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2019

Status Report on the Implementation of Integrated Water Resources Management in the Arab Region

Progress on SDG indicator 6.5.1

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DHI

2019 STATUS REPORT ON

THE IMPLEMENTATION OF INTEGRATED WATER RESOURCES MANAGEMENT IN THE ARAB REGION

PROGRESS ON SDG INDICATOR 6.5.1

2019

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The data presented here is dependent on the contributions of government officials and stakeholders from 19 Arab countries in reporting on SDG indicator 6.5.1, through a survey that includes 33 questions. National focal points coordinated country reporting processes, with some countries holding multi-stakeholder workshops that provided insight into the degree of their integrated water resources management (IWRM) implementation efforts. The workshops were co-facilitated by Country Water Partnerships of the Global Water Partnership (GWP).

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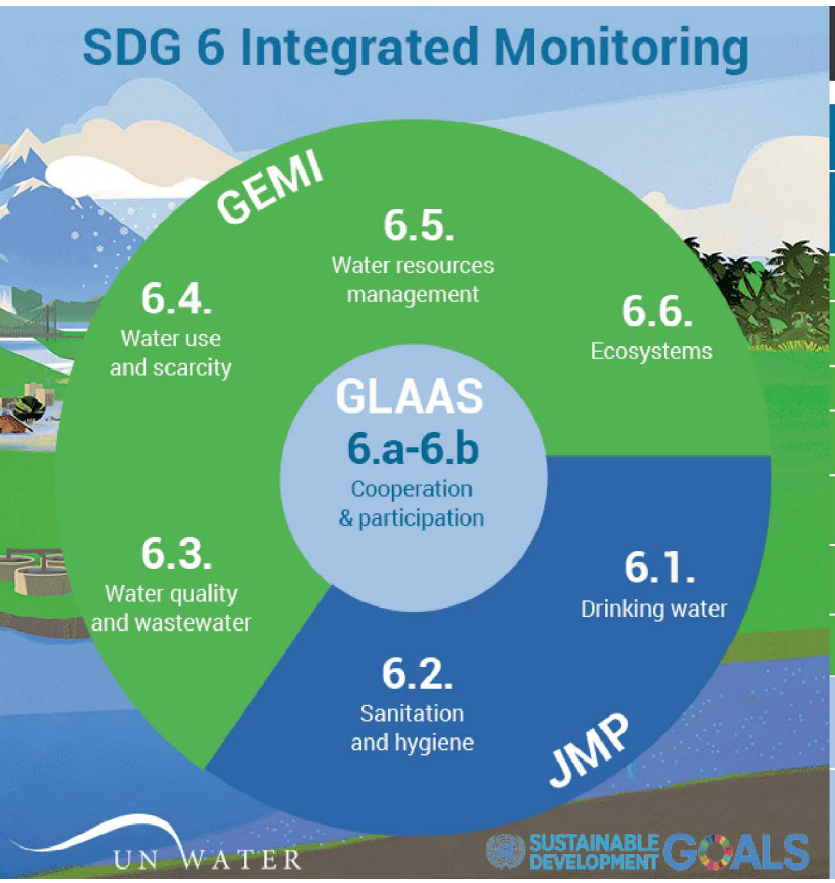
Presenting the UN-Water Integrated Monitoring Initiative for SDG 6



INDICATORS	CUSTODIANS
6.1.1 Proportion of population using safely managed drinking water services	WHO, UNICEF
6.2.1 Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water	WHO, UNICEF
6.3.1 Proportion of wastewater safely treated	WHO, UN-Habitat, UNSD
6.3.2 Proportion of bodies of water with good ambient water quality	UN Environment
6.4.1 Change in water-use efficiency over time	FAO
6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	FAO
6.5.1 Degree of integrated water resources management implementation (0-100)	UN Environment
6.5.2 Proportion of transboundary basin area with an operational arrangement for water cooperation	UNESCO, UNECE
6.6.1 Change in the extent of water-related ecosystems over time	UN Environment, Ramsar
6.a.1 Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan	WHO, UN Environment, OECD
6.b.1 Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management	WHO, UN Environment, OECD

To learn more about water and sanitation in the 2030 Agenda for Sustainable Development, and the Integrated Monitoring Initiative for SDG 6, visit: www.sdg6monitoring.org

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Acronyms

AMWC	Arab Ministerial Water Council
ASWS	Arab Strategy for Water Security
AWARENET	Arab Integrated Water Resources Management Network
BHR	Bahrain
COM	Comoros
DJI	Djibouti
DZA	Algeria
EGY	Egypt
ESCWA	United Nations Economic and Social Commission for Western Asia
FAO	Food and Agriculture Organization of the United Nations
GCC	Gulf Cooperation Council
GWP	Global Water Partnership
HDI	Human Development Index
HLPF	High-Level Political Forum
IRQ	Iraq
IWRM	Integrated water resources management
JOR	Jordan
KWT	Kuwait
LBN	Lebanon
LBY	Libya
MAI	Ministry of Agriculture and Irrigation
MAR	Morocco
MDG	Millennium Development Goal
MPI	Multidimensional Poverty Index
MRT	Mauritania
NBI	Nile Basin Initiative
NSAS	Nubian Sandstone Aquifer System
NWSAS	Aquifer System of the Northern Sahara
NWRA	National Water Resources Agency
OMN	Oman
OSS	Sahara and Sahel Observatory
PSE	State of Palestine
QAT	Qatar
SAU	Saudi Arabia
SDN	Sudan
SDG	Sustainable Development Goal
SOM	Somalia
SYR	Syrian Arab Republic
TUN	Tunisia
UAE	United Arab Emirates
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
YEM	Yemen

Executive Summary

The Arab region is the most water-scarce area in the world and has identified and studied its water challenges. The situation is worsening as demand increases beyond sustainable limits, with climate change projected to further stress already scarce resources.

In recent decades, all countries have become aware of the need to better manage their resources and increase their focus on integrated water resources management (IWRM) rather than solely supply augmentation and service provision.

The Arab Ministerial Water Council's Arab Strategy for Water Security in the Arab Region: to meet the challenges and future needs for sustainable development 2010–2030 (ASWS) has prioritized enhancing IWRM implementation to address key challenges in ways that are economically efficient, socially equitable and environmentally sustainable. In adopting the Sustainable Development Goals (SDGs), specifically SDG target 6.5, Arab countries have recommitted to IWRM implementation as an important mechanism for achieving sustainable development and management of water resources in the region.

This report provides the first review of progress in implementing IWRM in the region, and identifies priority areas that will help accelerate full implementation.

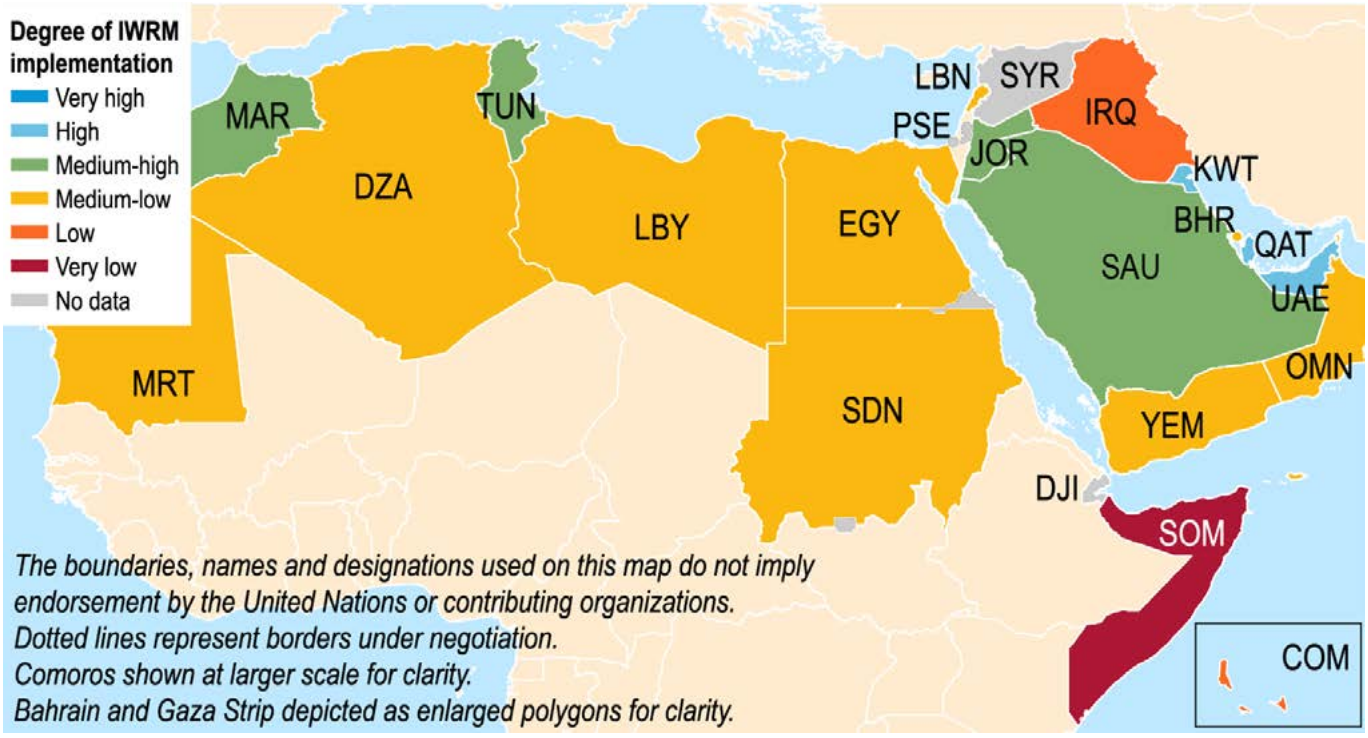
The analysis is for the most part based on responses from 19 Arab countries to the global SDG indicator 6.5.1 self-assessment survey instrument. The indicator on IWRM implementation is measured on a scale of 0 to 100, based on the degree of implementing 33 elements, from very low to very high implementation. These elements cover the enabling environment of laws, policies and plans, institutional arrangements and stakeholder participation, management instruments for informed decision-making, and financing for sustainable water management.

I Current status of overall IWRM implementation

The average implementation in the Arab region is 48 out of 100 (medium-low implementation), and similar to the global average of 49. This, however, masks a wide spread of IWRM scores, from 10 (very low) to 82 (high). Among the 19 reporting countries:

- 12 (63 per cent) score in the medium-low, low or very low implementation categories and are unlikely to meet the global target (to reach a very high degree of IWRM implementation by 2030) unless there is significant acceleration in progress. For these countries, implementation could be facilitated by

National indicator 6.5.1 scores per IWRM implementation category in the Arab region, based on 19 reporting countries



Note: Score thresholds for IWRM implementation are: very high 91–100, high 71–90, medium-high 51–70, medium-low 31–50, low 11–30, and very low 0–12.
Country codes: BHR: Bahrain; COM: Comoros; DJI: Djibouti; DZA: Algeria; EGY: Egypt; IRQ: Iraq; JOR: Jordan; KWT: Kuwait; LBN: Lebanon; LBY: Libya; MAR: Morocco; MRT: Mauritania; OMN: Oman; PSE: State of Palestine; QAT: Qatar; SAU: Saudi Arabia; SDN: Sudan; SOM: Somalia; SYR: Syrian Arab Republic; TUN: Tunisia; UAE: United Arab Emirates; YEM: Yemen.

setting national interim targets, helping provide an enabling environment and the means of implementation.

- Four countries score in the medium-high category and are potentially able to reach the global target if efforts are sustained towards 2030.

- Three countries are in the high implementation category and are likely to meet the global target if momentum is maintained.

Given the significance of water management for sustainable development in this arid region, as recognized by ASWS, IWRM implementation needs to be accelerated in most countries.

National differences, correlation with level of development and opportunities for international collaboration

The wide spread in IWRM scores demonstrates the need for each country to assess its own strengths and weaknesses for accelerating implementation. While overall development and political stability influence the level of IWRM implementation, they are not necessarily the most important factors. Political will and level of priority are key drivers for furthering implementation. There are examples, in the region and globally, of countries with lower development levels progressing with IWRM implementation where it has been given high priority and adequate funding.

The disparity between countries in managing their water resources has also been recognized in the ASWS, which sets among its objectives exploiting the comparative advantages of States in water resources management, and enhancing country cooperation and exchange of experiences and information. One avenue is to facilitate subregional collaboration among countries likely to have political, economic, geographic or historical ties.[1] Countries of the Cooperation Council for the Arab States of the Gulf (or colloquially, the GCC) have the highest average IWRM implementation (61, medium-high implementation), followed by the Maghreb countries (52, medium-high implementation), the Mashreq (40, medium-low implementation), and Southern Arab countries (29, low implementation). As seen in figure above, however, there are significant differences between countries in each subregion, highlighting opportunities for cooperation within each.

Implementation across the four IWRM dimensions

The four main dimensions of IWRM are policies, laws, and plans; institutions and participation; management instruments; and financing. The highest implementation level is found for management instruments and the institutions and participation that lie in the medium-high category, indicating the capacity to implement the elements in these two dimensions is generally adequate. The lowest are recorded for financing and the enabling environment that score in the medium-low category, suggesting the corresponding elements are generally institutionalized and implementation is under way.

- **Enabling environment:** many countries appear to be facing serious challenges in establishing an enabling environment for IWRM through policies, laws and plans. When comparing the seven enabling environment elements for implementation, progress is lowest for the transboundary arrangements, paradoxical given the importance of transboundary water resources in the region.

- **Institutions and participation:** wide disparities exist between countries in the region and between countries within the same subregion in establishing institutions and engaging stakeholders for IWRM implementation. In the GCC subregion, for example, Qatar and the United Arab Emirates have established efficient authorities and built support among stakeholders, while Oman is still at the early stages of implementation.

  As a key factor for successful IWRM implementation, gender mainstreaming is gaining attention in several countries. It is encouraging that the average implementation for gender-specific objectives for water resources management at national level is slightly higher than the world average.

- **Management instruments:** the region is at the same level as the global average for development and implementation. The highest average scores for water resources management instruments are obtained for national availability monitoring and sustainable and efficient water-use management. This is moving in the right direction, given the two elements are particularly important in a highly water-stressed region. It is also in line with key ASWS themes that emphasize the need to monitor the evolving water situation and stress the importance of increasing water-use efficiency to help bridge the water deficit.

- **Financing:** in the region, financing for water resources management exhibits the lowest score of the four IWRM dimension**s. This score (mediu**m-low) is similar to the world average, indicating it is not given appropriate attention globally, despite IWRM implementation success being tightly linked to the budgeting and financing made available for water resources development and management. Although more than half of the total renewable water resources originate from outside the region, with two thirds crossing at least one international

1 The 19 reporting countries of the four subregions are, the GCC (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates), the Maghreb (Algeria, Libya, Mauritania, Morocco, Tunisia), the Mashreq (Egypt, Iraq, Jordan, Lebanon) and the Southern Arab countries (Comoros, Somalia, Sudan, Yemen).

border, transboundary financing is reported to have the lowest score. Several Arab processes have recognized the importance of increasing financing and investment as a means of implementing IWRM.

Arab regional priorities

Implementing IWRM is essential to advance action on regional priorities, mainly groundwater and shared water resources, as stated at the Regional Preparatory Meeting on Water Issues in Beirut in March 2018 for the Arab Forum on Sustainable Development (in April of the same year) and High-Level Political Forum (in July).

The average implementation scores of groundwater and transboundary water resources are in the medium-low level across the four IWRM dimensions, justifying the attention directed at them through the ongoing regional process.

About two thirds of the available surface water and groundwater resources are shared between neighbouring Arab countries and across the region's borders. This high dependency, from outside and within the region, calls for regional cooperation. In most cases, however, shared resources are not governed by clear agreements to ensure their sound exploitation. Although several Arab countries have established cooperation agreements or treaties with neighbours for transboundary water resource management, few are successfully implemented.

Groundwater is the second major conventional water resource in the region, contributing more than 50 per cent of total water withdrawals in 10 Arab countries. The resource is exploited even in surface water-rich countries due to increasing demand and the declining quality of surface water. In addition, groundwater resources in most countries are threatened by pollution from agriculture, industry and other human activities. Surprisingly, this report finds no clear correlation between dependence on groundwater resources and the implementation of aquifer management instruments.

Using SDG 6.5.1 reporting in regional dialogue

Moving forward, the findings highlighted in this report could be used as a source of information to foster regional dialogue and action to accelerate IWRM implementation. Recommendations are two-pronged:

- procedural approach for collecting information from the countries
- building on the results from the questionnaires and workshops

1. Approach for collecting information from countries

While it is essential to acknowledge the work by country focal points in providing responses to the survey's 33 questions, it is also important to note that the comprehensiveness of stakeholder engagement in reporting will likely have varied between countries. Further, text explanations given to support the scores were often insufficient to allow for results to be interpreted, and regional and subregional trends established.

Comprehensive stakeholder engagement and thorough text explanations of scores will support inclusive in-country planning for accelerating IWRM implementation. For future reporting mechanisms it would be useful to organize preparatory workshops and training in all reporting countries. These would involve the national focal points and key IWRM stakeholders to ensure survey responses provide reliable, informed insight into the degree of implementation efforts.

2. Building on the reporting process to guide national, subregional and regional dialogue

Over the years, national efforts supported by bilateral, subregional and regional cooperation initiatives have helped Arab countries implement elements of IWRM. However, most countries need to set targets in line with national priorities and capacities to encourage action on the ground and further progress. Given the significance of water management for sustainable development in the region, IWRM implementation needs to be accelerated, though not separately from the other development operations.

Countries can build on the processes for reporting on indicator 6.5.1 in a number of ways:

- Use the results of questionnaires and workshop reports to identify those elements of IWRM that are not progressing well, and prioritize and set interim targets for them.
- Build on discussions and relationships with stakeholders (for example, interministerial and civil organizations) to develop action plans and set interim targets. In cases where stakeholder dialogue is less comprehensive or free-text responses to questions limited, countries may wish to identify and work with additional stakeholders to reach consensus on key issues and priorities.

Djibouti and Syrian Arab Republic, the two countries not submitting completed questionnaires, and the State of Palestine, which was not invited to participate in this first round,[2] may still find it useful to initiate or resume processes to complete the questionnaire for use as a diagnostic planning tool to work towards target 6.5.

2 The national baseline reporting of SDG core indicators coordinated by the United Nations Statistical Commission included the 193 Member States of the United Nations but not Observer States. In future reporting, ESCWA recommends pursuing the inclusion of the State of Palestine.

THE SETTING

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The Arab region consists of 22 countries, namely Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, the Syrian Arab Republic, Tunisia, the United Arab Emirates and Yemen. With 5 per cent of the world's population having access to just 1 per cent of the total water resources, water scarcity is one of its most critical development challenges. This challenge is expected to grow over time due to many forces, including population growth, food demand, conflict and climate change. Most Arab countries are already living in conditions of absolute water scarcity. The region is one of the most water-stressed areas of the world, with an average per person of renewable water resources of 351 m^3 in 2014. Twelve countries are below the absolute water scarcity level of 500 m^3/year. Renewable water resources are unequally distributed across the region, as evidenced by the annual share per capita that varies from 5 m^3/year in Kuwait to 2,802 m^3/year in Mauritania.[1]

The situation is exacerbated by the fact that more than half of total renewable water resources originate from outside the region. Some countries rely almost exclusively on transboundary water resources originating from outside their borders. However, most shared resources lack comprehensive agreements, which threatens the region's stability and means future water supplies are uncertain. Deteriorating water quality is also a concern in the region. Overexploitation and pollution of renewable and non-renewable water resources threaten their availability. In addition, most Arab countries lack operational standards, monitoring programmes and clear water allocation policies, resulting in limited management and operational efficiencies.

Efficient and sustainable water resources development, allocation and use has been recognized as a key element in socioeconomic development. The complexity of achieving efficient and sustainable water management is also well documented, and the related decision-making processes require intervention by several ministries, agencies, the private sector, non-governmental organizations (NGOs) and users, at national and international levels.

The region may need to put more emphasis on the integrated water resources management (IWRM) approach at all levels (local, subnational, national, subregional and regional). Implementing IWRM within local specificities is a tedious and long-term process that requires coordination, cooperation and mobilization of trained human capital and financial resources.

1.1 Why Integrated Water Resources Management?

Implementing IWRM provides a holistic framework for addressing differing demands and pressures on water resources, across sectors and at different scales. IWRM frameworks ensure resources are developed, managed and used in an equitable, sustainable and efficient manner.

Though the concept is relatively simple, implementation has proved challenging and countries have reported mixed results. With the adoption of the SDGs and recognition of the potential to integrate planning across goals and multiple targets, the demands on IWRM are much larger than in the past. To achieve SDG 6, which calls for sustainable management of water and sanitation for all people, there is a need for increased focus on the mechanisms for implementing and using IWRM, including sustainable financing and pragmatic problem-solving.[2]

IWRM has sometimes been seen as an end in itself, a one-size-fits-all approach,[3] when it is in fact an extensive, ongoing process that should be tailored to individual situations. Various IWRM elements can be applied in multiple ways by a range of actors at different speeds. When implementing these elements, local political, economic and social realities should be considered. While adopting IWRM can provide the overarching framework, numerous complementary approaches and mechanisms can support its implementation, acting as catalysts for achieving IWRM objectives. These include:

- programmes and plans related to sustainable agriculture and food security, sustainable cities and development, and disaster risk reduction
- a nexus approach providing mechanisms for facilitating dialogue between relevant sectors (food, energy, water, ecosystems) in a given context
- source-to-sea/ridge-to-reef approaches useful for upstream and downstream considerations and land management impacts on the marine environment
- ecosystems approach/nature-based solutions
- regulatory systems and bodies with unified key performance indicators (KPIs) and tools
- corporate water stewardship

1 Food and Agriculture Organization of the United Nations, AQUASTAT, main database. Available at http://www.fao.org/nr/water/aquastat/data/query/index.html (accessed on 20 December 2018). Averages calculated by authors.

2 Mark Smith and Torkil Jønch Clausen, "Revitalizing IWRM for the 2030 Agenda", World Water Council Challenge Paper for the High-Level Panel on IWRM at the 8th World Water Forum. Brasilia, Brazil, 2018.

3 Tushaar Shah, "Increasing water security: the key to implementing the Sustainable Development Goals", TEC Background Papers, No. 22 (Stockholm, Sweden, Global Water Partnership, 2016).

- implementation of water supply, sanitation, wastewater treatment and reuse services
- integrated flood and/or drought management activities.

There are other governance approaches and measures that complement the IWRM framework, including the Organisation for Economic Co-operation and Development (OECD) Principles on Water Governance, which provide the 12 must-do's to design and implement effective, efficient and inclusive water policies.[4]

In summary, implementing IWRM should not be seen as the task of water ministries, though they will have a coordinating role. Although not perfect, water governance indicators address different IWRM elements and are a useful feedback mechanism for facilitating the implementation of core aspects of good water management.

1.2 Regional political policy documents for better water management

Several national and regional sectorial strategies are prioritizing water in the region's political agenda, within the framework of sustainable development. The guiding document is the Arab Strategy for Water Security 2010-2030 (ASWS) and its accompanying action plan.[5] These two documents present key policies adopted by the Arab Ministerial Water Council of the League of Arab States in 2012 and 2014, respectively. Establishing principles for IWRM is the fifth objective of the ASWS, "Incorporation of IWRM principles into the water policies of the Arab States". The ASWS is not a rigid structure, rather a guide for joint Arab action covering the timeframe until 2030.

The main objective is to achieve Arab water security to meet the challenges and future requirements for sustainable development. The ASWS considers that around two thirds of available resources originate in areas outside Arab borders, and that the region faces a water deficit increasing in severity due to population growth, climate change and other development demands. The strategy is based on key themes that may be summarized as follows:

1. Following up regional studies on the status of water resources and establishment of an integrated Arab water information system.
2. Scientific research, and transfer and localization of modern technology.
3. Tackling climate change impacts on water resources and adopting adaptation measures.
4. Establishing principles for IWRM.
5. Achieving the Millennium Development Goals (MDGs).[6]
6. Providing necessary funding for water projects.
7. Increasing water-use efficiency.
8. Protecting water rights for States: (a) water shared with non-Arab States; (b) water rights in the occupied Arab territories; and (c) water shared between Arab States.
9. Building institutional and human capacity in the water sector.
10. Raising awareness of water and environmental issues among all members of the community.
11. Protecting the coastal aquatic environment.
12. Expanding the use of non-conventional water.
13. Institutional development and water legislation and law.
14. Integration between the ASWS and relevant Arab strategies.

The strategy complements several Arab initiatives, including:[7]

- The Strategy for Joint Arab Economic Action and the Arab Charter of National Economic Action, 1980
- MDGs and the Initiative for Sustainable Development in the Arab Region, the result of the Earth Summit, Johannesburg, 2002
- GCC Unified Water Strategy, 2016-2035
- Strategy for Sustainable Arab Agricultural Development Strategy, 2005–2025

4 Organisation for Economic Co-operation and Development, "OECD principles on water governance". Available at https://www.oecd.org/cfe/regional-policy/OECD-Principles-on-Water-Governance.pdf (accessed on 20 May 2019).

5 Arab Ministerial Water Council, "Arab strategy for water security in the Arab region: to meet the challenges and future needs for sustainable development 2010–2030" (Cairo, Egypt, 2012). Available at https://www.unescwa.org/sites/www.unescwa.org/files/events/files/arab_strategy_for_water_security-english_translation-2012_0.pdf (accessed on 20 December 2018).

6 The MDGs reached their deadline in 2015, and were replaced by the SDGs, which are expected to shape the global agenda on economic, social and environmental development for the next 15 years.

7 Arab Ministerial Water Council, "Arab strategy for water security in the Arab region: to meet the challenges and future needs for sustainable development 2010–2030" (Cairo, Egypt, 2012). Available at https://www.unescwa.org/sites/www.unescwa.org/files/events/files/arab_strategy_for_water_security-english_translation-2012_0.pdf (accessed on 20 December 2018).

Best practices in strategic planning were applied as specific objectives; key themes and implementation means and mechanisms as well as performance indicators were clearly defined. The following expected outcomes were agreed for the ASWS:

1. Provide information on all water resources in the region, including shared water.
2. Achieve sustainable development in line with available resources and the effects of climate change.
3. Raise awareness of water and environmental security among all segments of society and civil society organizations in integrated water resources management.
4. Build human and institutional capacities in Arab States in various fields of water management, particularly regarding international law, manage negotiations on shared and other water in the occupied Arab territories, and enhance curricula and training to meet the requirements of national institutions working in the sector.
5. Increase the funding available for the water sector and build an Arab industrial and technological base in this field.
6. Provide mechanisms and frameworks for cooperation between Arab States and activate mutual agreements for managing shared water resources.

After the adoption in 2015 of the 2030 Agenda for Sustainable Development and its SDGs (2015–2030) by all the Arab countries, there is a need to review Arab strategies to include the SDGs with indicators that fit with local socioeconomic conditions. The ASWS is under review by the Arab Ministerial Water Council to reflect on progress in its first period and look at modifications based on recent global and regional strategies, particularly the 2030 Agenda. It is imperative to again examine the capacity of individual countries in drafting achievable targets and benchmarks (see sections 3.2 and 6.4.3).

1.3 Water resources management in the 2030 Agenda

The 2030 Agenda comprises 17 SDGs and 169 targets addressing social, economic and environmental aspects of development and seeks to end poverty, protect the planet and ensure prosperity for all. The aspirational targets are intended to be universally relevant and applicable to every country. As part of the 2030 Agenda, IWRM must deliver tangible progress, faster and at a larger scale than previously.

The official wording of SDG 6 is to "ensure availability and sustainable management of water and sanitation for all". Its targets address all aspects of the freshwater cycle (see box 1). The water-related SDGs build on the success of the preceding MDGs, and their focus on water supply and sanitation, to consider a more holistic approach to water management. The United Nations defined eight targets and 11 indicators for SDG 6, including targets to improve the standard of water supply, sanitation and hygiene services (targets 6.1 and 6.2), increase treatment, recycling and reuse of wastewater (target 6.3), improve efficiency and ensure sustainable withdrawals (target 6.4), and protect water-related ecosystems (target 6.6), all as part of IWRM (target 6.5). The targets also address the means of implementation for achieving these development outcomes related to International cooperation (target 6a) and local participation (target 6b).[8]

BOX 1

SDG 6: Ensure availability and sustainable management of water and sanitation for all

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.

6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

6.b Support and strengthen the participation of local communities in improving water and sanitation management.

8 Further information on SDG 6 targets and indicators, and the roles and responsibilities of custodian agencies and programmes, is provided on the "Acknowledgments" page at the beginning of this report.

The Arab Ministerial Water Council adopted a series of resolutions leading in 2011 to a regional initiative for setting up a mechanism to improve monitoring and reporting on access to water supply and sanitation services (the MDG+ Initiative).[9] ESCWA was asked to lead the scheme in coordination with an advisory board comprised of representatives from the League of Arab States, Arab Countries Water Utilities Association, Centre for Environment and Development for the Arab Region and Europe, Arab Water Council and Arab Network for Environment and Development. The World Health Organization was also consulted during its development and implementation.

The SDG 6 targets are connected to the 17 SDGs and more than one third of the 169 targets by direct and indirect interdependencies.[10] Implementing IWRM (target 6.5) can enhance linkages and address potential trade-offs and synergies between SDGs on, for example, sustainable agriculture and food security (SDG 2), health and well-being (SDG 3), gender equality (SDG 5), energy (SDG 7), decent work and economic growth (SDG 8), industry, innovation and infrastructure (SDG 9), reduced inequalities (SDG 10), sustainable cities and communities (SDG 11), responsible consumption and production (SDG 12), climate action (SDG 13), life below water (SDG 14), life on land (SDG 15), and peace, justice and strong institutions (SDG 16).

Two indicators measure progress towards target 6.5:

- 6.5.1 on integrated water resources management implementation (see chapter 2)
- 6.5.2 on the proportion of transboundary basin area with an operational arrangement for water cooperation

The indicators support each other by addressing the two main aspects of target 6.5. Indicator 6.5.2 has a separate, global-level indicator report, though linkages are explored in both this report (chapter 5) and the indicator 6.5.2 report.[11]

Indicator 6.5.1 links to all SDG 6 indicators, such as those on water-use efficiency, water supply, sanitation, wastewater treatment, ambient water quality and freshwater ecosystems. As a process-based indicator, it also links closely to the means of implementation indicators, namely indicator 6.a.1 on water- and sanitation-related official development assistance, and indicator 6.b.1 on procedures for local community participation.

The questionnaire for SDG indicator 6.5.1 includes 33 questions related to various aspects covered by the Arab political commitments (see section 2.1 for questionnaire overview).

1.4 Structure of the report

- **Monitoring and assessment approach:** chapter 2 describes data collection and the indicator calculation methodology.
- **Overall status of implementation of integrated water resources management:** chapter 3 presents the findings of SDG indicator 6.5.1 at national and subregional levels. It assesses likely progress towards target 6.5 and related Arab political commitments.
- **Implementing elements of IWRM:** chapter 4 details the four main dimensions of IWRM, including results from individual questions in each dimension.
- **Supporting Arab regional priorities:** chapter 5 presents the degree of implementing IWRM elements as they relate to two main Arab regional priorities, namely groundwater management, and cooperation over shared water resources.
- **Towards full IWRM implementation:** chapter 6 analyses some of the main constraints and enablers to implementing IWRM, and offers guidance on how the results can be used to foster dialogue and action.

1.5 Regional background

In 2018, the population of the region reached 424.7 million, of which 48.2 per cent were female. The average growth rate was 2.76 per cent during the five-year period 2010–2015.[12] While some countries, such as Egypt, are highly populated, others, such as Bahrain, Comoros and Qatar, have small numbers of inhabitants. The high inflow of labour migrants is responsible for population growth rates in countries of the GCC; the region has an average of 53.43 per cent expatriates compared with 9.5 per cent in the Middle East and North Africa (MENA) region. The average in Qatar in 2010 was 86.5 per cent.[13]

9 United Nations Economic and Social Commission for Western Asia, 2016. "Regional initiative for establishing a mechanism for improved monitoring and reporting on access to water supply and sanitation services in the Arab region". Beirut, E/ESCWA/SDPD/2016/Booklet.5. Available at https://www.unescwa.org/sites/www.unescwa.org/files/page_attachments/booklet_on_regional_initiative_for_establishing_a_regional_mechanism.pdf (accessed on 16 May 2019).

10 UN-Water, "Water and sanitation interlinkages across the 2030 Agenda for Sustainable Development" (Geneva, Switzerland, 2016).

11 United Nations Economic Commission for Europe and the United Nations Educational, Scientific and Cultural Organization, *Progress on Transboundary Water Cooperation: Global baseline for SDG indicator 6.5.2.* (Paris, 2018).

12 United Nations Department of Economic and Social Affairs, Population Division, "World population prospects: the 2017 revision https://population.un.org/wpp/DataQuery (accessed on 20 December 2018).

13 United Nations Economic and Social Commission for Western Asia, "The demographic profiles of the Arab States 2017". Available at https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/demographic-profiles-2017.pdf (accessed on 20 December 2018).

Variations also exist between countries in population distribution. While most are urbanized (17 countries have more than 50 per cent living in urban areas), the majority of people in countries such as Comoros, Sudan and Yemen live in rural areas. Further, the age structure of the population differs. Most countries are in the early stages of demographic transition and have youthful populations (average median age of 25.2 years), though Kuwait and the United Arab Emirates (at 33.4 years) are more advanced, with a more pronounced ageing phenomenon.[14]

Regarding the economic structure of the Arab countries, oil, gas and mining comprise 41 per cent of GDP in the oil-rich countries and almost 10 per cent in the others. These sectors generate little employment relative to other sectors.[15] In Iraq, for example, petroleum accounts for more than half of the GDP, but less than 1 per cent of employment. The service sector, a high employment but low productivity sector, comprises a large and growing share of GDP. Agriculture represents a small share of GDP, but is an important source of livelihoods for many in poor rural areas. Manufacturing remains a small part of most Arab economies.

