Ministry of Water & Irrigation
وزارة المياه والري

Climate Change Policy for a Resilient Water Sector

2016

This document is an integral part of the National Water Strategy and related policies and action plans.

1. National Water Strategy 2016-2025.
2. Water Sector Capital Investment Program (2016-2025).
3. Water Demand Management Policy.
4. Energy Efficiency and Renewable Energy in the water sector Policy.
5. Water Substitution and Re-Use Policy.
6. Water Reallocation Policy.
7. Surface Water Utilization Policy.
8. Groundwater Sustainability Policy.
9. **Climate Change Policy for a Resilient Water Sector.**
10. Decentralized Wastewater Management Policy.
11. Action Plan to Reduce Water Sector Losses (Structural Benchmark).

Ministry of Water and Irrigation

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Foreword

Jordan is a nation burdened with extreme water scarcity that has always been one of the biggest barriers to our economic growth and development. This crisis situation has been aggravated by a population increase that has doubled in the last two decades alone because of refugees fleeing to Jordan from neighbouring countries. We must then add to this the transboundary and climate change issues affecting Jordan's water supplies.

In the face of these challenges, and to achieve our goal of successful integration of Jordan's water resources management, the Ministry of Water and Irrigation has been active in putting forward four new policies that set clearly defined rules to manage the scarce water resources efficiently and sustainably. These new policies lay out the measures and actions required to achieve our national goals for long-term water security. These result-oriented policies are built upon and updated from previously adopted strategies, policies, and plans. Together, they are an integral and ongoing part of the overall management efforts that have already been achieved.

This policy is the result of the efforts of working group to whom I am thankful. My team has been putting great efforts to enhance water governance that support these policies at all levels, which include enforcement of a suitable legal framework and regulatory tools, enhancing efficient institutional capacities, and supporting dynamic management plans that adapt the concepts of participation and decentralizations all under the umbrella of Integrated Water Resource Management which I am sure will show results in the near future

Dr. Hazim El- Naser
Minister of Water and Irrigation

Introduction

Water scarcity is a severe constraint to Jordan's development. Current annual precipitation ranges from about 30 – 570 mm per year. Less than 10% of total annual precipitation (ca. 7000 million m^3) are turned renewable useable water resources, i.e. river discharge and groundwater recharge (less than 700 million m^3). Water availability per capita is among the lowest in the world (ca. less than 100 m^3 per person and year) and continues to decrease further with population growth and more refugees arriving. The flow of refugees across the Jordanian border can be interpreted as an inflow of additional water demand. On top of these growing water demands which have already led to severe declines in groundwater levels and river flows, water availability is simultaneously decreasing due to climate change. Climate change not only brings global warming, but in the MENA region and in Jordan it also causes more infrequent and reduced total annual precipitation. Already over the past decades the MENA region experienced a warming of about 0.2 degrees per decade, recently at an even higher rate. Mean annual temperatures in Amman have increased by more than 1.5 degrees over the past half century. Precipitation has already decreased in the region and also in Jordan itself (by more than 50 mm per year over the past half century in Amman), and the number of heat extremes and days with extremely high temperatures has increased[1] [2] [3].

Climate change impacts in the MENA region include:

- higher temperatures, more (intense) heat waves and accordingly stronger evaporation;
- less total rainfall and accordingly declining river flows and reduced groundwater recharge;
- increasing variability, changing spatial and temporal rainfall patterns and seasonal shifts, more intense droughts and floods[4].

The most recent state-of-the-art regional climate scenarios and impact assessments are available through the CORDEX RICCAR initiative[5]. RICCAR results, which only became available after the publication of Jordan's 3rd National Communications, are tailored for the Arab domain. RICCAR simulations are based on a broad range of global and regional climate and impact models, using the latest global climate scenarios[6]. RICCAR results show that climate pressures and their water sector impacts will intensify over time, and the resulting decrease in water availability is projected to get particularly severe after about the year 2040 - see figure 1 and 2 for the Jordan River basin, which is also fairly representative for the wider region.

[1] Jordan's 3rd National Communications, http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php
[2] Rahman et al. (2015): Declining rainfall and regional variability changes in Jordan, Water Res. Res., 51(5): 3828-3835
[3] Abdulla (2015): 21st century projections for precipitation and temperature change in Jordan, Report to MWI
[4] Milly et al. 2008: Stationarity is dead, Science, 319, 573-574
[5] CORDEX is a consortium of world leading climate modelers, RICCAR has a specific focus on the Arab domain
[6] The so-called Representative Concentration Pathways (RCPs) were developed for the latest (5th) IPCC report

