

Disaster Risk - Poverty Trends in Jordan, Syria, Yemen: Key Findings and Policy Recommendations

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This paper is based on the findings of national disaster loss databases in Jordan, Syria and Yemen. National databases in Jordan and Syria were supported by UNISDR through financial resources provided by the Swiss Development Cooperation Agency (SDC). In the case of Yemen, financial resources were made available through the World Bank/ Global Facility for Disaster Reduction and Recovery (GFDRR). The research undertaken to support the development of this paper has been financially supported by the Swiss Development Cooperation Agency (SDC).

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I. INTRODUCTION

a. Project Context

Over the past decades, experience across countries in Latin America and Asia shows that systematically recording data on disaster loss represents a low cost, high impact strategy for visualizing risk patterns and trends over space and time. Further, institutionalizing national disaster loss data enables national and local governments to assess the dynamic relationship between risk patterns and socio-economic development indices, such as for income poverty, health, and education.

The UNISDR *Global Assessment Reports on Disaster Risk Reduction* and various regional assessments have demonstrated that a disaster risk-poverty analysis can be crucial to understanding how disaster impacts influence local, national or regional poverty profiles over time, albeit differently. Conversely, such analysis can also demonstrate how the varied experiences of poverty can make rural and urban populations more vulnerable to potential disaster impacts.

In an attempt to bring this globally validated methodology and risk information management expertise to the Arab region, in 2009, UNISDR's Regional Office for the Arab States (UNISDR-ROAS) initiated focused support to six pilot countries (Algeria, Egypt, Jordan, Morocco, Syria and Yemen). The project aimed at enabling national and regional institutions to develop system wide capacities to monitor, archive and disseminate data on key hazards and vulnerabilities, and periodically assess emerging risk – poverty trends at the national and provincial level. Later on the support extended to Djibouti and Lebanon as well based on country's expressed interest.

The project was implemented by UNISDR's Regional Office for the Arab States (UNISDR ROAS) with support from the Swiss Agency for Development and Cooperation (SDC) and the World Bank/Global Facility for Disaster Reduction and Recovery (GFDRR), in collaboration with the Regional Center for Disaster Risk Reduction hosted by the Arab Academy for Science, Technology and Maritime Transport (AASTMT), the United Nations Development Programme (UNDP) and national and regional partners. The project also fulfills regional priorities framed by the recently adopted *Arab Strategy for Disaster Risk Reduction 2020*.

II. KEY FINDINGS

This section outlines poverty and human development trends across Jordan, Syria and Yemen on the basis of available national poverty assessments¹ and human development data²; it summarizes key findings from historical disaster data³; and in conclusion, characterizes the underlying risk processes that drive disaster risk – poverty interactions in the three countries.

a. Poverty and human development trends

Over past decades, human development statistics show that the Arab region has had some success in reducing the proportion of the poorest of the poor. For the three countries assessed, this overall trend cannot be confirmed especially in view of the recent and severe politico-economic challenges coupled with the lack of updated and accurate poverty data across governorates.

Country	HDI Rank (2011)	Population in millions (2012)	Headcount of MPI poor (% of population, 2011)	% Urban population (estimates as of 2011) ⁴
Jordan	95	6.3	2.4	78.6
Syria	119	20.7	5.5	56.2
Yemen	154	24.7	52.5	32.4

There are obvious differences in the demographic, economic and human development indices of the three countries – evidenced by the statistics. It should also be noted that aggregate national welfare indicators and human development indices hide a complex picture of poverty and food insecurity, particularly in the rural areas.

Three macro-trends frame the experience of poverty across Jordan, Syria and Yemen:

1. **Lopsided economic policies and jobless growth:** The three countries are experiencing severe transitional challenges in adopting robust governance systems and capacities that can develop diversified, resilient economies. In past decades, the countries have been mainly dependent on foreign assistance, unpredictable and declining oil revenues, a slow growing service sector and a fast deteriorating agricultural sector.

At the policy level, a lopsided and non-diversified economic outlook has focused on developing industry and oil revenues, while leaving the agricultural sector underinvested and increasingly unproductive in past decades. The implications of single sector dependence and the underutilization of land and agriculture are evident in the high rates of rural and urban unemployment across the countries. The oil economies of Syria and Yemen in particular, have been characterized by the ‘jobless growth’ phenomenon in past

¹ <http://jorinfo.dos.gov.jo/home.aspx>

<http://www.cbssyr.org/yearbook/2011/Data-Chapter2/TAB-1-2-2011.htm> Syria Civil Affairs Record as of 2011.

<http://www.undp.org/ye/reports/24d06139cb9b57MDG%20Yemen%20English.pdf>

² <http://hdr.undp.org/en/data/profiles/>

³ <http://www.desinventar.net/>

⁴ Cross-country comparisons should be made bearing in mind that all data is based on national definitions and statistics <http://hdr.undp.org/en/data/profiles/>

decades. Oil revenue contributes to spikes in the nations' GDP but without an increase in urban or rural employment. The 'jobless growth' phenomenon is made worse by changing demographics - characterized by the 'youth bulge' - more young people with better education make up a larger proportion of the population than ever before. This phenomenon is a considerable challenge for a small country like Jordan where young people are either unproductive at home or migrate to neighboring countries for employment, creating other kinds of social and economic vulnerability.

