of different stakeholder groups including the private sector, and gender mainstreaming) by region	23
Figure 3.7	Progress on capacity building (including assessment of capacity needs, programs for capacity development, programs for training, education and research)	24
Figure 3.8	Progress on capacity building (including assessment of capacity needs, programs for capacity development, programs for training, education and research) by region	25
Figure 4.1	Water resources assessment and development guidelines (including basin studies for long-term development and management of water resources, periodical assessment of water resources, regulatory norms and guidelines for sustainable development of water resources and programs to value water-related or dependent ecosystem services)	30
Figure 4.2	Water resources management programmes (an amalgamation of 13 questions including programs relating to allocation, management of a variety of hydrological components and environmental considerations)	30
Figure 4.3	Water resources management programmes (an amalgamation of 13 questions including programs relating to allocation, management of a variety of hydrological components and environmental considerations) by region	31
Figure 4.4	Monitoring and information management (an amalgamation of 9 questions including monitoring of water quality, quantity, aquatic ecosystems, water use and efficiency and early warning systems)	31
Figure 4.5	Knowledge sharing (an amalgamation of 4 questions relating to knowledge sharing and dissemination)	32
Figure 4.6	Financing of water resources management (including cost recovery mechanisms, subsidies and charges for water resources management)	33
Figure 4.7	The relationship between progress with implementation of the enabling environment of policy, law and plans (chapter 2.2) and implementation of management instruments (chapter 2.4)	35
Figure 4.8	Percentage of water indicators by category being used regularly by countries which were subject to Level 2 interviews (30 countries)	37
Figure 5.1	Water resources included in national infrastructure investment plans	40
Figure 5.2	Water resources included in national infrastructure investment plans by region	40
Figure 5.3	Mobilizing financing for water resources infrastructure – financing for water resources included in national investment plans	40

Figure 5.4 Progress with infrastructure development for various water related purposes (including irrigation, energy, groundwater recovery, flood management, water supply, wastewater treatment, desalination, rainwater harvesting and for natural systems (e.g. wetlands, floodplains and catchment restoration) 41
Figure 5.5 The relationship between progress with implementation of the enabling environment of policy, law and plans (chapter 2) and investment and development of infrastructure (chapter 5) 41
Figure 6.1 Government budget allocation (% of GDP) for water resources development 46
Figure 6.2 Grants and loans from aid agencies for water resources development 46
Figure 6.3 Investments from International Financing Institutions (e.g. World Bank) for water resources development 46
Figure 6.4 Investments from private sources (e.g. banks and private operators, non-profit) for water resources development 47
Figure 6.5 Revenues (e.g. water use charges/tariffs) used for water resources development 47
Figure 6.6 Payments for ecosystem services and related benefit/cost transfer schemes 47
Figure 7.1 Priority issues for water development and use 52
Figure 7.2 Change in priority issues for water development and use over the past 20 years 52
Figure 7.3 Key global management challenges 53
Figure 7.4 Change over the past 20 years in key global management challenges 54
Figure 7.5 Key global threats to development from water (including extreme events, water scarcity and water quality) 55
Figure 7.6 Perceived change over the past 20 years to key global threats to development from water (including extreme events, water scarcity and water quality) 56
Figure 7.7 Map of global threats from floods and droughts 56
Figure 7.8 The importance of disaster management 57
Figure 7.9 Perceived change over the past 20 years in the importance of disaster management 57
Figure 7.10 The importance of climate change adaptation 57
Figure 7.11 Perceived change over the past 20 years in the importance of climate change adaptation: T 57
Figure 7.12 Programs to address climate change adaptation through water resources management 57
Figure 8.1 The importance of water for ecosystems / environment 62
Figure 8.2 Perceived change over the past 20 years in the importance of water for ecosystems / environment 62
Figure 8.3 Global responses to a range of questions on water for the environment 63
Figure 8.4 Global responses to a range of questions on water for the environment 63
Figure 8.5 The importance of water for agriculture 64
Figure 8.6 Perceived change over the past 20 years in the importance of water for agriculture 64
Figure 8.7 National agricultural plan with water resources management component 64
Figure 8.8 Infrastructure development and mobilizing financing for irrigation 64
Figure 8.9 The importance of water for energy 65
Figure 8.10 Perceived change over the past 20 years in the importance of water for energy 65
Figure 8.11 National energy policy/strategy/plan with water resources management component 65
Figure 8.12 Infrastructure development and mobilizing financing for energy / hydropower 65
Figure 8.13 Change in water efficiency in integrated water resources management plan or equivalent 2008 – 2012 66
Figure 8.14 The importance of water use efficiency management 66
Figure 8.15 Perceived change over the past 20 years in the importance of water use efficiency management 66
Figure 8.16 Measures to improve water efficiency 66
Figure 9.1 The Impacts of improved water resources management on development over the past 20 years 70
Figure 9.2 Impacts of improved water resources management on social development over the past 20 years 70
Figure 9.3 Impacts of improved water resources management on economic development over the past 20 years 71
Figure 9.4 Impacts of improved water resources management on environmental development over the past 20 years 72
Figure 9.5 Impacts of improved water resources management on overall development over the past 20 years 72
Figure 10.1 Progress towards developing and implementing integrated water resources management plans 76

List of Boxes (summarizing responses to the Level 2 Survey)