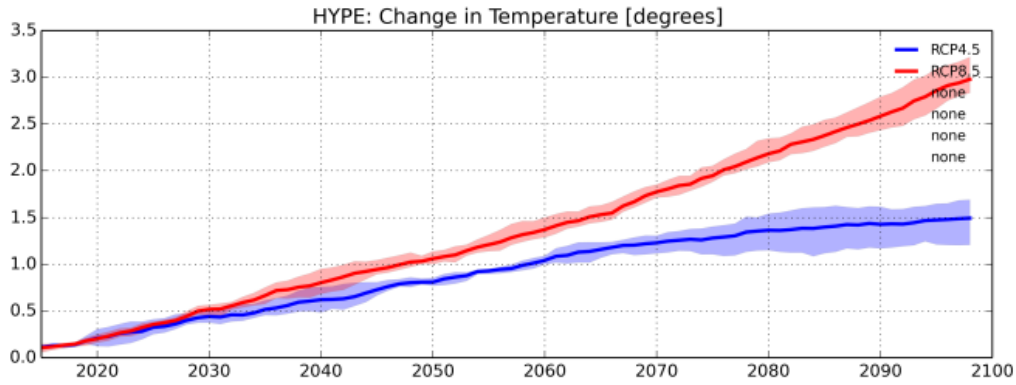

Figure 1: Temperature change for the Jordan River basin for two different climate change scenarios or greenhouse gas concentrations (RCP = representative concentration pathways), from RICCAR

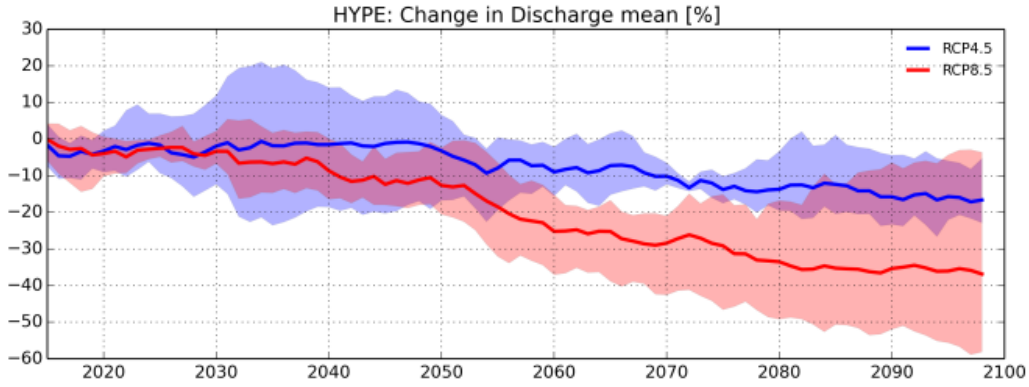

Figure 2: Change in Jordan River discharge as driven by climate change (mean model result and uncertainty range), from RICCAR

Jordan's 3rd National Communications on Climate Change[1], which also use CORDEX ensemble scenarios and RCPs but not yet specifically for the Arab domain, show very similar results:
Mean and maximum temperatures over the full country of Jordan will be 2-4 degrees higher, precipitation will be 15-20% lower and potential evapotranspiration about 150 mm higher by the end of the century.

Impact projections for Jordan, based on one particular climate model (the UK HadCM3) model and the older SRES A2 and B2 scenarios find for Amman an increase in dry years (years with <200 mm precipitation) from once every 3 years to once every 2 years, and about 30 days longer dry seasons[7], and a reduction in precipitation by ca. 10-15% by the end of the century (Abdulla 2015).

Socio-economic scenarios, which include other drivers than climate change (in particular increasing water demand) can be compared for their impacts with these climate scenarios by

[7] Verner et al. (2013): Increasing Resilience to Climate Change….The cases of Jordan and Lebanon, World Bank

using WEAP[8]. WEAP models are available for all major basins in Jordan and for the country as a whole and have been used for example for the National Water Master Plan and the Action Plan for the Substitution and Reallocation Policy as well as for the National Communications on Climate Change.

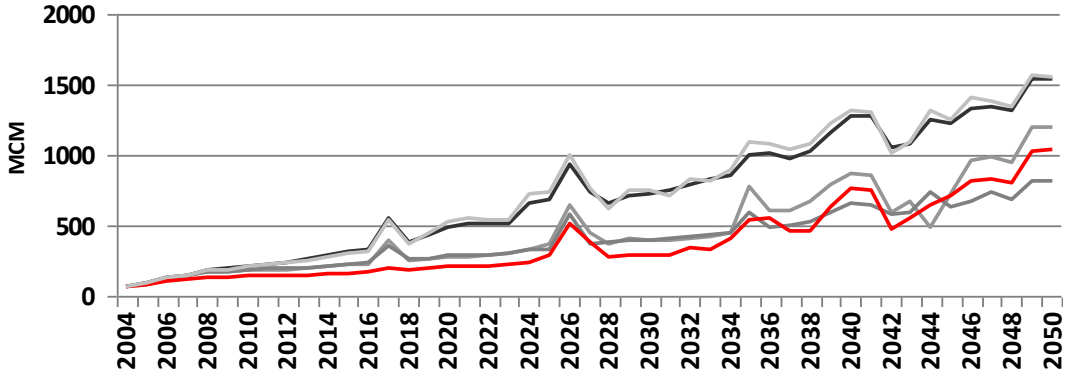

Figure 3: Comparison of unmet water demand (in MCM) in the Jordan basin due to climate change vs. due to socio-economic change, until the year 2050[9]

red curve: unmet demand as a result of decreasing water availability due to climate change (middle of the road SRES A1B scenario), grey curves: unmet demand as a result of increasing water demand due to different socio-economic development pathways.

