Disaster Risk Assessment for Aqaba

JULY2011

This Disaster Risk Assessment of Aqaba includes the following:

1. Seismic Risk Assessment
2. Evaluation of an earthquake on Aqaba& Jordan economy and public finances
3. Gender & social vulnerability assessment

This disaster risk assessment was directed and reviewed by the UNDP and ASEZA team.

1. Seismic Risk Assessment

The study was conducted by the Jordan Royal Scientific Society (Department of Constructions, Consultation & Projects). The findings were reviewed by an external consultant Dr Fouad Bendimerad.

1. Rationale

Archeological and historical evidences demonstrate that major damaging earthquakes have hit the region along to the Dead Sea Fault System (DSFS).

In March 1068, a major earthquake in the Hejaz(northwest Arabia) occurred during the morning and was reported to have killed 20,000 people in the whole region. The city of Aila at the head of the Gulf of Aqaba was completely destroyed with all but twelve of its inhabitants.

The recent majorseismic event occurred in November 1995 with an epicenter located 93 km south of Aqaba. It was strongly felt in Amman and the northern area of Jordan. Although no deathswere reported from this earthquake, the initial panic and confusion triggered more interest for preparedness and earthquake risk reduction.

Figure 1: Pictures showing the minor damage and cracks due to the 1995 earthquake in Aqaba City.



2. Probabilistic analysis:

No.	Year	Latitude (N°)	Longitude (N°)	M_L	No.	Year	Latitude (N°)	Longitude (N°)	M_L
1	31 BC	32	35.5	6.3	11	1105	32	35.5	6.1
2	33 AD	32	35.5	7	12	1160	32	35.5	6.1
3	48	30	32.2	6.3	13	1212	30	35	6.5
4	112	31.5	35.5	6.3	14	1293	31	35.5	6
5	363	31	35.5	6.3	15	1458	31	35.5	6.1
6	634	32.5	35.5	6.6	16	1546	32	35.5	7
7	748	32	35.5	7.3	17	1588	30	35	6.3
8	1033	32.5	35.5	6.7	18	1834	32	35.5	6.3
9	1047	31	35.5	6	19	1927	32.1	35.5	6.3
10	1068*	30	35	7	20	1995	28.758	34.628	6.2

Table 1. RevisedEarthquake catalogue of the DSFS and adjacent regions for last 2000 years.

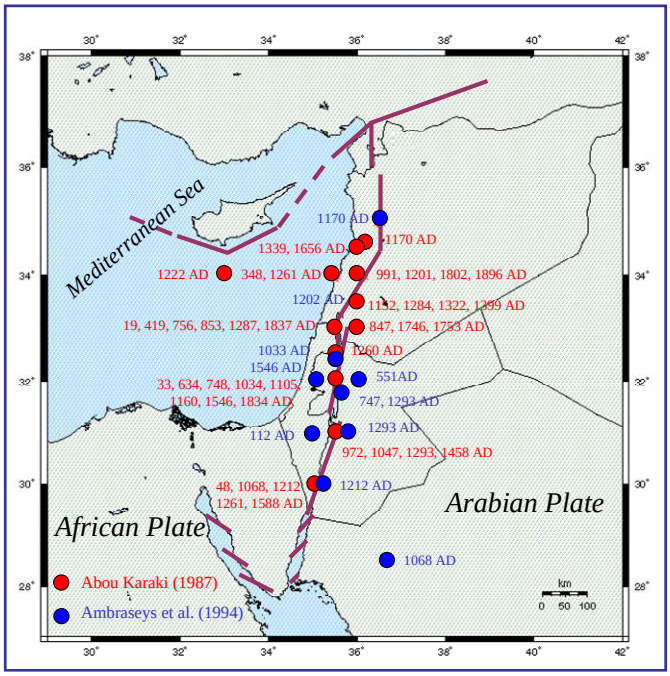


Figure 2: Map of historical seismicity (Reference to table 1)

Probability: Accurate forecast for earthquake is not possible. **Probabilistic seismic analysis estimates a major earthquake (Magnitude over 6) might occur anytime in the next 30 years along the Dead Sea Fault System (1,000 km) with a maximum magnitude of 7,5 (Mw).**