2. **Water scarcity and food insecurity:** Jordan, Syria and Yemen are among the most water stressed countries in the world with a low percentage of arable land. Desertification trends are worsening with the impacts of climate variability, coupled with ineffective macro-economic policies, which have been unable to stimulate appropriate investments in ground water conservation, natural resource management and agricultural infrastructure. Reduced agricultural productivity across Jordan, Syria and Yemen has had a significantly negative impact on food security, health and human development in the past decade.
3. **Pockets of severe poverty:** The three countries experience poverty across their territories - evident in urban centers, rural provinces, and refugee camps/settlements. Poverty is found to be most severe in rural non-diversified economies where agriculture is severely limited by low rainfall, degraded lands, erosion and desertification. Syria experiences a regional bias with poverty and deprivation being most severe in its rural northeast and coastal areas. Jordan's southern highlands represent the country's poorest - mainly farmers and landless people, particularly women. All three countries host migrants, refugees and asylum-seekers - a key contributor to the experience of severe poverty. The UN Refugee Agency (UNHCR) estimates that in addition to half a million internally displaced people, at least 220,000 refugees from Africa currently reside in Yemen. Syria gives refuge to at least 1.2 million Iraqis and Jordan hosts at least 450,000.

b. Disaster risk impacts

Jordan, Syria and Yemen demonstrate quite different disaster risk profiles when assessed by the following variables: mortality, people affected, and houses damaged and destroyed. For detailed country disaster statistics please refer to www.desinventar.net/

Country	Data cards reported	Disaster related mortality (%)	People affected (%)	Houses damaged & destroyed (%)
Jordan (1981 - 2010)	454	Flash flood: 33 Flood: 20 Snowstorm: 12 Cold wave: 11	Drought: 99	Snowstorm: 57 Earthquake: 13 Flash flood: 9 Rains: 9
Syria (1980 - 2009)	7326	Fire: 83 Forest fire: 4 Flash flood: 3	Drought: 59 Frost: 19 Cold wave: 9 Heat wave: 2	Rains: 39 Flash flood: 25 Fire: 10 Flood: 8
Yemen (1971 - 2011)	8945	Epidemic: 57 Liquefaction: 13 Earthquake: 10 Floods: 7	Flood: 84 Liquefaction: 10 Epidemic: 2	Liquefaction: 41 Flood: 31 Earthquake: 20 Flash flood: 2

Three regional disaster risk trends are significant:

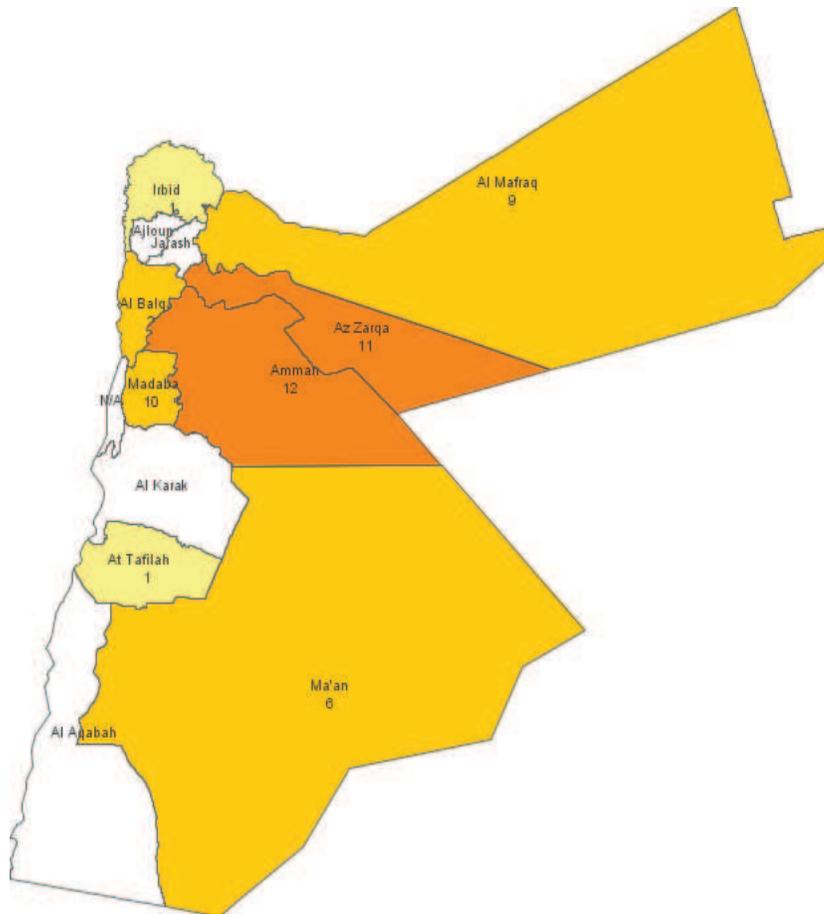
1. Mortality from weather and geological disasters remains high in poor urban and rural communities:

Global trends indicate that in countries where policies, systems and capacities enable systematic urban land use planning, zoning and infrastructure development, there is substantial evidence of a decrease in urban disaster related mortalities. This offers a contrast with the rural hinterlands and remote areas, where capacities for risk management are less developed due to policy priorities and resource constraints.

Although poverty (and vulnerability to disaster impacts) is widespread in the rural hinterlands and severe in remote rural areas across all three countries assessed, data show that disaster mortality rates in urban areas are also high – especially for flood, fire, earthquake and liquefaction hazards. This finding confirms that the urban poor across the three countries do not necessarily have access to life saving services or infrastructure. In poor urban shanties/ settlements, exposure and vulnerability to disaster impacts may be exacerbated by social marginalization and lack of access to community infrastructure.