Box 2.1	Water Governance is improving and having impact on the ground	14
Box 2.2	What makes some countries stall?	15
Box 3.1	Water management institutions becoming more effective	21
Box 3.2	Is there really an “integrated approach”?	22
Box 3.3	Stakeholders have more influence – but not yet enough?	24
Box 3.4	Capacity challenges need long term commitment	25
Box 4.1	Recognizing the need for better information management	32
Box 4.2	Payment as an economic instrument	33
Box 4.3	Management instruments put water policy into practice	34
Box 5.1	Infrastructure development: a lot of investment but more coordination needed	42
Box 6.1	Payment for water resources management: some way to go	48
Box 6.2	Payment as an economic instrument	49
Box 7.1	Water resources development and management issues	55
Box 9.1	Improved water resources management has had great impact	73

List of Tables

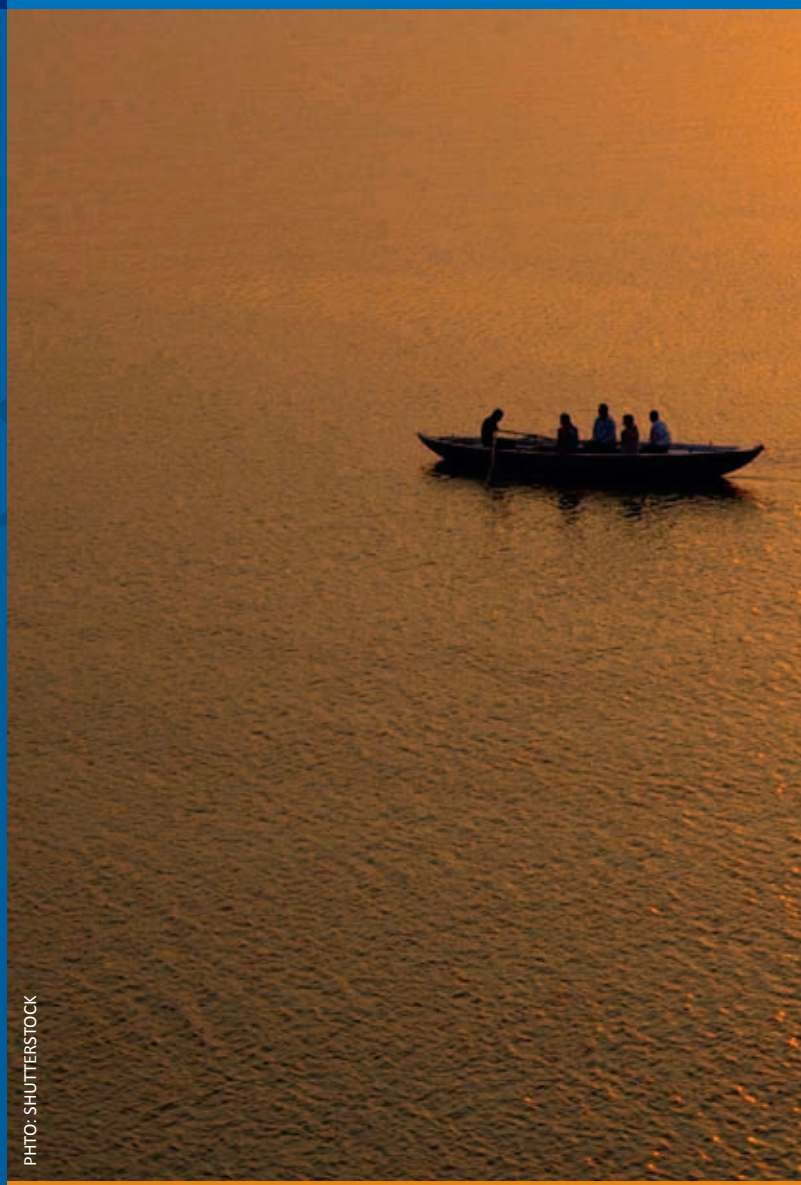
Table 1.1	Survey response summary	7

Chapter 18 of Agenda 21 called for "the application of integrated approaches to the development, management and use of water resources". UN-Water has been asked by the UN Commission on Sustainable Development (UN CSD, at its meeting in 2005) to produce a status report on the progress of water resources management for Rio+20.

This Status Report, prepared by UNEP in collaboration with UNDP and GWP, is based on a 2011 UN-Water survey sent to the governments of all UN member states. More than 130 countries have responded to the survey and this data has been complemented by interviews in 30 representative countries. The report is intended to inform decision-making at the Rio+20 conference and follow-up global policy discourses. It will facilitate information exchange to enhance the coherence and impact of national efforts to improve water resources management and related work of the UN and other external support agencies at the country level.

Since 1992, 80% of countries have embarked on reforms to improve the enabling environment for water resources management based on the application of integrated approaches. To ensure continued progress and positive outcomes in applying integrated approaches to water resources management, government and external support agencies should learn from experience and increase their efforts.

The high country response to the survey demonstrates the value of reporting and emphasizes the need for a more rigorous, evidence-based, reporting system on progress with water resources development and management. Implementing integrated approaches to water resources management should remain a key component of future development paradigms.



PHTO: SHUTTERSTOCK

www.unep.org

United Nations Environment Programme
P.O. Box 30552 Nairobi 00100, Kenya
tel: +254 20 762 1234
fax: +254 20 762 3927
e-mail: uneppub@unep.org

UNEP

ISBN: 978-92-807-3264-1
Job Number: DEP/1532/NA