Data suggests poverty rates increased in a number of countries during 2015 due to deteriorating growth performance, lower remittances from Arab oil-exporting countries, subdued global economic recovery and an increasing influx of refugees due to domestic and political conditions in some Arab countries. Djibouti and Yemen continue to have the highest rates of extreme poverty, while the lowest rates are in GCC countries. Within this context, the Multidimensional Poverty Index (MPI) suggests that some countries, referred to as the Southern Arab countries in this report, namely, Comoros, Djibouti, Somalia, Sudan and Yemen, lag behind the other countries for which data are available for this index. This suggests unequal access to basic services and economic opportunities in these countries.[16]

Persistent conflicts are among the main drivers of poverty in the region, reversing hard-won economic development gains by destroying productive resources, capital and labour, and causing thousands of fatalities and massive displacement.

The Arab Human Development Report 2016 notes that, measured by the Human Development Index (HDI), all Arab countries increased their level of achievement between 1980 and 2010, driven mostly by gains in education and health, while income fell behind in comparison, notwithstanding great variations between countries. But the report also indicates that the global financial and economic crisis in 2008–2009, coupled with political instability since 2011, have had a negative impact on human development in the region. Average annual growth in the HDI dropped by more than half between 2010 and 2014 relative to the growth between 2000 and 2010.[17]

14 United Nations Department of Economic and Social Affairs, Population Division, "World population prospects: the 2017 revision".

15 UN Economic and Social Commission for Western Asia, "Annual Report 2015: together for justice and sustainable development". Available at https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/annual-report-2015-english.pdf (accessed on 9 December 2018).

16 United Nations Development Programme, "The 2018 global multidimensional poverty index (MPI)". Available at http://hdr.undp.org/en/2018-MPI (accessed on 16 December 2018).

17 United Nations Development Programme, Regional Bureau for Arab States, *Arab Human Development Report 2016* (New York).

2

MONITORING AND ASSESSMENT APPROACH

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The analysis in this report is mainly based on the responses by the 19 Arab countries (see figure 1) to the global SDG indicator 6.5.1 questionnaire (section 2.1).[1]

Boxes illustrate country status, drawing on the free-text justification/evidence fields to each question in the indicator 6.5.1 questionnaire (section 2.3), workshop reports from two countries (section 2.2), and relevant external data sources.

Tables, maps[2] and bar charts are also used to illustrate findings.

2.1 Overview of survey on IWRM implementation and indicator calculation

The survey

SDG indicator 6.5.1 on IWRM implementation is measured on a scale of 0 to 100, based on the degree of implementation, using 33 questions in a self-assessed country questionnaire, organized into the four main dimensions of IWRM:

1. Enabling environment: the conditions that help to support IWRM implementation, including policy, legal and strategic planning tools.
2. Institutions and participation: the range and roles of political, social, economic and administrative institutions and other stakeholder groups that help support implementation.
3. Management instruments: the tools and activities that enable decision-makers and users to make rational and informed choices between different actions.
4. Financing: the budgeting and financing made available and used for water resources development and management from various sources.

Each of the four sections contain questions at national, subnational, basin/aquifer, local and transboundary levels (see table 1), addressing target 6.5 on implementing

Table 1 Overview of survey question subjects for the four IWRM dimensions, per level

	1. Enabling environment	2. Institutions and participation	3. Management instruments	4. Financing
National level	• Policy • Law • Plans	• Authorities • Cross-sectoral coordination • Capacity • Public participation • Business participation • Gender objectives	• Availability of monitoring • Water-use management • Pollution control • Ecosystem management • Disaster management	• Budget for investment • Budget for recurring costs
Subnational	Policy	Gender objectives	Data and information sharing	• Subnational or basin budget for investment • Revenue raised
Basin/aquifer (and local)	Basin/aquifer management plans	• Basin/aquifer organizations • Local public participation	• Basin management instruments • Aquifer management instruments	
Transboundary	Management arrangements	• Organizational arrangements • Gender objectives	Data and information sharing	Financing for cooperation
Federal countries only	Provincial water law	Provincial authorities	-	-

1 Further information on the data collection process can be found in the global report. United Nations Environment Programme, 2018. *Progress on integrated water resources management. Global baseline for SDG indicator 6.5.1: degree of IWRM implementation.* Available at http://www.unwater.org/publications/progress-on-integrated-water-resources-management-651/.

2 In the maps, country borders, including island countries, have sometimes been simplified for visual clarity. These do not express any opinion on the part of ESCWA, contributory organizations or publishers concerning the legal status of any country or territory, the delimitation of its frontiers or boundaries, or the designation of its name, frontiers or boundaries.

IWRM at all levels. The desire to establish the degree of implementation for all elements of IWRM at each level had to be balanced by the need to maintain a concise questionnaire and keep the reporting burden realistic. The elements included in the survey instrument, and the levels at which they are represented, were selected as the most likely to be relevant to the majority of countries globally.[3]

The five questions on transboundary IWRM implementation provide information that complements SDG indicator 6.5.2. All questions are provided in annex 1 and the full survey is available online.[4]

Calculating the indicator score

Each survey question is scored on a scale of 0 to 100, in increments of 10, guided by specific threshold descriptions (see section 2.3). Question scores in each section are averaged to give a section average for each of the four sections, rounded to the nearest whole number. The four section averages are then averaged to calculate the final indicator 6.5.1 score for each country, on a scale of 0 to 100.

National benefits of completing the questionnaire

While a single indicator score is calculated to track progress on target 6.5 at global level, individual scores and free text for each question are more important at country level, where they act as a diagnostic tool for identifying IWRM elements that could be further implemented in line with national and regional priorities (section 2.3). Further, bringing together multiple stakeholders to reach a consensus on survey responses can provide a valuable mechanism for intersectoral coordination and collaboration.

2.2 National data collection processes

The data collection process aimed to build on existing monitoring efforts in countries and encourage country-led national processes. Noting that data collection was undertaken as part of the global monitoring process for indicator 6.5.1, 21 United Nations Member States in the region were invited to appoint a National Focal Point for the indicator, who would be responsible for coordinating data collection and submission

19 out of 22 countries in the Arab region reported on the degree of IWRM implementation

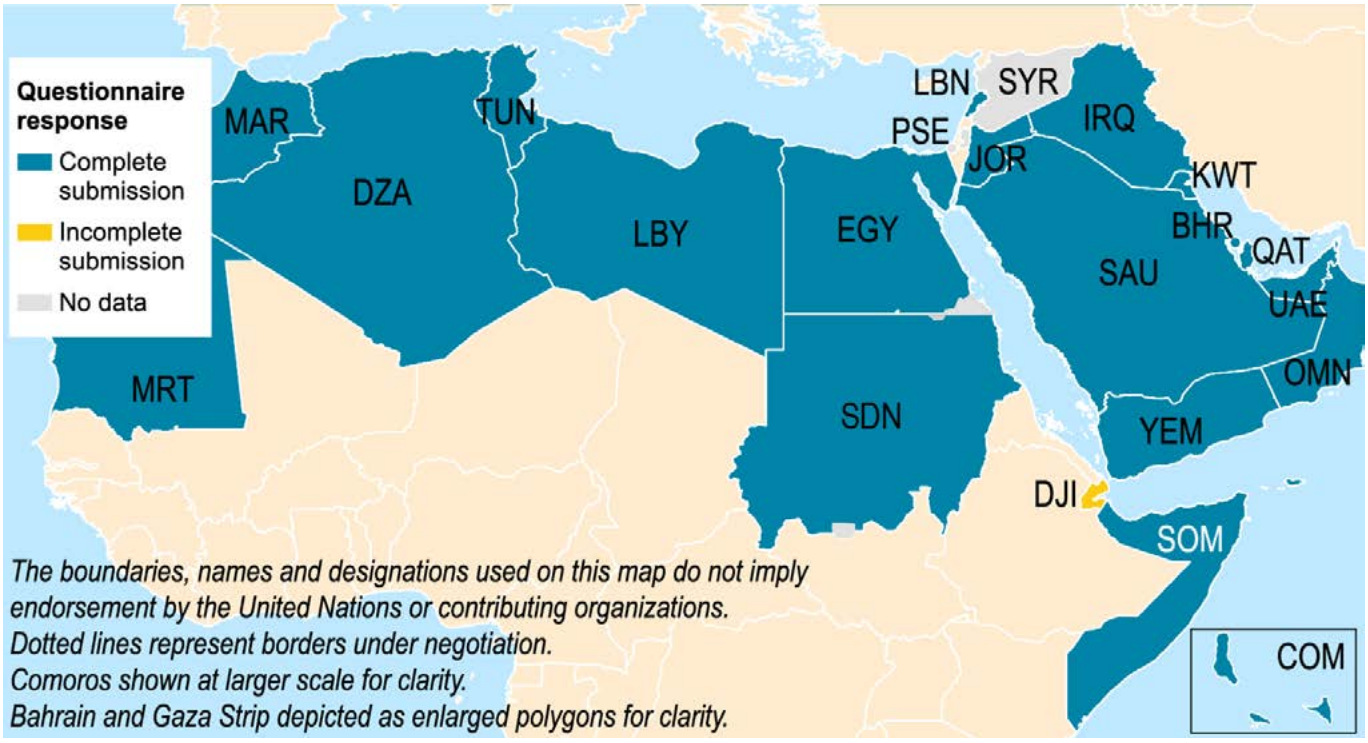

Figure 1 Arab region country submissions on SDG indicator 6.5.1

Notes: Djibouti submitted an incomplete questionnaire and no response was received from the Syrian Arab Republic. Reporting of SDG core indicators coordinated by the United Nations Statistical Commission included the 193 Member States of the United Nations but not Observer States. For information on State of Palestine see section 4.1. Bahrain is shown as a circle on maps for clarity. In some, country borders, including island countries, have been simplified for visual clarity. These do not express any opinion on the part of ESCWA, contributory organizations or publishers concerning the legal status of any country or territory, the delimitation of its frontiers or boundaries or the designation of its name, frontiers or boundaries.

3 United Nations Environment Programme, 2018. *Progress on integrated water resources management. Global baseline for SDG indicator 6.5.1.*

4 Available at http://iwrmdataportal.unepdhi.org.

BOX 2

Country-level multi-stakeholder workshops as enablers of IWRM implementation

Bringing together multiple stakeholders to agree on the scores for the degree of implementation of elements of IWRM mirrors an important aspect of implementing IWRM, namely cross-sectoral dialogue. In Mauritania, for example, a workshop connected heads of missions, advisers and the central directors of the Ministry of Hydraulics and Sanitation and the ministries representing the sectors of agriculture, livestock and environment, while the national water company and civil society were represented at a high level. Discussion, and the negotiation process, led to a greater understanding of the key issues and priorities of stakeholders across different sectors. It is important to maintain and build on these collaborative relationships to further sustainable and equitable water resource management in a country.

to United Nations Environment Programme, serving as the custodian agency for indicator 6.5.1. Ten countries nominated focal points affiliated with national ministries responsible for water management (ministries of water, the environment or similar), nine from National Statistical Offices or similar, and two with other affiliations (see annex 4).

Note that the State of Palestine is not one of the 193 UN Member States, and was not officially invited to participate in the global baseline monitoring process for 6.5.1. It submitted a national voluntary review on the implementation of the 2030 Agenda to the High-Level Political Forum (HLPF) in 2018. ESCWA recommends that the State of Palestine is invited to report on indicator 6.5.1 in future rounds of data collection. During the drafting of this regional report, the Palestinian Water Authority was asked to submit a brief report summarizing the degree of IWRM implementation in the context of the 6.5.1 survey instrument (see box 4.1, and section 4.1).

National focal points were advised to design a process that included multiple stakeholder groups to the extent possible, ensuring survey responses represented a consensus among stakeholders.[5] In most cases, the response information was collected from government officials and sectoral stakeholders through direct communication or workshops (see section 2.3 for further discussion).

In two Arab countries, Mauritania and Sudan, stakeholder workshops were held in collaboration with the national focal points and the GWP Country Water Partnerships. These provided not only a platform for stakeholder discussion and consensus-building, but also information on the barriers to implementation and examples of country actions taken to further IWRM (see box 2).

2.3 Addressing objectivity, transparency and comparability of survey responses

There are challenges in systematically measuring water governance across countries, and developing a single indicator score. The objectivity, transparency and comparability of survey responses are addressed in three main ways:

1. Countries are encouraged to organize multi-stakeholder processes to reach a consensus on responses to each question (see section 2.2). Such processes establish cross-sectoral and multi-level dialogue and ensure key stakeholders agree on the responses, resulting in a more realistic assessment of implementation. While it is not possible to accurately cross-check country reports, multi-stakeholder processes are the best way to achieve robust results. Countries reported that it was easier to reach consensus on the scores when they were based on evidence.

2. For each question, specific guidance is provided on the degree of implementation for the following six thresholds: 0, 20, 40, 60, 80 and 100 (see annex 1.2).

3. For each question, countries are encouraged to justify their score with information on, for example, specific challenges facing implementation, and through describing the measures taken to further IWRM. Such notes provide a valuable source of information on IWRM implementation at national level and are used throughout this report to illustrate the steps countries are taking and the different forms of implementation. The justification fields facilitate consensus, allow for the assessment of progress over time, enhance transparency and provide insight into national contexts. It should be noted that not all countries provided reasoning for their scores, an issue that may be addressed in future reporting.

In addition, efforts have been made to ensure high data quality, including holding online training seminars for national focal points and implementing quality control processes for submitted questionnaires.

Despite these measures, it is acknowledged that country responses retain an element of subjectivity, particularly where multi-stakeholder processes are less extensive. During baseline monitoring, focal points were not asked to report on stakeholder processes, so it is not possible

5 Through training webinars, email, telephone conversations, and the Step-By-Step Monitoring Methodology available at http://iwrmdataportal.unepdhi.org.

to analyse their robustness. However, through anecdotal evidence available from correspondence with focal points, it is estimated that the majority of countries at least consulted across government departments in filling out the survey. Another challenge is that the level of free text responses to each question in the region was relatively low compared with countries worldwide. Both issues (recording stakeholder processes and improving free text responses) should be addressed in future monitoring processes to increase transparency, robustness and confidence in the indicator results (see section 6.4.3). Given these potential limitations, external data and information sources are used to supplement and contextualize the findings from the survey, particularly in chapters 4 and 5, mainly in boxes.

Ultimately, while results are indicative and country-driven, the self-assessed reporting is designed to be useful to the countries themselves in furthering IWRM implementation. The crucial issue pertains to what countries do with the information and how IWRM implementation can progress over time, rather than a comparison of scores between countries. At national level, the surveys can be used as a simple diagnostic tool to identify areas of relatively low or high IWRM implementation (see section 6.4.3). At regional level, the 19 data points (country scores) present a useful pattern on the status of IWRM implementation, though the potential subjectivity of the individual data points must be considered.

2.4 Subregional analyses and levels of socioeconomic development

In addition to national and regional levels, results are also aggregated at subregional level to identify whether lessons can be learned from countries with similar social, economic, political and/or geographic contexts (figure 2).

While there may be overlaps, the subregions have been defined for the purposes of this report. Countries of the GCC, Maghreb and Mashreq exhibit varying levels of political and economic coordination. The clearest ties are found within the GCC, while the Maghreb countries are all members of the Arab Maghreb Union. The Mashreq countries are strongly linked through geographic and historic ties, though different levels of cooperation exist among countries. The Southern Arab countries have comparable levels of socioeconomic development, as illustrated by similar HDI and MPI scores.

The HDI is a summary measure of achievement in key dimensions, including life expectancy, education and standard of living.[6] HDI is used in this report to explore the correlation between level of development and IWRM implementation. In contrast to measures such as GDP that focus on economic development, HDI reflects a country's capacity to implement health and education measures. If a

Analysing results from the four subregions facilitates coordination and prioritization.

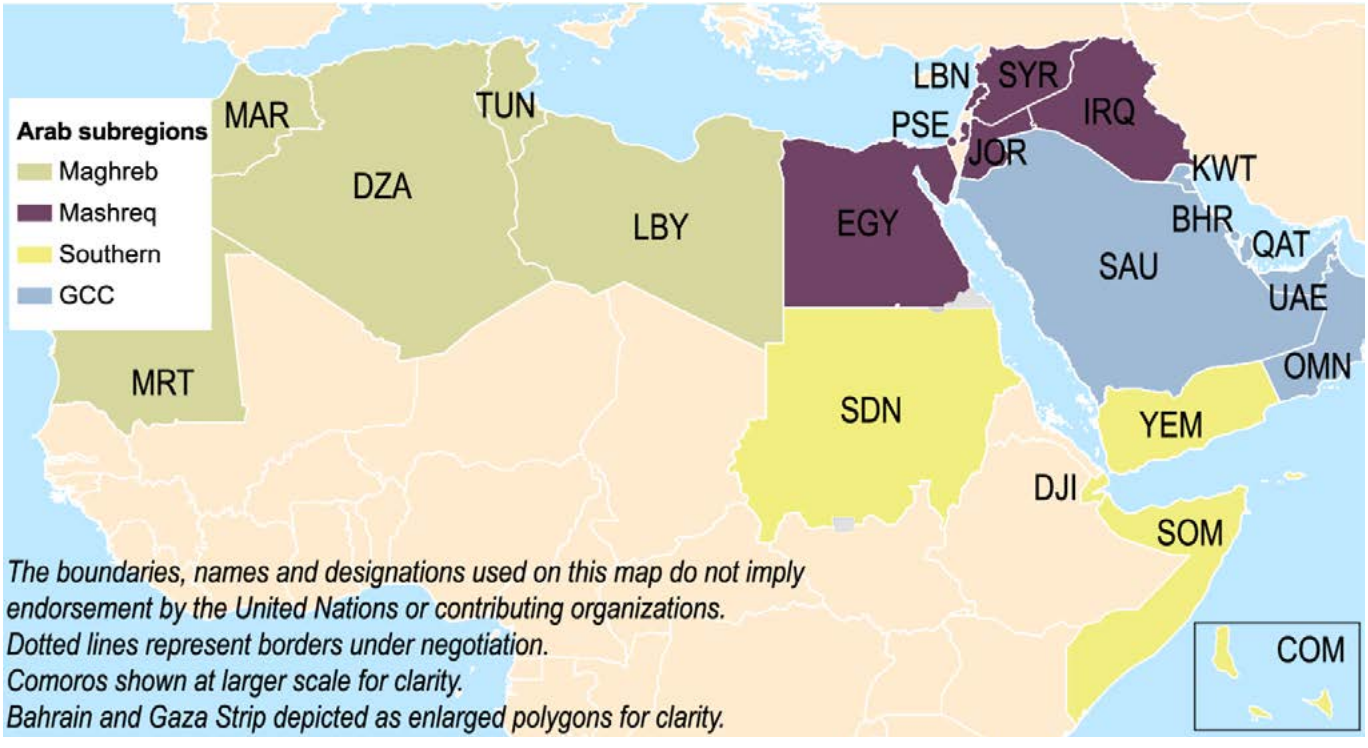

Figure 2 Four subregions of the Arab region

6 United Nations Development Programme, "Human Development Index", in *Human Development Report 2016*. Available at http://hdr.undp.org/en/content/human-development-index-hdi (accessed 26 July 2018).

country has capacity in these areas, then it has in theory the capacity to implement IWRM, even if the level of economic development is not high, or if countries are likely to prioritize health and education over IWRM.

Overall IWRM implementation at subregional level is presented in section 3.3, with subregional analyses across the four dimensions and 33 elements of IWRM in chapters 4 and 5, respectively.

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3 OVERALL STATUS OF IWRM IMPLEMENTATION

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General interpretations of the implementation categories for the overall indicator 6.5.1 score (table 2) are based on the threshold descriptions from individual questions. It is not possible to provide more accurate interpretations of the overall implementation categories as scores can depend on any number of score combinations from the 33 underlying questions. This is why analysing the situation in each country down to individual question level is vital to identify national strengths and weaknesses. Individual question thresholds are provided in annex 1, with further discussion in chapters 4 and 5.

In line with target 6.5 on implementing IWRM at all levels by 2030, including through transboundary cooperation, a global, aspirational target for indicator 6.5.1 has been set, which is to reach a very high degree of implementation, or an average score of between 91 and 100. Recognizing that some Arab countries have generally lower levels of IWRM development, it is recommended they set targets guided by the global ambition but consider their local circumstances (see section 3.2).

Table 2 Overall IWRM implementation categories, score thresholds, and interpretation.

	Score range	General interpretation for overall IWRM score
Very high	91 - 100	Vast majority of IWRM elements are fully implemented, with objectives consistently achieved and plans and programmes periodically assessed and revised.
High	71 - 90	IWRM objectives of plans and programmes are generally met and geographic coverage and stakeholder engagement is generally good.
Medium-high	51 - 70	Capacity to implement IWRM elements is generally adequate and elements are generally being implemented under long-term programmes.
Medium-low	31 - 50	IWRM elements are generally institutionalized and implementation is under way.
Low	11 - 30	Implementation of IWRM elements has generally begun, but with limited uptake across the country, and potentially low engagement of stakeholder groups.
Very low	0 - 10	Development of IWRM elements has generally not begun or has stalled.

Of the 19 countries, 12 (63 per cent) report medium-low, low or very low IWRM implementation. Countries should prioritize the weaker elements of their water resources management.

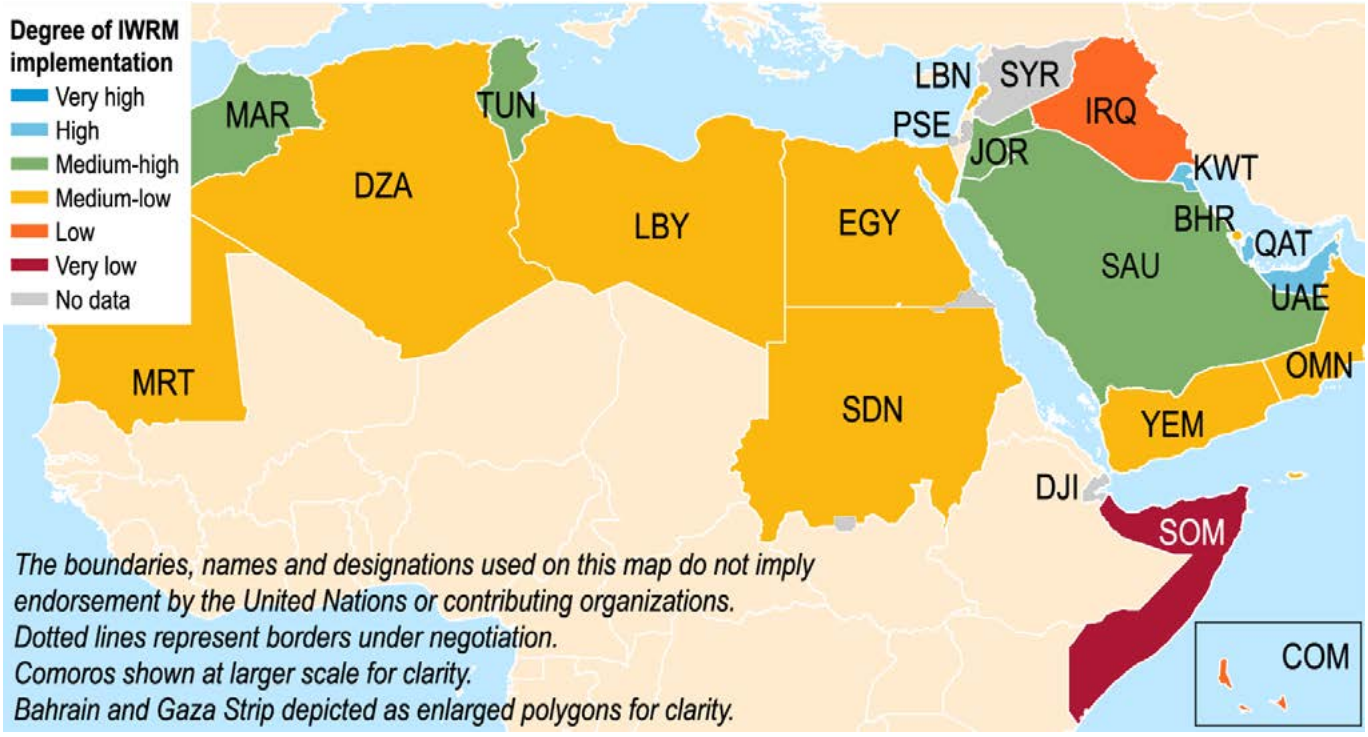


Figure 3 Country implementation of IWRM in the Arab region

KEY FINDINGS AND **RECOMMENDATIONS**

1. The average IWRM implementation in the region is 48 out of 100 (medium-low implementation), similar to the global average of 49. **Given the significance of water management for sustainable development in the region, as recognized in the Arab Strategy for Water Security, it is recommended IWRM implementation is accelerated in most countries.**

2. The regional average masks a wide spread of IWRM scores from 10 (very low) to 82 (high). **Opportunities for peer-to-peer capacity-building should be explored and facilitated by regional and subregional bodies, to prioritize and advance the status of water management in countries with lowest capacity.**

3. Sixteen out of 19 countries have at least institutionalized most elements of IWRM (medium-low implementation and above). **The challenge lies in increasing capacity, financing and coordination across sectors, particularly in the nine countries reporting medium-low implementation, to build on this foundation and deliver tangible benefits.**

The degree of IWRM implementation in each country is shown in Figure 3, the distribution of IWRM implementation categories across the region in Figures 4 and 5.

Of the 19 countries, 16 (84 per cent) have at least institutionalized most elements of IWRM (medium-low implementation and above), with three lagging behind. Implementation at all levels and sectors must be the focus.

Countries per category			**Score range**	**Baseline**	**Towards 2030**
Number of countries		**%**			
0	Very high	0	91-100	No country has fully implemented all IWRM processes.	Likely to meet the global target if momentum is maintained.
3	High	16	71-90	3 countries are generally achieving policy objectives for IWRM. Geographic coverage and stakeholder involvement generally good.	
4	Medium-high	21	51-70	4 countries are implementing most IWRM elements in long-term programmes.	Potentially able to reach the global target, but efforts need to be focused and sustained towards 2030.
9	Medium-low	47	31-50	9 countries have institutionalized most IWRM elements and implementation is under way, but uptake of arrangements is not widespread.	**12 countries unlikely to meet the global target unless progress is significantly accelerated. Countries should aim to set national targets based on the local context.**
2	Low	11	11-30	3 countries have started developing IWRM elements. Limited uptake across the countries and potentially low stakeholder participation.	
1	Very low	5	0-10		

Figure 4 Distribution of 6.5.1 scores per IWRM implementation category in the region, based on 19 reporting countries

With a spread of IWRM implementation, from a score of 10 (very low) to 82 (high), there are opportunities for peer learning to support the weakest countries.

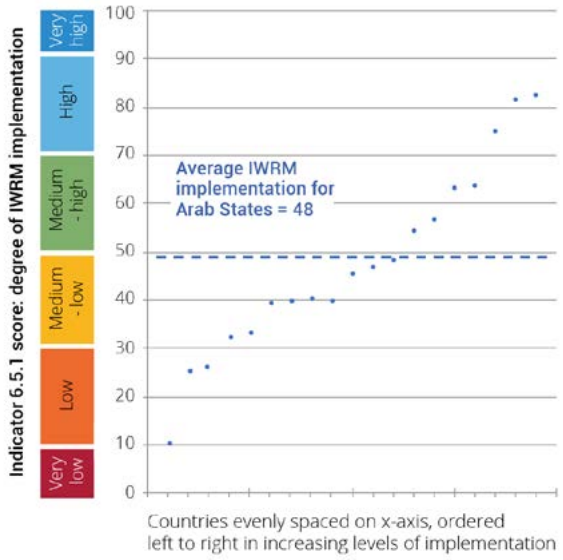


Figure 5 Indicator 6.5.1 baseline for Arab countries, IWRM implementation scores (0–100)

3.1 Country status

KEY FINDINGS AND **RECOMMENDATIONS**

1. Country experience, evidence and progress noted from similar surveys in 2008 and 2012 suggests that roughly two thirds of Arab countries with medium-low, low or very low IWRM implementation will not reach global and regional targets unless progress is stepped up. **Progress should be significantly accelerated in these countries and national interim targets set to facilitate implementation.**

3.2 Progress towards targets

To achieve target 6.5 by 2030, an ambitious global target for indicator 6.5.1 has been set, which is to reach a very high degree of IWRM implementation or a global average score of between 91 and 100. This is in line with the ASWS, which seeks to establish the principles of integrated water resource management as a key element in the water policies of Arab States. [1]

As this is predominantly a baseline assessment, estimating progress towards global and regional targets is challenging. An empirical analysis can only be carried out following subsequent reporting on indicator 6.5.1, using a methodology comparable to that used in this baseline. In the absence of empirical data, experience in past decades indicates that progress has generally been slow and that most countries are unlikely to meet targets unless current rates of implementation are accelerated, particularly among the 63 per cent of countries in the medium-low, low and very low implementation categories (figure 3, section 3.1).

It should be noted, however, that most countries have institutionalized and begun implementing many IWRM elements, which, alongside global efforts made within the SDG framework, has provided a solid foundation from which to progress. It is recommended that countries set targets in line with national priorities and capacities to encourage action on the ground and further accelerate progress (see section 6).

Though global status reports on IWRM implementation were published in 2008 and 2012,[2] they did not create IWRM implementation scores, making a direct comparison with the SDG baseline difficult. Further, although many questions in the 2008, 2012 and 2017/18 surveys were similar to those in the SDG baseline and could therefore be compared, the approach to collecting national data and the number of possible responses to each question are different. This underlines the need to maintain a consistent reporting and assessment methodology throughout the SDG period.

3.3 Subregional implementation of IWRM and links to levels of development

KEY FINDINGS AND **RECOMMENDATIONS**

1. The GCC has the highest average IWRM implementation score (61), followed by the Maghreb (52), the Mashreq (40) and Southern Arab countries (29). **To advance IWRM regionally, attention must be given to four Southern Arab countries (Comoros, Somalia, Sudan and Yemen).**

2. While overall development appears to impact on the degree of IWRM implementation, it is not the only factor. **Political will and prioritization are important in furthering IWRM, even in countries with relatively low development.**

1 Arab Ministerial Water Council, Cairo, 2014. Arab Strategy for Water Security in the Arab Region to Meet the Challenges and Future Needs for Sustainable Development 2010-2030, English Version.

2 Nine and 11 Arab countries reported in 2008 and 2012 respectively. Data available at http://iwrmdataportal.unepdhi.org.

There is a steady fall of about 10 points between the average scores of each of the four subregions (see figure 6, and section 2.4 for a subregional breakdown). However, the low number of countries in each subregion (6, 5, 4 and 4) suggests averages should be treated with caution.

The HDI can be used to illustrate the complex (and weak) correlation between development level and IWRM implementation (section 2.4). At the extremes, there appears to be some link between the overall level of socioeconomic development and political stability and the degree of IWRM implementation, with GCC countries having the highest average HDI (0.83), Southern countries the lowest (0.49). For the Maghreb (average HDI of 0.67) and Mashreq (0.71) countries, however, this correlation is not clear. Differences between countries in the same subregion must be acknowledged when discussing the average HDI, a composite measure that takes into account health, education and standard of living.[3] In theory, if a country has the capacity to implement measures relating to health and education, then it may also have the capacity to implement IWRM, although countries are likely to prioritize direct health and education measures.[4] As figure 7 shows, there does not appear to be a strong correlation between IWRM implementation and HDI, particularly for countries with medium and high HDI (that is, in the middle). This implies the level of IWRM implementation is likely to be influenced by other factors, such as the priority given to water resources management in a country (box 3), though it is not possible to test this hypothesis with the information available. A few countries with very high HDI (Kuwait, Qatar and United Arab Emirates) also have high degrees of IWRM implementation, suggesting that a certain level of development can facilitate more rapid IWRM progress. However, IWRM implementation is not guaranteed with higher levels of development, as illustrated by countries below the line of best fit in figure 7.

The GCC subregion has the highest average IWRM implementation, southern Arab countries the lowest, indicating opportunities for peer support and learning within and across subregions.

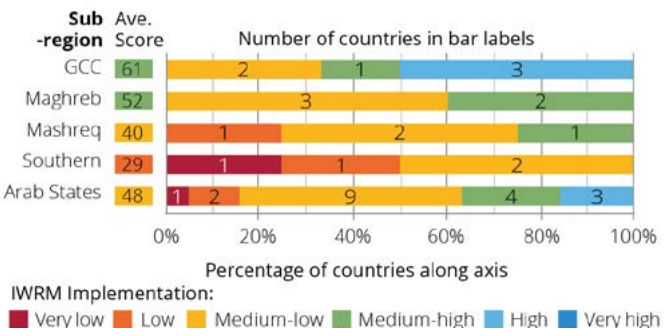


Figure 6 Subregional averages and country breakdown of IWRM implementation

BOX 3

The GCC Unified Water Strategy 2016–2035

The GCC States are located in one of the most water-stressed areas of the world. This is due to low and irregular rainfall (70–150 mm/year), high evaporation rates (more than 3,000 mm/year) and one of the lowest per capita renewable freshwater resources in the world, which continues to decline far below the absolute water scarcity limit of 500 m3/year, going from 602 m3/year in 1970 to 87 m3/year in 2014. Historically, water provision in the region has been achieved by resorting to costly investment in water supply sources and infrastructures, such as desalination, wastewater treatment, dam constructions and groundwater overdrafting. Previously, few attempts had been made to implement demand-side management; for example, metering, pricing, incentives/disincentives, water-saving devices and legislative tools. There are many difficulties, driven by population growth and changing demand patterns, confronting the main water-related subsectors, such as municipal water supply, wastewater treatment, agriculture and industry. Recognizing these common challenges, in 2016 the GCC Supreme Council approved the GCC Unified Water Strategy 2016–2035 (GCC UWS). The strategy defines main themes and strategic objectives, and the potential benefits that could accrue, including the expected contribution to overall water-sector sustainability. It also elaborates key performance indicators and a set of targets that will allow for effective monitoring and evaluation of the outcomes.