The key conclusion of this WEAP-based analysis is that, different from most other world regions, climate change (decrease in water availability) contributes to the future water gap about as much as the (socio-economically driven) increases in water demand.

The water sector will be most heavily affected by climate change. Water-related impacts include reduced total water availability, less reliable seasonal patterns, increasing intensity of droughts during which reservoirs are not refilled, groundwater is not recharged and rain fed agriculture suffers damages, increasing intensity of flood events during which water and other infrastructure experiences overflow and damages. High rainfall events also increase erosion which causes losses of soil water storage and siltation of reservoirs. Higher temperatures cause higher evaporative demand and hence higher irrigation water demand. Higher temperatures also affect the efficiency of wastewater treatment plants.

Climate change acts as a threat multiplier[10], aggravating already existing water problems. The increasing climate pressure over time sets the baseline for this Climate Policy and its implementation. The general principle is that those (in particular infrastructure) solutions with a long lifetime, will have to be resilient to more severe climate shocks and more severe changes in temperature and total water availability as projected after about the year 2040 (see figure 1a and b).

[8] www.weap21.org
[9] Hoff et al. (2011): A water resources planning tool for the Jordan River; Water, 3, 718-736
WEAP has been used in a similar way in the California Water Plan and in other water and climate policies and plans
[10] World Bank (2014): Turn down the heat.

Guiding Principles

This Climate Policy responds to the challenges posed by climate change. It is based on **resilience as guiding principle**. Resilience means to absorb disturbances while maintaining structure and function[11]. The Jordanian water sector needs to build resilience in response to the combination of climate change and other disturbances and shocks. This Climate Policy for a Resilient Water Sector provides the background, concept and solutions and implementation mechanism for building resilience. The implementation is spelled out in more detail in the accompanying action plan to this Climate Policy. The three main levels of resilience are[10]:

- *persistence*, i.e. the degree of disturbance which a system can be subject to, without changing state or structure;
- *adaptability*, i.e. the ability of a system to adapt, self-organize and learn, while remaining in the same state;
- *transformability*, i.e. the ability of a system to transform into a new state after crisis or shock.

These three levels of resilience present successively stronger responses to the increasing pressure of climate change. Take the example of irrigation: initially, under current climate variability and relatively mild climate change, *persistence* of irrigated systems can be achieved by applying more irrigation water, in order to compensate for increasing evaporation. If climate change intensifies over time and total water availability decreases, *adaptation* requires a shift to less water intensive crops and to water-smart drip irrigation. If climate change intensifies even further with more severe droughts and water deficits, *transformation* becomes unavoidable and agriculture may need to be replaced by other less water-intensive and economic activities.

Note that transformations don't have to become a threat, since they can provide new opportunities for sustainable development, such as an energy transition to renewables. This requires early and pro-active planning and preparation, e.g. education and training of farmers to change to other employment and income opportunities.

[11] Rockström, Hoff et al. 2014: Water resilience for human prosperity, Cambridge University Press

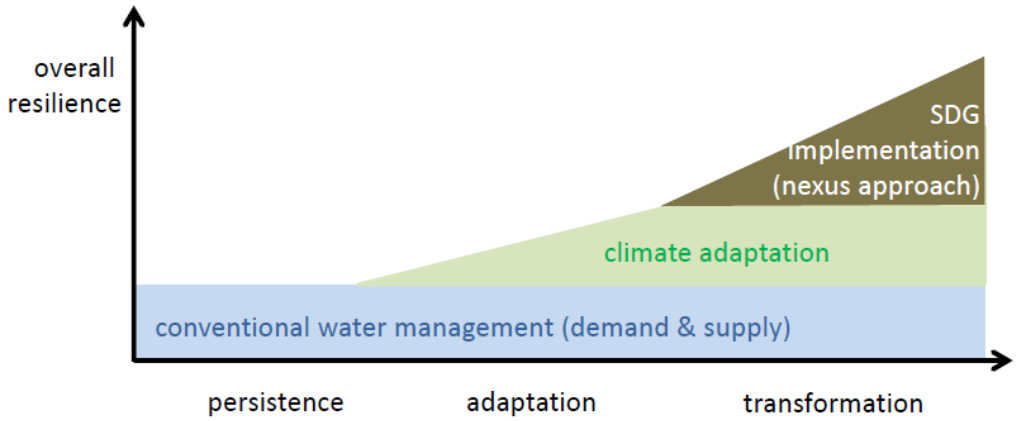

Figure 4: Conceptual representation of the different levels of resilience of the water sector: persistence, adaptation and transformation