Figure 3: The threemain sourcesof earthquakes due to fault lines

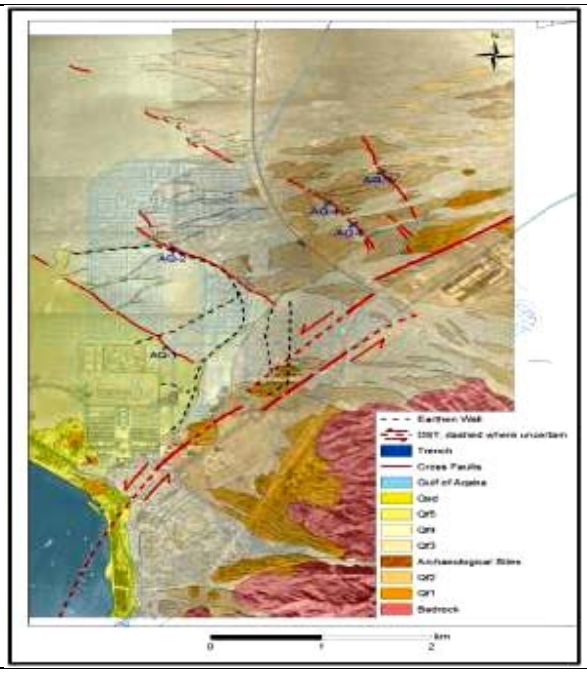


Figure 4: Geologic map of the northern part of Aqaba with mapping of fault and cross faults

3. Findings

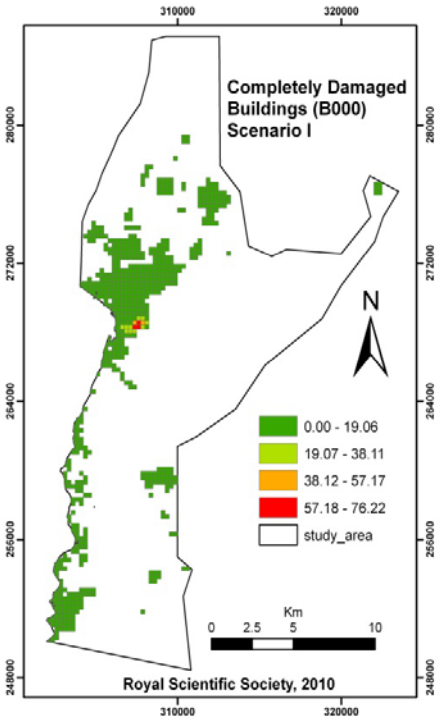
The results of seismic hazard analysis showed that the **Aqaba Fault systemis the main seismic source** within the region, which runs through the offshore-onshore boundary of the northern gulf region across the city of Aqaba.

The findings presented below only consider an earthquake occurring along theAqaba Fault Systemwith a maximum magnitude of 75 Mw.

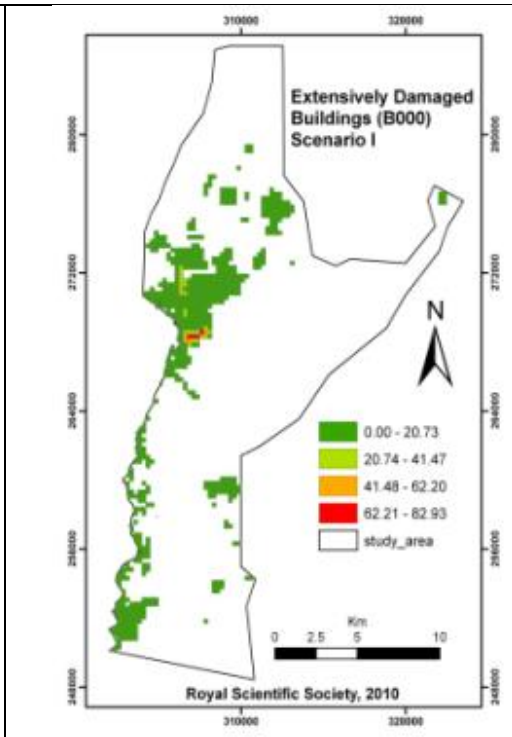
3.1. Estimation of damage of residential buildings