Sources: Waleed Al-Zubaria and others, "An overview of the GCC Unified Water Strategy (2016–2035)", in Desalination and Water Treatment, vol. 81 (June 2017).
Food and Agriculture Organization of the United Nations, AQUASTAT, main database.

3 United Nations Development Programme, "2016. Human Development Index". Available from http://hdr.undp.org/en/content/human-development-index-hdi (Accessed on 26 July 2018).

4 United Nations Environment Programme, 2018, Progress on integrated water resources management. Global baseline for SDG indicator 6.5.1: degree of IWRM implementation. Available at http://www.unwater.org/publications/progress-on-integrated-water-resources-management-651/(accessed 7 December 2018).

While overall development and governance influence IWRM implementation, they are not necessarily the most important factors. Political will and level of priority are critical for furthering implementation.

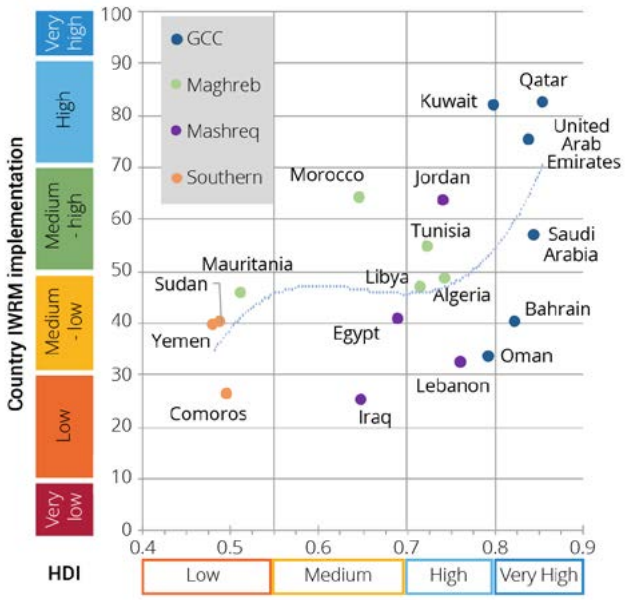


Figure 7 Correlation between degree of IWRM implementation and HDI score

Note: Somalia does not have an HDI score, and reports an IWRM score of 10.

4

IMPLEMENTING ELEMENTS OF IWRM

This chapter examines the level of implementation across the four IWRM dimensions of enabling environment, institutions and participation, management instruments and financing. It also includes analysis of the 33 individual questions from the questionnaire on IWRM elements, though questions relating to groundwater or basin management are primarily discussed in section 5.2, and relating to transboundary cooperation over water resources in section 5.3.

The region is close to world averages through the four IWRM dimensions (figure 8). At 48, the average IWRM implementation is close to medium-high, indicating IWRM elements are generally institutionalized and their implementation under way.

The highest implementation score is found for both the management instruments (51) and institutions and participation (51). Scores for financing are recorded at 41, and at 47 for the enabling environment. This suggests decision-makers are aware of the importance of the tools and methods to use when choosing between actions. In addition, there is relatively good support of IWRM implementation by institutions and stakeholders. However, water infrastructure and management are clearly handicapped when considering the financial resources required for IWRM implementation. This may be related to the low level of enabling conditions, which include policy, legal and strategic planning.

At subregional level, all the implementation categories for GCC countries are in the medium-high level and score higher than the other regions (see table 3, box 3, section 3.3). The Maghreb countries are second, with an average score of 52, the financing dimension on the medium-low level (47). The Mashreq countries are third, with an average score of 40, and the financing dimension on a low level (27). The Southern Arab countries lag behind, with an average implementation level of 29. Their management instruments (26) and financing (21) dimensions are in the low level of IWRM implementation. These findings relate closely to the HDI scores of 0.83 and 0.49 for the GCC and Southern subregions, respectively (section 3.3).

Financing has the lowest average score (41) of the four IWRM dimensions.

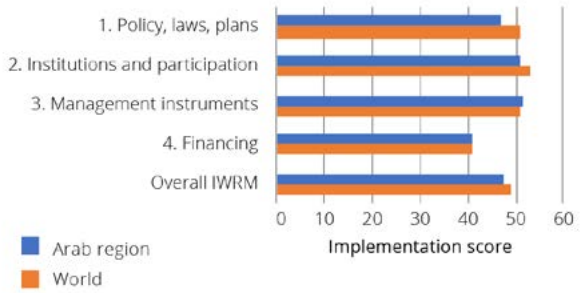


Figure 8 Average implementation of the four dimensions of IWRM in the region and the world

At country level, average scores for these dimensions range from 4 to 100, demonstrating the need for careful assessment by each country on its own strengths and weaknesses for progressing with IWRM implementation. Sections 4.1–4.4 discuss this issue, with scores summarized in annex 3.

As discussed, the State of Palestine was not included in the official baseline monitoring of SDG 6.5.1, although the status of water governance was discussed in the Palestinian national voluntary review on implementing the 2030 Agenda.[1] Nonetheless, during the drafting of this report, the Palestinian Water Authority provided an overview of the degree of implementation of the four IWRM dimensions (see box 4.1).

Table 3 Implementation scores of the Arab region across the four IWRM dimensions

Dimension	GCC	Maghreb	Mashreq	Southern
1. Enabling environment	50	57	44	32
2. Institutions and participation	68	52	40	36
3. Management instruments	68	52	50	26
4. Financing	59	46	27	21
Average	61	52	40	29

1 State of Palestine, 2018. Sustainable Development Goals: Palestinian National Voluntary Review on the Implementation of the 2030 Agenda. Available at https://sustainabledevelopment.un.org/content/documents/20024VNR2018PalestineNEWYORK.pdf (accessed on 1 February 2019).

BOX 4.1

Implementation of IWRM in the State of Palestine (not official SDG reporting)

Enabling environment: at national level, a IWRM policy is being used by authorities, and a water law has been ratified without being implemented because of the lack of control over the limited available water resources due to the Israeli occupation. An IWRM plan was prepared in 2002 but has not been updated. There are no policies at subnational level. Some pilots are under way at regional and local levels, except for groundwater management. Individual pilots are being implemented for basin management and adaptation to climate change. A transboundary strategy, including arrangements, has been prepared but is not being implemented.

Institutions and participation: the authorities have a clear mandate to lead the formulation of an IWRM plan and its implementation at national level. Different sectors and stakeholders contribute to the decision-making process for policy development, planning and management, allowing for some long-term initiatives to be implemented with appropriate coverage. However, communication between the government and the private sector is limited due mainly to the absence of a legal and regulatory framework. Gender-specific objectives are part of the national plans, the funding is partial and the objectives are partly achieved. At the basin/aquifer level, the authorities have the capacity to effectively lead IWRM implementation plans, with full participation of stakeholders at local level. Gender is partly covered in subnational laws, policies or plans but is missing at transboundary level

Management tools: at national level, management tools for sustainable use of water are being implemented on a long-term basis with at least an acceptable coverage and an appropriate use by stakeholders. Some already declined aquifers suffer excessive pumping because of increasing demand and lack of other water sources, such as in Hebron. A further issue is the lack of information about water use by the Israeli occupation. The management tools are being implemented also for pollution control risk areas but their use is limited for water-related ecosystems, which rely on short-term and ad hoc projects. At the other levels, management tools are being implemented on a long-term basis at basin level, as well as data and information sharing, with at least acceptable geographical and stakeholder coverage, except for transboundary water.

Financing: funding of the development and management of water resources, at national level, is based on an ad hoc budget that only partially covers planned projects, with implementation still at an early stage. There are no subnational or basin budgets for investment, including for water infrastructure. Some funds are mobilized for special projects, such as the Central Desalination Plant in Gaza Strip. Limited fees from the well licence renewal and water extraction, for example, are collected but these are not used for IWRM activities. The law for pay-in-draw from aquifers is not yet implemented. There is no specific earmarked funding from Member States' budgets or from other regular sources, as there are no agreements with riparian countries in this regard.

4.1 Developing and implementing laws, policies and plans (survey section 1)

KEY FINDINGS AND **RECOMMENDATIONS**

1. The implementation of enabling environments in the region is taking place at almost the same medium-low level. **Most Arab countries need to strengthen implementation activities of IWRM-based laws, policies and plans, when they exist.**

2. When comparing the seven enabling environment IWRM elements, progress is lowest at the transboundary arrangements level (37). **States should increase efforts to improve the enabling arrangements and frameworks for better transboundary water resources management and cooperation.**

3. The Southern subregion has the lowest average score (32) for the seven enabling environment elements, 15 and 19 points lower than the regional and world averages (47 and 51, respectively). **To accelerate IWRM implementation in the Arab region, increased support should be given to the Southern subregion.**

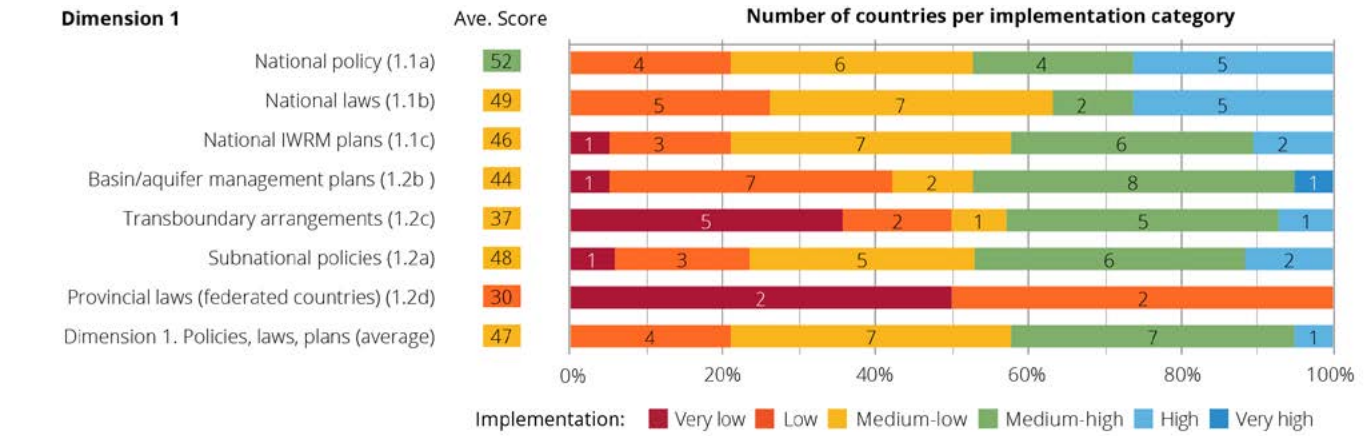
The water sector is today recognized as a national priority in all Arab countries because of the scarcity and the increasing demand for water from all sectors of economic and social activity. Water governance is improving in most countries, leading to more attention being directed towards IWRM implementation. Some countries, such as Algeria, Egypt and Tunisia, established policies, laws and plans for water management as early as 1975. Others, such as Morocco and Yemen, have been undergoing institutional reforms establishing new policies and instruments to accelerate progress (box 4.2). Most of the countries have promulgated policies/laws and established strategic plans for water management starting in 2000. However, some are still in the process of establishing a water management strategy, and a few do not have one, such as Comoros.

In some cases, the laws related to water management are established by different ministries, such as water, agriculture, irrigation, health and environment. The challenge is to find the right framework that would allow for IWRM implementation through a participatory, coherent approach.

The enabling environment dimension covers the creation of laws, policies and plans to support IWRM implementation. The extent of implementation of the policy, legal and planning elements of this dimension is measured at national level and at other levels (subnational and transboundary).

The establishment of an enabling environment for IWRM at different levels in the Arab world scores 47, close to the global

Almost half of countries (8 out of 19) have generally met IWRM objectives of policies, laws and plans with good geographic coverage and stakeholder engagement (on average, medium-high implementation and above)



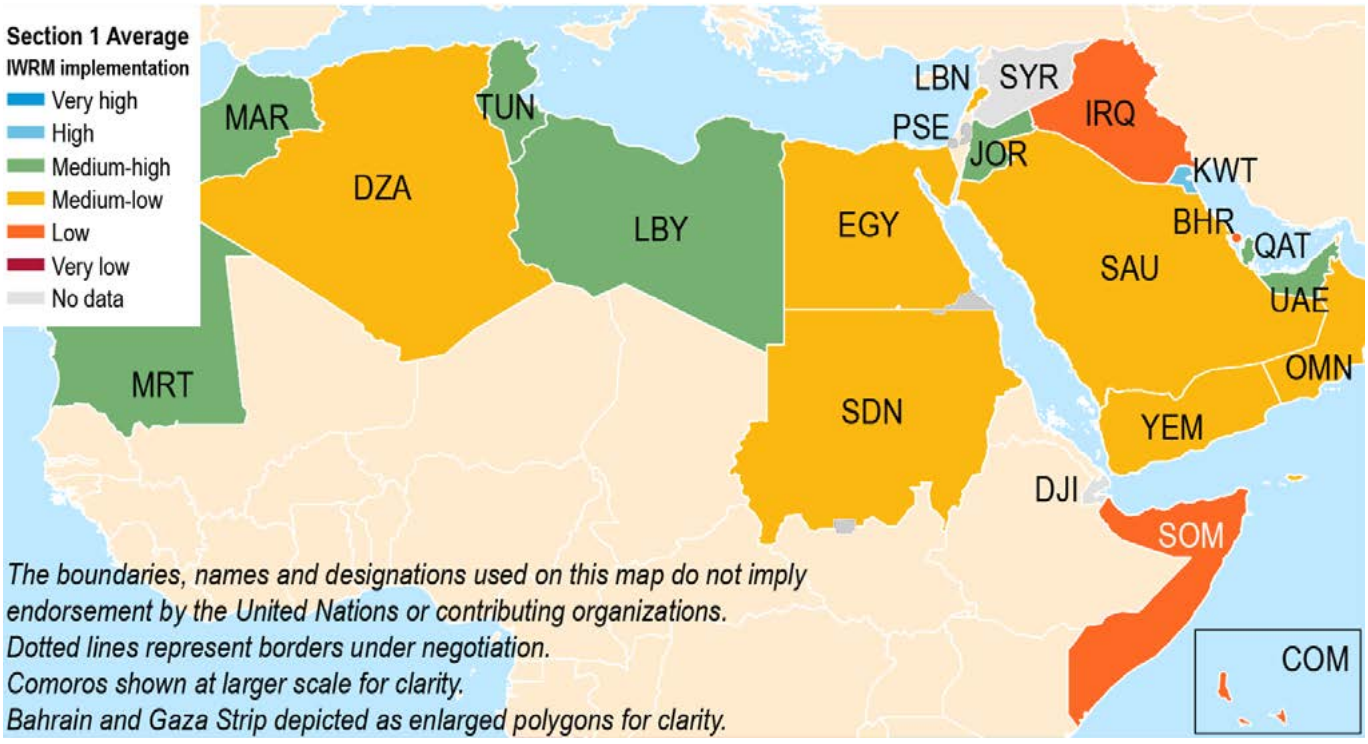


Figure 9 Implementation status, per country, of policies, laws and plans based on IWRM approaches

Table 4 Regional and subregional scores in the enabling environment.

1. Enabling environment	GCC	Maghreb	Mashreq	Southern	Arab Region[a]	WORLD
1.1 National level						
a) Policies	50	64	55	38	52 (20-80)	55
b) Laws	50	64	48	33	49 (20-80)	56
c) Plans	50	48	55	28	46 (0-80)	49
1.1 Average	50	59	53	33	49 (13-80)	53
1.2 Other levels						
a) Subnational policies	50	52	50	38	48 (10-80)	45
b) Basin/aquifer plans	63	46	33	25	44 (10-100)	42
c) Transboundary arrangements	15	68	30	35	37 (0-80)	56
d) Provincial laws (federal countries)	100[b]	n/a[c]	0[d]	17[e]	30 (0-100)	59
1.2 Average	57	55	28	29	45 (8-90)	47
Dimension 1 average	54	57	39	30	47 (13-84)	51

Note: cell colours indicate implementation categories, as used in figures throughout this report and as elaborated in Table 2.
a lowest and highest values in parenthesis; **b** one country (United Arab Emirates); **c** n/a = not applicable (no federal countries in Maghreb that reported); **d** one country (Iraq); **e** three countries.

average of 51. However, the region presents scores for all enabling environment elements that are lower than those of the rest of the world, except for subnational policies (48) and basin/aquifer plans (44) that are slightly higher (table 4).

The implementation of enabling environments – policies, laws and plans – is almost at the same medium-low level, on average, at national level (49), and at subnational, basin/aquifer and transboundary levels (45).

Considerable attention should be given to transboundary arrangements that score the lowest among the seven elements (37), just after provincial laws (30) that concern only the five federal countries of the region (figure 9). This may be explained by the difficulties some Arab countries face in establishing cooperation agreements with their neighbours. Six have established transboundary arrangements with neighbours that are at least adequately implemented. Among these, Algeria scores at the medium-high level (box 4.3). This element is further discussed in section 5.3.3.

The lowest score of all is that of provincial laws (federal countries), though this was reported on by only five countries, namely, United Arab Emirates (100), Somalia (20), Sudan (20), Comoros (10) and Iraq (0).

For the enabling environment, the Maghreb subregion scores higher on most elements than the other subregions, except for national and basin/aquifer plans. Its average (57) for enabling environment, dimension 1, falls in the middle of the medium-high level, which is six points higher than the world average (51) and indicates capacity to put in place adequate conditions that support IWRM implementation. At national level, the GCC and Mashreq subregions are at the same level of implementation, at the edge of the medium-low and medium-high levels. The Southern subregion scores mainly at the medium-low level, with a low score for planning (28) IWRM implementation.

An analysis of countries' performances in implementing the seven enabling environment elements shows positive and negative results. In terms of the positives, ignoring the element on federated countries (1.2d) that concerns only five countries, 42 per cent of countries have on average attained or surpassed the medium-high level (51 and above). This figure rises to 47 per cent in the two elements of national policies and basins/aquifers management plans.

Jordan and Tunisia have reached a high or very-high level of implementation in the six IWRM elements that apply to them. Similarly, Kuwait and Morocco have reached high or very-high scores in the applicable five elements.

Moreover, there are five Arab countries (Jordan, Kuwait, Morocco, Tunisia and United Arab Emirates) with a high implementation level for the formulation of national water resources policy (1.1a). In addition, five countries (Jordan, Kuwait, Mauritania, Morocco and Oman) score high on the formulation of national laws (1.1b), while only two countries

BOX 4.2

Examples of effective national enabling environments for IWRM

Morocco presents the highest score for enabling environments at national level in the Maghreb subregion. Since its independence, the Kingdom has attached much importance to managing its water resources and made considerable efforts to build hydraulic infrastructures, mainly to serve agriculture. These efforts were accompanied by the institutionalization of water management and planning as well as the implementation of a number of policies, plans and projects. In 1995, Morocco established a framework to govern its water resources through basin agencies (Law No. 10-95), which is based on the principles of IWRM. This law led in 2009 to the National Water Strategy. Several instruments have been included in the master plans for IWRM implementation for each basin agency and in the National Water Plan. In 2016, a new Water Law (No. 36-15) was introduced, with reforms aimed mainly at strengthening the institutional framework, improving water governance and enforcing the participatory approach in water management. It has also endorsed establishing information systems for the governance and the integrated management of water at the levels of users, stakeholders and decision-makers.

Yemen has the highest score (50) for enabling environments in the Southern subregion. There may be lessons to be learned from this country, in spite of its semi-arid nature and low rainfall. Since about 90 per cent of Yemini water is consumed by the agricultural sector, the Ministry of Agriculture and Irrigation (MAI) is the most powerful government entity in water management. In 1995, Yemen established its National Water Resources Agency (NWRA) as a powerful agency to oversee all water resources and set policies to help conserve and sustain them. Although, this agency later brought a mind shift towards IWRM, it was not able to control drilling of illegal wells. In 2003, the Ministry of Water and Environment was created to oversee NWRA and the water users, excluding the MAI. This Ministry established a National Water Sector Strategy and Investment Programme, 2005–2009. The country was counting on investment support from western nations and international aid for the implementation of the plan. At the same time, implementation plans for IWRM were developed at the level of the water basins in 2006. Since the outbreak of the conflict in 2015, Yemen has faced severe problems in implementing IWRM plans. Moreover, repeated fighting has damaged or destroyed a great deal of the country's infrastructure, including water and sewage facilities.

Source: Food and Agriculture Organization of the United Nations, "Yemen: country fact sheet on food and agriculture policy trends", brief by the Food and Agriculture Policy Decision Analysis (FAPDA) team (September 2014). Available at http://www.fao.org/3/a-i4127e.pdf.

BOX 4.3

Progress by Algeria on arrangements for transboundary water management

Algeria scores at the medium-high level (60) for this element, with progress on transboundary IWRM implementation. Several agreements and various instruments have been established with neighbouring countries. Regarding surface-water management, a joint Algeria-Tunisia technical committee led by the prime ministers of both countries held sessions between 1985 and 2014, and a further monitoring committee was established in 1991. In addition, a Memorandum of Understanding was signed in 2011 with Morocco, creating a Joint Technical Committee, though no mechanism has been implemented for managing shared water resources. As for shared groundwater, a consultation agreement was signed in 2006 between Algeria, Libya and Tunisia for concerted management of the Aquifer System of the Northern Sahara (NWSAS). Algeria is also a member of the Sahara and Sahel Observatory (OSS), an international, intergovernmental organization based in Tunis since 2000. All the Maghreb States are members of the OSS, whose mandate is to initiate and facilitate partnerships around the challenges related to shared water resources management, among other activities.

Source: Observatoire du Sahara et du Sahel (Sahara and Sahel Observatory). Available at http://www.oss-online.org/en

(Kuwait and Qatar) score high on development and implementation of national IWRM plans (1.1c).

At subregional level, the highest score in the GCC subregion is obtained by Kuwait (84), in the Mashreq by Jordan (68), in the Maghreb by Morocco (68) and in the Southern countries by Yemen (50).

There is significant variation between national and subregional scores for implementing the enabling environment elements, which could provide opportunities for sharing ideas and experiences.

As regards negative findings, many Arab countries appear to be facing serious challenges in implementing some of the enabling environment elements. Excluding the element pertaining to the five federated countries, 10 to 12 countries on average are in the medium-low and low implementation categories for developing and implementing laws, policies and plans. The development of transboundary arrangements seems to be the weakest element in the Arab countries, with five countries in the very low level of IWRM implementation.

4.2 Establishing institutions and engaging stakeholders (survey section 2)

KEY FINDINGS AND **RECOMMENDATIONS**

1. Wide disparities exist between countries in the region and even between countries within the same subregion for establishing institutions and engaging stakeholders for IWRM implementation. For example, in the GCC subregion, Qatar reports a score of 100 and the UAE 90, whereas Oman is at 18. **Subregional and regional cooperation should be fostered to disseminate good practice and share experiences for establishing institutions and increasing participation for IWRM implementation.**

2. More than half of the countries, 58 per cent, report the establishment of national government authorities with the capacity for leading implementation of national IWRM plans (medium-high and above). However, only 37 per cent of the countries have put in place such organizations at basin/aquifer level. No more than 26 per cent of the countries report local public participation in water resources, policy, planning and management with a score above 50. **More emphasis should be directed towards the establishment of institutions with the capacity for leading IWRM implementation, taking into account the lowest management level as suitable to local context as well as towards increasing public participation at the local level.**

3. The average score for gender-specific objectives for water resources management at national level in the Arab region is medium-low (48). It is encouraging that this reported score is slightly higher than the world average at national level (46). However, the extent to which gender objectives are addressed in the Arab region decreases considerably at subnational and transboundary levels, with respective scores of 36 and 25. Several countries including Iraq, Lebanon, Libya, Mauritania, Oman and Somalia report scores of zero for the implementation of gender-specific objectives at subnational and/or transboundary levels. **Advancing gender objectives in water resources management at all levels should be a priority.**

Integrated water resources management implies that water should be managed at a range of levels, from national through to local. At all levels, IWRM implementation requires that appropriate and effective institutions be put in place to ensure all relevant stakeholders are involved in planning and decision-making.

This section focuses on the range and roles of political, social, economic and administrative institutions that help support the IWRM implementation. It includes institutional capacity and effectiveness, cross-sector coordination, stakeholder participation and gender equality. These dimensions include the subnational level (administrative units, river basin catchment and aquifers; state/provincial level for federal countries) and the supranational level (especially transboundary river basins).

The region's overall performance in establishing institutions and engaging stakeholders for IWRM implementation is in the bottom borderline of medium-high, the score of 51 close to the world average (53).

As shown in figure 10, the average implementation of each of the elements ranges from medium-high (capacity of national government authorities to lead implementation of national IWRM plans) to low (gender-specific objectives and plans at transboundary level).

The highest average implementation score (60) is recorded for national institutions. The capacity of ministries or other

Nine countries have at least sufficiently established institutions and engaged stakeholders (on average, medium-high implementation and above)

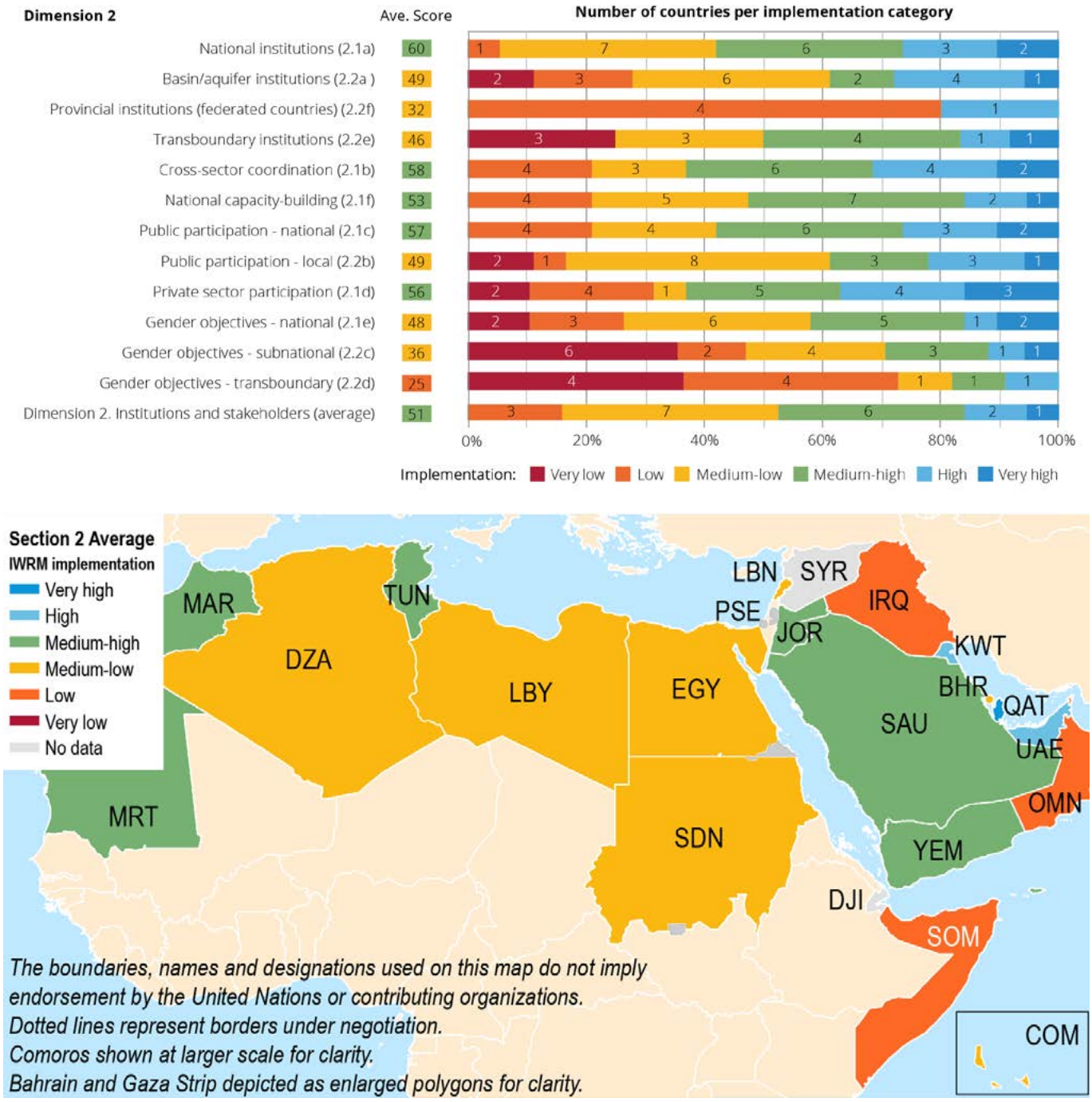


Figure 10 Implementation status, per country, of institutions, stakeholder engagement and gender objectives

institutions with a mandate and funding from government to lead IWRM implementation is key to water resources management. Indeed, institutional development, and building institutional and human capacity in the water sector, are major themes in the ASWS.

National authorities need to have the required institutional, technical and financial capacity. Another important aspect is the ability to manage potential conflicts of interest between different sectors and/or stakeholder groups and to establish coordination mechanisms. It is promising that cross-sector coordination is in medium-high, with a score of 58.

The average score for national capacity building is also in the medium-high level (53), which indicates that long-term capacity development initiatives are being implemented, and geographic and stakeholder coverage is adequate (box 4.4).

Nevertheless, the implementation of institutions decreases from national level (60) to basin/aquifer level (49) and

BOX 4.4

Building capacity for sustainable water management

Capacity development is a key factor for IWRM, and countries that have developed strong programmes are more likely to score highly for implementation. Ten countries (53 per cent) report implementing long-term capacity development initiatives with effective outcomes and geographic and stakeholder coverage that is adequate to excellent (medium-high to very-high). The majority (80 per cent) have an overall score for IWRM implementation higher than the regional average (more than 48).

In the **United Arab Emirates**, responsible ministries and water-related authorities provide annual programmes for capacity-building and development. Also, opportunities to attend workshops, training courses, conferences and graduate studies are provided through the UAE Water Security Strategy 2036 and university programmes on water resources.

In **Algeria**, recognizing the fundamental role of training, the water resources sector has put in place appropriate resources for skill development. A significant portion of the programmes is conducted in eight training institutions. The sector has created and put into operation the High School for Water Resources Management (ESMRE) in Oran, which has an international-standard educational platform. The country hosts the Pan African University Institute of Water and Energy Sciences. This centre for excellence is capacity-building in IWRM at graduate level.

Tunisia has established several research and academic institutes, such as the water research and technologies centre of Borj-Cedria (CERTE), the National Agronomic Institute of Tunisia (INAT) and the Higher Institute of Water Sciences and Techniques of Gabès (ISSTEG). The objective is to develop applied research on water resources, and to equip decision-makers with the necessary tools and knowledge.

Note: the content of this box is drawn from country replies to the questionnaire.

Table 5 Regional and subregional scores in institutions and stakeholder participation

2. Institutions and participation	GCC	Maghreb	Mashreq	Southern	Arab region	World
2.1 National level						
a) National institutions	78	62	50	40	60	58
b) Cross-sectoral coordination	80	54	55	35	58	63
c) Public participation	65	60	48	50	57	62
d) Business participation	67	64	50	38	56	55
e) Gender objectives	68	40	35	40	48	46
f) Capacity development	65	54	58	28	53	50
2.1 Average	71	56	49	38	55	56
2.2 Other levels						
a) Basin/aquifer organizations	68	60	38	23	49	46
b) Public participation	68	48	38	23	49	56
c) Subnational gender objectives	63	30	18	35	36	41
d) Transboundary gender objectives	40	20	20	30	25	32
e) Transboundary organizations	30	70	38	30	46	57
f) Provincial organizations (federal countries)	80	n/a[a]	20	20	32	55
2.2 Average	67	48	30	34	46	49
Dimension 2 average	68	52	40	36	51	53

Note: cell colours indicate implementation categories, as used in figures throughout this report and as elaborated in Table 2.
a n/a = not applicable (no federal countries in Maghreb that reported).

transboundary level (46). A comparable trend can be observed when looking at public participation at national level (57) and at local level (49). This might reflect how water resources management is centralized at national level across most of the region, and countries may wish instead to consider empowering and improving water resources management at all levels if suitable to the national context.

BOX 4.5

Gender mainstreaming in IWRM

Gender mainstreaming, a cross-cutting feature in the 2030 Agenda, is a prerequisite for addressing the challenges related to IWRM over access to safe drinking water, sanitation, and food and energy security, as well as the need for improved governance.[a] By taking account of men's and women's needs, interests and perspectives, ensuring the equity, efficiency and sustainability of water resources management policies and programmes is possible.[b]

Sustainable development can only be achieved when women are not only considered beneficiaries but also take active roles in policies and programmes, and in decision-making and implementation. While myriad social barriers need to be overcome to achieve gender equality in IWRM in the region, there are many examples where a gender approach has been successfully integrated in water sector policies, programmes and project implementation. This has built women's capacity to manage projects, providing them with opportunities to play leadership roles and improve their economic situation.[c,d] As reporting may vary, due to countries looking at the issue from different perspectives, gender mainstreaming of pillars and indicators may need to be unified.

In **Morocco**, significant efforts have been made to mainstream gender in water resources management. A new water law, adopted in November 2015, institutionalized a gender approach in water resources development and management, in particular through the representation of women's associations in the institutions provided by the law.[e] Under the framework of the agreement, signed in December of that year between the Moroccan Government and UN Women, a strategy was developed to mainstream gender in the water sector in Morocco.[f]

In **Egypt**, gender issues are reported to have been integrated into some water management activities at national level and efforts are directed towards raising awareness on gender equality issues to cover different urban and rural areas. Women hold several decision-making positions, including at Integrated Water Management Districts (IWMD) level. At transboundary level, the Nile Basin Initiative (NBI) regards gender mainstreaming as essential to its work. In 2006, the NBI launched a landmark programme, mainstreaming gender and acknowledging women as priority stakeholders. This committed the 10 NBI member countries to prioritizing access to safe and adequate water, sanitation and food for every woman, man and child.