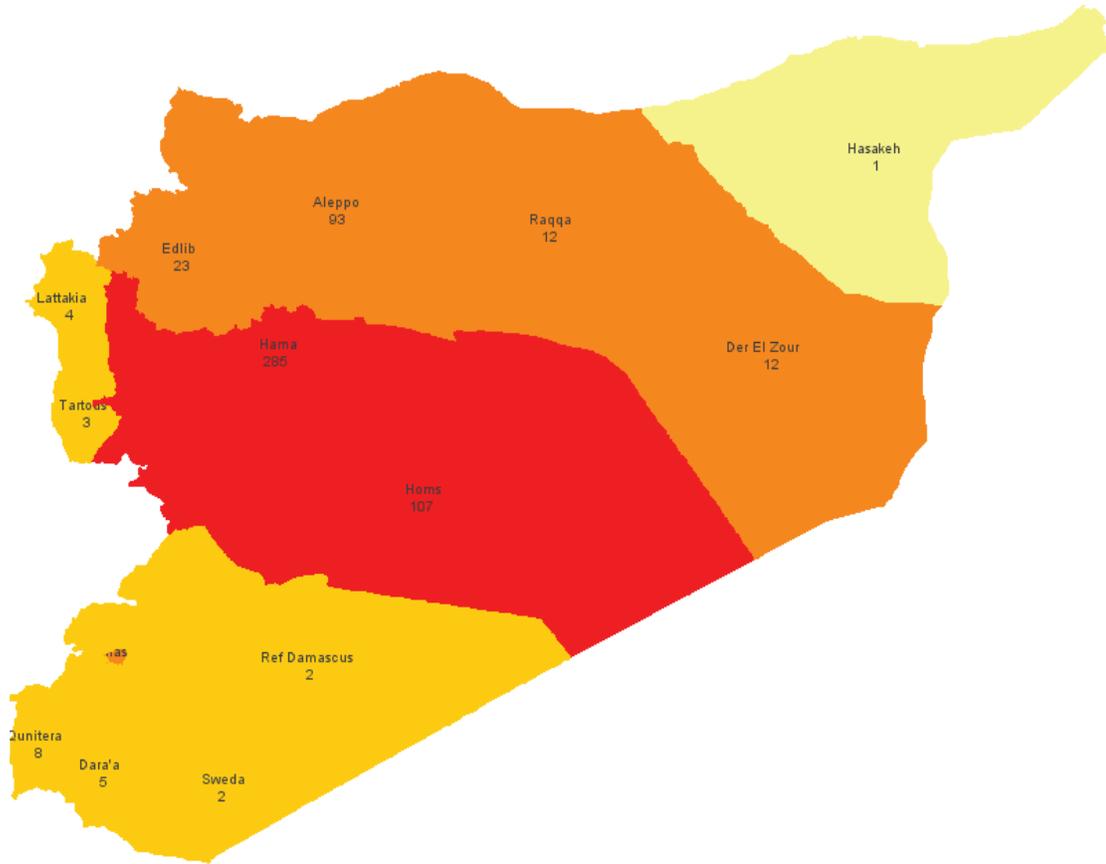
In Jordan, rains, flash floods and snowstorms affect the densely populated areas of Amman, Az Zarqa and Irbid which account for more than half of Jordan’s disaster related mortalities. In absolute numbers, these three governorates host the largest share of the country’s poor. As is evident from the map below, the rural hinterlands also experience extensive mortality risks from flash floods in Jordan.

Map 1: Flash flood related mortality in Jordan (the values indicate number of people reported dead due to flash floods in the period 1981 – 2010):



Syria experiences extremely dry, hot temperature in the summers, resulting in extensive risk from urban fires, forest fires and heat related mortalities (see map 2 below). Floods, usually associated with winter rains and snowmelt are also a common hazard in Syria and affect rural and urban areas, albeit differently. Mortality from flooding could be slowly declining in urban areas due to proximity to emergency services including search and rescue, health and rehabilitation. However, mortality numbers should be interpreted in view of the socio-economic marginalization and/ or invisibility of some categories of the urban poor, who may not be 'counted' at all.

Map 2: Fire related mortality in Syria (the values indicate number of people reported dead due to fires, in the period 1980 – 2009):

