Background Brief

Compilation of all Excerpts from IPCC Fourth Assessment Report
(Working Group II Contribution)
with direct relevance to the Arab countries

Current sensitivity and/vulnerability

I. Africa
- In assessing current sensitivity to climate weather: “Even countries located in dry areas (Algeria, Tunisia, Egypt and Somalia) have not been flood free”
- The relevance of the problem of water scarcity is evident in North Africa, considering that estimates for the annual average growth of the population are the world’s highest: 2.9% for the period 1990 to 2002. The water exploitation index is high in several countries in the sub region: >50% for Tunisia, Algeria, Morocco and Sudan and >90% for Egypt and Libya.
- Integrated analyses of climate change in Egypt, moreover, show that population changes, land use changes and domestic growth strategies may be more important in water management decision-making than a single focus on climate change.

II. Asia
- On the other hand, many people in megadeltas, of which the Nile Delta are already subject to flooding from both storm surges and seasonal river floods, and therefore it is necessary to develop further methods to assess individual delta vulnerability
- Central and West Asia include several countries of predominantly arid and semi-arid region. Furthermore, with the gradual reduction in rainfall during the growing season for grass, aridity in Central and West Asia has increased in recent years, reducing growth of grasslands and increasing bareness of the ground surface
- In addition, increasing population in areas with limited arable land have led some countries (Jordan, Iraq, Syria and Yemen) to use irrigated farming throughout the year as well as to increase their use of fertilizers and pesticides, these trends add to the land degradation problem.

Assumptions about future trends

I. Africa
- Other experiments indicate higher levels of warming with the A1FI emissions scenario and for the 2070-2099 period: up to 9 degrees Celsius for North Africa (Mediterranean Coast) in June to August.
- With the SRES A1B emissions scenario for 2080-2099, mean annual rainfall is very likely to decrease along the Mediterranean coast (by 20%), extending into the Northern Sahara and along the west Coast to 15°N,
Expected key future impacts and vulnerabilities, and their spatial variations

I. Africa

- Detailed assessments in Northern Africa based on temperature increases of 1 to 4°C and reductions in precipitations of between 0 and 10% show that the Ouergha watershed in Morocco is likely to undergo changes for the period 2000-2020. A 1°C increase in temperature could change runoff by of the order of 10%, assuming that the precipitation levels remain constant. If such an annual decrease in runoff were to occur in other watersheds, the impacts in such areas could be equivalent to the loss of one large dam per year.

- Further interactions between climate and other factors influencing water resources have also been well highlighted for Egypt. However, with climate change, an array of serious threats is apparent.
  
  o Sea-level rise could impact on the Nile Delta and on people living in the delta and other coastal areas
  o Temperature rises will be likely to reduce the productivity of major crops and increase their water requirements, thereby directly decreasing crop water-use efficiency.
  o There will probably be a general increase in irrigation demand.
  o There will also be a high degree of uncertainty about the flow of the Nile.
  o Based on SRES scenarios, Egypt will be likely to experience an increase in water stress, with a projected decline in precipitation and a projected population of between 115 and 179 million by 2050. This will increase water stress in all sectors.
  o Ongoing expansion of irrigated areas will reduce the capacity of Egypt to cope with future fluctuation in flow.

- Conway (2005) argues that there is no clear indication of how Nile flow will be affected by climate change because of the uncertainty about rainfall patterns in the basin and the influence of complex water management and water governance structures. Clearly, more detailed research on water hydrology, drainage and climate change is required. Future access to water in rural areas, drawn from low-order surface water streams, also needs to be addressed by countries sharing river basins. Climate change should therefore be considered among a range of other water governance issues in any future negotiations to share Nile water.

- The projected rise in sea level will have significant impacts on these coastal megacities because of the concentration of poor populations in potentially hazardous areas that may be especially vulnerable to such changes. Cities such as Lagos and Alexandria will probably be impacted.

II. Asia

- Surface water availability from major rivers like the Euphrates and Tigris may also be affected by alteration of river flows.

- In Lebanon the annual net usable water resources will likely decrease by 15% in response to a general circulation model (GCM) estimated average rise in temperature of 1.2°C under doubled CO2 climate, while the flows in rivers are likely to increase in winter and decrease in spring which could negatively affect existing uses of river waters.
• With regard to the Nile Basin, Conway (2005) found that there is no clear indication of how Nile River flow would be affected by climate change, because of uncertainty in projected rainfall patterns in the basin and the influence of complex water management and water governance structures.

Adaptation constraints and opportunities

I. Africa
   • Wheat grain yield cultivated under current and future climate conditions (for example, increases of 1.5 and 3.6°C) in Egypt highlight a number of adaptation measures, including various technological options that may be required under an irrigated agriculture system.
   • In some cases, (e.g., Egypt and Senegal) assessments have attempted to measure costs that may arise with and without adaptation to climate change impacts.

II. Asia
   • Reduction of water wastage and leakages, which in some cities like Damascus can be substantial, could be practiced to cushion the decrease in water supply due to decline in precipitation and increase in temperature.

   • The Integrated Coastal Zone Management (ICZM) concept is being embraced as a central organizing concept in the management of fisheries, coral reefs, pollution, megacities and individual coastal systems in China, India, Indonesia, Japan, Korea, the Philippines, Sri Lanka, Vietnam and Kuwait.