The Water Ambassadors initiative, funded by the German Federal Ministry for Economic Cooperation and Development (BMZ), and implemented by the German Society for International Cooperation (GIZ), was undertaken jointly in **Tunisia** and **Jordan** to enhance an exchange of experiences. Women were targeted as key actors in regulating consumption at household level and teaching sustainable water management to the next generation. The aim was to build the capacity of women in rural areas to raise water awareness, as well as building confidence, networks and communication channels between service providers and rural communities.

In **Yemen**, gender is integrated into operational plans for water resources management at water-basin committee level, although the country reports limited progress due to inadequate funding.

Sources:
a: UN Women, 2018, Turning Promises into Action: Gender Equality in the 2030 Agenda for Sustainable Development (New York, 2018).
b: Cap-Net UNDP and, Gender and Water Alliance, "Why Gender Matters in IWRM: A Tutorial for Water Managers" (2014).
c: GIZ 2011, "Water Wise Women Initiative", Jordan" (2011). Available at www.genderingermandevelopment.net/jordan.html;
d: Doaa Arafa, Lamia El Fattal and Hammou Laamrani, "Gender and water demand management in the Middle East and North Africa", WDM Research Report Series Working Paper no. 3 (Regional Water Demand Initiative for the Middle East and North Africa, 2007). Available at http://www.idrc.ca/EN/Documents/gender-and-wdm- in-mena-region.pdf.
e: Ministère Délégué auprès du ministre de l'Energie, des Mines, de l'Eau et de l'Environnement, chargé de l'eau Royaume du Maroc (n.d.) Projet de loi sur l'eau. Available from http://www.sgg.gov.ma/portals/0/AvantProjet/125/Avp_loi_36.15_Fr.pdf.
f: UN Women, 2017. Maroc : Le Secrétariat d'Etat Chargé de l'Eau et ONU Femmes présentent la stratégie d'institutionnalisation de l'intégration du genre dans le secteur de l'eau. Available at http://maghreb.unwomen.org/fr/actualites-evenements/actualites/2017/06/ieg-eau.

When it comes to gender-specific objectives for water resources management, the average score for at national level is at medium-low (48), slightly higher than the world average (46). Scores decrease at subnational level (36) and drop to the low range (25) at transboundary level. Developing and implementing gender objectives in water resources management at all levels is a main pillar of IWRM. It increases the effectiveness and efficiency of projects, supports water resources conservation and environmental sustainability, and improves gender equality and empowerment.[2] In the region, many sociocultural barriers need to be overcome to achieve gender equality in management but there has been progress, with several examples where the gender approach has been successfully integrated in water sector policies and in implementing programmes and projects (box 4.5).

At the subregional level (table 5), the overall performance in establishing institutions and engaging stakeholders for IWRM implementation is medium-high for the GCC and Maghreb countries, with respective scores of 68 and 52, but medium-low for the Mashreq and the southern Arab countries, with respective scores of 40 and 36.

2 United Nations Educational, Scientific and Cultural Organization, Managing Water Under Uncertainty and Risk: United Nations World Water Development Report 4 (Paris, 2012).

4.3 Applying management instruments (survey section 3)

KEY FINDINGS AND **RECOMMENDATIONS**

1. Arab countries score the same as the global average in developing and implementing IWRM management instruments (51), with five of the nine management instruments elements averaging higher than 50 (medium-high category). **This is encouraging but the region should explore some of the practical aspects of implementing IWRM as a problem-solving, water-management approach. Increased effort is required in all categories, with particular attention given to operational water management instruments for using ecosystem services where applicable, addressing risks of water-related disasters, monitoring aquifers and sharing data on transboundary waters.**

2. The Southern Arab countries are far behind the other subregions in operationalizing and implementing management instruments for water resources management, with an average score of 26 compared with 51 for the region and the world. **Fundamental, targeted country-level efforts should be made to accelerate and strengthen operationalizing IWRM, complemented by greater coordination with countries with good IWRM implementation.**

3. The development and implementation of ecosystems, aquifer and transboundary-related management instruments scores the lowest (43–48) of all nine elements in this dimension. Efforts to improve the management of these resources should be increased. **Countries should invest in effective systems for data and information sharing, both at national and regional level to monitor resource availability, use and quality.**

4. The subregions, with the exception of the southern Arab countries, score between 50 and 68 in developing and implementing IWRM management instruments. The GCC subregion leads this dimension, with five average scores in the high category. **This suggests experience sharing between countries within the framework of regional organizations and the League of Arab States would be beneficial.**

The management instruments dimension refers to the development and use of decision-making support tools – data collection and assessments, and instruments for water allocation – that provide a framework through which to implement management activities. The nine elements are: national water availability monitoring; approaches, techniques and tools for sustainable and efficient water-use management; water pollution control; water-related ecosystems; instruments for managing water-related disasters; basin management instruments; aquifer management instruments; data and information sharing within countries; and transboundary data and information sharing between countries.

BOX 4.6

Examples of effective implementation of management instruments at national level

Tunisia (in the Maghreb) and United Arab Emirates (GCC) have shown promising practices in implementing management instruments, scoring on average at medium-high (58) and high (71) levels, respectively.

Tunisia conducted three strategic studies (Eau 2000, Eau 2030 and Eau 2050) regarding water availability at national level, its nature, uses and quality. The country also established a permanent national commission for elaborating and implementing the national plan to combat and prevent water related disasters. Further, innovative tools developed for water quality monitoring are used by many institutions. The national water company SONEDE and the Ministry of Public Health are responsible for drinking water quality, while the National Agency of Environment Protection monitors quality in rivers and natural wetlands. Tunisia has established a database related to agriculture, which also includes information about drinking water and dams.

The **United Arab Emirates** has established several monitoring systems for its water resources and demand management programmes. In addition to the local and short- to medium-term water resources management strategy, the country also drafted a 2016–2036 strategy for water security. The strategies take account of protection and the development environment as well as fighting desertification. The management instruments are implemented across different ecosystem types and biodiversity on a long-term basis. A national plan (NCEMA) was developed to respond to water-related emergencies.

In 10 countries, water resources management instruments are adequate, with some elements generally being implemented (on average, medium-high implementation and above).

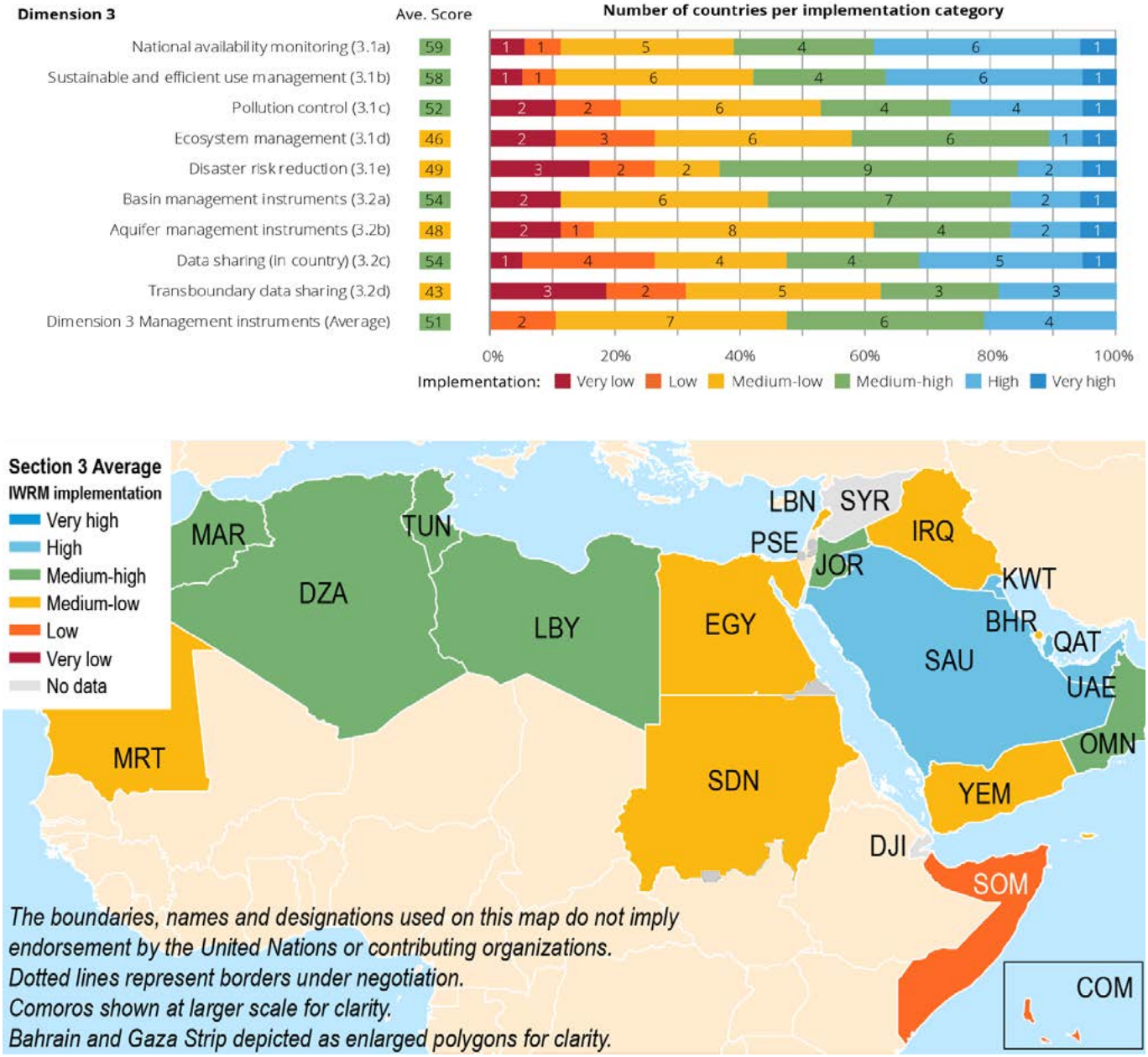


Figure 11 Implementation status, per country, of water resources management instruments

As mentioned previously, the development and implementation of water management instruments in the region scores the same as the world average. Some elements are on a par with the world scores, and five of the nine score better. They are in the medium-high implementation category (52–58), the other four in the upper level of medium-low (42–49). The variation between countries and subregions in implementing management instruments is presented in figure 11.

The average implementation across all management instruments shows that four countries, from the GCC subregion, are in the high category, six are in the medium-high level, seven in the medium-low and two in the low level (Comoros and Somalia).

The highest average scores for water resources management instruments are obtained for national availability monitoring (59) and sustainable and efficient water-use management (58). This is promising, considering the high levels of water stress experienced by many Arab countries, and the regional priorities laid out in the ASWS and its action plan in 2012 and 2014, respectively, as well as at *the 2018 Arab Forum on Sustainable Development* and the High-Level Political Forum. Eleven and 10 countries are at least in medium-high for these two elements, indicating that long-term national monitoring and efficient management are carried out with adequate coverage. Some countries report promising practices that can help increase use by stakeholders (box 4.6).

Table 6 Regional and subregional scores for implementation of management instruments

3. Management instruments	GCC	Maghreb	Mashreq	Southern	Arab region	World
3.1 National level						
a) Water availability monitoring	82	56	68	28	59	58
b) Sustainable water-use management	75	50	60	43	58	52
c) Pollution control	75	52	53	15	52	52
d) Ecosystem management	68	54	28	20	46	46
e) Disaster risk reduction	73	40	60	15	49	53
3.1 Average	74	50	54	24	53	53
3.2 Other levels						
a) Basin management	74	56	55	25	54	49
b) Aquifer management	70	50	48	20	48	42
c) In-country data sharing	68	48	48	48	54	52
d) Transboundary data sharing	42	60	35	25	43	48
3.2 Average	61	54	46	30	49	48
Dimension 3 average	68	52	50	26	51	51

Note: cell colours indicate implementation categories, as used in figures throughout this report and as elaborated in Table 2.

Analysis reveals the GCC subregion reports the highest average implementation of management instruments (68), the medium-high level (table 6). The Maghreb and Mashreq subregions are behind on eight of the nine elements, with average scores of 52 and 50. The southern subregion lags significantly behind, with an average score of 26. These scores conform with the pattern for each HDI group, as do the global implementing elements of IWRM.

The development and implementation of ecosystem, aquifer and transboundary-related management instruments score the lowest of the nine elements (46, 48 and 43, respectively). Globally, they are also the lowest scoring elements in this dimension. Surface-water and groundwater development should be noted for their importance in addressing present and future water challenges, especially where there is high demand from agriculture and other human activities. Most countries in the region have problems monitoring the level and quality of groundwater. Information and data about water-related ecosystems are often missing as they are not given the attention they deserve as excellent providers of quality water. Another problem is the weak level of coordination between countries.

Apart from the Southern countries, the Arab region is doing relatively well on the other management instruments' elements. Most of the countries in the three subregions perform effectively on in-country data and information sharing, with several reporting the establishment of national web-based information management systems on water resources.

It is encouraging that several countries in the region report implementing pollution-management instruments (five in the GCC subregion), on a long-term basis and with very good coverage nationally and across sectors. Four countries report very limited or no implementation of the pollution management instruments, and will have to address this vital element, which affects all water sources and hinders sustainability.

4.4 Financing water resources management and development (survey section 4)

KEY FINDINGS AND **RECOMMENDATIONS**

1. Sixty-eight per cent of countries report insufficient funds disbursed or made available at national level; at subnational level, funding is lacking for 79 per cent. The figures represent a great challenge to successful IWRM implementation in the region. **The majority of Arab countries need to significantly increase financing for water resources development and management, at national and subnational/basin levels.**

2. Although more than half of the total renewable water resources originate from outside the region, with two thirds crossing at least one international border, transboundary financing is reported to have the lowest score (33). Some countries, such as Egypt and Iraq, rely almost exclusively on transboundary water resources, yet their respective scores are in the low (20) and very-low levels (0), respectively. **Arab countries, especially those with high dependency on shared surface water and/or groundwater aquifers should significantly increase financing for transboundary cooperation.**

3. The extent of revenues raised from dedicated levies on water users at basin, aquifer or subnational levels is medium-low (36). At subnational level, 42 per cent of countries report that no revenues are raised. Some report that processes are in place to raise local revenue but are not implemented. Thirty-two per cent report that limited revenues are raised from charges that cover some IWRM activities. Only one country, Kuwait, reports that revenues raised from charges cover most IWRM activities. **Revenue raising for water resources management requires urgent attention in most countries while ensuring affordability and leaving no one behind.**

Effective water resources management requires financing for both initial investments and recurrent costs. The financing dimension of IWRM implementation reflects the extent to which the funding available for water resource development and management are appropriate or sufficient. The ASWS lists as one of its key themes "providing necessary funding for water projects", which focuses on water supply and sanitation and irrigation. Attracting Arab capital for investment in Arab water projects is one objective.

Financing aspects (see figure 12) are captured through questions on: national and subnational budgets for investments in water resources management, including infrastructure (4.1a and 4.2a); national budgets for the recurring costs of IWRM (4.1b) and subnational or basin-level revenue raising for IWRM elements (4.2b); and financing for transboundary cooperation (4.2c).

Only six countries (32 per cent) are satisfactorily implementing IWRM elements of financing water resources management (on average, medium-high implementation and above).

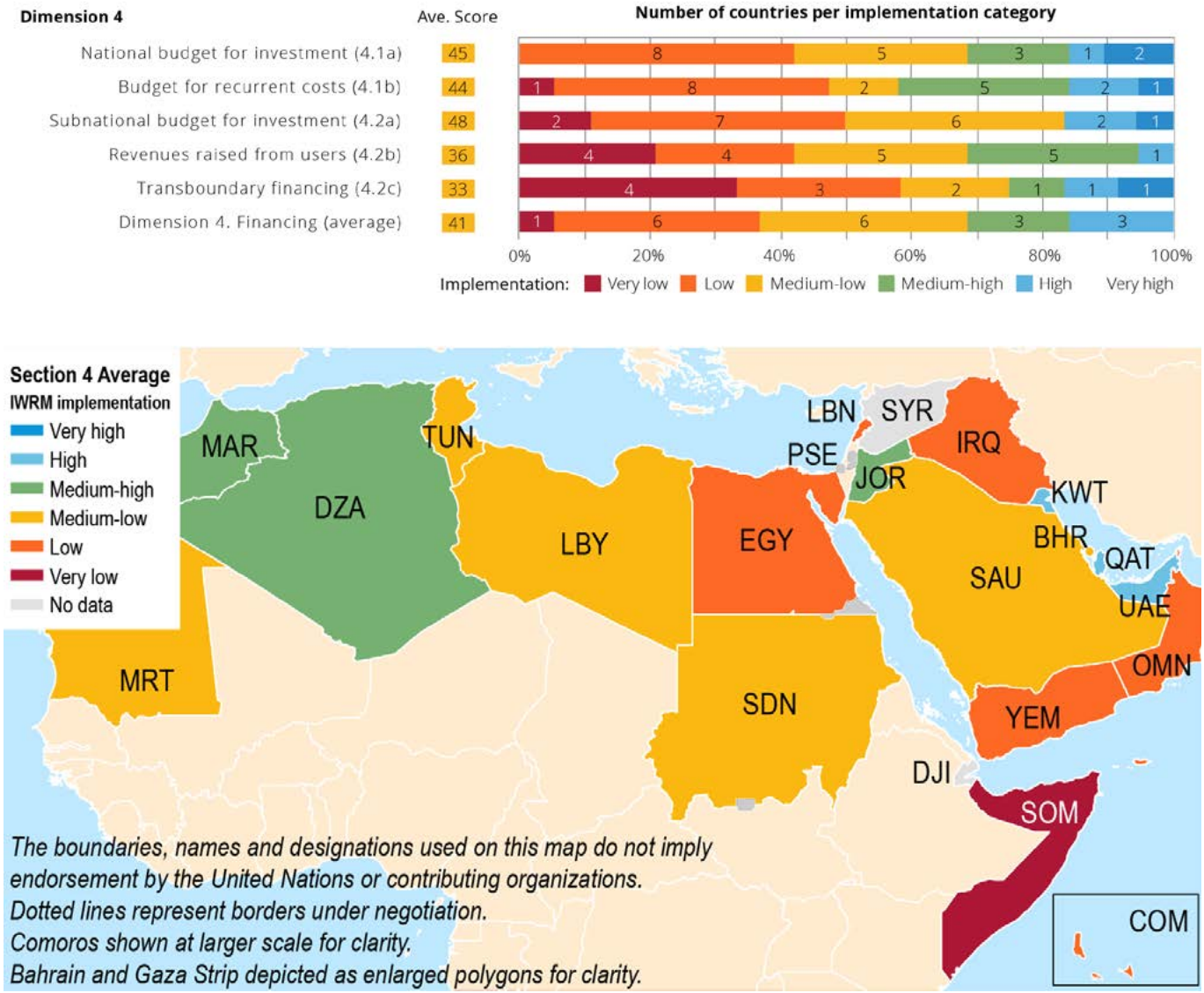


Figure 12 Implementation status, per country, of financing for water resources management

Table 7 Regional and subregional scores for the implementation of financing

4. Financing	GCC	Maghreb	Mashreq	Southern	Arab region	World
4.1 National level						
a) Budget for investment	68	48	30	23	45	42
b) Budget for recurrent costs	72	42	35	15	44	42
4.1 Average	70	45	33	19	45	42
4.2 Other levels						
a) Subnational budget for investment	66	40	23	15	38	35
b) Revenue raising	43	42	28	28	36	40
c) Transboundary financing	10	60	18	30	33	40
4.2 Average	48	47	23	23	37	39
Dimension 4 average	59	46	27	21	41	41

Note: cell colours indicate implementation categories, as used in figures throughout this report and as elaborated in Table 2.

In the Arab region, financing for water resources management has the lowest average score (41) of the four IWRM dimensions. Medium-low, this score is similar to the world average, suggesting this dimension is not given the appropriate attention worldwide despite successful IWRM implementation being tightly linked to the budgeting and financing made available for water resources development and management.

At subregional level, the GCC countries report on average medium-high implementation of financing, Maghreb countries medium-low implementation, and Mashreq and Southern countries low implementation (table 7).

The GCC subregion, on average, mobilizes public finance for water resources management to an extent 18 points higher than the world average, unsurprising given these

BOX 4.7

Financing water resources management in the GCC: extremes and contrasts

The GCC subregion is the regional leader for budgets allocated to IWRM investment at national (68) and subnational levels (66), which are medium-high. These scores are higher than the world averages, which are medium-low for investment budgets at national (42) and subnational (35) levels. Within this subregion, however, countries perform differently in their financing of water resources management.

In **Qatar**, the government has guaranteed a sufficient budget for investments planned for infrastructure implemented within strategies adopted by entities involved in the water sector, including short- and long-term strategies. Limited fees are collected from taxes but they are not used in activities related to sustainable water resources management as the government provides a dedicated budget for these.

Saudi Arabia reports a national budget for investment and establishment of water resources infrastructure, but it is insufficient. At subnational level, provision has been made for many water plans and implementation is under way, but again, these allocations are insufficient. Part of the limited revenue collected from fees cover the costs of some integrated water management activities.

In **Oman**, it is reported that at national level, the budget is insufficient due to the economic impact of decreasing fossil energy prices.

countries generate high income from oil production. Nonetheless, analysis of individual GCC countries reveals two subgroups, each with distinct performances. The first group, including Qatar (85), Kuwait (80) and the United Arab Emirates (80), has a high overall performance for financing. The three countries report that at national and subnational levels, funding is available and all planned projects are under implementation or completed (high to very high). They have also secured national budgets for the recurrent costs of implementing all IWRM elements.

The second group, comprising Bahrain (40), Oman (24) and Saudi Arabia (46), is at medium-low to low levels for overall financing performance. These countries report that at national and subnational levels, sufficient budget is allocated for planned investments but insufficient funds are disbursed or made available (medium-low), or that budget is allocated but only partly covers the planned investments (low). The recurrent costs for the IWRM implementation elements are medium-high for Oman and Saudi Arabia, medium-low for Bahrain.

The reported level of revenue raised to cover IWRM activities in this subregion (43) is higher than the world average (40). It would be of interest to further document the financial levies put in place in the GCC countries (box 4.7).

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5

IMPLEMENTATION OF IWRM TO ADVANCE ACTION ON SELECTED ARAB REGIONAL PRIORITIES

KEY FINDINGS AND **RECOMMENDATIONS**

1. The average implementation scores of groundwater and transboundary water resources are in the medium-low level (44 and 37, respectively) across the four IWRM dimensions, among the lowest among the elements considered in this study. **It is imperative Arab countries draw increased attention to these important water resources.**

2. About two thirds of the available surface-water and groundwater resources are shared between neighbouring Arab countries and across the region's borders. The scores for management of these resources, across the four dimensions, are at the medium-low level. **These need to be governed by clear cooperation arrangements or agreements to ensure sustainable and efficient exploitation.**

3. Groundwater is the second major conventional water resource in the region, contributing more than 30 per cent of total water withdrawals in 11 countries. Aquifers are overexploited due to increasing demand and the declining quality of surface water. Arab countries score on average at medium-low level. **These resources need to be protected and sustainably managed.**

4. The Arab Ministerial Water Council acknowledged the importance of groundwater and included cooperation mechanisms and frameworks for managing shared water resources among the ASWS's six expected outcomes. **Implementing IWRM to these resources needs to be considered as an Arab regional priority.**

5.1 Summary of Arab regional priorities

As outlined in Chapter 1, water is scarce in the region and, as such, constitutes a challenge to sustainable development. Water scarcity and stress is exacerbated by the upsurge in demand due to rapid population increase, climate change, urbanization and industrial development. This chapter focuses on two key regional priorities, namely groundwater (section 5.2) and transboundary water resources (section 5.3). Their integrated management, at national level and through transboundary cooperation, deserves special attention to ensure they continue to support sustainable development and peacekeeping.

Most Arab countries depend on transboundary water resources for their water supply as about two thirds of all fresh water in the region crosses one or more country border.[1] This dependency, from outside and within the region, calls for regional cooperation. The Arab Ministerial Water Council recognizes that many States share surface water and groundwater, in most cases without clear agreements to ensure sound exploitation. Among the six expected outcomes of the ASWS, therefore, the council included the need for cooperation mechanisms and frameworks, and the activation of mutual agreements for managing shared water resources.[2]

Arab countries need to improve cooperation, between neighbouring Arab countries and across the region's borders, by sharing knowledge and experience on transboundary water, improving financing and increasing capacity-building initiatives. The absence of legal agreements to organize transboundary water may lead to conflict between countries. Competition over shared waters, such as the Jordan River, which is shared by Jordan, Israel, Lebanon, State of Palestine and Syrian Arab Republic, adds to regional political tensions related to occupation and legitimate rights. IWRM-based sustainable management and protection of transboundary water resources is necessary to ensure cooperation and stability in the region.

Groundwater is the second major conventional water resource in the region, accounting for more than 50 per cent of total water withdrawals in 10 Arab countries. Some areas in the Arabian Peninsula and the Maghreb rely solely on groundwater. The resource is exploited even in countries rich in surface water due to increasing demand and the declining quality of surface water. Most aquifers are shared across borders, within and outside the region.[3] In addition to their overexploitation, groundwater resources in most Arab countries are threatened by pollution from agriculture, industry and other human activities. It is vital that the region manages water demand and improves efficiency across all sectors, and offers effective alternatives.

The most important groundwater system in the region is the great desert aquifer, the Nubian Sandstone Aquifer System,

1 Arab Ministerial Water Council, Cairo, 2012. Arab Strategy for Water Security in the Arab Region to Meet the Challenges and Future Needs for Sustainable Development 2010-2030, http://www.accwam.org/Files/Arab_Strategy_for_Water_Security_in_the_Arab_Region_to_meet_the_Challenges_and_Future_Needs_for_Sustainable_Development_-_2010-2030.pdf (Accessed on 7 December 2018)

2 Ibid.

3 Food and Agriculture Organization of the United Nations (FAO), 2016. AQUASTAT Main Database, http://www.fao.org/nr/water/aquastat/data/query/index.html (Accessed on 20 December 2018) – Averages calculated by the authors.

in North Africa, which covers 2.6 million km2 across four countries. The Nile is the longest river in the world, flowing 6,700 km through 10 countries. Its basin covers an area of about 3.1 million km2 where about 400 million people live in 10 riparian states. Some of the most important shared river basin systems in the region are:

1. Nile River (Rwanda, Burundi, Democratic Republic of the Congo, United Republic of Tanzania, Kenya, Uganda, Ethiopia, South Sudan, Sudan and Egypt)

2. Jordan River (Jordan, Israel, State of Palestine, Syrian Arab Republic, Lebanon)

3. Tigris-Euphrates Rivers (Iraq, Syrian Arab Republic, Turkey)

Give their importance, groundwater and shared water resources were discussed at the preparatory meeting, jointly organized by the League of Arab States, the Food and Agriculture Organization of the United Nations (FAO) and ESCWA, for the Arab Forum for Sustainable Development and for the High-Level Political Forum. They were listed in the outcome document as part of the four priorities, which include:

1. Strengthening IWRM to cope with water scarcity by placing more emphasis on water demand management and improving surface-water and groundwater governance.

2. Enhancing cooperation on shared water resources.

3. Supporting climate change adaptation and reducing disaster risks, which could be linked to groundwater as a major adaptation resource to climate change in the region.

4. Improving water-related infrastructure to ensure water services for all.

The regional average implementation scores are in the medium-low level for aquifer and transboundary water management, across the four IWRM dimensions. The two elements score lower than the world averages, and are among the lowest of the other elements considered in this report (table 8). It is, therefore, pertinent to address them in this report and draw attention to their management.

5.2 Groundwater management

KEY FINDINGS AND **RECOMMENDATIONS**

1. There is no clear correlation between the degree of dependence on groundwater resources and the implementation of aquifer management instruments. However, most of the Arab countries (15 out of the 18 reporting scores for this element) are at least partially implementing their management instruments. **They need to focus on geographic coverage and stakeholder participation.**

2. Sixteen countries have established instruments for groundwater monitoring, including seven implementing these with very good to excellent coverage and at least adequate ownership and use by stakeholders. **They may share their experience and know-how with other countries.**

3. Ten countries have adequate sectoral systems with acceptable geographical coverage. **The other nations lag behind and need to establish and/or improve their data and information sharing systems.**

4. Only nine countries have institutionalized IWRM financing elements with their implementation under way. **As a result, several countries need to address the financing of groundwater projects and at t times support each other for implementation.**

Groundwater constitutes the second major conventional water resource in the region. Libya (100 per cent) and Djibouti (94 per cent) rely almost entirely on groundwater. Saudi Arabia (78 per cent), Oman (74 per cent), Yemen (71 per cent), Tunisia (63 per cent), Jordan (60 per cent) and Lebanon (55 per cent) draw for more than half on groundwater resources (see figure 13). Even countries with significant surface water are increasingly depending

Table 8 Average implementation scores across the four IWRM dimensions for aquifer and transboundary water management

	1. Enabling environment		2. Institutions and participation		3. Management instruments		4. Financing		Average	World average
	Ques.	Score	Ques.	Score	Ques.	Score	Ques.	Score		
Basin/aquifer	1.2b	44	2.1a	49	3.2b	48	4.2b	36	44	46
Transboundary	1.2c	37	2.2d,e	36	3.2d	43	4.2c	33	37	47

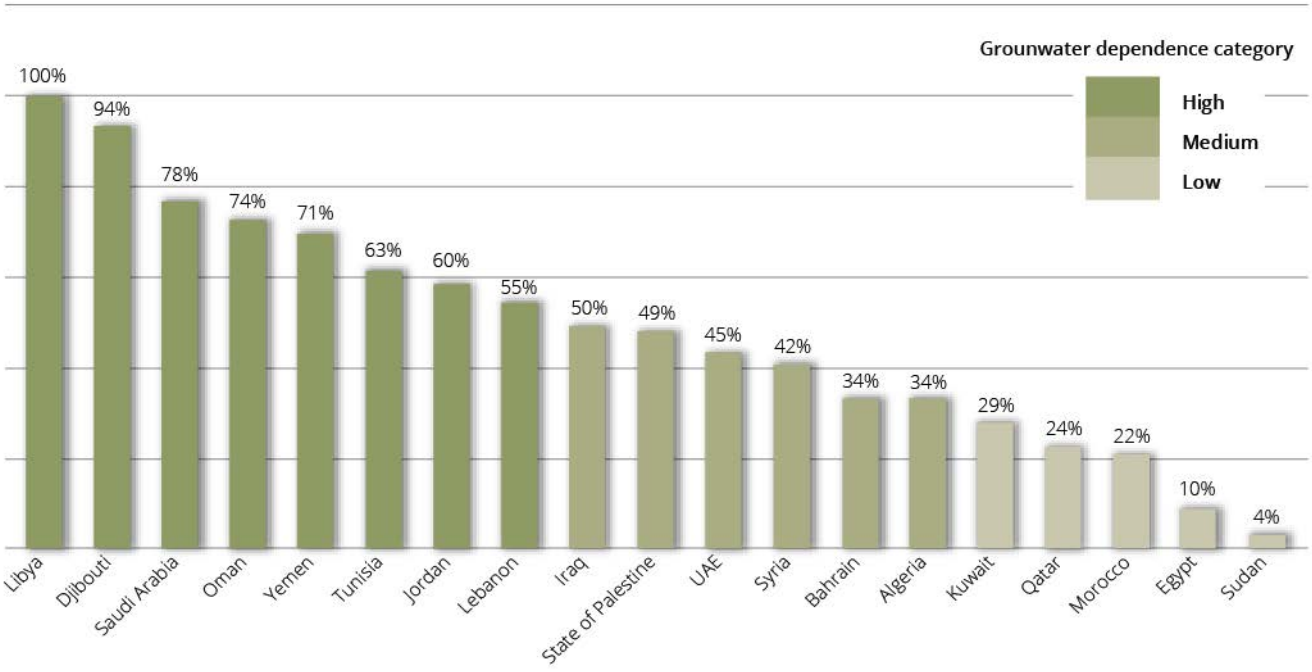

Figure 13 Ratios of groundwater withdrawals as percentage of total withdrawals (surface water, groundwater, desalinated water, treated wastewater and agricultural drainage water) in Arab countries

Source: Food and Agriculture Organization of the United Nations, AQUASTAT, main database. Available at http://www.fao.org/nr/water/aquastat/main/index.stm (accessed on 5 December 2018).
Note: Data not available for Comoros, Mauritania and Somalia.

on groundwater to meet the growing needs of agriculture, domestic use and industry. As demand for water resources increases in the region, the interlinkages between water security, energy security and food security are intensifying.[4] Countries may intuitively be divided into three groundwater dependence categories (groundwater withdrawals as a percentage of total withdrawals): high (>50 per cent); medium (30–50 per cent); and low (<30 per cent).

Several studies have been devoted to the major groundwater systems in the region.[5,6,7] It is worth noting that almost all of these groundwater systems are transboundary, hence the link between this regional priority (in this section 5.2), and the transboundary regional priority (in section 5.3).

While there is insufficient numerical data for Comoros, Mauritania and Somalia, the three countries are endowed with groundwater resources at different levels.

Comoros, which is composed of three islands, has small watersheds and aquifers with limited natural storage. The coastal towns of the main island, Grand Comore, depend mainly on groundwater resources, while the rural areas rely solely on rainwater harvesting. Groundwater resources are absent in the other two islands, Anjouan and Moheli, which rely completely on seasonally variable streams.[8]

In Mauritania, the significant groundwater resources are characterized by large geographical disparities. The main aquifers are located in the coastal sedimentary basin (Trarza Bennichab and Boulenoir) and in the southern part of the Taoudenni basin (water Dhar). The surface-water resources essentially consist of the Senegal River, which forms the border between Mauritania and Senegal.[9]

The main groundwater sources of Somalia are boreholes, shallow wells and springs. Apart from the inhabitants of

4 Guy Jobbins and others, "To what end? Drip irrigation and the water–energy–food nexus in Morocco", *International Journal of Water Resources Development*, vol. 31, issue 3 (2015).