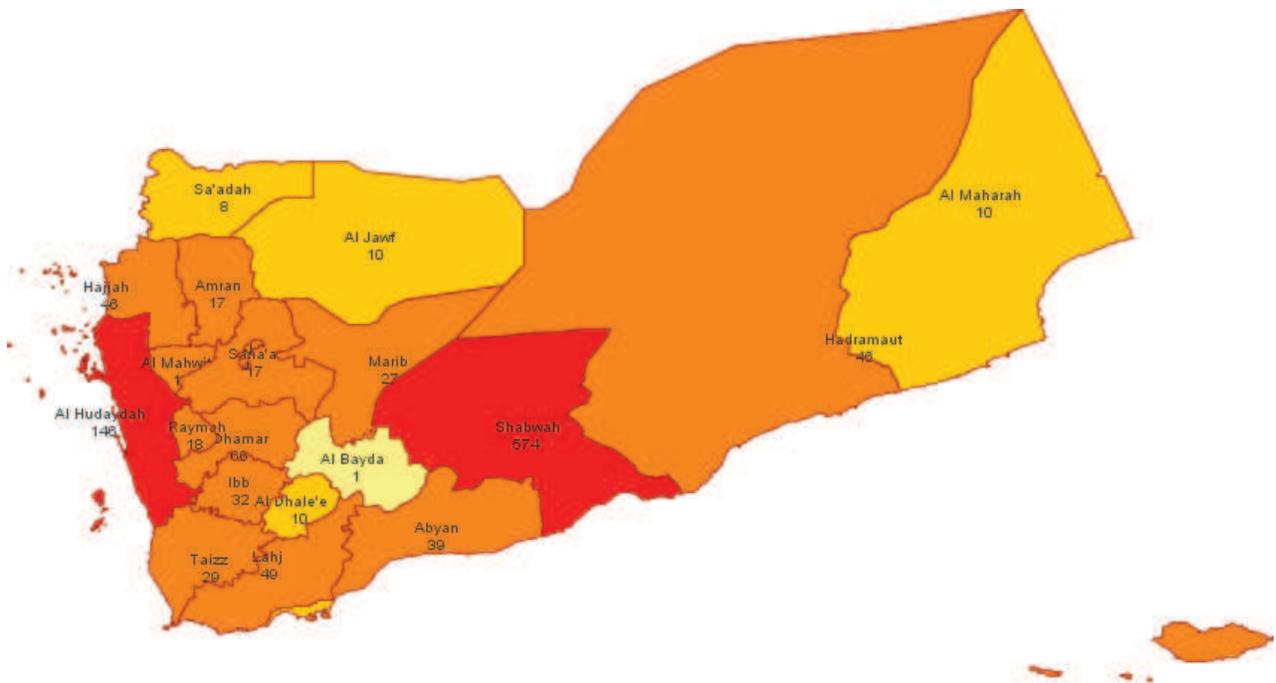


Across its territory, Yemen experiences extremely dry and wet conditions, coupled with severe ground water scarcity, resulting in a large proportion of extensive risk from water related mortalities – floods, drought and epidemics.

Unlike Jordan and Syria, Yemen also reports substantial mortalities from geological risks, which due to the location of geological faults and soft soil types, cause mortalities in both rural and urban areas.

However, as the map below confirms, mortality from liquefaction is concentrated in the extremely poor governorate of Shabwah where increased exposure and vulnerability prove deadly.

Map 3: Liquefaction related mortality in Yemen (the values indicate number of people dead due to liquefaction events, in the period 1971 – 2011):



The data suggests a decadal increase in disaster mortality for Syria – mainly attributed to increasing fire related disasters. The data does not confirm any increase in disaster mortality for Jordan and Yemen over the past decade.

2. Extensive asset loss in urban centers and damage to livelihoods in rural areas:

In line with globally validated results⁵, most damage to housing, infrastructure and livelihoods, is spread among a number of high frequency, low-severity disasters, extensively distributed in time and space. This is generally true for Syria and Jordan.

However, Yemen experiences the impacts of extensive and intensive disaster risks. The average annual loss due to recurrent, extensive flooding in Sana'a and its hinterlands is estimated at US \$ 3 million⁶. In 2008 alone, Yemen experienced flooding⁷ that caused approximately US \$ 1.7 billion in total damage and loss and is estimated to have increased the national poverty rate from 28% to 51%⁸.

Yemen also experiences intensive damage from liquefaction and earthquakes with significant impacts on the education and health sector, water, sewer, power, critical infrastructure and services (see Annex).

Map 4: Liquefaction related damages in Yemen (the values indicate number of houses

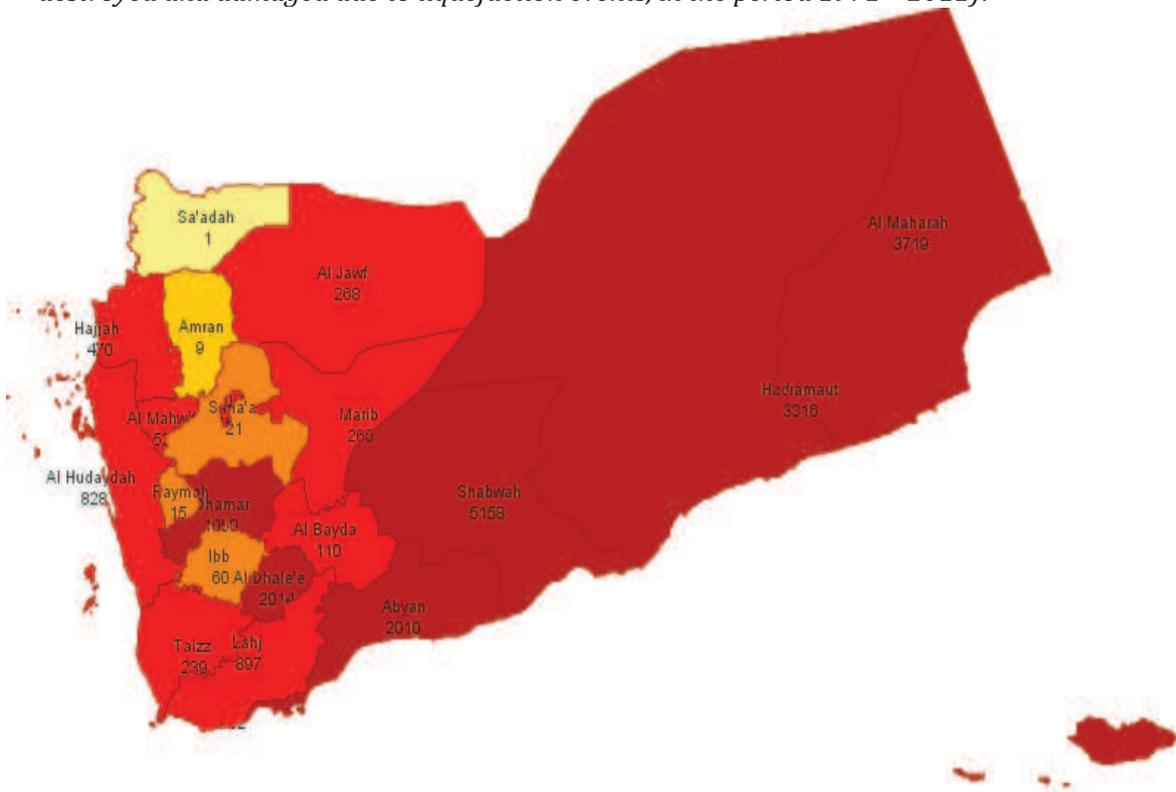
⁵ ISDR Global Assessment Report on Disaster Risk Reduction, 2011