Following the resilience concept with its increasingly stronger responses to climate change over time, a rigorous screening and prioritization of water sector solutions (see below) is necessary, according to their appropriateness under the expected severity of climate impacts during their respective lifetime (some water infrastructure may last for up to 100 years). Solutions will need to be more and more robust, as climate pressure increases over time. This Climate Policy outlines such a pro-active and adaptive process towards a resilient water sector. Building resilience enables the water sector to deal with the combination of climate and other pressures, including also for example price shocks on international energy markets that are likely to intensify in the future (the Jordanian water sector is very energy intensive and – like the energy sector as a whole - very dependent on fossil fuels and hence vulnerable to these price shocks). Building resilience has to encompass and integrate climate adaptation and mitigation and other capacity building measures.

The guiding principle resilience is also mentioned in the National Water Strategy, which requires Jordan to be more resilient…to future pressures on its water supply. Resilience is also a „main pillar in Jordan's Water Reallocation Policy. The long term goal of the [National] Climate Change Policy is…to increase the resilience….of water. Jordan's Response Plan is built around a resilience-based comprehensive framework. So this Climate Change Policy for a Resilient Water Sector can build on existing legislation and planning.

Integrated Water Resources Management is another guiding principle of this Climate Change Policy. Robust and resilient solutions for the water sector have to be based on existing IWRM approaches – upon which also Jordan's National Water Strategy is based. IWRM solutions have to be implemented, enforced and also modified as required for climate adaptation, and for sustainable development as specified in the Sustainable Development Goals (SDGs) [12] – see figure 5.

The SDGs are by nature integrated and transformative. National implementation of the SDGs has to take a comprehensive approach to environment- and development-related goals and targets. Many of those goals and targets are relevant for the water sector, not only those

[12] UN (2015): Transforming our world: the 2030 agenda for sustainable development

directly related to water (SDG 6), but also those related to food and agriculture (SDG 2), health (SDG 3), energy (SDG 7), economic growth and employment (SDG 8), infrastructure (SDG 9), cities (SDG 11), trade (SDG 12), climate (SDG 13) and land (SDG 15). Jordan's National Water Strategy explicitly refers to the targets 6.1 (access to drinking water), 6.2 (access to sanitation), 6.3 (water quality), 6.4 (water use efficiency), 6.5 (IWRM), 6.6 (water-related ecosystems) and 11.5 (water related disasters).

As for any new policy, it is important to integrate this Climate Policy with the existing policy context (see section on policy context). Under that heading this Climate Policy assesses climate (and other) water-related risks (see background section) for prioritizing options and implementing solutions and eventually monitoring outcomes (see section on implementation).

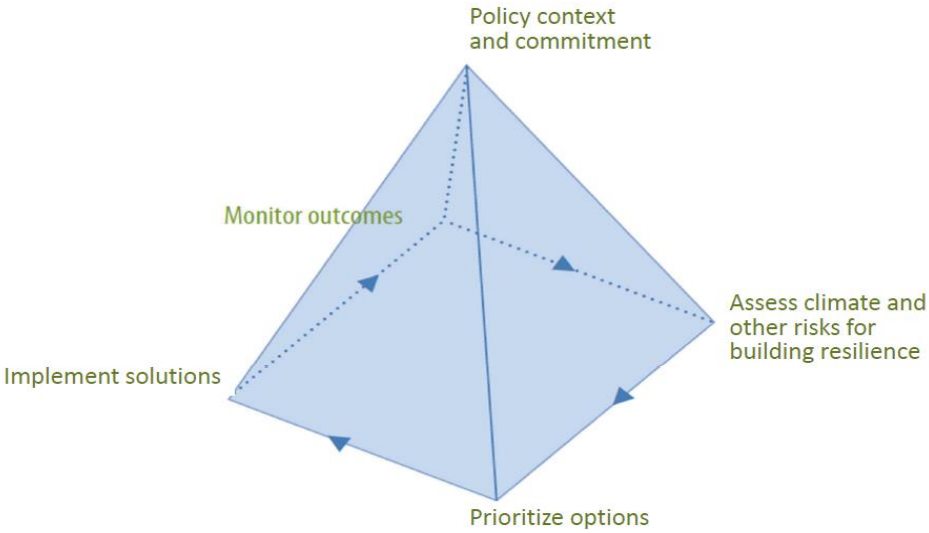

Figure 5: Structure of the Climate Change Policy for a Resilient Water Sector [13]

Rational, objectives and policy context

Given the large challenges resulting from climate change and other pressures, the rational of this Climate Change Policy is to provide a framework and methodology for strengthening the resilience of the Jordanian water sector, based on existing IWRM approaches. It does so in a systematic way by i) prioritizing solutions according to a combination of climate specific and other (already established)criteria, ii) applying climate proofing steps to solutions or investments, and iii) monitoring and evaluating the results based on indicators derived from i) and i). These objectives enable a mainstreaming of climate adaptation (and mitigation) into the existing institutional framework.