5 UNDP, Regional Bureau for Arab States, 2013. *Water Governance in the Arab Region:* Managing scarcity and securing the future.

6 United Nations Economic and Social Commission for Western Asia (UN-ESCWA), Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), 2013. Inventory of Shared Water Resources in Western Asia, https://waterinventory.org/sites/waterinventory.org/files/00-inventory-of-shared-water-resources-in-western-asia-web.pdf (Accessed on 22 December 2018).

7 Ksia C., 2010. International Shared Aquifers in the Arab Region, *International Conference on Transboundary Aquifers: Challenges and New Directions, ISARM2010.*

8 United Nations Development Programme. Adapting water resource management in Comoros to increase capacity to cope with climate change", UNDP Comoros Project Document (August 2010). Available at https://adaptation-undp.org/projects/ldcf_comoros (accessed on 22 December 2018).

9 Centre for Environment and Development for the Arab Region and Europe, 2014. Mauritania water sector M&E rapid assessment report", Monitoring and Evaluation for Water In North Africa (MEWINA) Project.

the Juba and Shabelle river basins, the Somali population depends on groundwater for domestic water supply, livestock and small-scale irrigation.[10]

5.2.1 Summary of country findings from SDG 6.5.1

One question (3.2b, aquifer management instruments) was specifically dedicated to aquifers, and it is discussed in this section. Other questions lump surface-water basins and aquifers together: 1.2b, plans; 2.2a, institutions; 4.2a, budgets; and 4.2b revenue raising (sections 5.2.2–5.2.4). However, these questions would likely relate to groundwater management arrangements for most countries, given the high reliance on groundwater.

The implementation of aquifer management instruments (3.2b) is effective with at least an adequate coverage in seven countries (medium-high implementation and above, figure 14). Eight countries have long-term programmes with limited coverage (medium-low implementation). Mauritania is implementing some short-term projects on an ad hoc basis and uses management tools at the coastal sedimentary basin level (low implementation). Comoros and Somalia have not yet implemented IWRM instruments for their aquifer management (both very low implementation). Comoros reports that its aquifers are not protected.

Seven countries are implementing effective aquifer management instruments with at least an adequate coverage (medium-high implementation and above).

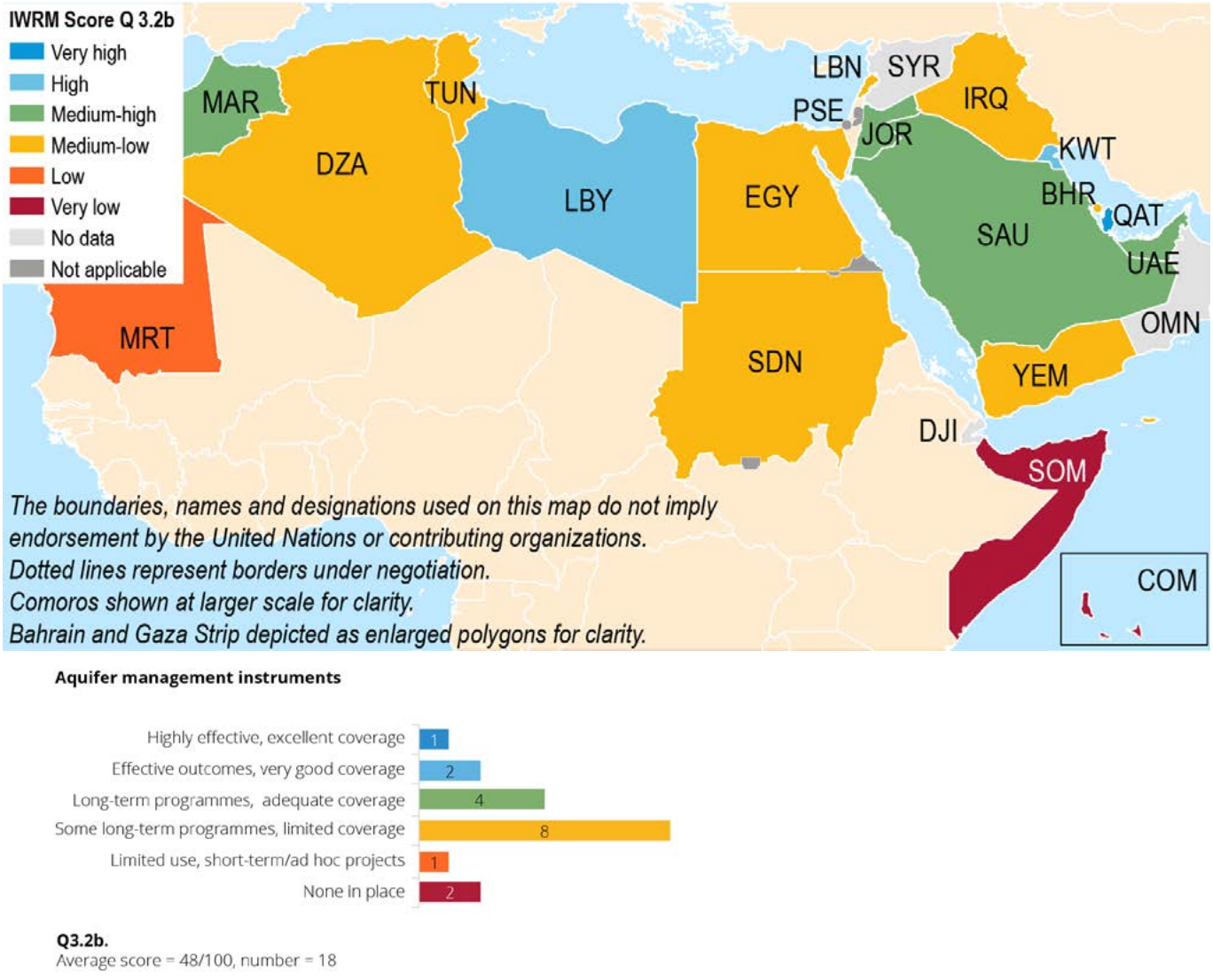

Figure 14 Country implementation of aquifer management instruments (Q3.2b)

10 Food and Agriculture Organization of the United Nations and Somalia Water and Land Information Management, "Water resources". Available at http://www.faoswalim.org/water-resources (accessed on 22 December 2018).

Although Oman did not report a score for aquifer management instruments, it reports monitoring the water balance in its aquifers. In addition, the country performs hydrogeological studies and mathematical modelling of the most important aquifers, with information gathered in databases. Thus, it appears that the omission may have been an oversight.

Of the countries relying on groundwater resources for more than 50 per cent of total withdrawals (figure 13), Libya reports high implementation (80), Jordan and Saudi Arabia medium-high implementation (70). These three countries are implementing aquifer-level management instruments, with adequate geographic and stakeholder coverage (box 5.1). A further three countries (Lebanon, Tunisia and Yemen) score in the medium-low level (40–50), which means implementation is taking place but with limited geographic coverage and stakeholder participation (figure 14). Yemen reports that annual implementation plans have been suspended since 2011 due to the Yemeni crisis and cessation of government and international funding. Oman did not score this element.

With the exception of Oman (no score), Somalia and Comoros (very low score), and Mauritania (low score), the remaining countries score at least at the medium-low level, with Qatar (24 per cent dependency) and Kuwait (29 per cent dependency) scoring at high and medium-high levels, respectively. It may be concluded that there is no clear correlation between dependence on groundwater resources and the implementation level of aquifer management instruments, and therefore, there is no need to break results down into these three groundwater dependency categories.

Considering all reporting countries, the 11 that score at or below the medium-low implementation level, which corresponds at best to limited geographic and stakeholder coverage of aquifer management instruments, need to address this issue themselves or through regional/international support. Countries highly dependent on groundwater resources, such as Iraq, Lebanon, Tunisia and Yemen, must give this issue particular consideration.

Lack of data on groundwater resources dependence for Comoros, Mauritania and Somalia may be directly linked to their low or very low implementation of aquifer management instruments. These countries likely need to give high priority to groundwater management.

Regarding the questions that lump surface-water basins and aquifers together (as discussed in sections 5.2.2 to 5.2.4), it is clear that, apart from Libya and Tunisia, there is observable correlation between the IWRM implementation level on aquifers alone and basins/aquifers together. Six countries (Jordan, Kuwait, Morocco, Qatar, Saudi Arabia and United Arab Emirates) have scored at least at the medium-high level for both elements (aquifers, and basins/aquifers). These countries are implementing basin and groundwater-level instruments on a long-term basis but need to improve geographic coverage and stakeholder participation.

Of the countries, 61 per cent have at least approved basin/aquifer management plans based on IWRM.

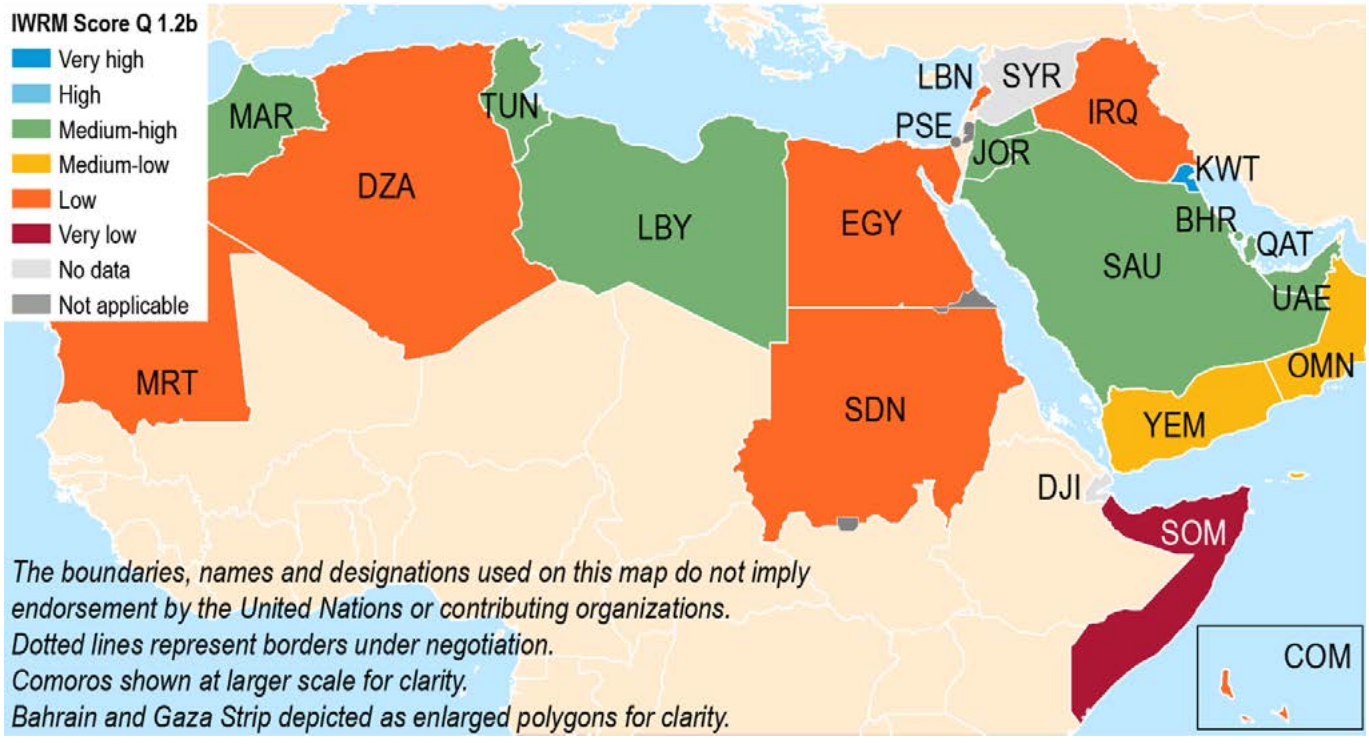

Figure 15 Country implementation of management plans for most important aquifers/basins

5.2.2 Management arrangements and organizational frameworks (Q1.2b, Q2.2a, Q3.2b)

Sustainable and efficient basins/aquifer water use management at national level is a key to successful socioeconomic development. Country implementation of IWRM-based basin/aquifer management plans (1.2b) for the most important aquifers/basins is displayed in figure 15.

Kuwait is doing well (very high implementation) on this element and reports that its groundwater resources are monitored and its wells observed using online cameras. Eight other countries are implementing plans using the IWRM approach (medium-high). Oman and Yemen have only approved plans and seven countries are in the process of preparing plans (low level). Somalia, which scored zero for this element, reports having a plan to establish a river basin authority, the Juba-Shabelle basin authority. Some countries report conducting studies and applying mathematical modelling and technology for the planning and monitoring of basins and aquifers.

Regarding organizational frameworks leading IWRM implementation for basins and aquifers (2.2a), seven countries have the capacity to lead revision, evaluation and implementation of plans (medium-high and above). Six countries are able to formulate plans (medium-low), though Comoros, Oman and Sudan have plans based on water resources management only (low). Iraq and Somalia report no basin/aquifer-level organizations for leading IWRM implementation plans. Bahrain reported that this element is not applicable to the country but mentioned one basin without subnational division, which is equivalent to national level. The country status of authorities for the most important aquifers/basins in the region is given in figure 16.

For implementation of aquifer management instruments (3.2b), see section 5.2.1.

Seven countries using predominantly groundwater have the capacity to lead revision, evaluation and implementation of IWRM plans.

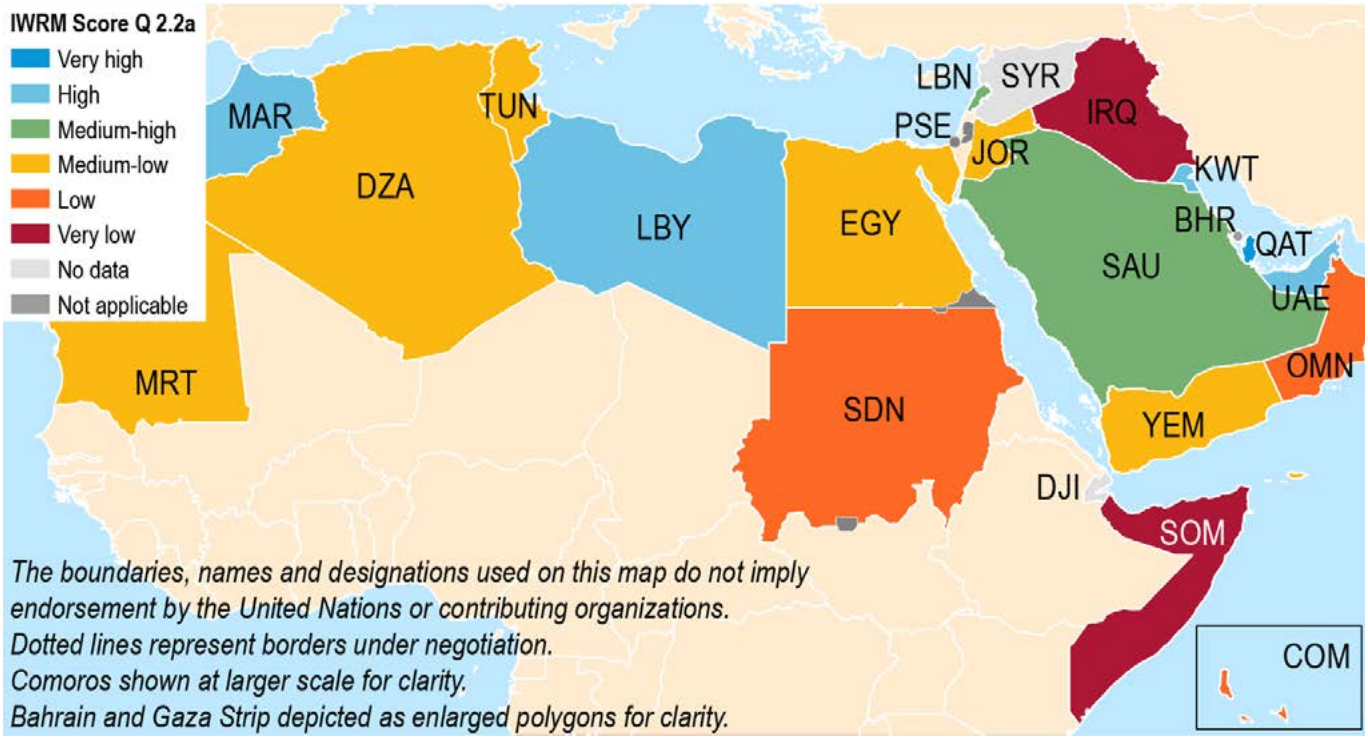

Figure 16 Country status of authorities for most important aquifers/basins

5.2.3 Monitoring and data sharing at national level (Q3.1a, Q3.2c)

Regarding national water availability monitoring (3.1a), seven countries deploy monitoring instruments with very good to excellent coverage, and at least adequate ownership and use by stakeholders (figure 17). Four countries have adequate monitoring instruments but their use by stakeholders is limited. Five countries have established instruments to monitor water availability but these are not widely used by stakeholders and their coverage is limited. Comoros and Somalia seem to have problems with implementing water resources monitoring tools, which remain on a short-term and ad hoc basis or are not in place. In addition to water availability monitoring, some countries report monitoring water withdrawal from aquifers and its quality.

As for data sharing at national level (3.2c) (see figure 18), Somalia, which scores low to very low on most elements, reports solid data and information systems accessible online and free to all stakeholders. Four of the six GCC countries (Kuwait, Oman, Saudi Arabia and United Arab Emirates) and Libya have established systems with very good coverage. Adequate sectoral systems with acceptable geographical coverage are used in Jordan, Lebanon, Qatar and Yemen. The three neighbouring Maghreb countries (Algeria, Morocco and Tunisia) and Egypt lag behind, with arrangements only between major water users. Comoros does not have any data and information sharing system, while the remaining Arab countries (Bahrain, Iraq, Mauritania and Sudan) are implementing limited ad hoc systems. In the era of information technology, Arab countries need to establish online data and information sharing systems at national level, a key component for a successful participatory approach.

Of the countries, 61 per cent have at least established water availability monitoring instruments with adequate national coverage (medium-high and above).

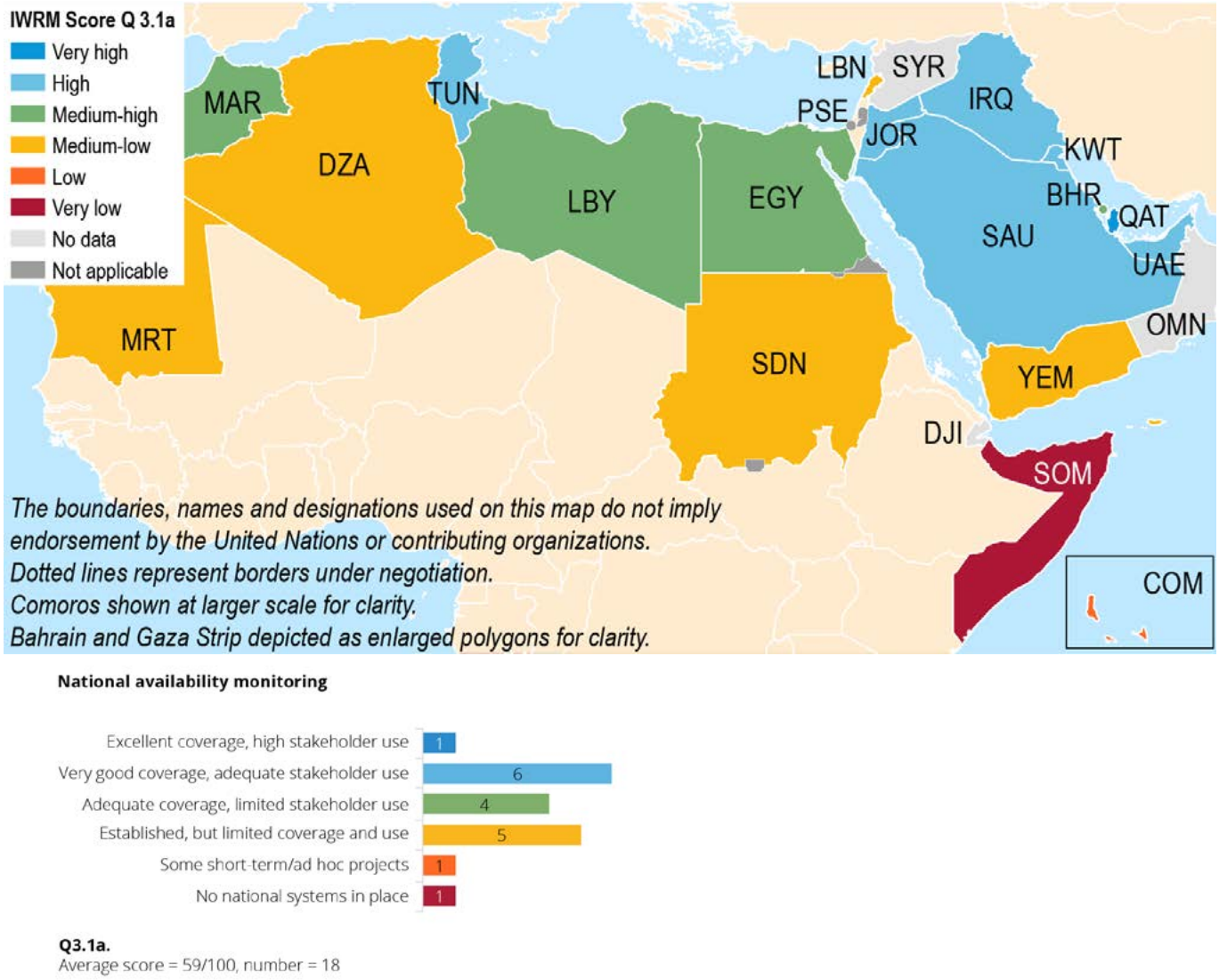

Figure 17 Country implementation of national water availability monitoring systems

Only six countries have established data and information sharing system with at least very good coverage (high and very high implementation).

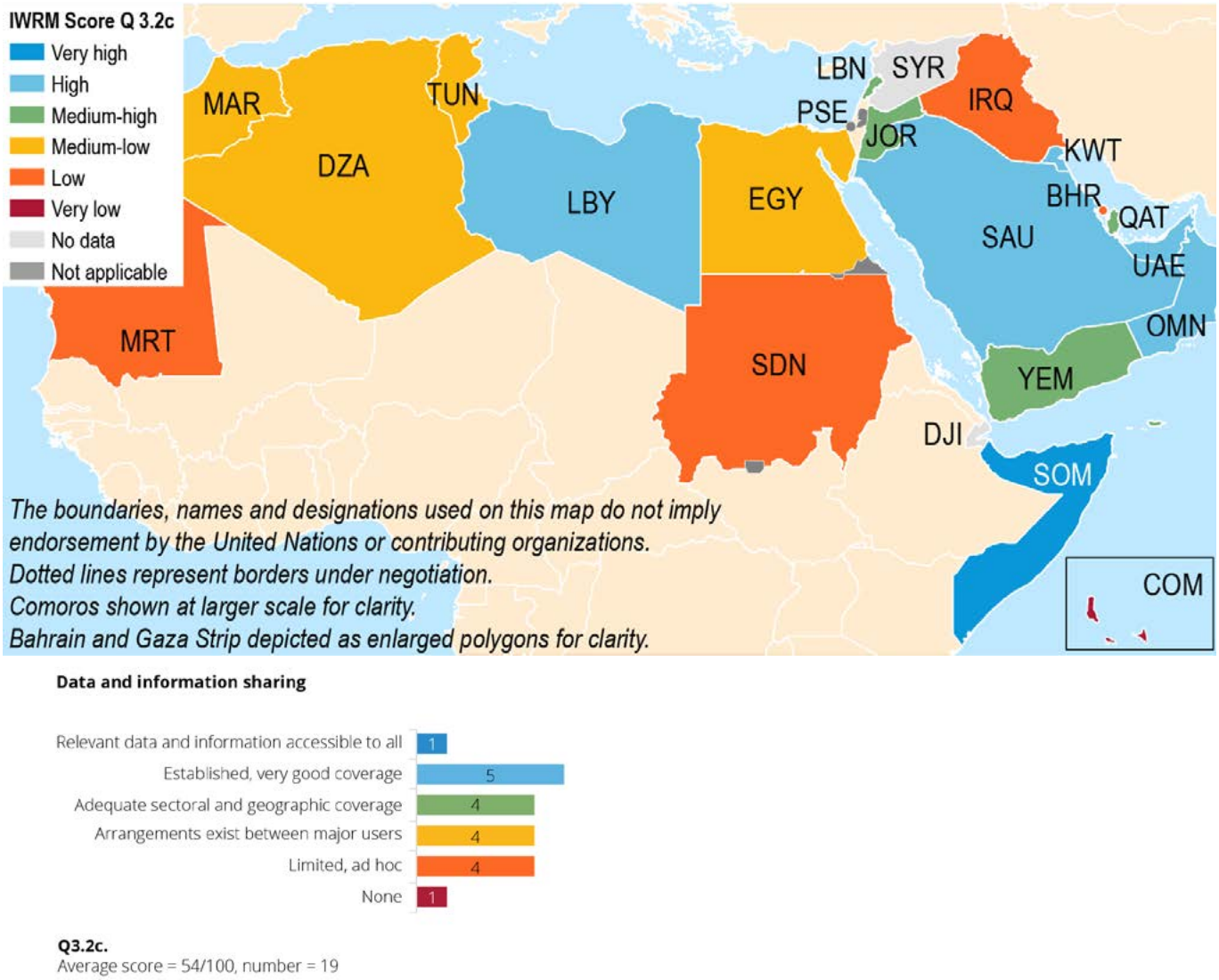

Figure 18 Country implementation of data and information sharing within countries at all levels

5.2.4 Finance

Apart from the financing for transboundary cooperation (4.2.c), the four other elements of financing IWRM implementation (budget for investment, 4.1a, budget for recurrent costs, 4.1b, subnational budget for investment, 4.2a, and revenue raising, 4.2b) relate, to some degree, to groundwater resources financing. The average indicates that Kuwait, Qatar and United Arab Emirates, three high-income and very high HDI countries, have adequate budgeting and financing for water resources development and management from various sources (high implementation). Four countries with medium to very high HDI rankings (Algeria, Jordan, Morocco, Saudi Arabia) have adequate financing for IWRM implementation with long-term programmes (medium-high implementation). Tunisia (high HDI) and Bahrain (very high HDI) have institutionalized IWRM financing elements, with implementation under way (medium-low implementation). Eight countries (high to low HDI) have just begun implementing IWRM financing elements but with limited scope and low engagement of stakeholders (low implementation). In Somalia, IWRM budgeting and financing has not begun or has stalled (figure 19).

5.2.5 Subregional analysis

Regarding the implementation of aquifer management instruments (3.2b), the average scores for the different subregions are given in table 9.

The average scores relate closely to the HDI index, especially for the two extremes, the GCC and Southern subregions. The GCC countries score in the upper range of medium-high level, followed by the Maghreb and Mashreq subregions, which

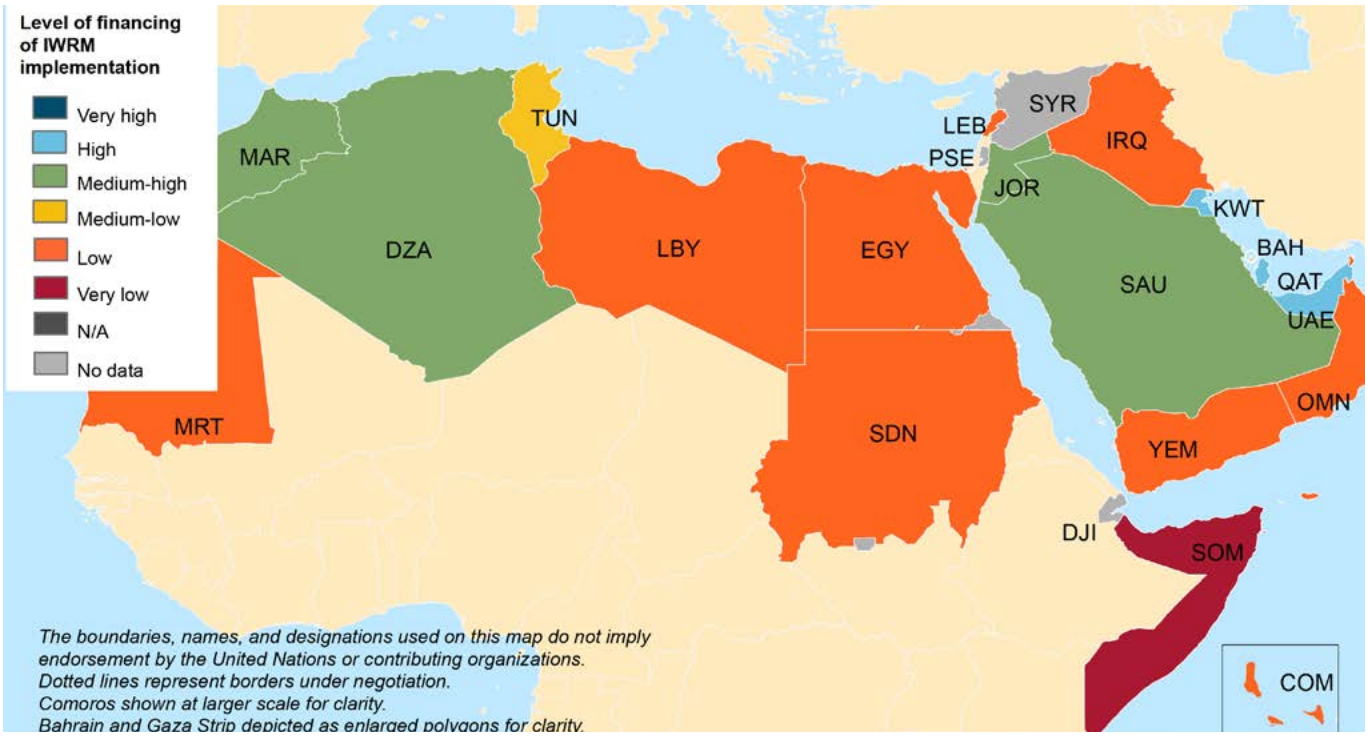

Figure 19 Level of financing of IWRM implementation, apart from transboundary cooperation

score in the medium-low level. The Southern subregion lags behind with a score in the low level.

The analyses for this element within each subregion reveal that while some countries are deploying aquifer IWRM instruments throughout their respective countries with good stakeholder engagement (Qatar, Kuwait, Libya), others may have established institutions to deal with this important issue but are struggling with implementation. Comoros and Somalia (Southern) may have not even started to develop IWRM elements for the management of their aquifers.

As for the other questions that lump surface-water basins and aquifers together (1.2.b, 2.2.a, 4.2.a, 4.2.b), the analysis of the results does not reveal enough information to draw sound conclusions (table 10). The ranking stays the same as for IWRM groundwater management but the findings relate closely to the HDI index only for the GCC and Southern subregions.

The analysis of the level of implementation of basin/aquifer management by countries in each of the four subregions indicates that the Maghreb countries are performing at medium-low and medium-high levels. The countries of the other subregions are spread across three or four levels of implementation. Kuwait and Qatar (GCC) are deploying aquifer IWRM instruments nationally with good stakeholder engagement, while Iraq (Mashreq) and Somalia (Southern) may not have started to develop IWRM elements for managing their aquifers.

Table 9 Average scores for aquifer management instruments in the Arab subregions (lowest and highest values in parentheses)

Subregion	GCC	Maghreb	Mashreq	Southern
Average score (Q3.2b)	70 (40–100)	50 (20-80)	48 (40-70)	20 (0-40)
Average HDI	0.83	0.67	0.71	0.49

Table 10 Scores of Arab subregions for IWRM implementation at the basin/aquifer level

Subregion	GCC	Maghreb	Mashreq	Southern
Average score	58 (20–85)	47 (40–63)	30 (10–58)	23 (3–33)
Average HDI	0.83	0.67	0.71	0.49

BOX 5.1

An example of effective groundwater resources management

Jordan has 12 major aquifers[a] and water demand is met mostly from groundwater (60 per cent). The country scores at the medium-high level (70) for aquifer management instruments. It has been implementing public policies and regulations on groundwater with three main objectives: to increase groundwater availability, control the number and the expansion of wells, and reduce abstraction by existing wells.[b] Well registration has been mandatory since 1961, and in 2002 a groundwater by-law was established for well drilling and use. It led to a rise in the number of illegal wells being backfilled, from 26 in 2007, to 177 in 2017. The government has taken action against illegal well owners and water bill non-payers, accompanied by activities to increase awareness using media and involving educational institutions, civil society and religious leaders. Results are encouraging. Official data show a fall in abstraction for irrigation, which has levelled off in the last few years. In addition, Jordan is engaged in non-conventional water resources, with treated wastewater constituting 14 per cent of water use.[c]

Source: **a**: Jordan, Ministry of Water and Irrigation. "Jordan water sector: facts and figures (Amman, 2017). Available at, http://www.mwi.gov.jo/sites/en-us/default.aspx (accessed on 9 December 2018).
b: François Molle and others, "Groundwater governance in Jordan: the case of Azraq Basin", Policy White Paper, International Water Management Institute (April 2017). Available at, http://publications.iwmi.org/pdf/H048395.pdf (accessed on 9 December 2018).
c: Jordan, Ministry of Water and Irrigation, "Jordan water sector – facts and figures". Available at http://www.mwi.gov.jo/sites/en-us/default.aspx (accessed on 9 December 2018).

