

Water Sector

Policy Brief for Climate Change Adaptation for the Ministry of Water Resources and Irrigation

Main Issues for Water and Coastal Sectors

WATER RESOURCES

Egypt as an arid country relying on the Nile River which provides 95% of its water resources is suffering water stress due to the limited supplies and growing population, and increased competition on water from the upper Nile basin countries. Besides, water pollution, lack of financial resources, lack of harmonized legislations, and significant decline in Nile stream flow under climate change present additional challenges. The application of the Integrated Water Resources Management (IWRM) approach is an essential element in facing these future challenges to the water sector.

COASTAL ZONES & IMPACT TO GROUNDWATER

Climate change poses significant risks through sea level rise on the coastal zones, which is already subsiding around the Nile delta. Estimates indicate that 0.5 m SLR would lead to the permanent submersion of 1,800 km² of cropland in low lands of the Nile Delta, and accelerate the trends of desertification in the form of increased soil salinity in the remaining lands. Depending on the underlying hypotheses and scenarios, SLR might cause the loss of as much as 12-15% of the existing agricultural land in the Delta, and 195,000 jobs.

In addition to that, low land areas and groundwater aquifers along the Mediterranean coast of Egypt are exposed to inundation and severe deterioration and salinization from salt water intrusion due to SLR. This will lead to deterioration of crop quality and productivity in addition to expected increased health problems and loss of tourism. This phenomenon is considered of utmost importance and warrant full investigation.

Water and agriculture appear to be the highest priority for Egypt. The flow of the Nile is projected to decrease by one-tenth in the middle scenario and by more than one-third in the lowest flow scenario. Agricultural productivity is projected to face risks from higher temperatures and a potential reduction in water supplies. Therefore it will also be important to reduce the vulnerability of crop yields to changes in climate.

The combination of lower crop yields and reduced water for irrigation results in an estimated decrease in agriculture production of one-quarter for the middle scenario and almost one-half

for the low scenario. Food prices would rise 40 to 60% and employment in agriculture would decrease by roughly 20 to over 35%. Annual reductions in total welfare are estimated to be 100 to 200 million EGP, larger than the impacts on other sectors, except tourism in some scenarios. A reduction in water supplies would also harm human welfare by potentially reducing municipal and industrial water allocations.

The consequences of a decrease in Nile flow are great, and Egypt should give high priority and enough attention for improving the efficiency of water use and increasing water supplies.

Finally coastal resources are also at risk from SLR and should be effectively addressed through an integrated approach via the UNDP-GEF “Integrated Coastal Zone Management” project.

Importance for policy change

So far, the country is managing water resources with some difficulties. The per capita share of fresh water resources is decreasing while the Nile water supply (the major source of water supply) is fixed since 1959 when the population has increased fourfold. Now, there is high pressure on water resources in Egypt to support the basic needs for the population, industry, and agriculture production.

Therefore, there is a need to have new policies that are capable of facing and overcoming the above mentioned challenges. More challenges are expected to happen more often, especially with the dry climate change scenario on the Nile Basin countries, and with sea level rise along the North coast. Decisions need to be taken at the national level to tackle the management of water resources.

Major Policies to be considered

There are four main issues for adaptation of Egypt's water resources: water management, enhancement of supplies, reduction in demand and coastal management.

Water management

Among the important issues facing Egypt is management of the HAD. If flows appear to be decreasing, perhaps flood management margins could be decreased. If flows increase, then an issue is what should be done with excess water. The Second National Communication mentioned further developing storage options in Egypt in places such as Toshka and the Quattara Depressions. Another possibility that is often overlooked in the literature is increased variability. It is possible that flows could also fluctuate between higher and lower flow levels on seasonal and annual cycles. Since reservoirs are designed to manage the flow variability at a particular site, increased variability would lower the yield.

Water management can also involve improved planning for extremes and long-term changes in conditions. Egypt should have a drought management plan. If one already exists, it should be assured to account not only for increased demand; e.g. from population growth, but also the possibility of more intense and frequent droughts should Egypt's climate become hotter and drier.

An integrated water management strategy for Egypt is needed. It should account for current risks including potential changes in those risks from climate change. A water management plan should be evaluated in light of climate change to make sure if adjustments, changes, or contingency plans are sufficient.

Enhancement of supplies

With population growth and the potential for reduced flow in the Nile, cost-effective options for enhancing supplies should be pursued. These options don't need to be developed immediately; unless they are already needed, but they should be kept open as options should be needed in the future. This may involve research and development (R&D), keeping land use options open (e.g., to build a desalination plant or reuse facility), removing regulatory and institutional barriers to such options, and having financing available.

- Desalination is an option that is already being pursued in Egypt and may need to be enhanced with advances in science and technology under climatic changes.
- Reuse is another option for enabling more to be done with existing supplies. Water applied to irrigation need not meet the same standards as drinking water. Water that has been used for municipal, industrial, or even agriculture uses can be treated to certain levels and used for internal uses, irrigation, or to maintain instream flow.
- Additional groundwater usage is in general not a sustainable strategy unless it is being recharged.
- Additional rainwater harvesting could help along the Mediterranean coast.