⁶ http://sdwebx.worldbank.org/climateportalb/doc/GFDRRCountryProfiles/wb_gfdr climate_change_country_profile_for_YEM.pdf

⁷ <http://www.undp.org/ye/reports/24d06139cb9b57MDG%20Yemen%20English.pdf>

⁸ Arab Academy for Science, Technology and Maritime Transport, United Nations International Strategy for Disaster Reduction, World Bank, Workshop Summary Report, *Regional Workshop on disaster risk reduction and climate change*, Cairo 21-23 Nov 2009

destroyed and damaged due to liquefaction events, in the period 1971 – 2011):

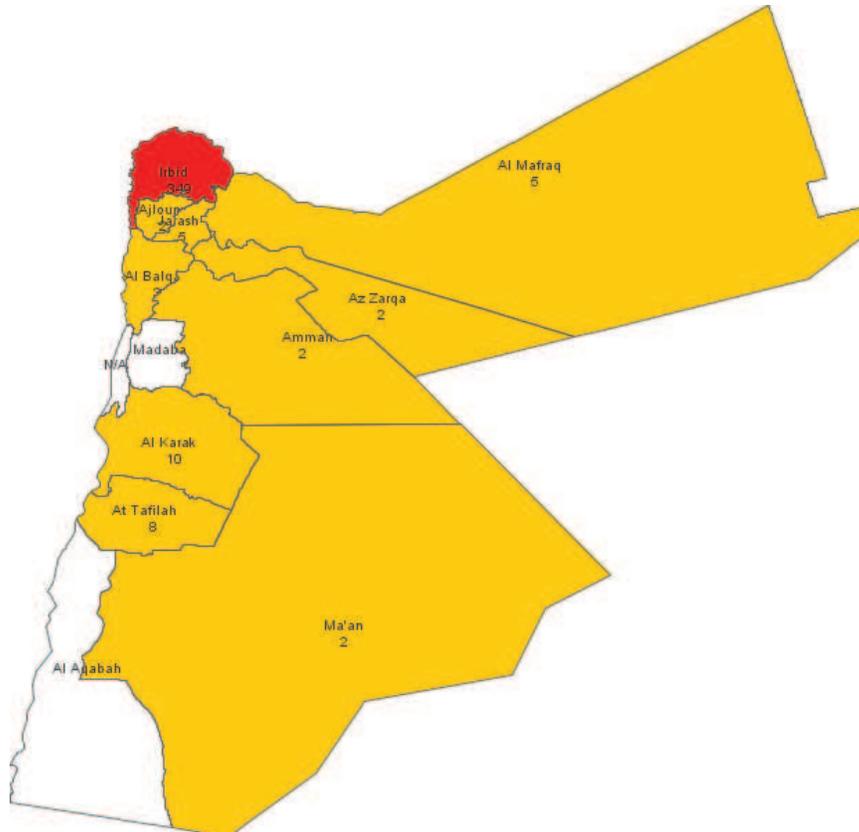


In primarily agrarian economies such as Yemen and Syria, extensive weather related risk from - drought, flood and rain - are detrimental to agricultural productivity, livelihoods, health and education indices. Jordan experiences pockets of severe rural poverty where communities are badly affected by cumulative impacts from extensive weather related disasters, especially flash flood and drought⁹.

In primarily urbanized economies such as Jordan and in densely populated urban centers (and hinterlands) across Yemen and Syria, frequent weather related disasters cause sudden and cumulative deterioration of already poor and unsafe living conditions, thereby limiting employment and small business opportunities. Impacts on health and education are not as severe as found in rural areas, perhaps due to the increasing number of school and hospital facilities accessible in urban areas.

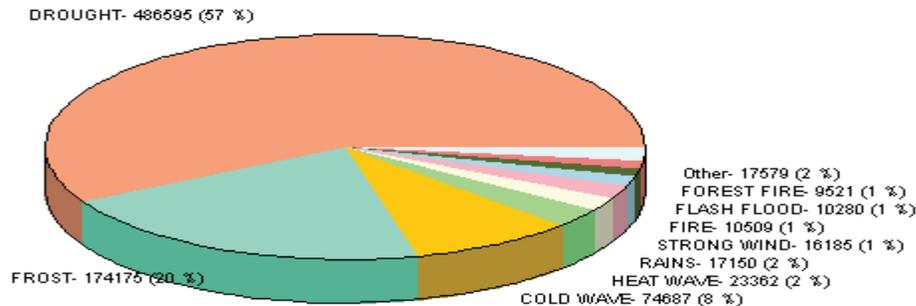
Map 5: Snowstorm related damages in Jordan (the values indicate number of houses destroyed and damaged due to snowstorms, in the period 1981 – 2010):

⁹ Jordan Rural Poverty Fact Sheet - International Fund for Agricultural Development, 2010



Consistent with global findings, national damage and loss data for the three countries also confirms that there is an increase in cumulative extensive risk which is likely to become an intensive weather and/or geological disaster if underlying risk factors are not sufficiently addressed.

3. People and economies in rural areas most extensively affected by drought:
Drought impacts contribute to a majority of reporting on 'people affected' in Jordan and Syria. The graph below shows the proportional impact of drought to other hazards, in terms of *people affected* in Syria (1980-2009).



From 2007 to 2010, severe drought in Jordan and Syria had the worst recorded economic impact in many decades. Although no drought related statistics are recorded in Yemen's disaster database, it is the most-water stressed country in the world and one of the 10 poorest countries in terms of water resources. In all three countries, the increasing demand for water caused by high population growth rates, presents an enormous stress on the already scarce water resources due to the high rates of ground water extraction. Water scarcity also threatens food security by reducing agricultural productivity, as well as hindering human health and economic development.