5.3 Cooperation on shared water resources

KEY FINDINGS AND **RECOMMENDATIONS**

1. Several Arab countries have established cooperation agreements or treaties with riparian countries for transboundary water resources management. Few, however, are successfully implemented. In addition to the good will of riparian countries and the support of the international community, **increased cooperation over shared water resources is needed for more sustainable and peaceful outcomes for the region.**

2. Four countries do not have any agreement with neighbouring countries and three have signed arrangements but have not yet contributed to project implementation. Only five countries report meeting all or part of the expected financial contributions for transboundary cooperation arrangements. **Most countries need to address the financing of transboundary water, which will help IWRM project implementation.**

3. Transboundary data and information sharing arrangements exist in 11 countries but only three are implementing effective tools. **Developing and implementing tools is vital to better monitor and manage transboundary water resources in the region.**

4. Gender-specific objectives and plans at transboundary level have the lowest average score (25) and the lowest number of reporting countries (11 out of 19). Only two report having at least partially funded and achieved these gender objectives. **Most countries need to include gender in their IWRM objectives and plans, and address this component of water resources management at all levels, including transboundary level.**

5. The Maghreb subregion reports the highest levels of implementation across all transboundary elements of IWRM, apart from gender-specific objectives (medium-high). The three other subregions score almost at the same level for all the elements (medium-low to low). **Transboundary cooperation initiatives need to be increased in the region, including experience sharing between higher-performing countries and those requiring improvement.**

As noted, better cooperation agreements have been established with some riparian neighbours. Two examples are the Aquifer System of the Northern Sahara and the Nubian Sandstone Aquifer System (see box 5.2). Additionally, Jordan and Saudi Arabia signed an agreement in 2015 on the Al-Disi/Saq-Ram Aquifer, establishing a joint

technical committee to oversee its implementation.[11] The Nile River has frequently been the subject of discussion and political interaction between transboundary countries.

Despite cooperation being hinted at, there are no arrangements at several major river basins, such as the Tigris-Euphrates River Basin (shared between Iraq, Syrian Aran Republic and Turkey) and the Jordan River Basin (shared between Israel, Jordan, State of Palestine, Lebanon and Syrian Aran Republic). Jordan, however, reports that a bilateral arrangement with Israel is operational and recognizes the role of the joint water committee in implementing the arrangement.[12]

5.3.1 Global and regional frameworks for cooperation over shared water resources

The Convention on the Law of the Non-Navigational Uses of International Watercourses (United Nations Watercourses Convention), adopted by the General Assembly in 1997, could serve as the basis for transboundary water governance. Entering into force in 2014, it currently includes 36 parties. Turkey, as a major upstream riparian country of the Arab region for the Euphrates/Tigris rivers, voted against the convention.[13]

The Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) was adopted in 1992, amended in 2013 and opened to all United Nations Member States in 2016. None of the Arab countries has signed or adopted the convention,[14] though some, such as Jordan, Iraq, Lebanon and Tunisia, have shown interest and are considering ratifying it.

To improve the legal framework for managing transboundary groundwater resources, in 2008 the United Nations International Law Commission (ILC) adopted the draft articles on the Law of Transboundary Aquifers. This set of 19 articles, which complements the United Nations Watercourses Convention, provides a frame of reference for the legal grounding for cooperation in aquifer-specific agreements.

BOX 5.2

The Nubian Sandstone Aquifer System (NSAS)

The Arab region scores on the medium-low level (43) for the transboundary data sharing element, the lowest of the management instruments' nine elements. It is also lower than the world average (48). Libya scores on the high level (80) for this element. One of the most water-stressed countries in the world, it is also endowed with vast quantities of groundwater that are mostly shared non-renewable sources. The Nubian Sandstone Aquifer System (NSAS) is shared with three other African countries, Chad, Egypt and Sudan. Libya has been extracting underground water from its basin reserves, including NSAS, to serve its coastal cities and agriculture. Demand for water is increasing in the four countries and could become an impetus for further unrest.

Egypt and Libya started the initial arrangements for managing this vital water resource in the early 1970s but the first step in official cooperation among neighbouring countries was the Joint Authority for the Study and Development of NSAS, established by the two countries in 1992. They were subsequently joined by Sudan in the same year, and Chad in 1999.[c] Two documents providing a framework for the cooperation process between the NSAS countries were published in 2000. These agreements consisted of terms of reference for the monitoring and exchange of groundwater information, and monitoring and data sharing. In 2013, the Regional Action Programme for the Integrated NSAS Management laid the ground for a regional Strategic Action Plan, which was signed by the NSAS countries and the Joint Authority.[b,c] In 2015, Chad, Egypt and Sudan declared their intent to reinforce cooperation for managing the aquifer at the 7th World Water Forum in Korea. It is hoped Libya will regain full stability and contribute to these efforts.

Source: **a**: International Atomic Energy Agency Technical Cooperation Programme and UNDP Global Environmental Finance, "Regional Strategic Action Programme for the Nubian Aquifer System".
b: International Atomic Energy Agency Technical Cooperation Programme and UNDP Global Environmental Finance. Regional Strategic Action Programme for the Nubian Aquifer System" (2013). Available at https://www.iaea.org/sites/default/files/sap180913.pdf (accessed on 15 December 2018).
c: Geert-Jan Nijsten and others. Transboundary aquifers of Africa: review of the current state of knowledge and progress towards sustainable development and management", Journal of Hydrology: Regional Studies, vol. 20 (2018).

11 International Water Law Project, "Agreement between the Government of the Hashemite Kingdom of Jordan and the Government of the Kingdom of Saudi Arabia for the management and utilization of the ground waters in the Al-Sag/Al-Disi layer" (unofficial English translation), (Riyadh, April 2015). Available at https://internationalwaterlaw.org/documents/regionaldocs/Disi_Aquifer_Agreement-English2015.pdf (accessed 4 December 2018).

12 Treaty of Peace between the State of Israel and the Hashemite Kingdom of Jordan. 26 October 1994. Available at https://peacemaker.un.org/sites/peacemaker.un.org/files/IL%20JO_941026_PeaceTreatyIsraelJordan.pdf (accessed 4 December 2018).

13 United Nations General Assembly (1997). Convention on the Law of the Non-Navigational Uses of International Watercourses (A/Res/51/229) (8 July).

14 Economic Commission for Europe (UNECE) (2013). Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992) (ECE/Mp.WAT/41). Geneva: United Nations. Available at http://www.unece.org/fileadmin/DAM/env/document/2013/wat/ECE_MP.WAT_41.pdf.

It acknowledges the complementary relationship between universal and regional or aquifer-specific legal instruments.[15]

Under the Arab Ministerial Water Council (AMWC), established in 2008 by the League of Arab States, a set of guidance principles is being developed for shared water cooperation in response to a 2016 resolution.

In that respect, ESCWA, working with the AMWC Technical Secretariat, organized an Expert Group Meeting on Improving Shared Water Resources Cooperation within the Framework of Global and Regional Agreements in December 2018. Aimed at strengthening the capacity of ESCWA member countries to improve transboundary cooperation on shared water resources to support implementing the 2030 Agenda for Sustainable Development, the meeting also discussed the draft guidance principles for shared water cooperation as mandated by the AMWC.

5.3.2 Summary of country findings from SDG 6.5.1

Transboundary cooperation is represented by five elements in the SDG 6.5.1 questionnaire:

- Arrangements (1.2c): such as treaties, conventions, agreements or memorandums of understanding.
- Gender (2.2d): inclusion of gender objectives in transboundary cooperation and achievement of these objectives.
- Organizational frameworks (2.2e): such as joint bodies, joint mechanisms or commissions.
- Data and information sharing (3.2d): institutional and technical mechanisms established.
- Financing (4.2c): national contributions to support transboundary cooperation arrangements.
- It is worth noting that countries may not address the questions or results may be over-optimistic when interpreting the findings for transboundary cooperation, given that:
  - Countries were asked to report on "only the most important transboundary basins or aquifers that are regarded as significant, in terms of economic, social or environmental value to the country (or neighbouring countries)", and may have omitted some basins/aquifers.
  - Only the majority of these basins/aquifers had to meet the criteria described in each threshold to achieve the score for that threshold.

Comoros, Morocco and Yemen reported that the five elements dedicated to transboundary water management were not applicable to them. Oman and Somalia reported zero as a score for all elements, and Iraq the same value for four. Some of these countries may not have agreements with neighbouring countries, such as Iraq.

In addition, the transboundary elements of IWRM implementation have a much smaller sample size, with 31 per cent of country scores (29 out of 95) reported as "not applicable". Some elements have a small number of scores for the 16 countries that responded to transboundary questions.

Analysis of the five elements devoted to transboundary IWRM, across the four main dimensions of implementation, indicates that on average the 16 countries are performing at a medium-low level (see table 11). The region is below the world average, especially on international arrangements and organizational frameworks, with a points difference of 19 and 11.

The region may be considered as being in the early stages of IWRM implementation of transboundary water resources. It is in the process of setting up organizational frameworks, initiating arrangements and establishing systems for data and information sharing, and funding less than 50 per cent of agreed contributions. Gender-specific objectives and plans are not given sufficient consideration, and are rudimentary, with low coverage and engagement of stakeholders.

Table 11 Average scores of the 16 countries for the five transboundary water management elements

	Organizations	Arrangements	Financing	Data sharing	Gender	Average
Arab region	46	37	33	43	25	38
World	57	56	40	48	32	47
Difference	11	19	7	5	7	9

15 United Nations, International Law Commission, Draft articles on the Law of Transboundary Aquifers, with commentaries, 2008. Available at http://legal.un.org/ilc/texts/instruments/english/commentaries/8_5_2008.pdf (accessed 24 December 2018).

Gender-specific objectives and plans are not given enough consideration in the Arab region.

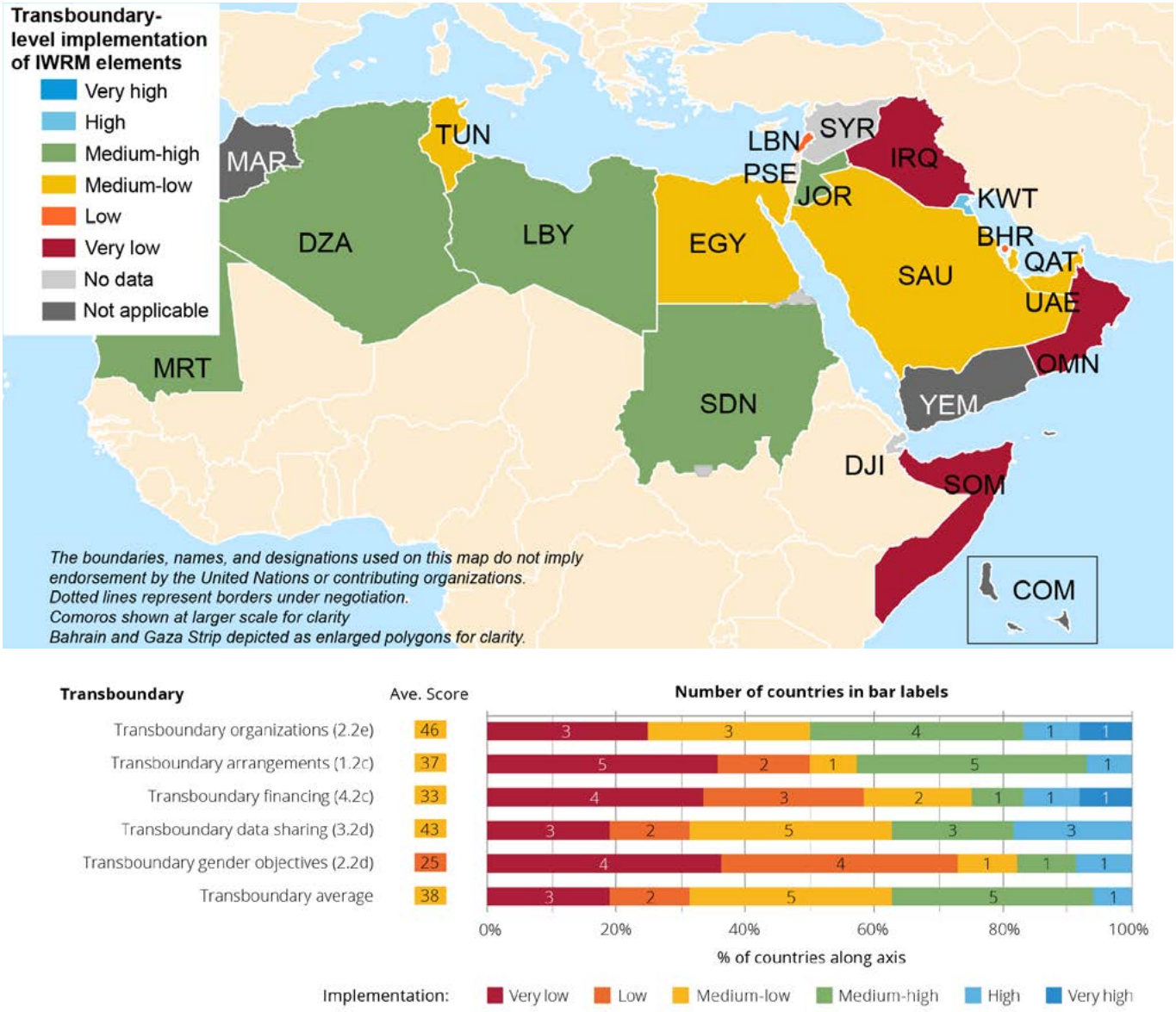

Figure 20 Transboundary-level implementation of IWRM elements

Several States face serious challenges, including political instability and conflicts with neighbours. The Israeli occupation adds to an already complex situation of shared water resources in the Middle East. In addition, Turkey has voted against international transboundary agreements and may not be willing to enter cooperation agreements with either Iraq or Syrian Arab Republic.

A tremendous effort needs to be made by most countries in the region; first by prioritizing cooperation on transboundary water resources, and second by addressing the observed shortcomings. Figure 20 shows that for each of the five elements pertaining to transboundary water resources, at least three countries are scoring at very low level and need to work on all five elements (Iraq, Oman, Somalia). Five countries do not have any arrangement with neighbouring countries (Bahrain, Iraq, Oman, Somalia, United Arab Emirates), while four do not contribute to financing (Iraq, Lebanon, Oman, Somalia) or consider gender objectives (Lebanon, Libya, Oman, Somalia). Iraq indicated there is no regular source of financing, except for some grants for developing small projects or capacity development proposed by international organizations.

On the positive side, Algeria reports having partly addressed arrangements with neighbours and mostly implemented transboundary organizations and a data-sharing system, as well as funding for more than 75 per cent of agreed contributions. Libya has mostly addressed arrangements with neighbours and fully implemented transboundary organizations with a data-sharing system that is mostly operational. Kuwait did not report on transboundary arrangements under 6.5.1, but described using a data-sharing system that is mostly operational and mostly

achieving gender objectives. Mauritania is only partially considering gender in transboundary water management but reports having fulfilled its financial commitments and partly implementing arrangements, organizations and data sharing with neighbours.

It may be concluded that the Arab countries sharing the major aquifers and rivers are taking some steps towards building organizations and frameworks with other riparian countries.

5.3.3 Arrangements and organizational frameworks

Regarding transboundary arrangements (1.2c: treaties, conventions, agreements or memorandums of understanding), the region scores very low on average (37) compared with the world average of 56 (see figure 21). Apart from Comoros, which is composed of islands, four other countries (Kuwait, Morocco, Qatar and Yemen) report this dimension does not apply to them, although some are sharing water with neighbouring countries. Of the 14 countries that gave a score for this element, Bahrain, Iraq, Oman and Somalia reported not having made any arrangements, while United Arab Emirates indicated partially implementing arrangements with neighbours on transboundary water resources (all very low implementation). Encouragingly, seven countries have established arrangements, with provisions mostly implemented by Libya, partially fulfilled by Algeria, Jordan, Mauritania, Sudan and Tunisia, and initiated by Egypt (medium-low implementation and above). Egypt, which shares important water resources with its neighbours, provided a short sentence saying transboundary arrangements are partially implemented. The difficulties facing some countries in establishing cooperation agreements with neighbours may be due in some cases to the nationalistic approach in water management, political conflict or the unwillingness of neighbouring countries to enter into such agreements.

Seven countries have adopted arrangements, with six having at least partially implemented provisions.

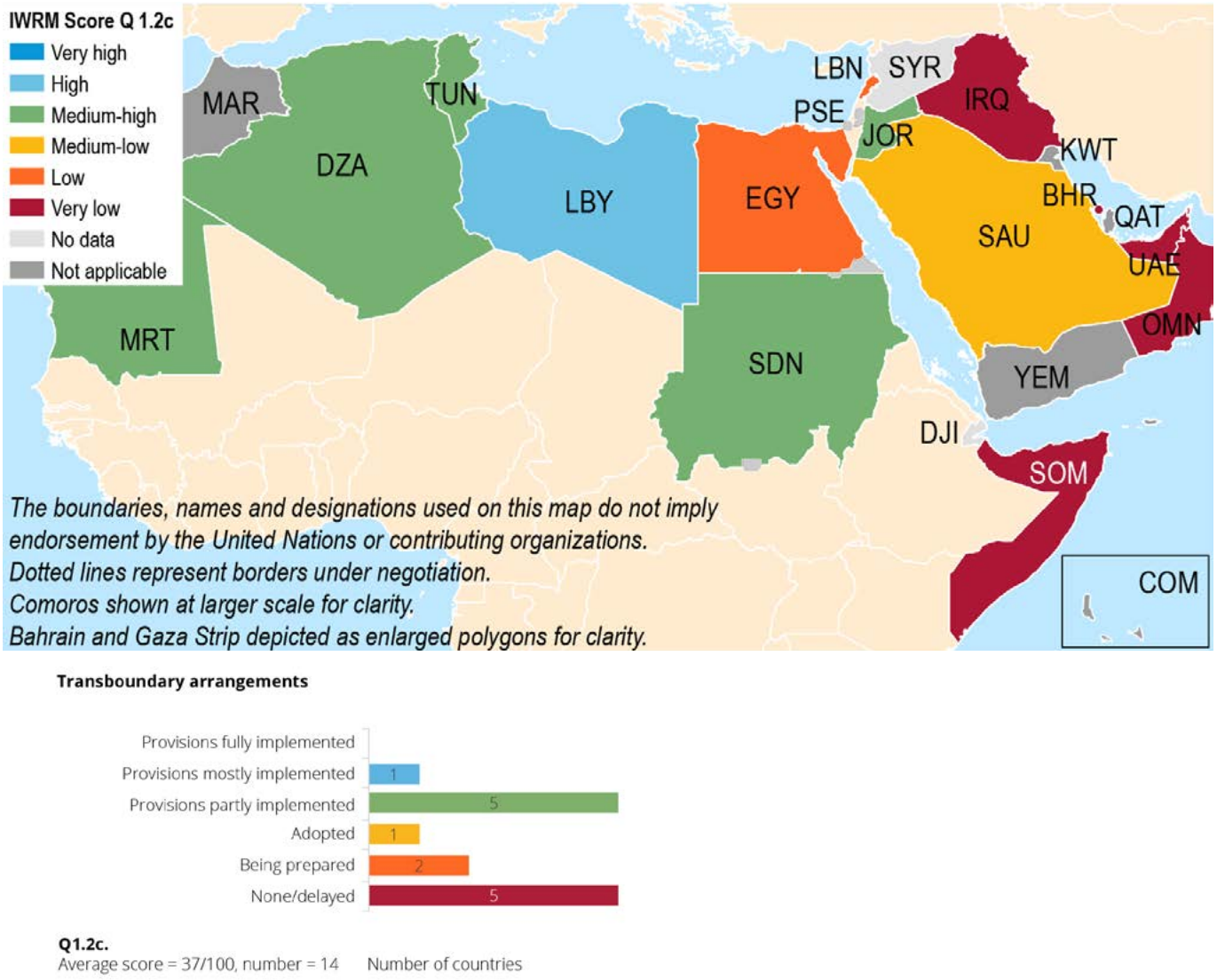

Figure 21 Transboundary-level implementation of IWRM to arrangements

Nine countries have established organizational frameworks, with the mandate fully implemented by one, mostly fulfilled by one and partially activated by four.

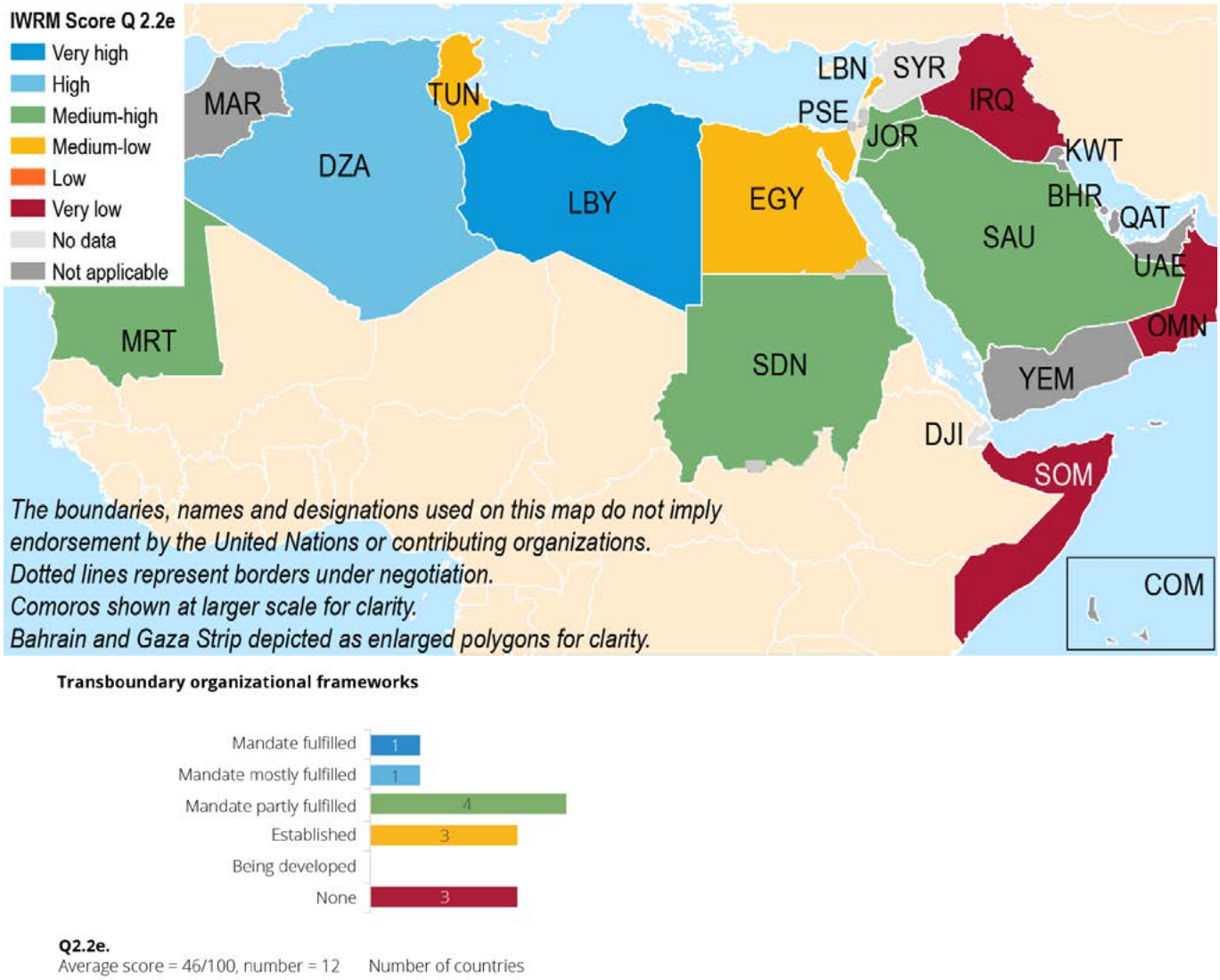

Figure 22 Implementation of transboundary organizational frameworks

Transboundary organizational frameworks (2.2e: joint bodies, joint mechanisms or commissions) have the highest average scores (46) of any question on transboundary water in the questionnaire (see figure 22). The medium-low level of this score, however, indicates that, on average, the provisions and mandate are only adopted and that framework implementation has not started. It is regrettable that three countries (Iraq, Oman, Somalia) of the 12 to which this element applies have reported not having organizational frameworks. On the positive side, the nine remaining countries have established frameworks, with the mandate fully implemented by Libya, mostly fulfilled by Algeria and partially activated by Jordan, Mauritania, Saudi Arabia and Sudan.

5.3.4 Financing

Transboundary financing (4.2c) has an average score of 33 in the region, 13 points below organizational frameworks and four below arrangements. This medium-low level of implementation indicates funding from countries to support transboundary arrangements is less than 50 per cent of the agreed amounts (see figure 23). Five countries reported meeting all or part of expected contributions for transboundary cooperation arrangements, with 100 per cent for Mauritania, 75–99 per cent for Algeria, 50–74 per cent for Sudan and less than 50 per cent for Jordan and Libya. Four countries (Iraq, Lebanon, Oman, Somalia) of the 12 affected by this element have no financing arrangement and three (Egypt, Saudi Arabia, Tunisia) have adopted agreements but have not yet contributed to project implementation. Although Egypt, which shares aquifer and basin water resources, gave a low score (20), it reports having established the framework for completing allocations for the Nile Basin support initiative to implement a number of projects in the basin countries through the relevant ministries. The Egyptian Government agreed in 2012 to provide EGP 5.3 million ($295,000) for Nile Basin countries.

Five countries reported meeting all or part of expected contributions for transboundary cooperation arrangements.

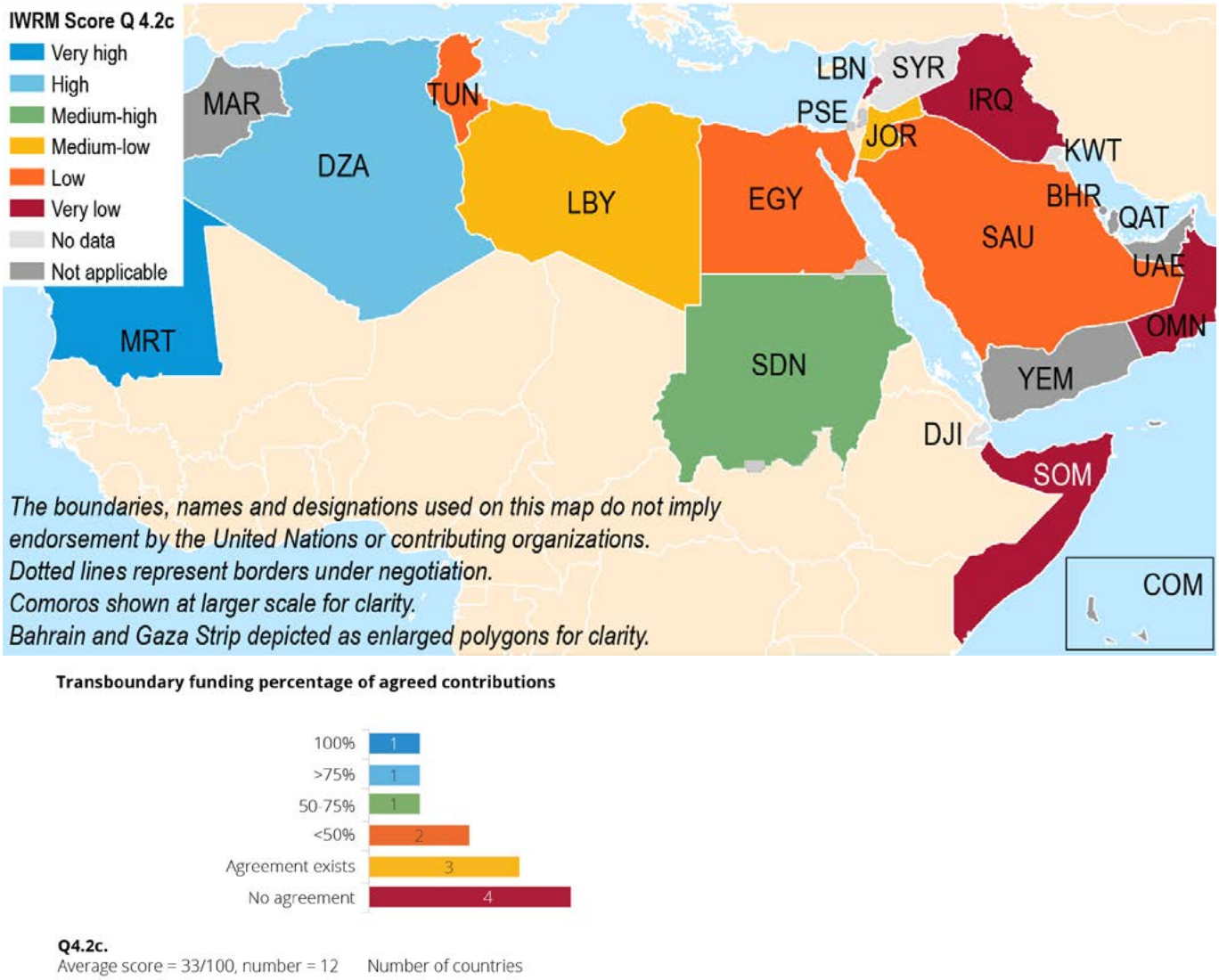

Figure 23 Country breakdown of financing for transboundary cooperation from Member States

5.3.5 Data and information sharing

Comoros, Morocco and Yemen reported that this element does not apply to them, with Morocco indicating that shared transboundary water resources are limited, localized and scarce. Transboundary data and information sharing (3.2d) has an average score of 46, second in transboundary-level questions. This medium-low level of implementation indicates that although data and information sharing arrangements exist in 11 countries (medium-low and above), five countries (Bahrain, Iraq, Oman, Somalia, Tunisia) report limited or no data sharing (see figure 24). Five countries (Egypt, Lebanon, Qatar, Saudi Arabia, Sudan) made arrangements with limited implementation. Jordan, Mauritania and United Arab Emirates went one step further, adequately implementing data and information sharing systems, with Algeria, Kuwait and Libya using effective tools. It appears that data and information sharing remains a major barrier to effective transboundary collaboration in the region.

5.3.6 Gender

Gender-specific objectives at the transboundary level could include, for example, the presence of a specific gender strategy in transboundary agreements, arrangements, implementation plans or impact assessments, and also gender parity of male and female participants in meetings of transboundary decision-making authorities.

This element (2.2d) has the lowest average score (25) and the lowest number of reporting countries (11 out of 19). The same observation is apparent at global level, which also has the lowest average score (32) for this

Data and information sharing remains a major barrier to effective transboundary collaboration in the region.

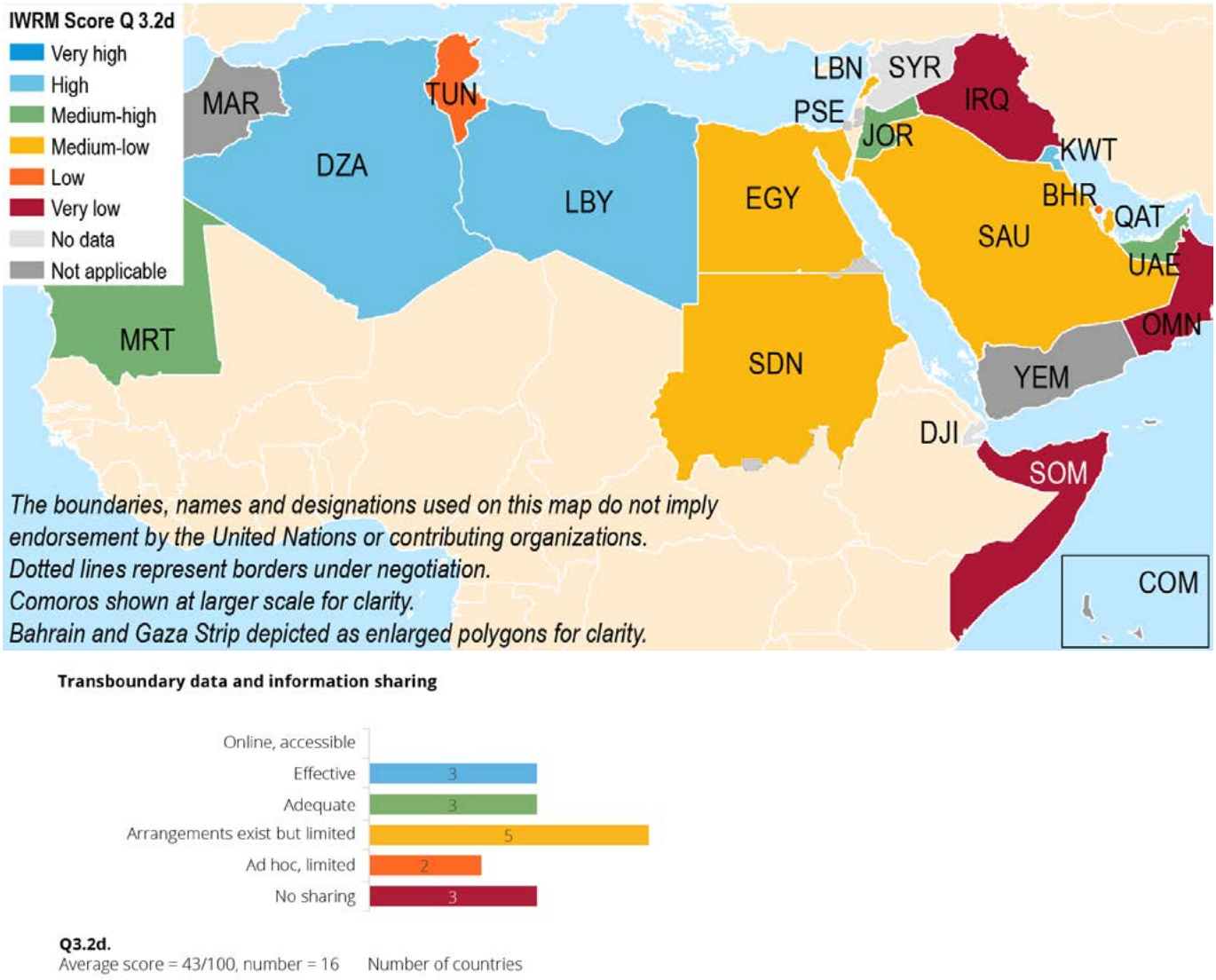

Figure 24 Country breakdown of transboundary data and information sharing

element. This low level of implementation indicates that, on average, gender is addressed only partially in transboundary plans. While many countries report having considered gender in arrangements, only Algeria, Kuwait and Sudan report having at least partly achieved gender objectives at transboundary level (see figure 25). Four countries have partially introduced gender objectives in their plans, while four admitted not addressing this important element.