Demand Reduction

Agriculture currently uses about 85% of water resources in Egypt (CAPMAS, 2010), so demand reduction needs to address water use by agriculture. In addition population is projected to increase substantially so reducing water demand in the domestic sector is also important. Among the options that can be considered is the enhancement use of market mechanisms to reduce demand.

One general point that can be made about many, if not all of the adaptations on water resources is that the adaptations identified above can be justified without consideration of climate change. The extremely tight water supplies in Egypt combined with growing demand make more

efficient use of water and enhancement of supplies imperative. Climate change presents yet another reason for making such investments and may hasten the time when these investments need to be made.

Coastal Resources

Policies to be considered for Coastal Resources are to:

1. Develop an ICZM Plan
2. Implement recommendations from the Egyptian Second National Assessment on projecting coastal resources, including:
 - Creation of wetlands in vulnerable areas
 - Reinforcing hard structures such as Mohamed Ali Seawall and coastal roads
 - Enhancing the work of the Coastal Zone Management Committee to formulate and implement the ICZM plan
3. Expand marine protected areas
4. Redirect growth away from vulnerable areas
5. Develop a strong monitoring and enforcement system to ensure implementation of adaptation measures especially for seawater intrusion

The UNDP-GEF project called “Adaptation to Climate Change in the Nile Delta” will be addressing the above mentioned policy concerns.

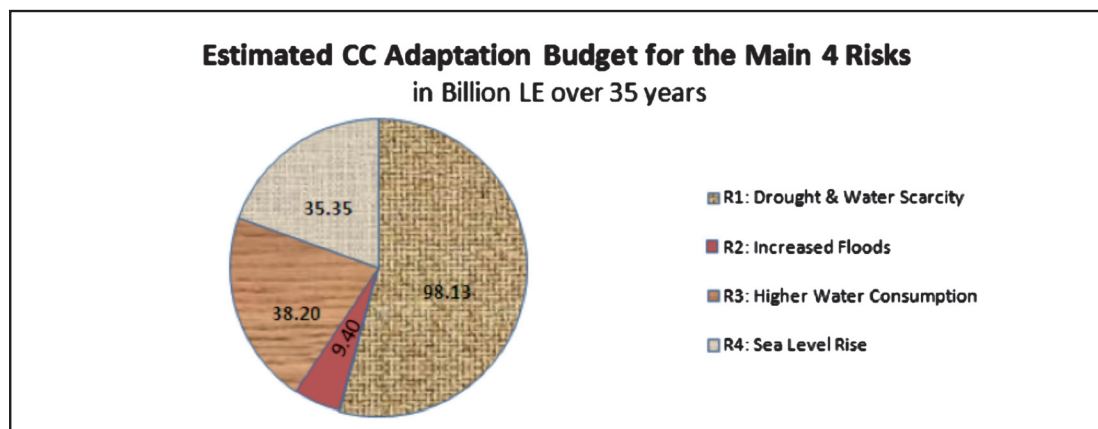
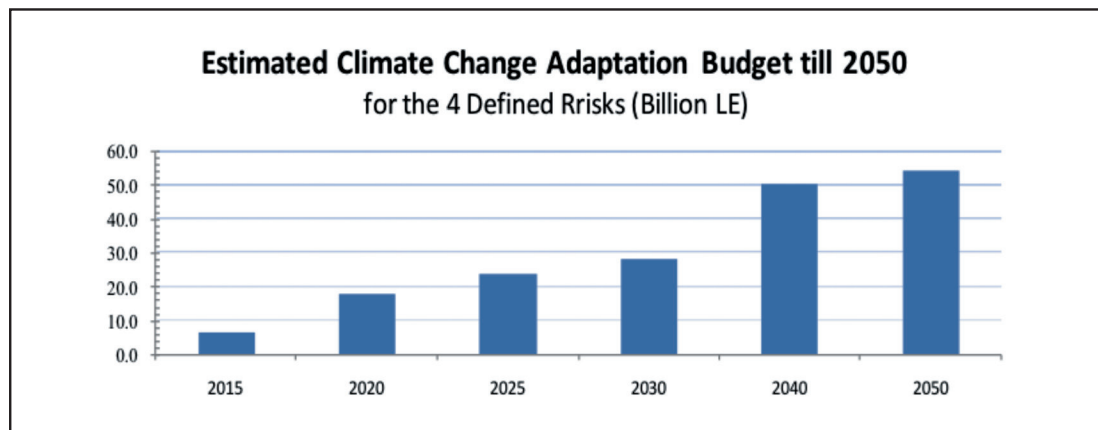
Providing an enabling environment is necessary to implement these policies by:

- Understanding mainstreaming of climate change adaptation as an Integrated Policy Approach;
- Establishing of transparent and effective governing structures;
- Promoting of dialogue and coordination between water-related sectors;
- Building on existing practices, tools and systems;
- Integrating within development budgets;
- Building capacity of the required institutional frameworks; and
- Raising Public awareness on climate change.