The impacts of drought also have an obvious gender bias that is not evident from the disaster data, but is supported by circumstantial evidence. An increase in women headed households is particularly experienced among rural poor landless households and seasonal migrant laborers severely affected by prolonged drought with little or no access to social safety nets.

Accounting for drought losses and impacts is a major gap in the national disaster data. Unless Arab countries can collect drought related data and calculate the cost of their losses, it will remain difficult to justify drought risk management investments and programs.

c. Disaster Risk-Poverty Relationship:

The disaster risk – poverty relationship in Jordan, Syria and Yemen can be characterized by two broad conclusions:

1. Ecosystem decline and climate variability lead to failing livelihoods, food insecurity and extreme vulnerability in rural provinces: Rural poverty is both a cause and a consequence of drought risk in the three countries. Drought erodes already impoverished livelihoods further, leaving households and communities more vulnerable to future droughts and hazards. For vulnerable rural households, even minor drought episodes can lead to yield losses and can have devastating impacts on precarious, non-diversified livelihoods.

Frequent and severe drought conditions, coupled with a systemic lack of investment in rural infrastructure and agriculture¹⁰ have resulted in low productivity of labor, land and water, thus severely constraining agricultural growth. In all three countries assessed, poverty is more severe in the rural areas. For instance, 62% of Syria's poor live in rural areas, of which almost 50% is employed in agriculture – a sector characterized by low productivity and an irregular demand for labor. In Yemen, agriculture remains the country's most important productive sector, contributing 25% of the country's GDP and employing over 45 % of the country's work force. However, as a result of low productivity and emerging water shortages, rural incomes are stagnating and poverty is increasing¹¹.

2. Population growth coupled with rapid, 'fringe' urbanization have resulted in unsafe living conditions and little access to basic amenities/services in urban centers: Increased rates of unemployment and food insecurity due to drought and agricultural unproductivity have led to increased migration from the rural areas and urban hinterlands. This influx, coupled with a lack of systematic planning and investment in urban infrastructure has led to poor, unsafe and unsanitary living conditions for a growing number of urban residents, making them further vulnerable to potential disaster impacts. In Yemen, the urban coastal areas are growing at a rate of about 3 % per annum due to migration from agricultural hinterlands, and the risks of exceeding the carrying capacity of the coastal areas to support livelihoods is high. A significant proportion of the urban-poor live in informal settlements, typically on marginal or hazardous lands, where vulnerability to risks from rock and landslides is high. Considered 'illegal' by Governments, informal settlements generally lack access to basic municipal infrastructure and services, thereby increasing socio-economic exclusion and inequality in the city and compounding vulnerability to natural hazards.

d. Constraints and Gaps

It is important to highlight at the outset that in the recent context of severe political and economic challenges across the region, the project (and this preliminary analysis) faces a number of tactical constraints and gaps:

- i. *Representative, not comprehensive sample:*
Of the project countries, only Jordan, Syria and Yemen have been able to compile and publish their updated disaster databases online as of May 2012, and are used as a representative sample for this regional disaster risk-poverty analysis. The political situation notwithstanding, as the project's activities continue to develop national capacities over the next year, more countries will be able to complete and publish their databases online thus enabling a comprehensive understanding of disaster risk-poverty trends in the region.
- ii. *Varied availability and coverage of disaster data:*
The availability and coverage of disaster data is varied across the countries (and provinces). For instance, data related to disaster impacts on key sectors such as agriculture, power and energy, roads, communications, health and education is generally limited in all three countries. Over the next years, the project will work with country teams to improve data coverage requirements and set minimum quality

¹⁰ <http://www.undp.org/ye/reports/EDSP%20-%2049260%20-Project%20Document.pdf>

¹¹ http://sdwebx.worldbank.org/climateportal/doc/GFDRRCountryProfiles/wb_gfdr climate_change_country_profile_for_YEM.pdf

standards for national disaster databases in the region. Improved data collection, analysis, sharing and coordination at the local, national and sub regional levels are necessary if national authorities are to get a nuanced understanding of risk trends and impacts.

- iii. *Weak access to recent sources of provincial poverty data:*
Due to political and capacity challenges, it has not been possible to complement provincial disaster data with provincial poverty data for all the countries represented in this analysis¹². Instead, human development indices have been used to assess national poverty trends over past years, and national census and national poverty assessment data, where available, have been used to assess poverty profiles. For the next iteration of the regional risk-poverty analysis, systematic efforts will be undertaken in countries with national disaster databases, to also compile and ‘match’ corresponding levels of poverty data according to a regionally agreed methodology.
- iv. *Insubstantial drought data in countries severely affected by drought:*
In countries where disaster reports for ‘number of people affected’ unanimously point to drought and water scarcity related disasters, there is little or insubstantial data on drought mortality (from food insecurity and starvation), or loss and damage from various sectors (agriculture, livelihoods, power and energy, industry, environment). Drought related data is essential to undertake an evidence-based drought risk and poverty trends analysis. Through continued work with the project countries over the next years, and in consultation with regional and international drought risk experts, this data gap will be progressively addressed.
- v. *Systemic lack of capacities and resources:*
The project’s aim - to institutionalize national disaster loss databases has been challenged by the systemic lack of capacities for data collection, verification, compilation, monitoring and analysis. The project will continue to support developing national and local partner capacities to collect, analyze, apply data and develop appropriate modeling, forecasting and decision support tools.