5.3.7 Subregional analysis of transboundary cooperation.

Analysis of transboundary basins and aquifers in the region is expected to clarify the impact of subregional frameworks on transboundary cooperation. Morocco (the Maghreb) reports that the five elements (arrangements, organizations, data sharing, financing and gender) are not applicable, but said that shared water resources with neighbouring countries are limited, localized and scarce. The Southern subregion is represented here by two countries only, namely Somalia and Sudan, as Comoros does not share any water with its neighbours.

Table 12 shows that, on average, the Maghreb subregion reports the highest levels of implementation across all transboundary elements of IWRM, apart from gender-specific objectives. The three other subregions score almost on the same level for all the elements (medium-low and low), except for financing, which is not met by GCC countries. The averages for the subregions do not correlate with average HDI values.

The analysis of IWRM implementation of transboundary cooperation at country level, within the subregions, reveals that some countries are implementing IWRM plans and programmes, with others making some progress towards

Only three countries report having at least partly achieved gender objectives at the transboundary level.

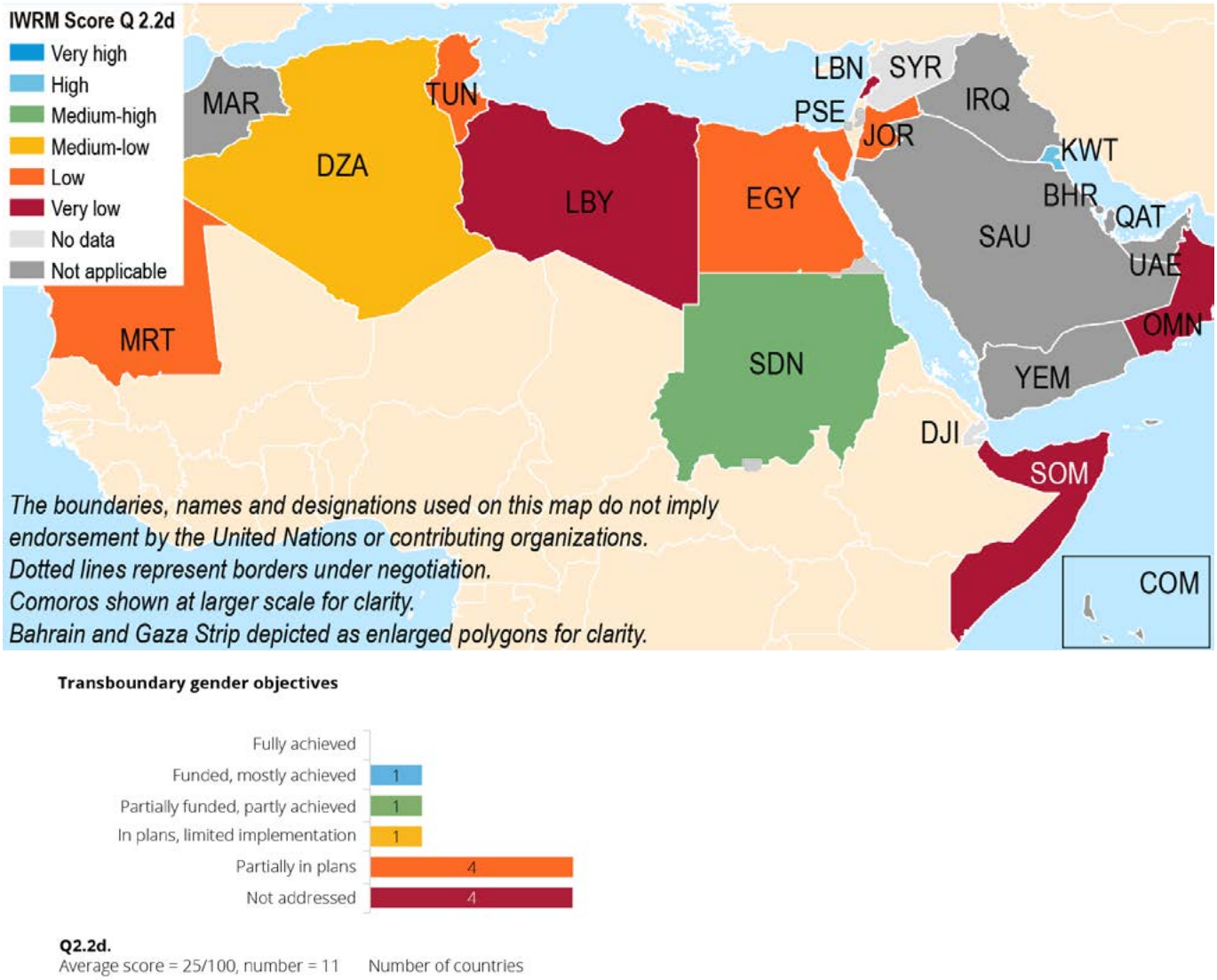

Figure 25 Country breakdown of consideration/achievement of transboundary gender objectives

Table 12 Subregional average scores for implementation of transboundary cooperation elements in 16 Arab countries

Transboundary elements	GCC	Maghreb	Mashreq	Southern	Region	World
Arrangements	15	68	30	35	37	56
Organizations	30	70	38	30	46	57
Data sharing	42	60	35	25	43	48
Financing	10	60	18	30	33	40
Gender	40	20	20	30	25	32
Average	35	56	27	30	37	47
Average HDI	0.83	0.67	0.71	0.49	0.70	0.73

achieving this goal. The Maghreb countries are distributed into two levels of implementation (medium-low and medium-high). The GCC and Mashreq countries are scattered between three different levels. In the Southern subregion, Sudan reports making some progress while Somalia reports no progress on developing IWRM elements for transboundary water resources.

Regarding arrangements and organizational frameworks, averages for these elements is an indication of political commitment and availability of frameworks for transboundary cooperation. The analysis indicates that, apart from Morocco, the countries of the Maghreb subregion have established arrangements and organizational frameworks, with the mandate being at least partially implemented. The Mashreq and Southern subregions score at the same level, indicating that their countries have adopted some agreement with neighbouring countries and established some institutions for their implementation. The score of the Mashreq subregion is lowered by Iraq's null score for the two elements, which may be due to the political situation in the country and lack of cooperation from other riparian countries. Regarding the Southern subregion, the two elements are applicable to Sudan (65) and Somalia (0). There is a large discrepancy between the GCC countries, with Saudi Arabia scoring at medium-high (55) and United Arab Emirates at a very low level (10), Bahrain and Oman scoring zero, and Kuwait and Qatar responding 'not applicable'. Saudi Arabia indicated that coordination is under way with some neighbouring countries, such as Jordan and the Gulf States, in accordance with international laws but the Kingdom has not yet been able to coordinate with Iraq and Yemen. The low scores for all GCC countries except Saudi Arabia is related to their low dependency on shared water resources.

5.3.8 Comparison with SDG 6.5.2 on transboundary cooperation

The SDG indicator 6.5.2 measures the proportion of the transboundary basin area (river, lake or aquifer) within a country with an operational arrangement for water cooperation in place. An arrangement might include a bilateral or multilateral treaty, convention, agreement or other formal arrangement among countries that provides a framework for cooperation on transboundary basins. Four criteria were used to monitor the operationalization of this indicator; namely, the existence of a joint body or mechanism, regular meetings between countries (at least once a year), joint management plans or objectives, and systematic exchange of data and information (at least once a year). Indicator 6.5.2 supplements indicator 6.5.1, which tracks the degree of IWRM implementation at all levels, including on transboundary water resources.[16]

The first global monitoring of SDG indicator 6.5.2 demonstrates that for the 62 countries considered, only 59 per cent of their transboundary basin area is covered by operational arrangements. Only 17 countries have all their transboundary basins covered by operational arrangements. These results are consistent with those observed for SDG indicator 6.5.1.

Regarding the Arab region, as only nine countries contributed to the first monitoring exercise of SDG indicator 6.5.2, it is difficult to draw any comparative conclusions with that for SDG indicator 6.5.1. This lower response rate may be explained by the fact that indicator 6.5.2 is more quantitative and demanding, and focused on transboundary water only. In addition, some Arab countries do not have important shared-water resources with neighbouring countries as defined under indicator 6.5.1. It should be noted that the responses to the two indicators may not come from the same focal points or government entities, which may explain any variations.

It is important to highlight that some countries, such as Lebanon and Libya, reported for shared waters under 6.5.1 but not under 6.5.2. The qualitative comparison for the countries that reported on both indicators shows that arrangements for transboundary cooperation are low in the region.

Operational arrangements and frameworks for transboundary water resources are still rare or are in the making, with the Maghreb subregion leading on this aspect. The financial aspect of transboundary cooperation shows that most of the Arab countries are not meeting all or part of expected contributions for transboundary arrangements. The extent to which gender-specific objectives are addressed at the transboundary level is still very low.

In future rounds, it would be useful if reporting on 6.5.1 and 6.5.2 was more closely coordinated and results unified at national level.

16 United Nations Economic Commission for Europe and the United Nations Educational, Scientific and Cultural Organization, 2018. *Progress on Transboundary Water Cooperation: Global baseline for SDG indicator 6.5.2.*

6 TOWARDS FULL IMPLEMENTATION OF IWRM

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The most water scarce in the world, the region has identified and studied its water challenges. Water scarcity is worsening as demand increases beyond sustainable limits, driven by fast-growing populations, increasing affluence, economic growth and diversification. New and complex connections are appearing between water, energy, climate change and food security.

Over recent decades, all Arab countries have become aware of the need to better manage their water resources. It has become well established that more focus is required on the integrated management of water resources rather than water supply augmentation and service provision.

Several States have resolved to take action to reduce the quantitative and qualitative depletion of their water resources. They have engaged in developing strategies and policies to reduce deterioration, and have also taken practical steps, setting priorities for water use in various sectors on the basis of water quota allocation. Most States have enacted water-related legislation and launched large-scale awareness campaigns, along with efforts aimed at restructuring water institutions in line with the principle of integrated management of water resources. National water strategies provided a basic foundation to support development of the regional Arab Strategy for Water Security 2010-2030 (ASWS) (see section 1.2).[1]

Through the ASWS, States committed to working towards attaining Arab water security to meet the challenges and future requirements of sustainable development, including through applying the principles of IWRM as a key element in their water policies.

In adopting the SDGs, and more specifically target 6.5, Arab countries have recommitted to implementing IWRM, now widely recognized as providing a mechanism for achieving sustainable development and management of water resources in the region.

This regional report for SDG indicator 6.5.1 is the first attempt to review the progress for IWRM implementation and identify priority areas that will help accelerate progress towards full implementation.

6.1 Summary of key findings for SDG indicator 6.5.1 in the Arab region

- The average IWRM implementation is in the medium-low range, close to the world average. Considering the global target for indicator 6.5.1 is to reach a very high degree of IWRM implementation by 2030 and that the Arab Strategy for Water Security 2010-2030 (ASWS) has prioritized IWRM as a key element in water policies, current implementation rates need to be accelerated, particularly among the 63 per cent of countries in the medium-low and below implementation categories (see figure 3, section 3.1)

- Analysis of the performances of the 19 reporting countries shows that while none have fully implemented all IWRM processes, three are in the high implementation category and are likely to meet the global target if momentum is maintained, and four are in the medium-high category, potentially able to reach the target if efforts are sustained towards 2030. The alarm should be sounded for the 12 countries in the medium-low, low and very low categories as they are unlikely to reach the target unless progress is significantly accelerated (figure 4, section 3.1). These countries should prioritize the elements of water resources management that are weakest nationally and mobilize efforts and resources to improve them. National interim targets could also be set to facilitate implementation.

- Levels of implementation are widespread in the region, from very low to high, indicating the need for each country to assess its own strengths and weaknesses for progressing with IWRM (figure 5, section 3.1). This disparity was recognized in the ASWS, which set among its objectives exploiting the comparative advantages of States in water resources management and enhancing cooperation and exchange of experiences and information between countries.

- At subregional level, the GCC has the highest average IWRM implementation in the medium-high category, followed by the Maghreb also in medium-high, then the Mashreq in medium-low and the Southern Arab countries in the low category (figure 6, section 3.3). At the extremes there appears to be some link between the overall level of socioeconomic development and political stability and the degree of IWRM implementation, with GCC countries having the highest average HDI (0.83), and Southern the lowest (0.49). For the Maghreb (average HDI of 0.67) and Mashreq (0.71) countries, however, this correlation is not clear (figure 7, section 3.3). While overall levels of development and governance influence IWRM implementation, they are not necessarily the most important factors. Political will and priority level are key drivers for furthering IWRM implementation.

- Examination of the four dimensions of implementation shows the highest level is found for management instruments and institutions and participation. They both lie in the medium-high category, indicating capacity to implement the elements in these two dimensions is generally adequate. The lowest scores are for financing and the enabling environment, which are in the medium-low category, suggesting the corresponding elements are generally institutionalized and implementation is under way (figure 8, section 4).

1 Arab Ministerial Water Council, "Arab Strategy for Water Security".

- **Enabling environment:** many Arab countries appear to be facing serious challenges in establishing an enabling environment for IWRM through policies, laws and plans (see figure 9). When comparing the seven enabling environment elements, progress is lowest for the transboundary arrangements, paradoxical given the importance of transboundary water resources in the region.

- **Institutions and participation:** wide disparities exist between countries in the region and between countries within the same subregion in establishing institutions and engaging stakeholders for IWRM implementation (see figure 10). For example, in the GCC subregion, Qatar and the United Arab Emirates have established efficient authorities and built support among stakeholders, whereas Oman is still at the early stages of implementing this IWRM dimension. As a key success factor for progress, gender mainstreaming is gaining attention in several countries (see box 4.5). It is encouraging that the average implementation for gender-specific objectives for water resources management at national level is slightly higher than the world average. The extent to which gender objectives are addressed decreases considerably at subnational and transboundary levels.

- **Management instruments:** the region is at the same level as the global average for developing and implementing water management instruments. In 10 countries, instruments are generally adequate, with some elements largely being implemented (see figure 11). The highest average scores are obtained for national availability monitoring and sustainable and efficient water-use management (see figure 11). This is heading in the right direction, given these two elements are particularly important in a region characterized by high water stress. It also accords with key themes of the ASWS, emphasizing the need to monitor the evolving water situation in countries and stressing the importance of increasing water-use efficiency to help bridge the water deficit.

- **Financing:** the financing for water resources management exhibits the lowest score of the four IWRM dimensions. The medium-low score is similar to the world's average, indicating this dimension is not given appropriate attention globally despite successful IWRM implementation being inked to the budgeting and financing made available for water resources development and management. Although more than half of the total renewable water resources in the region originate from outside the region, with two thirds crossing at least one international border, transboundary financing is reported to have the lowest score (see table 7). Several Arab processes have recognized the importance of increasing financing and investment as a means of implementing IWRM, including the aforementioned ASWS and the Regional Preparatory Meeting on Water Issues for the 2018 Arab Forum on Sustainable Development and High-Level Political Forum.

- IWRM implementation is essential to advance action on Arab regional priorities, mainly groundwater and shared water resources, as stated during the regional preparatory meeting. In this regard, several key points are raised in this report that can contribute to a deeper understanding of the situation and accelerate the means of implementation in addressing these two regional priorities (chapter 5):

  - The average implementation scores for groundwater and transboundary water resources are in the medium-low level across the four IWRM dimensions, highlighting the need for increased efforts on these issues.

  - About two thirds of the available surface water and groundwater resources in the region are shared between neighbouring Arab countries and across the region's borders. This high dependency, from outside and within the region, necessitates regional cooperation. In most cases shared resources are not governed by clear agreements to ensure their sound exploitation. Although several Arab countries have established cooperation agreements or treaties with riparian countries for transboundary water resources management, only a few are successfully implemented.

  - Groundwater is the second major conventional water resource in the region, contributing more than 50 per cent of total water withdrawals in 10 Arab countries. It is exploited even in countries rich in surface water due to increasing demand and the declining quality of surface water. In addition to overexploitation, pollution from agriculture, industry and other human activities is a concern in most countries. Surprisingly, this report finds no clear correlation between dependence on groundwater resources and the implementation of aquifer management instruments.

6.2 Challenges to IWRM implementation in the Arab region

The ASWS was developed to meet the challenges and future needs of sustainable development, taking into consideration the numerous water-related challenges facing the region, which may be summarized as follows:

- inability to secure water needs

- worsening social and political impacts of the food crisis and increased poverty

- low water usage efficiency

- shared water resources
- absence of a holistic approach to water sector management
- population growth and increasing demand
- lack of individual and societal awareness of water issues
- impact of climate change
- water in occupied Arab territories
- increasing role of water in economic development
- finance of water projects and private sector participation
- insufficient institutional and human capacity in the water sector
- inadequate scientific research and technology transfer in the water sector
- weak legal and legislative frameworks
- lack of service provision for clean drinking water and sanitation

Analysis of surveys for SDG indicator 6.5.1 on IWRM implementation from the 19 reporting countries indicates serious constraints in applying its principles. According to the IWRM indicators across the four dimensions (enabling environment, institutions and participation, management instruments and financing), no country has reached full implementation. With a medium-low average, the degree of implementation varies significantly across the region, from very low to high implementation, indicating that while all countries in the region face challenges preventing them from fully implementing IWRM, the nature and extent of the challenges can be specific to countries and/or subregions:

- **Water scarcity:** the Arab region hosts 13 of the world's 20 most water-scarce countries, making it the most water-scarce region globally. People in the region have access to about only 10 per cent of the renewable water levels of an average global citizen.[2] Moreover, population growth is placing severe strain on dwindling water resources. The population of the Arab countries, estimated at 424 million in 2018, is expected to reach approximately 678 million by 2050.[3] The increased pressure on already limited water resources constitutes a significant challenge to implementing IWRM, which needs to reconcile multiple and competing uses for water.

- **Impacts of climate change:** the Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region (RICCAR) has generated ensembles of regional climate and hydrological modelling projections up to the year 2100.[4] Temperature projections indicate a general rise, with a general change in temperature for RCP 4.5 of 1.5°C to 2.3°C, and RCP 8.5 of 3.2°C to 4.8°C by the end of the century.[5] As for precipitation projections, these vary considerably across the region, with a reduction of 8–10 mm in the average monthly precipitation in the coastal areas of the region, mainly around the Atlas Mountains in the west and in the upper Euphrates and Tigris rivers in the east.[6] Projections for other areas indicate an increase in precipitation, including for the south-eastern Arabian Peninsula and some parts of the Sahel. Climate change is expected to increase the number and frequency of extreme weather events in the region, such as floods and droughts, exacerbating pressure on scarce water resources. As a result, competition will increase for all types of available water resources, making the challenge of sustainably managing limited resources more difficult.

- **Conflict and political unrest:** several countries in the region have been in turmoil for many years. Conflict and political instability are increasing the vulnerability of water management systems, causing severe damage to infrastructure and reversing progress in many countries, not to mention human migration and loss of life. It is difficult to develop and implement sustainable, efficient water resources policies, laws and plans in such situations, and results in a high turnover of leadership in ministries responsible for water management, and unclear mandates and unstable budgets for water institutions. These challenges in the enabling environments and institutions for IWRM implementation are reflected in the lower performance of these two dimensions in the Arab region compared with the world average (see figure 8).

- **Poverty and low human development:** countries in the region with the highest rates of poverty and lowest levels of human development are lagging behind on IWRM implementation. The Southern Arab countries, such as Comoros, Somalia, Sudan and Yemen, that are characterized by high Multidimensional Poverty Index (MPI) values and low Human Development Index (HDI) values are facing severe constraints in the four

2 Food and Agriculture Organization of the United Nations, AQUASTAT, main database. Accessed on 30 January 2019 – Averages calculated by the authors.

3 United Nations Department of Economic and Social Affairs, Population Division, 2017. "World population prospects: the 2017 revision". (Accessed on 30 January 2019)..

4 United Nations Economic and Social Commission for Western Asia and others, 2017. Arab Climate Change Assessment Report: Main Report (E/ESCW/SDPD/2017/RICCAR/Report).

5 Representative Concentration Pathway (RCP) is a greenhouse gas concentration (not emissions) trajectory adopted by the Intergovernmental Panel on Climate Change (IPCC) in 2014.

6 United Nations Economic and Social Commission for Western Asia and others, *Arab Climate Change Assessment Report*.

dimensions of IWRM. Somalia has the lowest level of IWRM implementation in the world. Rampant poverty and occupying the bottom positions in human development indices hinder IWRM implementation, given the limited capacity in all areas of governance, management and financing. Also, poverty alleviation, job creation, education, health, and ensuring a basic water supply and sanitation services may take priority over IWRM.

- **High dependence on transboundary water resources:** more than half of all water originates from outside the region. Around two thirds of surface water resources come from major rivers, namely the Nile, Tigris, Euphrates and Senegal, all of which start outside the region's borders. The estuaries of these rivers, however, are located within Arab States and use of their waters is frequently a matter of political dispute among those involved. Most, if not all, of these rivers are without clear agreements governing the management and sharing of their waters, and failure to reach just and equitable agreements with source countries continues to be a problem that threatens water security in the region. Even Arab States sharing surface water and groundwater basins among themselves lack clear compacts governing their investments.[7] A key indicator for operational cooperation, transboundary data and information sharing between countries in the region is reported to be at a medium-low level. Even when arrangements are put in place, actual sharing is limited.

- **Relatively high dependence on groundwater:** groundwater is the second major conventional water resource in the Arab region and contributes more than 50 per cent of total water withdrawals in 10 Arab countries. Some areas in the Arabian Peninsula and the Maghreb region rely exclusively on groundwater. Although most countries are implementing at least partially their aquifer management instruments, more focus is needed on geographic coverage and stakeholder participation.

- **Challenges of effectively monitoring usage to ensure sustainable withdrawals:** the ASWS recognizes the importance of water information and data monitoring for sound planning and for developing appropriate policies to manage resources. This is particularly true for shared water resources within the region and for major river basins shared with non-Arab States. Many countries in the region still need to harness technological advances that facilitate collecting, storing, processing and sharing of data and information, and offer new opportunities for national and regional approaches to IWRM.

6.3 Constraints identified by countries

Many countries elaborated what they perceived to be the specific obstacles and hindrances that justify their often low level scores for various dimensions and elements of IWRM implementation. Although these are by no means universal constraints, most countries will identify with them. As a consequence, the list below is intended to be indicative, rather than exhaustive. Bracketed countries are those that indicated, explicitly or implicitly, the constraints in the free text responses in the 6.5.1 questionnaire or through workshop reports.

While the issues listed below are phrased as constraints, they are typically also priority action areas for countries to further IWRM implementation:

- **Weaknesses in national water resources policy, law and plans:** some countries have identified weaknesses in their water resources policy, law and plans. National policies can be non-existent (Comoros) or exist but not be based on IWRM (Somalia). They may also lack a defined national water policy and although a water strategy is established, it is not well implemented (Lebanon). Another situation is described where the national water resources plan prepared by the relevant ministry needs to be improved by a transitional strategy, including further reform interventions, to ensure smooth and enhanced streamlining with IWRM principles and approaches (Egypt).

- **Low level of transboundary water cooperation:** in some countries, there is a total lack of transboundary water management arrangements (Bahrain, Iraq, Somalia, United Arab Emirates). Transboundary data and information sharing between countries is either lacking (Oman, Somalia), limited (Bahrain, Qatar, Saudi Arabia), on an ad hoc basis and unofficial (Tunisia) or only partially covers shared water resources (Sudan).

  Major constraints exist for financing transboundary cooperation (Lebanon), with at times no specific funding allocated from the Member State budgets or from other regular sources (Bahrain, Iraq, Somalia).

- **Inadequate participation of business in water resources development, management and use:** some GCC countries (Kuwait, Qatar, United Arab Emirates) have established effective private sector participation for water resources development, management and use. Other Arab countries have identified this issue as a priority action area and are directing efforts towards increasing private sector participation (Egypt, Lebanon, Morocco, Sudan). Business participation in the sector, however, is still recognized as being limited in several Arab countries (Comoros, Iraq, Yemen).

- **Insufficient financing for IWRM implementation at national level:** several Arab countries have identified limitations in national budgets for investment and for recurrent IWRM costs. These vary, from severe constraints, with inadequate budget allocated for water infrastructure

7 Arab Ministerial Water Council, "Arab Strategy for Water Security".

and recurrent costs (Somalia), to situations where the allocated budget covers planned investment only partially and few IWRM elements (Iraq, Lebanon, Mauritania).

- **Lack of attention to gender mainstreaming in IWRM:** although developing and implementing gender objectives in water resources management at all levels is recognized as a main pillar of IWRM, several countries acknowledge that gender is only partially addressed. This is the case at national level (Egypt, Mauritania), subnational level (Lebanon, Mauritania, Somalia) and transboundary level (Lebanon, Saudi Arabia, Somalia, Sudan, Tunisia, United Arab Emirates). Women often have fewer rights and access to natural resources because of traditional roles, and land titling customs and inheritance that often favour men. They may be unable to access water services at household level or permits for irrigation because they do not hold the land (Egypt).

- **Inadequate intersectoral stakeholder coordination:** coordination is not well achieved between water authorities, nor with other governmental institutions and authorities concerned with water, such as ministries of agriculture and energy, and research centres. This is also observed between water authorities and the private sector (Lebanon). Moreover, fragmented management, contradictory sectoral policies and plans, plus institutional instability, where some departments/directorates may be subject to dissolution or transfer to other ministries, are also recognized as important obstacles (Sudan).

- **Noninstitutionalized public participation:** current laws do not support community participation. Stakeholder participation in water resources policy, planning and management is mostly project/community driven (Sudan).

6.4 Enablers of IWRM implementation in the Arab region

IWRM should allow countries and communities to search for water solutions from outside the conventional water community and to use interdependencies to reinforce and deliver progress on SDG 6 and across multiple other SDGs. On the ground, IWRM must deliver results in terms of water security, across levels (local, national and transboundary) and sectors, as well as benefits for people and nature.

In the region, work towards IWRM implementation has been ongoing for the past decade, partly guided by the ASWS and its action plan (section 1.2). Adoption of the SDGs by all Arab countries has emphasized the importance of fostering dialogue and action on IWRM, with careful attention to Arab socioeconomic specificities.

Most countries are considering water resources management as a top priority in their national strategies. The situation requires increased collaboration between these countries and improved collective effort to face the water challenge. Regional and subregional organizations allow for strengthened relationships between countries, because they not only serve as platforms for experience sharing but also help with implementing joint IWRM strategies and actions plans.

6.4.1 Arab regional strategies and action plans

Given the scarcity of water resources and the high demand for their use, the Arab countries realized in the 1980s that their water policies needed to shift from managing supply to managing sustainable demand. In the following decades, they embraced integrated approaches to water management in their policies and strategies. In addition, the ASWS and its associated action plan were approved by the Arab Ministerial Water Council (AMWC), in 2012 and 2014, respectively. Several national initiatives are worth replicating, including the tool adopted by Tunisia for measuring progress towards target 6.5 (see box 6).

The GCC Supreme Council adopted, in 2016, the GCC Unified Water Strategy (2016–2035) which is assisting countries in establishing more sustainable water sector management systems in each country.

In addition to governmental initiatives, several NGOs were established in the region to help promote good governance, best practice and innovation in the water sector to support implementing the ASWS. Examples include the Arab Integrated Water Resources Management Network (AWARENET), the Arab Water Council, the Arab Countries Water Utilities Association and Arab Network for Environment and Development. These involve all segments of Arab society, as well as regional and international organizations and financial institutions.

As mentioned previously, in 2018 the League of Arab States, FAO and ESCWA jointly organized the ***regional preparatory meeting on water issues.*** Attended by Member State representatives of the AMWC and senior representatives from national, regional and international institutions and civil society organizations, it highlighted the importance of IWRM for achieving SDG 6 and the importance of pursuing the 2030 Agenda. This High-Level Dialogue on water-related SDGs resulted in the following key messages:[8]

- Water security is necessary to ensure public health, food security, nutrition, education and rural livelihoods.

8 Economic and Social Commission for Western Asia, Outcome Document, Regional Preparatory Meeting on Water Issues for the 2018 Arab Forum on Sustainable Development and High-Level Political Forum. Available at https://www.unescwa.org/sites/www.unescwa.org/files/events/files/outcome_document_on_water_issues_for_2018_afsdhlpf_english.pdf.

BOX 6

SDG-PSS: a tool measuring progress towards achieving SDG target 6.5

During Phase 1 (2016–2018) of the United Nations project Water in the World We Want,[a] Tunisia adopted its evidence-based platform to measure progress towards achieving the SDG 6 targets. The Policy Support System for SDG 6 (SDG-PSS) includes six critical components that apply to the six targets of SDG 6. These are capacity assessment, finance assessment, policy and institutional assessment, gender mainstreaming, disaster risk reduction/resilience mainstreaming and integrity. Indicator 6.5.1. can be assessed against these components, to identify gaps and weaknesses that can be addressed based on the achievable objectives set for 2030. The SDG-PSS is recognized by UN-Water as a useful tool to enhance cooperation between stakeholders, at national and regional levels, and help countries report on SDG 6. During the next phase (2019–2020), Tunisia will invite representatives from Arab countries to share expertise, experiences and data at a regional hub. In Phase 1, SDG-PSS was designed, tested and improved in a hands-on process by five partner countries in five regions, namely Costa Rica, Ghana, Pakistan, Republic of Korea and Tunisia. The project is expected to expand to include 40 countries in its second phase.

Source a: United Nations University Institute for Water, Environment and Health and United Nations Office for Sustainable Development, Water in the World We Want: SDG 6 Project (Hamilton, Ontario, 2019). Available at https://inweh.unu.edu/wp-content/uploads/2019/04/SDG-Final-Report_Final.pdf (accessed on 3 June 2019).

- Nexus approaches complementing IWRM application can enhance efforts to cope with water scarcity and the move towards water security in the region.
- Water security can be ensured by advancing action on regional priorities, namely efforts to cope with water scarcity, dependency on shared water resources, climate change impact, and the need to ensure water services are provided for all.
- There is a need to ensure water sustainability, availability, accessibility and affordability for all, based on the principle that access to water and sanitation is a human right. Further, efforts are needed to mainstream gender in water management strategies and policies.
- Advancing regional cooperation, national coherence and coordination across sectors, technology transfer, finance and investment, and capacity-building in the region can support achievement of the water-related SDGs.
- Policymakers can champion sustainable development by ensuring strategic plans incorporate the water-related SDGs, using appropriate water assessment tools, including water accounting.

6.4.2 Arab Integrated Water Resources Management Network (AWARENET)

The Arab Integrated Water Resources Management Network (AWARENET) is an independent regional network of training and research institutes, NGOs, government authorities and water experts. It develops and delivers capacity development programmes and resource materials on IWRM policies and practices for the region.

Established in 2002, the network counts 14 partners from within and outside the Arab region, including Cap-Net UNDP and GWP, and its members come from all Arab countries.

The objective is to better provide the public with water and sanitation services, protect resources and the environment, and promote socioeconomically constructive uses of water by improving the implementation of IWRM concepts. It also facilitates research in IWRM implementation, performing an important role in the process of SDG 6.5.1 reporting by:

1. providing a review of this report
2. fostering regional dialogue on IWRM
3. identifying specific IWRM capacity-building needs
4. facilitating capacity-building with its partnership network

6.4.3 Using SDG 6.5.1 reporting in regional dialogue

This report constitutes the first reporting exercise for SDG indicator 6.5.1 on IWRM implementation in the region. The most comprehensive quantitative assessment of regional IWRM progress, it is based on the information provided in the individual country questionnaires from 19 Arab countries and workshop reports from two (Mauritania and Sudan).

Moving forward, the findings could be used as a source of information for fostering regional dialogue and action to accelerate IWRM implementation. Recommendations are two-pronged: (1) the procedural approach for collecting information from countries, and (2) building on the results from questionnaires and workshops.

1. Approach for collecting the country information

While it is essential to acknowledge the work by country focal points to provide responses to the 33 survey questions, it is important to note that the text explanations given to support scores were often insufficient to allow results to be interpreted and regional and subregional trends established.

For future reporting it would be useful to organize preparatory workshops and trainings in all reporting countries. These preliminary meetings would involve national focal points and key IWRM stakeholders to help ensure survey responses provide reliable, informed insights into the degree of IWRM implementation efforts. This issue was raised during a stakeholders' workshop in Sudan, where participants noted that due to the questionnaire's complexity, a training module on reporting on SDG 6.5.1 would be beneficial. Greater involvement from regional organizations in data collection could strengthen this process.

Further, it is important to emphasize to countries that the self-assessed reporting is designed to be useful in furthering IWRM implementation, and that the surveys can be used as a simple diagnostic tool to identify areas requiring better focus at national and subnational levels. Therefore, the more inclusive the reporting process, and the more information that is provided through free text responses to each question, the more robust and useful it will be as a tool for national planning and working towards SDG target 6.5 and related regional targets.

In future rounds of reporting, it is recommended that the in-country data collection processes (including workshops and other communication, and the number and affiliations of stakeholders involved) should be reported, for greater transparency and confidence in results.

2. Building on the SDG 6.5.1 reporting process to guide national, subregional and regional dialogue

To achieve target 6.5 by 2030, a global, aspirational target for indicator 6.5.1 has been set, which is to reach a very high degree of IWRM implementation, or a global average score of between 91 and 100. This is in line with the ASWS, which contains a specific objective to establish the principles of integrated water resource management as a key element in water policies in States.[9]

As this is predominantly a baseline assessment, estimating progress towards global and regional targets is challenging. An empirical analysis can only be carried out following the results of subsequent reporting on indicator 6.5.1, using a methodology that is directly comparable.