Type of Damage/number of buildings / Percentage (%) of total					#
None	Slight	Moderate	Extensive	Complete	number of Buildings (2010)
2,469 *(20.4 %)*	3,641 *(30.0 %)*	2,283 *(18.8 %)*	2,545 *(21.0 %)*	1,187 *(9.8 %)*	12,125 *(100 %)*

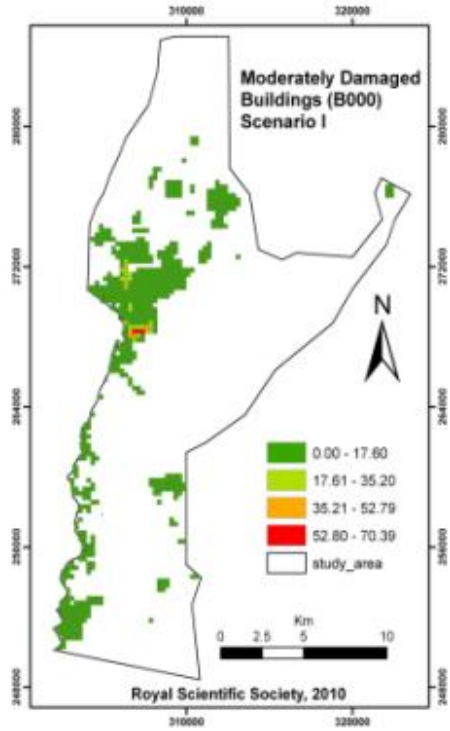
The highest ratios of damaged buildings will be in the districts: **Al-Shalaleh, Old City, Al-Kazan, East region-Industrial South, Al-Radwan, Al-Naser, Al-Rawdah Middle and Al-Remal.**



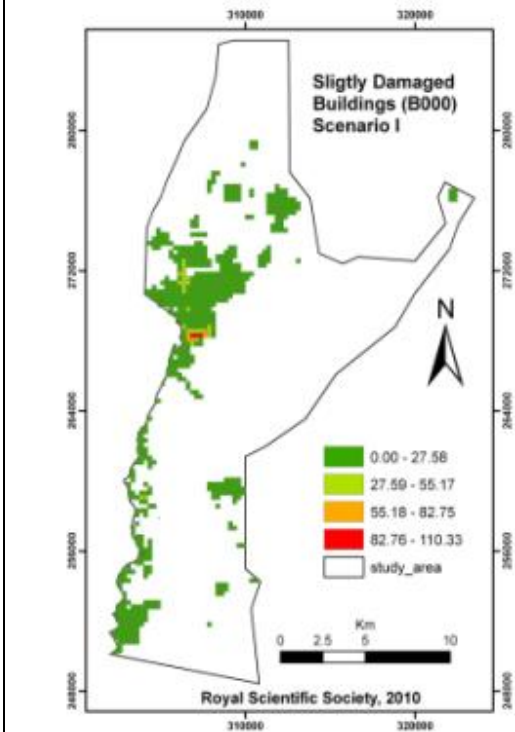
Completely damaged buildings distribution



Extensively damaged buildings



Moderately damaged buildings



Slightly damaged buildings distribution

3.2. Estimation of the repair costsfor theresidential buildings (in JOD)

Repair for Slight Damage	Repair for Moderate Damage	Repair for Extensive Damage	Repair for Complete Damage	Total repair costs (JOD)
11,866,787	44,651,787	111,237,060	65,438,818	233,194,452

3.3. Estimation of number for human casualties

# Casualties/type of injuries/ % population				# Casualties	# Population (est. 2010)
Minor	Medium	Severe	Dead		
2,527 *(2.4 %)*	1,240 *(1.2 %)*	640 *(0.6 %)*	640 *(0.6 %)*	5,047 *(4.8 %)*	106,000

The number of casualties could **increase by 10 to 25%**with an earthquake happening during high tourist peak season. (e.g.Weekend or Ramadan).

The current hospital capacity in Aqaba is limited to 206 beds among 3 hospitals.