Mainstreaming means that this Climate Policy builds upon and adds value to the objectives, goals, priorities, and solutions of existing strategies, policies and plans of the water related sectors, rather than developing new stand-alone activities. These will be modified as required from a climate change perspective. This Climate Change Policy complements and builds upon

[13] after Verner (2012): Adaptation to climate change in Arab countries, World Bank

the following comprehensive set of documents that were developed by MWI for the water sector:

- National Water Strategy (and Action Plan), which sets the goals and objectives for the water sector and also provides an initial response to Jordan's commitment to the global Sustainable Development Goals, ….highlighting the need for stronger inter-sectoral coordination;
- National Water Master Plan, including Management Plans for managing water resources and water demand;
- Surface Water (Utilization) Policy, which addresses the interactions between the different resources and with different qualities, especially treated wastewater, to reach the maximum amounts of supply fit for use and the optimal return per meter cube;

- Ground Water Policy, which aims at achieving sustainability for water resources through the management of water abstraction and the gradual decrease of abstraction to reach the safe yield to conserve the groundwater resources in the long run, which protects the watershed areas from pollution and allows for artificial recharge of ground water, which also includes the responsibility for awareness and water conservation, and which also refers to the principles of IWRM;
- Water Reallocation Policy, which prioritizes and re-allocates water from different sources (e.g. groundwater use considering safe yields) between the different sectors and governorates according to adaptive capacity, and at the same time at reducing non-revenue water;
- Water Substitution Policy (and Action Plan), which aims at substituting freshwater with treated wastewater and possibly other non-conventional water sources, avoiding negative impacts on water and soil quality, and which also refers to the principles of IWRM;
- Water Demand Management Policy, which lists a wide range of capacity building, institutional, economic and technical measures for demand management;
- Energy Efficiency and Renewable Energy Policy (and Action Plan), which aims at reducing the total energy consumption in water facilities by 15% and at increasing the share of renewable energy to 10% of overall energy used in the water sector;
- Water Sector Capital Investment Plan, which lists a broad range of infrastructure or hard solutions and economic and financial criteria for their prioritization;
- Structural Benchmark Action Plan, which lists options for improved cost-recovery in the water sector.

In addition to the above water-sector documents, the Climate Change Policy also builds on strategies, policies and plans from other institutions, such as:

- National Climate Change Policy, which holistically addresses adaptation and mitigation and which is the first of its kind in the Arab region;

- 3rd National Communications on Climate Change[1], which report Jordan's climate adaptation and mitigation activities to UNFCCC (Jordan is one of very few Non-Annex I countries that has already submitted their 3rd National Communications);
- Intended Nationally Determined Contribution (INDC), which together with the National Climate Change Policy and the 3rd National Communications provides the link to the international climate change agenda and funding; Jordan's intended national contribution will reduce national greenhouse gas emissions by at least 14%, and if international funding becomes available by another 12.5% by the year 2030;
- Response Plan for the Syria Crisis;
- Jordan 2025;
- Green Growth Plan (due in 2016), which will cover water as one of 6 focus sectors;
- Sustainable Development Goals (SDGs), which Jordan will begin to implement in 2016;

These strategies, policies and plans already contain most the required elements or building blocks for a resilient water sector. The Climate Change Policy builds upon the relevant elements of each of them and integrates these with climate adaptation (and mitigation). That integration follows a **nexus** approach[14] which will eventually also integrate water solutions with the SDGs (see nexus section of the National Water Strategy). Coordination with relevant institutions from the water sector and beyond as well as **policy coherence**[15] will be important for developing robust solutions and building resilience for sustainable development. The Paris Climate Agreement on climate provides additional policy context. This agreement prescribes climate mitigation solutions to hold the increase in the global average temperature below… 1.5°C. It further assesses adaptation needs with a view to assisting developing countries and proposes climate finance programmes [to] incorporate climate-proofing and climate resilience measures. The Jordanian Climate Policy for a Resilient Water Sector can build on this improved international policy context and use the new impetus for climate protection.

The principle of **adaptive management** also applies to this Climate Change Policy: rational, objectives and priorities need to be reassessed frequently and the monitoring of progress and actual performance need to be adapted to any new knowledge becoming available, in the water sector and in other sectors, including new results from climate science / climate services. This is similar to the iterative process of monitoring, evaluation and adaptation described in the Capital Investment Plan. So this Climate Change Policy will also frequently be iterated with the Capital Investment Plan. It can best serve its purpose as a living document (e.g. web-based) that is frequently amended and updated.

