

# **The Role of Science and Technology in the Dilemma of Drought and Food Security in the Arab Region**

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# Some Facts on the Arab Region

- Most of the Arab Region falls within the **hyper arid, arid and semi arid zones**.
- It is the **most water scarce region** in the world.
- Total Arab Population 355 Million (2010).
- Total Area 1.4 bill. ha. **Total Cultivated Area** 68,792 thou. ha ( 5% of Total Area). **Arable land per capita** about 0.2 ha. today.
- **70% of food imported**. The world's top nine wheat-importers are in the Arab Region. Egypt, the largest wheat importer in the world.
- The food gap is over 35bil US dollars.
- Many analysts believe that the interplay between climate change, food prices (particularly wheat) and politics is a hidden stressor that helped to fuel the Arab Spring Revolutions.



# Impacts of Climate Change on the Arab Region

- The region is getting drier. Droughts are now a common phenomena and increasing in frequency, intensity and duration. Droughts exacerbates desertification, land degradation, poverty, as well as sand and dust storms.
- The region is witnessing severe adverse impacts on water and food security: rising temperatures; changes in precipitation and climatic zones; shorter growing seasons; emerging diseases and insect pests; rising sea level and sea water intrusion.
- Agricultural yields, especially in rain-fed areas, are expected to fluctuate more widely over time and lead to lower, long-term averages. Some estimate that for the Arab region as a whole, agricultural output could decrease by 21% in value terms by 2080, with up to 40% decrease in parts of North Africa.
- Not only food production but all four dimensions of food security are to be affected: availability, accessibility, stability, utilization.
- 8-18% of annual global world wheat production is traded across borders. Major wheat exporting countries are also facing severe droughts. Addressing drought risks in these countries may affect countries that rely on them for their prosperity and well-being.
- The Arab region is at particular risk, with prevailing conditions of water and food insecurity.

# Addressing the Dilemma of Drought and Food Security

- With the expected increase in aridity and dryness, shifts are to occur in the geographical location of the agricultural systems.
- The rain fed agricultural systems are to come under pressure by climate change.
- Irrigation will need to produce more with less water.
- Drought cannot be prevented, but actions can be taken to better prepare to cope with drought, develop more resilient ecosystems and better ability to recover from drought.
- Learning to “live with drought” is the real challenge. : to find possible viable affordable solutions to solve the equation how with less water, less land and fragile ecosystems we can have more food and a decent living.
- Coping with drought and enhancing food security requires:
  - adequate strategies and policies for sustainable agricultural development,
  - sufficient investment in agricultural research and development,
  - full fledged drought strategies and policies.
- At present two renowned centers work in the region in close cooperation with national agricultural research centers: ICARDA: the International Center for Agricultural Research in Dry Areas ( Aleppo/Syria); and ACSAD: the Arab Center for the Studies of Arid Zones and Dry Lands ( Damascus/Syria). At present both Centers are having hard times.

# Full Fledged Drought Strategies and Policies

- Assess and map drought risk and vulnerability.
- Develop early warning systems.
- Increase adaptation and resiliency to drought through safety nets, insurance programs, special compensation programs, micro-finance etc....
- Focus on marginalized groups, landless farmers, women headed households and youth.
- Advance application of science and technology for drought preparedness.

# Advance Applications of Science and Technology for Drought Preparedness

- **Through** using **drought tolerant crops and varieties**; germplasm conservation and utilization for improving and developing drought tolerant crops with high yield potential, tolerant to abiotic stresses (drought, heat, salinity) and resistant/tolerant to biotic stresses (diseases, insect pests, and parasitic weeds).
- **Through** sustainable water management by :
  - optimizing water productivity**: at the basin level ( competition among uses , conflicts between countries, equity issues); at the national level (food security, food imports, socio-political issues); at the farm and field levels maximizing water use efficiency, productivity and income).
  - Technical possibilities** for making irrigation systems more efficient: reducing distribution losses through the modernization of existing schemes; converging of surface irrigation schemes to pressured irrigation systems such as drip or sprinkler systems; improving the efficiency of surface irrigation systems; shifting emphasis to relatively low-water demanding crops; increasing use of marginal water (treated sewage and brackish waters).

# Advance Applications of Science and Technology for Drought Preparedness (cont.)

**Expanding the alternating use of rainfall and irrigation water**( 70% of the agricultural land in the Arab Region is rain fed): water harvesting, both micro- and macro catchments; supplemental irrigation; deficit irrigation (water productivity can be increased substantially. Water is the limiting resource, not land).

- **Through** conservation agriculture ( zero tillage) that increases productivity and at the same time reduces CO2 emissions.
- **Through building** resilient ecosystem production systems in marginal lands (integrated crop/rangeland/livestock systems) using community approach.

# Conclusions

- With climate change, droughts will become more intense, frequent and prolonged. They will exacerbate desertification and poverty.
- In 2011, the UN Security Council agreed to a statement expressing “concern that the possible adverse effects of climate change may, in the long run, aggravate certain existing threats to international peace and security.”
- In Feb. 2013 at an informal meeting at the UN security council, the director of the Potsdam Institute for Climate Impact Research said "either rich nations will find a way to supply needy nations suffering from damaging climate effects or you will have all kinds of unrest and revolutions, with the export of angry and hungry people to the industrialized countries".
- The Security Council session was evidence of the increased focus on the link between climate change, extreme weathers and global security.
- Post 2015 HFA should focus on:
  - The emerging risks of water and food insecurity.
  - Drought, a hazard not well scientifically researched so far.



# Conclusions (cont.)

- Risks from climate change and extreme weathers that not only increase exposure and vulnerability, but affect people beyond the places where they occur (Raise commodity prices, cause shortages and disrupt supply chains and export markets).
- Strategies and policies, to address drought that contribute to food security and improve livelihoods.
- Strategies, policies and initiatives to address drought need to be integrated at the national, regional and global levels.
- More resources need to be pooled to finance DRR and Resilience including coping with drought.
- Financing DRR and Resilience is not expenditure, but rather an investment for sustainable development.
- Post-2015 HFA is a voluntary process with no commitments to developed countries like under the UNCCC process. However the socio-economic and political implications of climate change and extreme events could greatly affect the global, regional and national security. Developed countries should find a way to support countries, suffering from climate change and climate extremes, in their efforts to reduce disaster risks and build resilience.
- The World Bank and regional development banks need also to be further involved in DRR and Resilience.

# Thank You

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