3.4. Estimation of requirements for shelter

Distribution inhabitants /damaged buildings			# number of people need shelters / % population	# Population (est. 2010)
Moderate Damage	Extensive Damage	Complete Damage		
20,333 *(19.2 %)*	22,460 *(21.2%)*	9,627 *(9.1%)*	52,420 *(49.5%)*	106,000

3.5. Estimation of restoration time for transportation, water and wastewater systems

ROADS	Main Roads Restoration time (days)	Secondary Roads Restoration time (days)	Railroads Restoration time (day)
	53.5	42.1	5.3

WATER PIPELINES	Restoration Time (day)				
	Group I 600 mm pipes	Group II 350-500 mm pipes	Group III 150-300 mm pipes	Group IV 60-100 mm pipes	Group V <50 mm pipes
	2.2	1.8	33.1	64.7	2.8

WASTE WATER SYSTEM	Group I; > 600 mm Restoration Time (day)	Group II; < 600 mm Restoration Time (day)
	29.4	102.6

3.6. Risk of tsunami and soil liquefaction

The potential for a **Tsunami is considered as minimal**after the review of the past destructions left by earthquakes. This low probability is also due to steep slopes of the Gulf of Aqaba. If any, a smaller scale of tsunami (*Seiche* in Japanese) is more probable.

Results showed that potential of **soil liquefaction**(it happens where loosely packed, water-logged sediments come loose from the intense shaking of the earthquake with risks for buildings to sink sideways) **is also relatively minimal**. Areas with higher risk are located along the **northeastern shoreline corner** of the Gulf of Aqaba. This is due to the shallow depth of groundwater table and the local surface geology/texture.

2. Evaluation of the impact ofan earthquake on Aqaba and Jordan economy & public finances

The study was carried out by ProfessorAhmad AlWaked, Ph.D, Head of Economic department of the Hashemite University.

This evaluationuses the findings of the seismic risk assessment (Jordan Royal Scientific Society) in order to provide a comprehensive overview of the costs of an earthquake impacting mainlyAqaba city and slightly in the southern area close to the Jordan-Saudi border. It only considers an earthquake occurring under theAqaba Fault Systemwith a maximum magnitude of 7.5 Mw.
The methodological approach is based on the one used by the**World Bank in Istanbul, Turkey**.

Summary Indicators	Estimation in JOD (millions)	Estimation in USD (millions)	Cost in terms of % of Jordan GDP
Direct losses	**606.01**	**855.94.99**	**2.80**
Wealth losses	598.01	844.64	2.76
Compensation for death and disability	8	11.29	0.04
Indirect losses	**492.8**	**694.08**	**2.51**
Impact on output	482.5	679.30	2.46
Emergency assistance	11.3	15.91	0.05
Secondary Effects	**507.5**	**714.79**	**2.59**
Current account balance	310	436.62	2.58
Fiscal impact	197.5	278.17	1.01
PARTIAL TOTAL	**1.606 billion JOD**	**2.268 billion USD**	
Other key indicators			
Expected number of deceased	640		
Expected Total human Casualty	5,047 persons (4.8% of population)		
Expected Injured persons	4,4 thousand		
Expected population in need of shelter	47 to 65 thousands		
Expected Job losses	20-35 (% of labor force)		

Direct costs refer to the assets and inventories damages. **Indirect costs** refer to the forgone production and income and the costs of emergency relief while **secondary costs (macroeconomics)** refers to the short and medium effect of the disaster on the economy and on socioeconomic issues and public policy. In addition the estimation of the full impact of a natural disaster will **consider the development stage of the economy** and the **government and other public entities like ASEZA**.

Disaggregate for Direct Losses

	Estimation (Million JOD)
Residential building+ equipment	256
Hotels + equipment	195
Roads	4.31
Railways	0.58
Electricity distribution	6.46
Electricity production	20
Water & Wastewater distribution	4.06
Water Treatment Plant	23
Health centers	1.5
Health hospitals	5.5
Medical equipment	5.6
Schools	31.5
Equipment	4.5
Aqaba port decks	40

Introduction

Aqaba economic weight per capita (population of 106,000 inhabitants) is one of the highest in Jordan: More than 20 billion USDthat have been invested or pledged since 2001 when ASEZA was established. Along with tourism mega-projects, the cityhas also attracted global logistic companies which boosted the city status as a transport and logistics hub. The south coast industrial zone is gathering Jordan phosphate Mines Co., industrial complex, thermal power plant, Arab Potash Corporation and Arab gas pipeline. In addition, the large majority of imports and exports of Jordan go through the harbor of this city.