III. RECOMMENDATIONS

The following policy recommendations have been drafted to enable Jordan, Syria and Yemen to undertake focused actions that address risk-poverty interactions at their respective national and governorate levels:

1. Adopt and implement sustainable pro-poor growth policies by integrating disaster risk reduction measures into national and sectoral plans with a focus on infrastructure, agriculture, livelihoods and employment generation.
2. As part of the national social development policy and plans, institute social safety mechanisms for highly vulnerable populations with a specific focus on women headed households, the aged, and persons with disability.

¹² With the exception of Jordan – it is the only country that maintains a well-resourced online poverty indices database down to the provincial level.

3. Systemically tackle underlying risks and address food security challenges by investing in agriculture and rural economies thereby making them more diverse, productive and resilient.
4. Prepare vulnerable, water scarce areas for potential extreme weather and drought impacts by adopting comprehensive livelihood diversification measures including - water management infrastructure and conservation techniques, local awareness camps, community food banks, social security instruments and insurance schemes.
5. Conduct multi-hazard mapping in fast growing urban centers and hinterlands, to determine locations and communities at risk. Based on consultations, provide safe/ secure land for low-income households and communities.
6. Adopt a risk sensitive national urban development policy, and in accordance with it revise urban land use plans and zoning ordinances to include appropriate disaster risk reduction and risk management actions to be implemented in rapidly growing urban centers and hinterlands.
7. Strengthen building code enforcement with a specific focus on governorates that experience consistently high mortality and damage to houses, schools, hospitals and critical infrastructure.
8. Initiate mason trainings as part of a livelihoods and employment generation program in urban centers and hinterlands, whereby landless laborers and seasonal migrant workers can contribute to implementing disaster resilient building codes and safe building techniques.
9. Enable all home-owners, office, school and hospital staff with useful information, communication and awareness materials on appropriate mitigation and prevention measures in governorates most frequently and extensively affected by weather and geological impacts. The material should include structural assessment resources/techniques, building material recommendations, retrofit and micro-insurance options, among others.
10. Establish national and local emergency health support infrastructure, systems and plans with a focus on rural communities most vulnerable to mortalities from extreme weather and geological impacts.
11. Improve systems and capacities for disaster and poverty data collection, analysis, sharing and coordination at the local, national and sub regional levels. This is a critical requirement if national authorities are to develop a nuanced understanding of disaster risk trends and impacts on human development. In particular, accounting for drought loss and impacts is a major gap in the national disaster databases to be addressed with assistance from regional and international development agencies.

IV. ANNEX: Country Profile Summaries

A. Jordan

Jordan's disaster database¹³ covers the period 1981-2010 with a total of 454 data cards recorded from across 12 governorates.

In terms of hazard impacts, Jordan's historical disaster data shows that:

- Flash floods (33%), floods (20%), snowstorms (12%) and cold waves (11%) are together responsible for the most number of reported deaths across the country.
- Drought (99%) singularly contributes to the highest reporting on 'people affected'.
- Snowstorms (57%) and earthquakes (13%) are reported to cause by far the most damage and destruction to houses, followed by seasonal flash floods (9%), rains (9%) and floods (7%).
- Snowstorms (43%), rains (28%) and floods (22%) are reported to cause the most damage to roads (in meters).
- Frost (42%), epidemics (40%) and drought (15%) account for the greatest reported economic loss.
- Forest fires (50%), epidemics (18%) and fires (12%) are reported to cause the greatest impacts on the health sector.
- Snowstorms (91%) and frost (4%) are reported to cause the greatest impacts in the education sector.

In terms of spatial distribution of hazard impacts, of the 12 governorates, Amman and Irbid are the worst affected on most counts:

- Amman (29%), Az Zarqa (15%) and Irbid (15%) account for more than half of all disaster related mortality reported.
- Amman (33%), Al Balqa (33%) and Irbid (33%) account for most 'people affected' by disaster events.
- Irbid (59%), Al Aqabah (13%) and Al Balqa (8%) together account for the majority of houses damaged and destroyed.
- Al Aqabah (23%), Al Tafilah (22%), Ma'an (20%) and Al Karak (14%) report the most damage to roads.
- Al Mafraq (28%), Irbid (24%), Al Karak (23%) and Al Balqa (18%) report the highest disaster related economic losses.
- Irbid (31%), Amman (25%), Jarash (12%) and Al Aqabah (12%) report the greatest disaster impacts in the health sector.
- Irbid (14%), Amman (13%), Al Karak (13%), Ma'an (12%), Al Tafilah (11%) and Al Balqa (10%) all report significant disaster impacts in the education sector.

Further;

- Amman (38.7%) Irbid (17.8%) and Zarqa (14.9) host the largest percentage of the country's population in spite of their relatively small-medium sized land area. They also host the largest share of the country's poor – Amman (28%), Irbid (17%) and Zarqa (17%) respectively, followed by Mafraq (8%), Balqa (8%) and Karak (7%).

¹³ <http://www.desinventar.net/DesInventar/profiletab.jsp?countrycode=jo>

- By measure of their high population density, Irbid, Jarash, Balqa, Ajloun and Amman are most at risk in terms of number of people, houses, schools, hospitals and public infrastructure exposed.
- Some of these highly vulnerable governorates also have a high incidence of poverty compared to the national average – for instance, Ajloun (18%), Jarash (16%) and Balqa (15%)¹⁴.
- In each of the 12 governorates, more than 98% houses have electricity¹⁵ – this has clear implications in times of power and energy disruption due to hazard events. Amman (18%), Ma’an (14%), Irbid (12%), Balqa (10%) and Karak (10%) report the most extensive disaster impacts on power and energy.
- Disaster impacts on water supply are reported as most severe in Irbid (27%), Ma’an (16%), Amman (16%) and Balqa (16%).