[14] Hoff (2011): Scientific background paper to the Bonn Nexus Conference
[15] OECD (2015): The water-energy-food nexus: Policy coherence for sustainable development, see also SDG 17.14

Implementation: Prioritization, Climate Proofing and Monitoring

Building resilience to all climate and other pressures requires to make use of (and coordinate) the full range of solutions, which together form a **continuum of solutions** from soft (e.g. capacity building) to hard (e.g. infrastructure) solutions[16].

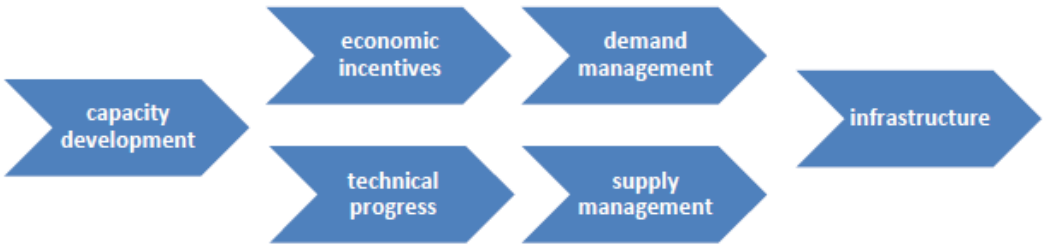

Figure 6: Continuum of soft and hard solutions in the water sector

Integrated Water Resources Management (IWRM) provides the point of departure for this Climate Change Policy. IWRM encompasses many relevant solutions for climate adaptation (and mitigation). Below is a list of water-related solutions, starting from hard (mostly infrastructure) solutions, and moving down towards softer, e.g. economic and capacity building, solutions:

- water storage, using all options, e.g. dams & reservoirs, ponds, cisterns, aquifer recharge and groundwater storage, soil water storage;
- new water, water harvesting (in combination with supplementary irrigation for drought- and climate-proofing and increasing the water use efficiency of primarily rain fed agriculture, which is practiced on 60% of Jordan's cropland), water transfers, wastewater collection/treatment/reuse, desalination (for climate mitigation purposes, this option needs to be based on renewable energy);
- water quality protection and improvement, to increase water availability for unrestricted use;
- virtual water through imports of water-intensive products;
- integrated water and land planning / management / zoning, water-smart land use, including urban planning - stop encroachment, loss of agricultural land[17], overgrazing, desertification, land degradation, erosion and reservoir sedimentation, including conservation agriculture and soil conservation for improved soil water storage and soil filtering capacity, protection of groundwater recharge areas from pollution and water-smart afforestation;
- economic incentives for reducing water (and energy) use and also for using more renewable energy in the water sector;
- water (and energy) demand management: either via technical measures, e.g. infrastructure rehabilitation and reduction of transmission losses (in the agricultural sector for example:

[16] for soft solutions see Gleick (2003): Soft path solutions, Science, 302, 5650, 1524-1528
[17] according to the 3rd National Communications the main threat to rainfed cultivation in Jordan is urban expansion

drought resistant crops, use of brackish water, better use of rainfall, more efficient irrigation) or also economic measures (e.g. water pricing) or awareness raising and behavioural changes;

- improvements in water use efficiency, e.g. driven by demand-management or water re-allocations, these generally also translate into energy savings[18];
- improved climate data collection, monitoring and early warning systems;
- training and capacity development:
  - public awareness and behavioural change, working with existing networks such as the Highland Forum
  - building political will to address climate change
  - mainstreaming climate expertise into water management, e.g. facilitating the use of climate data[19] for planning and early warning (climate services)
  - training of experts for writing successful proposals to international climate funds;

Given the expected decrease in total water availability that climate change brings to the region, particular emphasis needs to be on reducing demand (i.e. demand management). However, in order to bridge the rapidly increasing gap between demand and supply, all soft- and hard-path solutions have to be explored to the maximum extent possible in a coordinated way. Prioritization and climate-proofing of all solutions is important for meeting the challenges of climate change and eventually for making them integral part of national SDG implementation.

Prioritizing solutions requires additional new criteria on top of the existing ones, in order to address climate change and strengthen the overall resilience of the water sector. These criteria can for example be related to the appropriateness of solutions under the severity of climate change that is expected during the life time of the respective solution, or they can be related to synergies or trade-offs between climate adaptation and mitigation. These climate-specific criteria for prioritizing solutions need to be integrated with existing water-sector criteria (e.g. cost efficiency, feasibility, urgency) such as the criteria for investments listed in Jordan's Water Sector Capital Investment Plan. Here is an integrated list of climate-related and other criteria for systematic prioritization of solutions:

i) cost efficiency[20] – measured as either water savings or additional water supply per JD (adaptation) or CO_2 emission reductions per JD (mitigation) – this broadens cost effectiveness criteria as used in the Capital Investment Plan which has a strong focus on the supply side – or other criteria

ii) feasibility of implementation– measured e.g. by donor funding availability or by the level of agreement that can be reached with other sectors and ministries, or other criteria.