The following chapters provide the results of calculations:

1. Direct Costs:

Buildings and equipment

According to the RSS risk assessment, 12.1 thousand **residential buildings** were registered. The HAZUS software estimates the total cost of repairs to these buildings could be233.19 million JOD. The civil and architecture engineers assume equipment and belongings represents30% **of the value of the building**.The additional cost is 23.47 million JOD.

Aqaba has 42 **schools**, of which 26 are public. Most of the public are mainly located in high risk areas of the Old district and its surroundings. The study assumes half of these schools will be damaged and not safe for use. The estimated cost is 31.5 million JOD of which, 10.5 million for the private schools.Equipment losses are valued at 9.45 million JOD.

With**three hospitals and 12 public medical centers,** the health system provides a total 207 beds. Most of these medical facilities will be affected by the earthquake. The lower bound will equal to 7 million. In the health sector, the value of equipment is much higher: 80% of the value of the building JODor 5.6 million JOD.

The tourismis experiencing a strong growth with new**hotels, apartments & suites and restaurants**. Saraya, Ayla Oasis, Tala Bay and Marsa Zayed are four large investment projects that include/will include hotels, villas and houses with total investment equals 8.7 billion JOD[1]. The study estimates the minimum cost to be 150 million JOD.Equipment losses will be 45 million JOD.

Physical infrastructure/ critical lifelines

Based on the damages identified by the RSS risk assessment study:

	Restoration time (days)	Length (km)	Unit cost/sq/m
Main Roads	54	8.9	10
Secondary Roads	42	10.5	10
Pavement	60	19.4	30
Railways	5	1.1	650

The estimated cost for the damages to roads is 4.31 million JOD and 0.58 million JOD for the railways.

[1] Part of these investment projects are already in the final stage of construction like Saraya and Tala Bay, while the other two are planned to be completed by 2017.

The main source of **Aqaba's water supply** is the DISI aquifer field which is located 50 km northeast of Aqaba. The estimated restoration time for water system depends on the diameter of the pipes and type of damages. The estimated cost for the water system damages is around 2.06 million JOD.The estimated restoration time for **wastewater system** is based on the diameter of the pipes and type of damages. The length of the wastewater system in Aqaba is about 46km. The estimated cost for the wastewater system damages is around 1.5 million JOD. The cost of repair due to contamination of the potable water system will be around 0.5 million JOD.

Aqaba functions with two **water treatment plants**, one biological and one mechanical. The total cost of these plants equals 46 million JOD.[2] The study assumes both will be damaged severely. The estimated damage cost equals to half of the value: 23 million JOD.

The estimated number of **electrical posts** in the estimated affected area is around 4,971 units. The study assumes that all of these units will be replaced at a cost of 1.3 thousand JOD /unit. The cost of the repair for the electricity gridamounts to 6.46 million JOD. The cost of repairing the electricity plant will be 20million JOD.

The study assumes that the berths**in the port** will be damaged and will requireextensive repairs. The study assumes 20% of the capital value of the port is the repair costs. The repairs will amount to 40 million JOD.

Human causalities

The loss of human life is a direct economic loss to the country. To quantify this loss, the study considers expected future earningsof the dead person andaverage compensation paid by insurance companies. The rate per human life will amount to 12.5 thousand JOD. Accordingly, the cost is estimated to be 8 million JOD for the 640 deceased (RSS estimate).

2. Indirect Costs

Indirect costsrefer to the flows of goods and services that will not be produced or rendered over the time span that begin after the disaster and may extend throughout the rehabilitation and reconstruction phase (most will be concentrated on the first 12 months extending up to 5 years).