Analysis of the results of the country questionnaires shows that national efforts supported by bilateral, subregional and regional cooperation initiatives have helped Arab countries implement elements of IWRM over the years. However, most countries would need to set targets in line with national priorities and capacities to encourage action on the ground and further progress. Given the significance of water management for sustainable development in this water-scarce region, the implementation of IWRM must be accelerated.

Countries can build on the processes for reporting on indicator 6.5.1 in a number of ways, including the following:

- Using the results of the questionnaires and workshop reports to identify those elements of water resources management that are not progressing and may need to be prioritized, and to set interim targets. The questionnaire could be used to set a target score for a particular element in a given year.

- Building on discussions and relationships with stakeholders (interministerial and civil organizations, for example) to develop action plans and set interim targets. In cases where stakeholder dialogue was less comprehensive, or where free text responses to questions were limited, countries may wish to identify and work with additional stakeholders to reach consensus on key issues and priorities.

The two countries that did not submit fully completed questionnaires (Djibouti and Syrian Arab Republic) and the State of Palestine, which was not invited to participate in this first round, may still find it useful to initiate or resume processes to complete the questionnaire so it can be used as a diagnostic planning tool in working towards target 6.5.

9 Arab Ministerial Water Council, "Arab Strategy for Water Security".


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ANNEXES

A

Annex 1 6.5.1 Questionnaire

Table A.1.1 6.5.1 Questionnaire overview

Section 1: Enabling Environment. Assessment of Degree of implementation (0 – 100)	
1.1	**What is the status of policies, laws and plans to support IWRM at the national level?**
a	National water resources **policy,** or similar
b	National **water resources law(s)**
c	National **integrated water resources management** (IWRM) **plans**, or similar
1.2	**What is the status of policies, laws and plans to support IWRM at other levels?**
a	**Subnational** water resources **policies** or similar
b	**Basin/aquifer management plans** or similar, based on IWRM
c	**Arrangements for transboundary water management in most important basins / aquifers**
d	FEDERAL COUNTRIES ONLY: **Provincial/state water resources laws**
Section 2: Institutions and Participation. Assessment of Degree of implementation (0 – 100)	
2.1	**What is the status of institutions for IWRM implementation at the national level?**
a	National **government authorities' capacity** for leading implementation of national IWRM plans or similar
b	**Coordination between authorities from different sectors** on water resources, policy, planning, management
c	**Public participation** in water resources policy, planning and management at national level
d	**Business participation** in water resources development, management and use at national level
e	**Gender-specific objectives** for water resources management at national level
f	**Developing IWRM capacity** at the national level
2.2	**What is the status of institutions for IWRM implementation at other levels?**
a	**Basin/aquifer level organizations for leading implementation** of IWRM plans or similar
b	**Public participation** in water resources, policy, planning and management at the **local level**
c	**Gender**-specific objectives at **subnational levels**
d	**Gender**-specific objectives and plans **at transboundary** level
e	**Organizational framework for transboundary water management** for most important basins / aquifers
f	FEDERAL COUNTRIES ONLY: **Provincial / State authorities** responsible for water resources management
Section 3: Management Instruments. Assessment of Degree of implementation (0 – 100)	
3.1	**What is the status of management instruments to support IWRM implementation at the national level?**
a	**National monitoring of water availability** (includes surface and/or groundwater, as relevant to the country)
b	**Sustainable and efficient water-use management** from the national level
c	**Pollution control** from the national level
d	**Management of water-related ecosystems** from the national level
e	**Management instruments to reduce impacts of water-related disasters** from the national level
3.2	**What is the status of management instruments to support IWRM implementation at other levels?**
a	**Basin management instruments**
b	**Aquifer management instruments**
c	**Data and information sharing within countries** at all levels
d	**Transboundary data and information sharing between countries**
Section 4: Financing. Assessment of Degree of implementation (0 – 100)	
4.1	**What is the status of financing for water resources development and management at the national level?**
a	**National budget** for i**nvestment** including water resources **infrastructure**
b	**National budget** for the **recurrent costs of** the **IWRM** elements
4.2	**What is the status of financing for water resources development and management at other levels?**
a	**Subnational or basin budgets** for investment including water resources **infrastructure**
b	**Revenues** raised from dedicated levies on water users at basin, aquifer or subnational levels
c	**Financing for transboundary cooperation**

Table A.1.2 6.5.1 Questionnaire with threshold descriptions

The shortened version of the questionnaire below contains the full wording of the questions and the threshold descriptions, which are useful for interpreting progress on each of the questions. This version does not contain the glossaries and explanatory notes included in the full questionnaire, which can be downloaded from http://iwrmdataportal.unepdhi.org.

1. ENABLING ENVIRONMENT	Degree of implementation (0 – 100)					
	Very low (0)	**Low (20)**	**Medium-low (40)**	**Medium-high (60)**	**High (80)**	**Very high (100)**
1.1 What is the status of policies, laws and plans to support Integrated Water Resources Management (IWRM) at the national level?						
a. National water resources **policy,** or similar	Development **not started** or not progressing.	Exists, but **not based on IWRM**.	**Based on IWRM, approved** by government and **starting to be used** by authorities to guide work.	**Being used by the majority** of relevant authorities to guide work.	Policy **objectives consistently achieved.**	Objectives consistently achieved, and **periodically reviewed and revised**.
b. National **water resources law(s)**	Development **not started** or not progressing**.**	Exists, but **not based on IWRM**.	**Based on IWRM, approved by government** and **starting to be applied** by authorities.	**Being applied by the majority** of relevant authorities**.**	**All laws are being applied** across the country.	**All** laws are **enforced** across the country, and **all people and organizations** are **held accountable.**
c. National **integrated water resources management** (IWRM) **plans**, or similar	Development **not started** or not progressing**.**	**Being prepared**, but not approved by government.	**Approved** by government and **starting to be implemented** by authorities.	**Being implemented by the majority** of relevant authorities.	Plan **objectives consistently achieved**.	Objectives consistently achieved, and **periodically reviewed and revised.**
1.2 What is the status of policies, laws and plans to support IWRM at other levels?						
a. Subnational water resources **policies** or similar	**Development not started or delayed in most subnational jurisdictions**.	Exist in **most jurisdictions**, but **not necessarily based on IWRM**.	**Based on IWRM, approved by the majority of** authorities and starting to be used to guide work.	**Being used** by **the majority of relevant** authorities to guide work.	Policy objectives **consistently achieved by a majority of authorities**.	Objectives **consistently achieved by all** authorities, and **periodically reviewed and revised**.
b. Basin/aquifer management plans or similar, based on IWRM	**Development not started or delayed in most** basins/ aquifers of national importance.	**Being prepared for most** basins/ aquifers of national importance.	**Approved in the majority** of basins/ aquifers and starting to be used by authorities.	Being **implemented in the majority of** basins/aquifers.	Plan **objectives consistently achieved in majority** of basins/ aquifers.	**Objectives consistently achieved in all basins**/aquifers, and **periodically reviewed and revised**.

1. ENABLING ENVIRONMENT	Degree of implementation (0 – 100)					
	Very low (0)	Low (20)	Medium-low (40)	Medium-high (60)	High (80)	Very high (100)
c. Arrangements for transboundary water management in most important basins / aquifers	Development not started or not progressing.	**Being prepared or negotiated.**	**Arrangements are adopted**.	Arrangements' provisions are **partly implemented.**	**Most** of the arrangements' **provisions are implemented.**	The arrangements' provisions are **fully implemented.**
d. FEDERAL COUNTRIES ONLY: **Provincial/state water resources laws**.	**Development not started or delayed in most** states.	Exist in most jurisdictions, but not necessarily based on IWRM**.**	**Based on IWRM, approved in most states and starting to be applied by authorities** in the **minority** of states.	**Some laws** being applied in the **majority** of states.	**All laws** being applied in the **majority** of states.	**All laws** being applied in **all** states, and **all people and organizations** are **held accountable**.

2. INSTITUTIONS AND PARTICIPATION	Degree of implementation (0 – 100)					
	Very low (0)	Low (20)	Medium-low (40)	Medium-high (60)	High (80)	Very high (100)
2.1 What is the status of institutions for IWRM implementation at the national level?						
a. National **government authorities' capacity** for leading implementation of national IWRM plans or similar	**No dedicated government authorities** for water resources management.	Authorities exist, with **clear mandate to lead water resources management**.	Authorities have clear mandate to lead IWRM implementation, and the **capacity to effectively lead IWRM plan formulation**.	Authorities have the **capacity to effectively lead IWRM plan implementation**.	Authorities have the capacity to effectively lead **periodic monitoring and evaluation of the IWRM plan**.	Authorities have the capacity to effectively lead **periodic IWRM plan revision**.
b. **Coordination between** national **government authorities representing different sectors** on water resources, policy, planning and management	**No communication** between different government sectors on policy, planning and management.	**Communication: Information** on water resources, policy, planning and management **is made available between different sectors.**	**Consultation: Information, experiences and opinions are shared between different sectors.**	**Participation: Opportunities** for different sectors **to take part in** policy, planning and management **processes.**	**Representation: Formal consultation** between different government sectors **with the objective of agreeing on collective decisions on important issues and activities.**	**Co-decisions and co-production: Shared power between different sectors** on joint policy, planning and management activities.

2. INSTITUTIONS AND PARTICIPATION	Degree of implementation (0 – 100)					
	Very low (0)	Low (20)	Medium-low (40)	Medium-high (60)	High (80)	Very high (100)
c. **Public participation** in water resources, policy, planning and management at national level.	**No communication** between government and stakeholders on policy, planning and management.	**Communication: Information** on water resources, policy, planning and management **is made available to stakeholders.**	**Consultation:** Government authorities **occasionally request** information, experiences and opinions of stakeholders**.**	**Consultation:** Government authorities **regularly request** information, experiences and opinions of stakeholders.	**Participation:** Regular opportunities for stakeholders **to take part in relevant** policy, planning and management **processes.**	**Representation: Formal representation of** stakeholders in government processes **contributing to decision making on important issues and activities, as appropriate.**
d. **Business participation** in water resources development, management and use at national level.	**No communication** between government and business about water resources development, management and use.	**Limited communication** between government and business about water resources development, management and use.	**Regular consultation** between government and business about water resources development, management and use.	**Limited opportunities for** private sector involvement established for water resources development, management and use activities.	**Regular opportunities for private sector involvement** established for water resources development, management and use activities.	**Effective private sector involvement established** for water resources development, management and use activities.
e. **Gender-specific objectives** for water resources management at national level.	**Gender not explicitly addressed** throughout national laws, policy or plans.	**Gender partially addressed** throughout national laws, policies or plans.	**Gender addressed** in national plans but with **limited budget** and **implementation**.	Gender addressed in national plans, **partially funded** and **objectives partly achieved**.	Activities **adequately funded,** and **objectives mostly achieved**.	Objectives **fully achieved** and **adequately address gender issues**.
f. **Developing IWRM capacity** at the national level	**No capacity development specific to water resources management**.	**Occasional** capacity development, generally limited to **short-term / ad hoc activities**.	**Some long-term** capacity development initiatives are being implemented, but geographic and stakeholder **coverage is limited**.	**Long-term** capacity development initiatives are being implemented, and geographic and stakeholder **coverage is adequate**.	**Long-term** capacity development initiatives are being implemented, with **effective outcomes**, and geographic and stakeholder **coverage is very good**.	**Long-term** capacity development initiatives are being implemented with **highly effective outcomes**, and geographic and stakeholder **coverage is excellent.**

2. INSTITUTIONS AND PARTICIPATION	Degree of implementation (0 – 100)					
	Very low (0)	Low (20)	Medium-low (40)	Medium-high (60)	High (80)	Very high (100)
2.2 What is the status of institutions for IWRM implementation at other levels?						
a. **Basin/aquifer level organizations for leading implementation** of IWRM plans or similar.	**No dedicated basin authorities for water resources management.**	Authorities exist, with **clear mandate to lead water resources management**.	Authorities have clear mandate to lead IWRM implementation, and the **capacity to effectively lead** IWRM plan **formulation**.	Authorities have the **capacity to effectively lead** IWRM plan **implementation**.	Authorities have the **capacity to effectively lead periodic monitoring and evaluation** of the IWRM plan.	Authorities have the **capacity to effectively lead periodic IWRM plan revision**.
b. **Public participation** in water resources, policy, planning and management at the **local level**	**No communication** between local government and stakeholders on policy, planning and management.	**Communication: Local level information** on water resources, policy, planning and management **is made available to stakeholders.**	**Consultation:** Government authorities **occasionally request** local level information, experiences and opinions of stakeholders**.**	**Consultation:** Government authorities **regularly request** local level information, experiences and opinions of stakeholders.	**Participation:** Regular opportunities for stakeholders **to take part in relevant local level** policy, planning and management **processes.**	**Representation:** Formal representation of stakeholders on local authority processes contributing to decision-making on important local issues and activities, as appropriate.
c. **Gender**-specific objectives at **subnational levels**	**Gender not explicitly addressed** throughout subnational laws, policy or plans.	**Gender partially addressed** in subnational laws, policies or plans.	**Gender addressed** in subnational plans but with **limited budget** and **implementation**.	Gender addressed in subnational plans, **partially funded** and **objectives partly achieved**.	Activities **adequately funded,** and **objectives mostly achieved**.	Objectives **fully achieved** and **adequately address subnational gender issues**.
d. **Gender**-specific objectives and plans **at transboundary** level	**Gender not explicitly addressed** in transboundary policies or plans.	**Gender partially addressed** in transboundary policies or plans.	**Gender addressed** in transboundary plans but with **limited budget** and **implementation**.	Gender addressed in transboundary plans, **partially funded** and **objectives partly achieved**.	Activities **adequately funded,** and **objectives mostly achieved**.	Objectives **fully achieved** and **adequately address transboundary gender issues**.
e. **Organizational framework for transboundary water management** for most important basins / aquifers	No organizational framework(s).	Organizational framework(s) **being developed**.	Organizational framework(s) **established**.	Organizational framework(s)' **mandate is partly fulfilled**.	Organizational framework(s)' **mandate is fulfilled for the most part.**	Organizational framework(s)' **mandate is fully fulfilled.**
f. FEDERAL COUNTRIES ONLY: **Provincial / State authorities** responsible for water resources management	**No dedicated provincial/state authorities for water resources management.**	Authorities exist, with **clear mandate to lead water resources management**.	Authorities have clear mandate to lead IWRM implementation, and the **capacity** to effectively lead IWRM **plan formulation**.	Authorities have the **capacity** to effectively lead IWRM **plan implementation**.	Authorities have the capacity to effectively lead **periodic monitoring and evaluation** of the IWRM plan.	Authorities have the capacity to effectively lead **periodic** IWRM plan **revision**.

3. MANAGEMENT INSTRUMENTS		Degree of implementation (0 – 100)					
		Very low (0)	Low (20)	Medium-low (40)	Medium-high (60)	High (80)	Very high (100)
3.1 What is the status of management instruments to support IWRM implementation at the national level?							
a	**National monitoring of water availability** (includes surface and/ or groundwater, as relevant to the country).	No national monitoring systems in place.	Monitoring systems established for a limited number of **short-term / ad hoc projects** or similar.	**Long-term** national monitoring is carried out but with **limited coverage and limited use** by stakeholders.	**Long-term** national monitoring is carried out with **adequate coverage but limited use** by stakeholders.	**Long-term** national monitoring is carried out with **very good coverage and adequate use** by stakeholders.	**Long-term** national monitoring is carried out with **excellent coverage and excellent use** by stakeholders.
b	**Sustainable and efficient water-use management** from the national level, (includes surface and/ or groundwater, as relevant to the country).	No management instruments being implemented.	Use of management instruments is **limited** and only through **short-term / ad hoc projects** or similar.	**Some** management instruments implemented on a more **long-term** basis, but with **limited coverage** across different water users and the country.	Management instruments are implemented on a long-term basis, with **adequate coverage** across different water users and the country.	Management instruments are implemented on a long-term basis, with **very good coverage** across different water users and the country, and are **effective**.	Management instruments are implemented on a long-term basis, with **excellent coverage** across different water users and the country, and are **highly effective**.
c	**Pollution control** from the national level	No management instruments being implemented.	Use of management instruments is **limited** and only through **short-term / ad hoc projects** or similar.	**Some** management instruments implemented on a more **long-term** basis, but with **limited coverage** across sectors and the country.	Management instruments are implemented on a long-term basis, with **adequate coverage** across sectors and the country.	Management instruments are implemented on a long-term basis, with **very good coverage** across sectors and the country, and are **effective**.	Management instruments are implemented on a long-term basis, with **excellent coverage** across sectors and the country, and are **highly effective**.
d	**Management of water-related ecosystems** from the national level	No management instruments being implemented.	Use of management instruments is **limited** and only through **short-term / ad hoc projects** or similar.	**Some** management instruments implemented on a more **long-term** basis, but with **limited coverage** across different ecosystem types and the country.	Management instruments are implemented on a long-term basis, with **adequate coverage** across different ecosystem types and the country. Environmental Water Requirements (EWR) analysed in some cases.	Management instruments are implemented on a long-term basis, with **very good coverage** across different ecosystem types and the country, and are **effective**. EWR analysed for most of country.	Management instruments are implemented on a long-term basis, with **excellent coverage** across different ecosystem types and the country, and are **highly effective**. EWR analysed for whole country.

3. MANAGEMENT INSTRUMENTS		Degree of implementation (0 – 100)					
		Very low (0)	Low (20)	Medium-low (40)	Medium-high (60)	High (80)	Very high (100)
e	**Management instruments to reduce impacts of water-related disasters** from the national level	No management instruments being implemented.	Use of management instruments is **limited** and only through **short-term / ad hoc projects** or similar.	**Some** management instruments implemented on a more **long-term** basis, but with **limited coverage** of at-risk areas.	Management instruments are implemented on a long-term basis, with **adequate coverage** of at-risk areas.	Management instruments are implemented on a long-term basis, with **very good coverage** of at-risk areas, and are **effective**.	Management instruments are implemented on a long-term basis, with **excellent coverage** of at-risk areas, and are **highly effective**.
3.2 What is the status of management instruments to support IWRM implementation at other levels?							
a	**Basin management instruments**.	No basin level management instruments being implemented.	Use of basin level management instruments is **limited** and only through **short-term / ad hoc projects**.	**Some** basin level management instruments implemented on a more **long-term** basis, but with **limited geographic and stakeholder coverage**.	Basin level management instruments implemented on a more **long-term** basis, with **adequate geographic and stakeholder coverage**.	Basin level management instruments implemented on a more **long-term** basis, with **effective outcomes** and **very good geographic and stakeholder coverage**.	Basin level management instruments implemented on a more **long-term** basis, with **highly effective outcomes** and **excellent geographic and stakeholder coverage**.
b	**Aquifer management instruments**.	No aquifer level management instruments being implemented.	Use of aquifer level management instruments is **limited** and only through **short-term / ad hoc projects**.	**Some** aquifer level management instruments implemented on a more **long-term** basis, but with **limited geographic and stakeholder coverage**.	Aquifer level management instruments implemented on a more **long-term** basis, with **adequate geographic and stakeholder coverage**.	Aquifer level management instruments implemented on a more **long-term** basis, with **effective outcomes** and **very good geographic and stakeholder coverage**.	Aquifer level management instruments implemented on a more **long-term** basis, with **highly effective outcomes** and **excellent geographic and stakeholder coverage**.
c	**Data and information sharing** within **countries** at all levels	No data and information sharing.	**Limited** data and information sharing **on an ad hoc basis.**	Data and information sharing **arrangements exist** on a more **long-term basis between major data providers and users.**	Data and information sharing **arrangements implemented** on a more **long-term basis,** with **adequate coverage** across sectors and the country.	Data and information sharing **arrangements implemented** on a more **long-term basis,** with **very good coverage** across sectors and the country.	**All relevant data and information are online and freely accessible to all**.

3. MANAGEMENT INSTRUMENTS		Degree of implementation (0 – 100)					
		Very low (0)	Low (20)	Medium-low (40)	Medium-high (60)	High (80)	Very high (100)
d	**Transboundary data and information sharing** between **countries**	No data and information sharing.	**Limited** data and information sharing **on an ad hoc or informal basis.**	Data and information sharing **arrangements exist, but sharing is limited.**	Data and information sharing **arrangements implemented adequately.**	Data and information sharing **arrangements implemented effectively.**	All relevant data and information are **online** and **accessible between countries**.

4. FINANCING		Degree of implementation (0 – 100)					
		Very low (0)	Low (20)	Medium-low (40)	Medium-high (60)	High (80)	Very high (100)
4.1 What is the status of financing for water resources development and management at the national level?							
a	**National budget** for **investment** including water resources **infrastructure**.	**No budget** allocated in national investment plans.	**Budget allocated** but only partly covers planned investments.	**Sufficient budget allocated** for planned investments but insufficient funds disbursed or made **available.**	**Sufficient budget allocated and funds disbursed** for all planned programmes or projects.	**Funding available and all planned projects under implementation**.	Planned programmes **completed,** post-evaluation carried out and new funding cycle for programmes underway.
b	**National budget** for the **recurrent costs of** the **IWRM** elements	**No budget** allocations made for recurrent costs of the IWRM elements.	**Allocations** made for **only a few** of the elements and implementation at an early stage.	Allocations made for **at least half** of the elements but insufficient for others.	Allocations for **most of the elements** and some implementation under way.	Allocations include **all elements** and implementation regularly carried out.	Planned budget allocations for all elements of the IWRM approach **fully utilized**.
4.2 What is the status of financing for water resources development and management at other levels?							
a	**Subnational or basin budgets** for investment including water resources **infrastructure**.	**No** budget allocated In subnational or basin investment plans.	**Budget allocated** but only partly covers planned investments.	**Sufficient budget allocated** for planned investments but insufficient funds disbursed or made **available**.	Sufficient budget allocated and funds disbursed for all planned programmes or projects.	Funding available and all **planned projects under implementation.**	**Budget fully utilized**, programmes completed as planned and post evaluation carried out.

4. FINANCING		Degree of implementation (0 – 100)					
		Very low (0)	Low (20)	Medium-low (40)	Medium-high (60)	High (80)	Very high (100)
b	**Revenues** raised from dedicated levies on water users at basin, aquifer or subnational levels.	**No revenues** raised at the **subnational** level.	**Processes in place** to raise local revenue but **not yet implemented**.	Limited revenues raised from **charges, but are not** used for IWRM activities.	Limited revenues raised from **charges** cover some IWRM activities.	Revenues raised from **charges** cover most IWRM activities.	Local authorities raise funds **from multiple sources and fully cover costs** of IWRM activities.
c	**Financing for transboundary cooperation**	No specific funding allocated from the MS budgets nor from other regular sources.	MS agreement on country share of contributions in place and in-kind support for the cooperation organization / arrangement.	Funding less than 50% of that expected as contributions and by regulation.	Funding less than 75% of that expected as contributions and by regulation.	Funding more than 75% of that expected as contributions and by regulation.	Full funding of that expected as contributions and by regulation.

Annex 2 Arab region status of IWRM implementation by question

Table A.2.1 Distribution of country implementation of IWRM elements for the Arab region

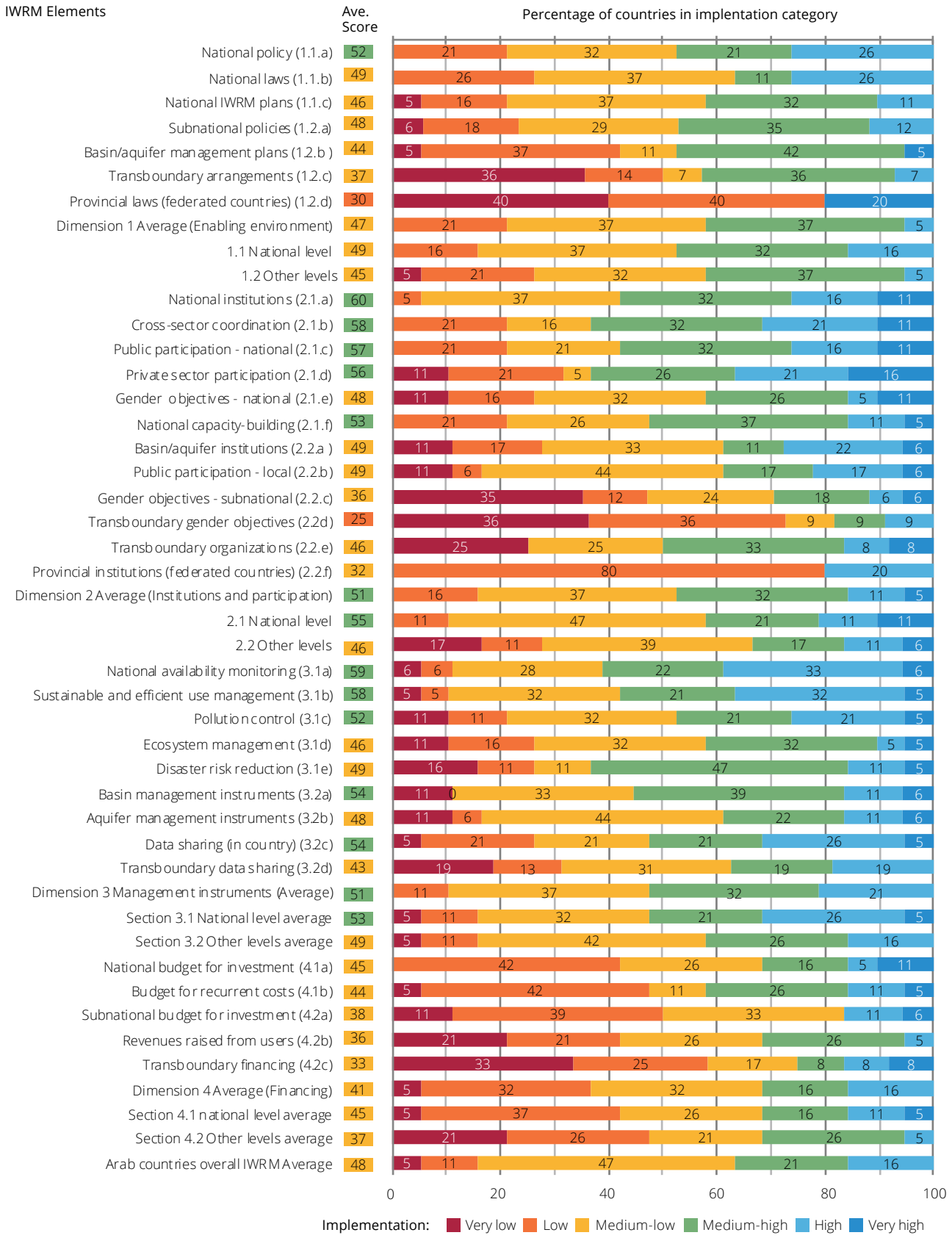
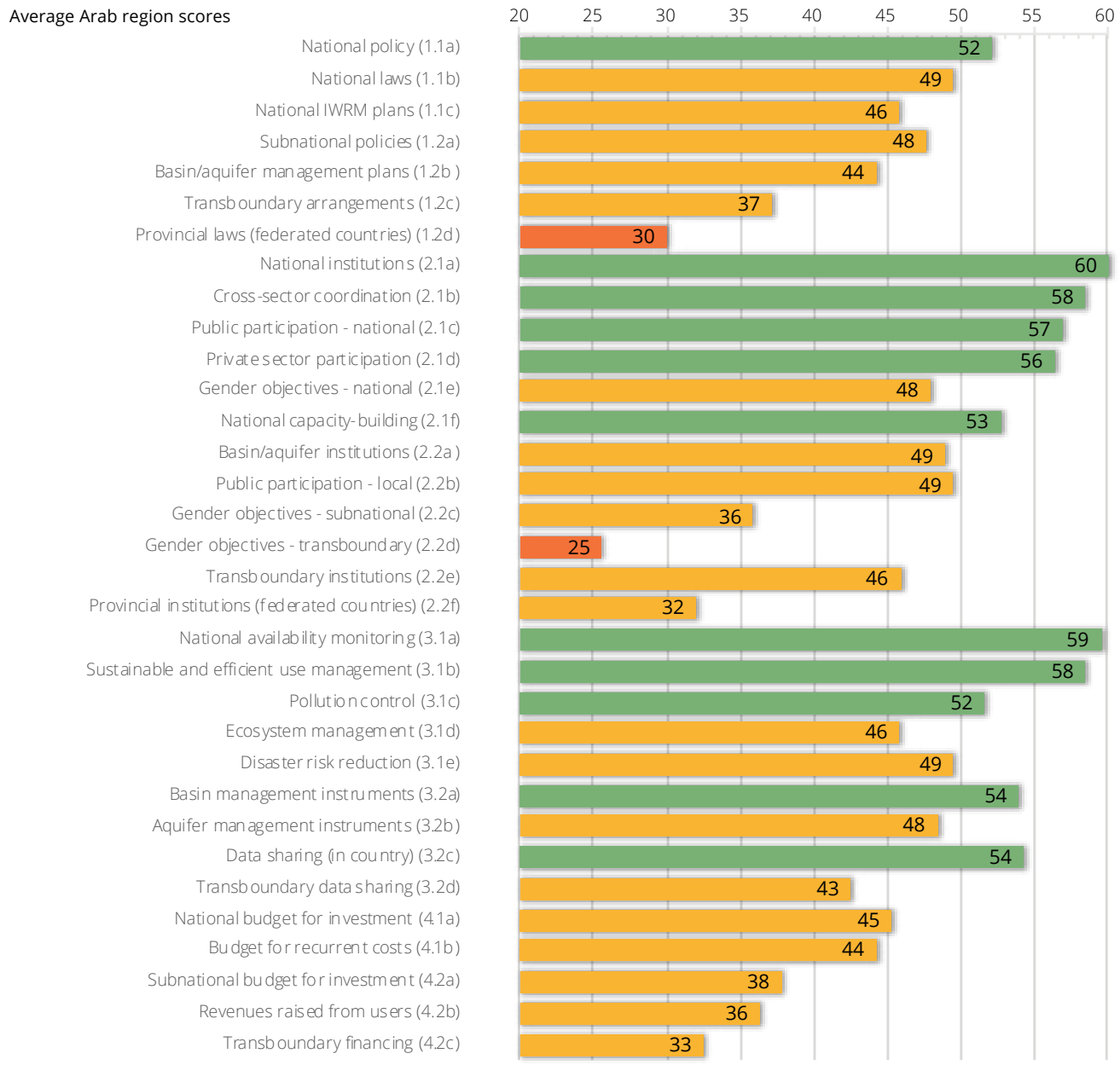


Table A.2.2 Average Arab region implementation of IWRM elements



Annex 3 National 6.5.1 data: IWRM implementation

IWRM implementation categories and score thresholds

Very low	Low	Medium-low	Medium-high	High	Very high
0 - 10	11 - 30	31 - 50	51 - 70	71 - 90	91 - 100

Scores based on 33 questions across four sections (see Annex 1). For full results for each question for each country, see http://iwrmdataportal.unepdhi.org

Country	Final IWRM Score	Section 1	Section 2	Section 3	Section 4
		Average	Average	Average	Average
		Enabling environment	Institutions and participation	Management instruments	Financing
Algeria	**48**	40	42	51	60
Bahrain	**40**	28	48	43	40
Comoros	**26**	27	35	14	28
Egypt	**40**	47	42	49	24
Iraq	**25**	24	22	42	12
Jordan	**63**	68	57	70	58
Kuwait	**82**	84	82	80	80
Lebanon	**32**	37	40	40	12
Libya	**47**	57	45	53	32
Mauritania	**45**	53	51	33	44
Morocco	**64**	68	69	64	55
Oman	**33**	33	18	57	24
Qatar	**82**	55	100	89	85
Saudi Arabia	**57**	42	68	71	46
Somalia	**10**	13	13	11	4
Sudan	**40**	37	44	44	34
Tunisia	**55**	67	53	58	40
United Arab Emirates	**75**	59	90	71	80
Yemen	**39**	50	51	36	20

Annex 4 National focal point affiliations

Ministry responsible for water resources	**Comoros, Djibouti, Jordan, Libya, Mauritania, Morocco, Oman, Somalia, Sudan, Tunisia**
National Statistical Office or similar	**Algeria, Bahrain, Egypt, Iraq, Kuwait, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates**
Other	**Lebanon (National Center for Remote Sensing, National Council for Scientific Research), Yemen (consultant appointed by Environmental Protection Authority)**

As described in Chapter 2, national focal points were advised to coordinate multi-stakeholder and multi-stakeholder processes to achieve consensus on country reports. Countries were not required to report on the processes used to achieve this. As such, there is insufficient information to judge the extent of stakeholder engagement. This issue may be addressed in future rounds of reporting to ensure greater transparency.

This report provides an Arab region baseline for Sustainable Development Goal (SDG) indicator 6.5.1: Degree of integrated water resources management implementation. The data presented is dependent on the efforts and contributions of government officials and other stakeholders from 19 Arab countries in reporting on SDG indicator 6.5.1.

Implementing integrated water resources management (IWRM) is a central building block in achieving the SDGs in the region, accepted internationally as the way forward for efficient, equitable and sustainable development and management of water resources and for coping with conflicting demands. Although the average for implementing IWRM is similar to the global score, there is a wide spread in the region, from very low to high. Among the reporting countries, 63 per cent are unlikely to meet the global target (to reach a very high degree of implementation by 2030) unless progress is significantly accelerated.

Through analysing the elements of the four fundamental dimensions of IWRM, this report identifies areas of progress, and areas that need urgent attention. The highest implementation level is found for both management instruments, and institutions and participation, the lowest for financing and the enabling environment.

National efforts supported by bilateral, subregional and regional cooperation initiatives over the years have helped Arab countries implement elements of IWRM. Most, however, need to set targets in line with national priorities and capacities to encourage action on the ground and further progress.

Moving forward, the report findings could be used as an important source of information to foster regional dialogue and action to accelerate IWRM implementation.