[18] there are large opportunities in Jordan for improving energy as well as water use efficiencies

[19] e.g. those available from the RICCAR / UNESCWA / FAO knowledge hub

[20] Note that conventional cost-efficiency calculations can be enriched by including a climate perspective and accounting for costs of inaction – see e.g. Stern (2009): The global deal

iii) urgency – measured e.g. based on the priority criteria in the Capital Investment Plan such as sewer overload – or other criteria.
iv) number of jobs created
v) total nation-wide potential for closing the gap between water demand and supply
vi) appropriateness of solutions for the expected severity of climate change during their lifetime
vii) synergies between climate adaptation and mitigation
viii) additional criteria for prioritizing solutions.

Such a more comprehensive set of climate-related and other criteria can go beyond the standard dichotomy of regret vs. no-regret or win-win solutions. Prioritizing solutions based on this set of criteria can help to build resilience to climate and other pressures, and with that contribute to the national SDG implementation. This set of criteria can be applied for prioritizing the full set of soft-to-hard solutions (see above). Following a nexus approach, such a prioritization will be done by an interdisciplinary team with a broad range of expertise and perspectives and representing all relevant sectors. It also needs to be updated frequently, as new (climate and other) data and information become available.

The **priority scores for each solution** can be presented e.g. as a table or in graphical form (note that the following table is tentative, pending elaboration and completion by an inter-disciplinary team of experts):

Table 1: Prioritization Scores for Selected Solutions According to Different Climate-Related and Other Criteria

	Cost Efficiency*	**Synergies or Trade-Offs between Adaptation & Mitigation****	**Climate Effects Addressed*****	**Lifetime of the Solution ********	**Resilience Levels Covered *********
Desalination (Fossil Fuel Based)	-1	-1	Ads/ad	3	1,2
Desalination (Solar Energy Based)	+1	+1	all	3	1, 2, 3
Wastewater Reuse And Energy Recovery	+1	+1	Ads/m	3	1, 2, 3
Water Harvesting	+1	+1	all	3	1,2
Virtual Water Imports	0	0	Ads/ad	1	1, 2
Solar Energy Farming	0	+1	all	3	1,2,3
Afforestation	+1	-1	m	3	1, 2
Expert Training	+1	+1	all	2	1, 2, 3

* +1: high cost efficiency, 0: medium cost efficiency, -1: low cost efficiency

** +1: synergy between adaptation and mitigation, 0: only adaptation or mitigation is addressed, -1: negative effects on the other dimension

*** ads: adaptation to decreasing total supply, ad: adaptation to droughts, m:mitigation

**** 1: short term - few years, 2: medium term - up to 20 yrs., 3: long term - beyond 20 years

***** 1: persistence (short term), 2: adaptability (medium term), 3: transformability (long term)

Climate proofing of solutions and investments is an additional implementation step of this Climate Change Policy which complements prioritization. As described above, this Climate Policy strongly relies on existing IWRM solutions and investments already planned in the water sector, such as the projects listed in the Water Sector Capital Investment Plan or in the Structural Benchmark Action Plan. The vulnerability to future climate change and other pressures and the potential contribution to building resilience (persistence, adaptation and transformation) varies among the different solutions. Individual solutions may need to be strengthened or otherwise modified, to be robust under future climate change conditions. New innovative solutions, beyond those already established, will be required to meet the additional challenges of climate change. A climate proofing procedure is required for implementing this Climate Change Policy. This climate proofing procedure assesses for each solution or investment the relevant climate impacts, the biophysical and socio-economic context, and resulting vulnerability and risks[21]. From that it identifies modifications and required additional actions. Figure 7 schematically presents the steps of climate proofing.