In terms of the temporal significance of Jordan’s risk trends:

- The seasonal ‘spikes’ in disaster loss reporting are witnessed in January – February, November – December and July – August.
- Events that contribute to high rates of mortality and houses damaged and destroyed include snowstorms, earthquakes and flash floods, as evidenced by data reported for 1982 (flash flood), 1992, 2000, 2003 (cold wave, snowstorm), 1994 (flash flood), 1995 (earthquake).

B. SYRIA

Syria’s disaster database covers the period 1980-2009, with a total of 7326 data cards, reported across its 14 governorates¹⁶.

In terms of hazard impacts, Syria’s historical disaster data shows that:

- Fires (83%) account for the highest number of mortalities reported over time.
- Drought (59%) and Frost (19%) affect a majority of the country’s population.
- Rains (39%), flash floods (25%) fires (10%) and floods (8%) are reported to cause the most damage and destruction to houses.
- Forest fires (41%), frost (20%) and flash floods (12%) cause the most amount of economic losses followed by cold waves (8%), fires (6%) and drought (4%).
- The health sector is reported to suffer most impacts from strong winds (36%), floods (18%) and frost (18%).
- The education sector reports most impacts from rains (31%), snowstorms (25%) and flood (13%).

In terms of spatial distribution of hazard impacts, Homs, Edlib and Lattakia are worst affected on most counts assessed¹⁷:

¹⁴ http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2009/11/19/000333038_20091119234547/Rendered/PDF/479510ESW0v10P1C0disclosed011118191.pdf

¹⁵ <http://jorinfo.dos.gov.jo/home.aspx>

¹⁶ <http://www.desinventar.net/DesInventar/profiletab.jsp?countrycode=sy11>

¹⁷ <http://www.cbssyr.org/yearbook/2011/Data-Chapter2/TAB-1-2-2011.htm> Civil Affairs Record as of 2011.

¹⁷ <http://www.cbssyr.org/yearbook/2011/Data-Chapter2/TAB-7-2-2011.htm> Census 2004.

¹⁷ <http://www.cbssyr.org/yearbook/2011/Data-Chapter6/TAB-8-6-2011.htm>

¹⁷ <http://www.cbssyr.org/yearbook/2011/Data-Chapter11/TAB-1-11-2011.htm>

- Hama (45%), Homs (19%) and Aleppo (14%) account for the majority of mortalities reported.
- Sweda (71%) reports an overwhelming number of 'people affected', followed by Tartous (11%).
- Edlib (25%), Lattakia (22%) and Homs (18%) account for more than half of all reports on houses damaged and destroyed.
- Lattakia (47%) and Edlib (18%) reported the highest number of economic losses.
- Qunitera (72%) reports the highest impacts in the health sector followed by Homs (18%) and Edlib (9%).
- Lattakia (29%), Homs (25%) and Qunitera (23%) report more than half of all disaster related impacts in the education sector.

In terms of temporal variations:

- The seasonal trends imply heightened reporting of events in May, June and July mainly due to forest fires, and in October, November and December due to cold wave, frost and snowstorm.
- 2008 marked the highest deaths due to a range of intensive weather related disasters – fire, forest fire, frost and cold wave.
- 2002 (flash floods) and 2004 - 2006 (rains) reported the most damage and destruction to houses.
- Across the years, fires and forest fires account for the most extensive risk.

C. **YEMEN**

Yemen's national database covers the period 1971-2011, with a total of 8945 data cards¹⁸.

In terms of hazard impacts, Yemen's disaster database shows that:

- Epidemics (57%), liquefaction (13%), earthquakes (10%) and floods (7%) account for most mortality reported.
- Floods (75%) affect the most number of people, followed by liquefaction (18%).
- Liquefaction (41%), floods (31%) and earthquakes (20%) are reported to cause most damage and destruction to houses.
- Floods (475) followed by liquefaction (43%) and fires (5%) are reported to account for the most economic losses.
- Floods are reported to cause all damage to hospitals and epidemics (88%) an overwhelming cause of impacts on the health sector.
- Epidemics (63%), liquefaction (17%), floods (10%) and rains (5%) are reported to cause most impacts in the education sector. Specific impacts on schools were not reported.

In terms of spatial impacts:

- Taiz, Dhamar, Hadramaut and Shabwah are worst affected by disaster impacts on a number of counts (recorded below). These governorates also consist of large aggregate percentages of the country's poor.
- Taiz (32%), Dhamar (13%), Aden (9%), Shabwah (9%), Sana'a (8%) account for the most number of disaster related mortalities reported.

¹⁸ <http://www.desinventar.net/DesInventar/profiletab.jsp?countrycode=ym>

- Marib (64%) followed by Hadramaut (24%) and Dhamar (5%) account for the most number of reports for 'people affected'.
- Hadramaut (24%), Ibb (15%), Al Maharah (12%) and Shabwah (10%) report the most number of houses damaged and destroyed.
- Al Maharah (90%) followed by Al Hudayah (3%) and Taiz (2%) account for the most reports of economic losses. Since the Al Maharah governorate accounts for the least percentage of poor in Yemen, it follows that it also suffers the greatest economic loss due to exposure of assets.
- Taiz (26%), Hadramaut (8%), Amran (6%), Dhamar (5%), Hajjah (4%) and Al Mahwit (4%) report the most substantial impacts on the health sector. Hadramaut solely makes up for all reports on hospitals affected.
- Taiz (16%), Hadramaut (10%), Aden (10%), Al Maharah (7%), Hajjah (5%), Sa'adah (5%), Shabwah (5%) report the most impacts on the education sector.

By temporal significance:

- Reporting shows no glaring seasonal spikes. However, the months of July-August, October and March – April show a moderate increase in reporting.
- More disaster related deaths are reported in March, December and June, July and August.
- Reports on houses destroyed and damaged are reported through October – February and June, August, with a spike in October and November.

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