Identifying Extreme Events for Analysis in the Arab Region

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Droughts

(Hydrological)  
(Meteorological)  
(Agricultural or soil moisture) 

“Prolonged absence or marked deficiency of precipitation” or 
“Deficiency that results in water shortage for some activity or for some group”  
(IPCC glossary) 

“Period of abnormally dry weather sufficiently prolonged for the lack of 
precipitation to cause a serious hydrological imbalance” (Heim, 2002) 

“Consequence of a natural reduction in the amount of precipitation over 
extended period of time” (UNISDR & ACSAD, 2011) 

“A Condition of moisture deficit sufficient to have an adverse effect on 
vegetation, animals, and man over a sizeable area” (US Geological Survey)
Syria: 2006-2009
- 1.3 million affected
- 803,000 lost almost all of their livelihoods
- Herders lost 80% of their livestock
- Migration: 40,000 to 60,000 families

- "Worsening drought threatens herders" (IRIN, 20Aug09)
- 2000 people displaced in southern mountains (IRIN, 2Sep08)

Somalia: 2011
- Entering its worst drought in five years
- "Drought refugees flee to Yemen" (CNTC, 28Aug11)
- Tens of thousands of people are fleeing drought and famine in Somalia (ABC, 16Jul11)

Morocco: 2012
- 3-4 million metric tons of cereal production reduction expected.
  (Bloomberg, 3Apr12)

Mauritania: (EM-DAT)
- 2011: 700,000 affected
- 2010: 838,000 affected
- 2001: 1 million affected

Algeria: 2005 (EM-DAT)
- Herders lost 80% of their livestock
- Migration: 40,000 to 60,000 families

- 2008 drought affected roughly 50% (284,000) of the population.
  (UNISDR & WB, 2009)

Sudan: (EM-DAT)
- 2012: 3.2 million affected
- 2009: 4.3 million affected
- 2000: 2 million affected
- 1983: 150,000 killed
Syria

- Syria experienced a serious drought from 2006 until 2009
- The worst drought to strike Syria in four decades
- About 1.3 million people of Eastern Syria are severely affected.
- Around 803,000 inhabitants lost almost all of their livelihoods
- Wheat and barley yields dropped by 47 – 67%
- Herders in the region lost around 80% of their livestock.
- Large migration of people:
  • Some estimated the people left their village to be more than 1 M
  • Many moved to cities, or neighboring Lebanon and Jordan

Source:
ACSAD & UNISDR, 2011, Case Study – Drought in Syria
NatureMiddleEast, 27Sep2010, Tackling the drought in Syria
Characteristics and Impacts

1) Reported in many parts of the Arab Region
2) Affects large population
3) Reduces agricultural production and threatens food security
4) Damages particularly in rural area
5) Sometimes even causes domestic and international migration
6) Often results in biodiversity loss resulting from overgrazing

Droughts and climate change

1) Reduction of precipitation is expected in the Arab Region - Increasing frequency and intensity of droughts in many parts of Asia (IPCC, 2007)
2) Regional climate simulations and high-resolution global atmospheric model simulations over Europe and Mediterranean region being affected by more severe droughts, consistent with available global projections. (IPCC, 2012)
3) Available global and regional studies of hydrological drought project a higher likelihood of hydrological drought by the end of this century, with substantial increase in the number of drought days in the Middle East (IPCC, 2012)
Floods: Flash Floods

Flood

“The overflowing of the normal confines of a stream or other body of water, or the accumulation of water over areas that are not normally submerged” (IPCC, 2012)

“An overflow or inundation that comes from a river or other body of water and causes or threatens damage. Any relatively high streamflow overtopping the natural or artificial banks in any reach of a stream.” (US Geological Survey)

“Temporary covering by water of land not normally covered by water” (EU Flood Directive)

Flash Flood

“The result of heavy or excessive amounts of rainfall within a short period of time, usually less than 6 hours, causing water to rise and fall quite rapidly.” (US Geological Survey)
(UNISDR&WB, 2009)
- Floods are the most recurrent disaster in Yemen – almost every year
  - 2008 Flood: 700,000 affected, 73 killed, $1.6 Billion damage
  - 2007 Flood: 2,000 affected, 28 killed
  - 2006 Flood: 2,000 affected, 31 killed
- Floods account for 83% of reported people killed by natural disaster

Djibouti: 2001, 2004
(UNISDR&WB, 2009)
- Frequent intense flash flood
  - 2004 Flood: $1.6 Billion damage, 230 killed, 115,000 affected
  - 2001 Flood: 95,000 affected

Algeria: (EM-DAT)
- 2011: $779 Million damage
- 2010: 75,003 affected, $29 Million damage
- 2008: 93 killed, 59,050 affected, $348 Million damage
- 2007: $29 Million damage
- 2001: 921 killed, 45,423 affected, $300 Million damage