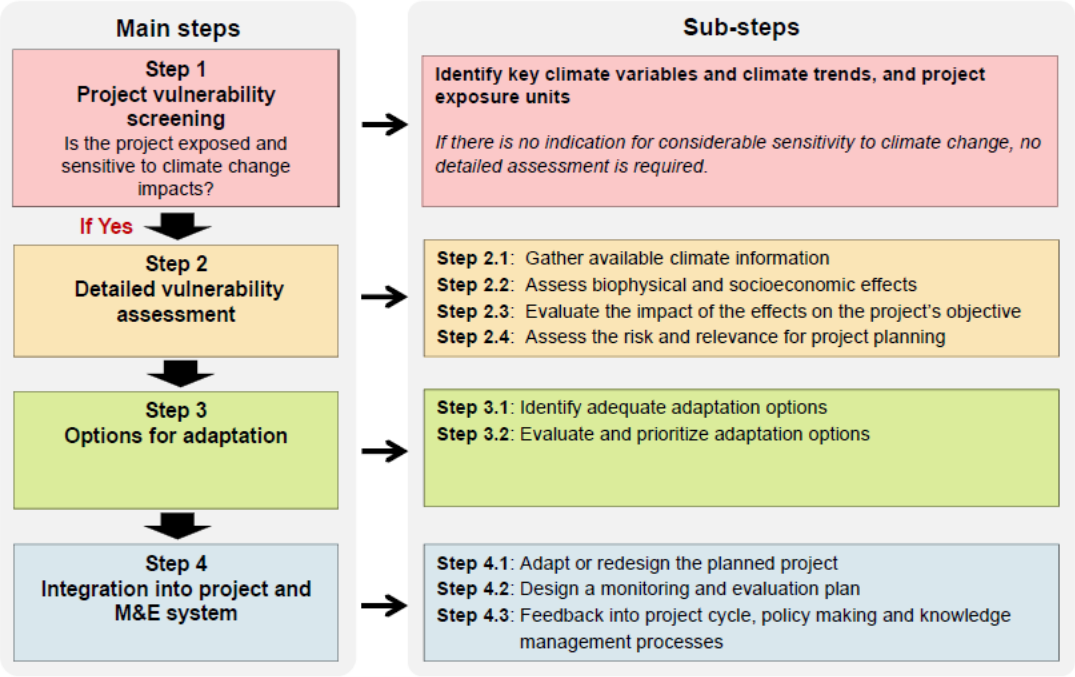

Figure 7: Steps in climate proofing of solutions and investments

This Climate Change Policy for a Resilience Water Sector with its pro-active and systematic integration of climate adaptation (and mitigation) and other sustainability criteria with the current water sector priorities and activities is unique in the MENA region and beyond. It creates opportunities for using the increasing awareness of climate change(see Paris Agreement)for:

[21] Eickhof (2014): Guidelines for Climate Proofing Water Investments in the MENA region, GIZ

i. implementing and enforcing IWRM measures that have long been overdue;
ii. making significant climate funding available for the water sector;
iii. making Jordan a leader in climate resilient green growth.

Action plan

An action plan complements this Climate Change Policy. This action plan specifies the implementation of the Climate Change Policy in terms of concrete activities and investments, timeframe, indicators for monitoring, and responsible actors.

The point of departure for this action plan is the list of projects in the Water Sector Capital Investment Plan and in the Structural Benchmark Action Plan. Prioritization and climate proofing of these solutions follows the criteria and steps listed in the respective sections of the Climate Change Policy. Prioritization of projects will be modified as required by the additional climate-related criteria. Climate proofing is based on the respective project context and the climate impacts projected for the relevant (short, medium and long term) time periods. From that the vulnerability will be assessed for each project listed in the two documents (Capital Investment Plan and Structural Benchmark Action Plan).

From those climate proofing steps, required modifications of planned projects and required new projects will be identified. Prioritization and climate proofing involves an interdisciplinary team of experts and can be supported by integrated water evaluation and planning tools, such as WEAP[22].

Since the implementation of the Climate Change Policy is to be mainstreamed with existing strategies, policies and plans (see relevant documents listed in the Climate Change Policy), also the indicators for monitoring and evaluation of progress have to be aligned with and complement existing performance indicators, e.g. those listed in the National Vision Jordan 2025 (e.g. fraction of renewables in the energy mix, energy efficiency of water supply, increase of drip irrigation, forest area). Additional indicators that address climate adaptation (and mitigation) include for example: robustness to increasing climate variability / droughts / floods and to uncertainty, vulnerability to higher temperatures and extreme heat waves, synergies between adaptation and mitigation (e.g. energy intensity, renewable energy use), eligibility for international climate funding, and others.

Integrated Water Resources Management, which provides a good basis for the Climate Policy, has not yet been aligned well with policies and action plans of other sectors beyond the water sector. For the Climate Change Policy, coordination and integration with other sectors becomes even more important, also for alignment with the Sustainable Development Goals. The following institutions are very relevant for the implementation (and frequent updating) of the Climate Change Policy and its action plan:

[22] www.weap21.org

- Ministry of Environment, in particular the Climate Change Directorate, but also others e.g. addressing water allocations to ecosystems;
- Ministry of Agriculture;
- Ministry of Energy and Mineral Resources;
- Ministry of Planning and International Cooperation, e.g. for accessing international climate funds;
- Ministry of Municipal Affairs;
- Greater Amman Municipality (GAM);
- General Department of Statistics.

So-called bridging institutions which have members from different sectors, such as the National Committee on Climate Change, can facilitate cross-sector coordination and climate mainstreaming.

The action plan for the Climate Change Policy can build on existing IWRM activities. However, IWRM implementation has been slow so far. In order to avoid such problems, the action plan needs to include incentives for effective implementation and enforcement of the Climate Change Policy.