Financial Resources needed for the New Policy?

The adaptation measures are developed to cope with the main four induced risks of climate change and their consequences as outlined and classified in the strategy report. Risk -1 Droughts and water shortage, Risk-2 Increased Nile River floods, Risk-3 Higher water consumption, and Risk-4 Sea Level Rise. The measures are classified and prioritized, and most of the selected ones are of no-regret or low-regret nature. This implies that they are needed to serve the development plans for satisfying future water demands taking into account possible climate change impacts, as well as safeguarding the exposed areas against sea level rise near the coastal zones. The estimated costs are phased in a compatible way with the growing demands and expected climate changes. However, it is based on current prices without taking inflation into account.

The total estimated budget for implementing the policy against the above mentioned 4 risks is about 180 billion LE until 2050 (unequally distributed over three-5 years plans and two-10 years plans). Risk-1 constitutes about 55% of the total budget, while the budget allocated for Risk-2 constitutes about 5% of the total adaptation budget. The budgets allocated for adaptation to Risk-3 and Risk-4 is almost equal and constitutes about 20% of the total budget. The strategy report shows the details of the estimated budgets for all projects under these measures at the designated years, as well as their classification.



What are the details of the New Policy?

The new policy is based on qualitative and quantitative assessment for the expected water availability and requirements. It focused on several infrastructural measures as well as managerial type ones. The infrastructural ones focused on developing additional water resources from groundwater, desalination, recycling agricultural drainage water and treated waste water for agriculture, in addition to enhancing the upper Nile water projects. It also aims at conserving all water demands in different sectors, especially in the domestic and agricultural sector. This may lead to distributing irrigation water on volumetric basis. Besides, the policy is looking after new alternatives like sea-water agriculture to grow some specific crops. Regarding coastal protection, the policy also considers protection of the risk area and maintaining and enhancement of the existing protection structures. These measures are given in the climate change strategy of the Ministry of Water Resources and Irrigation.

The new policy also considers important legislative and managerial tools like applying the integrated water management concepts and participation of stakeholders, issuing new regulations to protect the environment and create incentives to optimize water usage. Besides, the policy takes care of building capacity of human resources and creates awareness for the public.

The guidelines for mainstreaming the proposed adaptation strategy recommended establishment of an effective, competent, and capable entity that can implement the adaptation measures into the integrated water resources management as well as the national development strategy. This entity may start as a central body that is linked to the office of the prime minister or the cabinet to acquire the capacity and power in dealing and coordinating with all concerned ministries and bodies. Then, upon establishment and assigning mandates, resources, rules and authorities, and plans, it would expand over the whole country to cover all geographical and ministerial or sectoral aspects related to water resources management.

Mainstreaming climate change adaptation into national development plans is an iterative process to be integrated into policy making, financing, implementation and monitoring processes at national, sectoral and sub-national level. Legal, financial and institutional setup, in addition to high level and strong political support are needed for mainstreaming climate change adaptations into the national development plans.

Who are the key stakeholders?

The following table includes a list of the key stakeholders and their roles and reasons for involvement

Stakeholder	Key Roles and reasons for involvement
President or Prime minister's office	- High-level authority for securing political commitments
Ministry of Water Resources	- National policies / strategies / action plans - Management of Water resources
Ministry of Agriculture	- Water abstraction, - Irrigation efficiency, and Water conservation in crop production, and - Competing priorities with drinking water
Ministry of Infrastructures	- Implications regarding climate change trends affecting water availability and quality
Ministry of Environment	- Impacts on water quality, sanitation and environmental sustainability
Ministry of Health	- Changes in water patterns affecting water-borne diseases and vector borne diseases such as malaria
Ministry of Energy	- Implications for the availability of water for hydropower schemes, and cooling for power plants and refineries.
Ministry of Finance	- National budget and prioritization
Ministry of Planning	- The role of water and CC within general development vision and plans
Disaster Management unit	- Overlaps with climate risk and experience in related systems, mechanisms, processes and implementation
Meteorological Services & institutes	- Climate trends and predictions
Members of Parliament	- Regulation and standards - National policies - Public finances and fiscal policy
Research Community	- Research and development for Best Practices - Awareness-building and lobbying
Civil Society and Non-Governmental Organizations	- Local level expertise - Awareness-building
Media	- Framing of issues such as climate change, risks and disaster - Public awareness-raising - Early warning dissemination - Lobbying, and Exerting political pressure
Private Sector Institutions	- Often water is provided by private sector or public/private partnerships, as well as industrial and business use of water
Donor Agencies	- Capacity building - Technology transfer - Finance - Research and development

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Reasonable efforts have been made to ensure that the contents of this publication are factually correct and properly referenced.

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Please see MWRI for the detailed reports

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