Mauritania: (EM-DAT)
- 2007: 53,620 affected
- 2006: 7 killed
- 2003: 9 killed
- 2002: 25 killed

Morocco: (EM-DAT)
- 2010: 75,003 affected, $29 Million damage

Iraq: (EM-DAT)
- 2011: 6 killed, 2,001 affected
- 2009: 3,000 affected
- 2008: 4 killed

Saudi Arabia: (EM-DAT)
- 2009/11: 161 killed, $900 Million damage
- 2009/01: $300 Million damage
- 2005: 34 killed (Apr), 29 killed (Jan)

(UNISDR&WB, 2009)
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Tunisia: 2012 (NASA)

- February 2012
- A combination of melting snow, overflowing rivers, and heavy rains
- The Tunisian Army evacuated residents of multiple towns in the region of Tunis
- As of 23 Feb, 2 killed, 1 missing
Characteristics and Impacts

1) Reported in many parts of the Arab Region
2) High casualties and affects relatively large population
3) Damage to physical structures including houses, building, bridges, & roadways
4) Water quality

Flood and climate change

1) Possible increase of flood risk with increased climate variability (IPCC, 2007)
2) Trend in flood damages has been growing rapidly during the last decades (WMO, 2006)
3) Sea-level rise can increase flood risk, while many major cities in the Arab Region located in the coastal area.
4) There is limited to medium evidence available to assess climate-driven observed changes in the magnitude and frequency of floods at a regional scale. / Projections of flood changes at the catchment/river-basin scale in the Middle East and Africa are rare. (IPCC, 2012)
Cyclone

- Tropical Storm Delta (2005)
  - High wind: 110km/h
  - Low pressure: 980hPa
  - Canary Islands, Morocco, Algeria
  - $364 M damage in Canary Islands,
    No damage reported in Morocco

- Tropical Storm Phet (2010)
  - Category 3 cyclone
  - High wind: 230km/h
  - Low pressure: 970hPa
  - Oman, Pakistan, India
  - $780 M damage, 44 killed

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  - Category 4 cyclone
  - High wind: 230km/h
  - Low pressure: 970hPa
  - Oman, Pakistan, India
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- Cyclone India Cyclone (2001)
  - Category 5 cyclone
  - High wind: 270km/h
  - Low pressure: 920hPa
  - Oman: $4.2 B damage,
    50 killed, 27 missing
  - UAE, Iran, Pakistan

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Tracks and Intensity of All Tropical Storms
Characteristics and Impacts
1) Mostly affects Gulf countries
2) High casualties and affects relatively large population
3) Less severe than those of (South-)East Asia and North America

Cyclone and climate change
1) Cyclones from Arabian Sea: decrease of frequency and increase of intensity (IPCC, 2007)
2) In general, there is low confidence in any observed long-term increases in tropical cyclone activity (i.e. intensity, frequency, duration) (IPCC, 2012)
Sandstorms/Dust Storms

Algeria: July 2011
Libya: April 2012
Syria & Iraq: June 2012
Gulf: June 2012
Arabian Peninsula: March 2011
Mauritania: April 2003
Egypt: April 2007
Red Sea and Sudan: June 2012
Arabian Peninsula: 2011 (NASA)

- 26-27 March 2011
- Over 500 km across the peninsula (KSA, Yemen, Oman, UAE)
- Originated from Iraq and Kuwait
- The airport in Kuwait shut down and disrupted traffic across the peninsula.
Gulf: 2012 (NASA)

- June 2012
- Iraq, KSA, Kuwait, Gulf
- The dust storm paralyzed the country, with visibility reduced to less than 500 meters (Kuwait Times, 4 June 2012)
Characteristics and Impacts

1) Affect most of the Arab Region
2) The Sahara and East Asia have been recognized as the largest dust sources globally (Goudie 2009 from IPCC 2012)
3) Disrupt economic & social activities /can cause health problem (IPCC, 2012)
4) Indicated that intensified and more frequent storms would result in large GDP losses equivalent to $12.7 billion in the MENA. ((Dasgupta et al., 2009 from UNDP, 2010)

Dust storm and climate change

1) “(T)here is low confidence in projecting future dust storm changes, although an increase could be expected where aridity increases” (IPCC, 2012)
2) “Under a projected increase of temperatures, soil erosion is expected to increase… which are also expected to increase (dust storms) in terms of frequency and intensity” (UNDP, 2010)
3) “Dust storms over the Arabian Gulf: a possible indicator of climate change consequences” (Hamza et al., 2011)
Other Extreme Events to Consider

1. Extreme Temperature: Heat wave
   - Iraq: “Baghdad takes a breather as heat wave ushers in Ramadan” (Daily Star, 2 Aug 11) – (50 degree Celsius)

2. Others?
   - Extreme temperature: Cold wave
   - Mass movement wet/dry: Avalanche, Landslide
   - Extreme sea levels: transient sea level extremes and extreme coastal high water caused by severe weather events
   - Severe waves
Thank you!