The study assumes that all of the economic activities in Aqaba including the production in the southern coast will shut down for at least three to six months. The second assumption is that most economic activities will then recover butat 20 percent

[2] According to Aqaba Water and USAID/Jordan, the construction cost for the biological plant was 38 million JOD and 8 million JOD for the mechanical one.

lower compared to the pre-earthquake level for few years. Third assumption is that the recovery of tourism will last minimum six months up to one year to regain the current level. Fourth assumption is that the Government will launch the reconstruction shortly after the relief of the disaster.

Production and income losses

The earthquake will hit the only Jordanian seaport through which most of imports and exports are shipped. The consequence on national output and income will be severe.

The volume of merchandise handled by Aqaba port handling was around 16.8 million tons during 2010. Most of the import/export trade of Jordan goes through this port. Its value amounts to 8,418 billion JOD in imports and 4,219 billion JOD in exports. The impact will be severely disrupted. With the port shut down to business for at least 3 months (minimum to repair and deal with humanitarian priorities), the estimated losses in import/exports would amount to **199.5 million JOD**.

Aqaba Development Corporation charges fees for the services provided to importers and exporters; the net income from the port handling was about **52 million JOD** in 2009 and **4 million JOD** for the ASEZA storage facilities.

Aqaba **gross domestic product** constitutes around 5.5 percent of Jordan GDP in 2005, with a nominal (real) growth rate above 14% (11%) annually for the period 2001-2005. Experience of other disaster shows the production rate might contract by an average of 2 to 3%.

In particular, tourismwill be severely affected affectinghospitality sector as well as wholesale and retail trade. Adding to it the transport hub, storage facilities and the construction, these sectors constitute about **two-third of Aqaba GDP**.[3]

In 2010, 452 thousand tourists visited Aqaba of which half were foreigners.For Jordan, **tourism sector** generated an income of 2.4 billion USD in 2010. Income for Aqaba was valued at 414 million JOD.Considering a recovery taking minimum 6 months the study estimates the costs at **212 million JOD**.

The study cannot estimate the **cost of insurance** due to lack of information, but expects a high demand for compensation and bank loan for reconstruction.

[3] Based on Rockler's study and projections and the structure of Jordanian economy, this study assumes the structure of Aqaba economy will keep the same features.

The construction sector will lead the economic growthwith the reconstruction for the next 1 to 2 years.Minimum 300 million JOD will be spent in the first year.Before that,**removalof rubbles**will cost 10-15% of the reconstruction or around **15 million JOD**.

Loss of employment

At national level, the distribution of employment is the following: transport, storage and communications, construction, wholesale and retail and public administration and defense employed respectively 27, 13, 11.9 and 10.1 percent. These figures are similar for Aqaba economy.[4]

Considering the above and the expected damages, the immediate loss will amount to11,813 jobs (4,723 from tourism sector, 7,090 from retail/wholesale/industries).However it is expected that reconstruction will create many jobs, although most of them will be filled by non-Jordanian.

Emergency Assistance: Temporary shelter and social assistance costs

Between 49,000 up to 65,000 Aqaba inhabitants might need shelter or relocation. The cost of humanitarian assistance to fulfill**basic human needs including shelter** is expected to be high due to long duration for reconstruction. According to the Jordanian Red Crescent/Aqaba, the cost is estimated in a range of 10-15 JDper person per day. This means the government and ASEZA need between 9.1-13.8 million JOD to provide the basic needs excluding housing and medical services if people in shelter do not move to other cities in the country. Estimated cost of temporary shelters will be around 10 million JOD.[5]

Emergency medical carewill require the setup of a field emergency hospital as the capacity of hospitals will be very limited. The estimated cost for the medical services is around 1.3 million JOD.

3. Secondary Effects

Secondary effects concern the short and medium-term impact of the disaster on overall economic performance (regionally and nationally) such as the implications for the fiscal accounts (tax losses – VAT, income, corporate, customs, tourism- for ASEZ and Jordan Government) and the balance of payments. This chapter will estimate the losses for each category based on today's economic indicators.

[4] Department of Statistics calculations and Rockler study show the same features for Aqaba GDP.
[5] This rough estimation based on 1,000 JOD per family. Estimated number of families is around ten thousand.

Balance of payments

With regards to the national capital account, the study assumes governmentdoes not have sufficient reserves to cope with these unexpected expenditures (Jordan already relies on foreign aid and loans to finance its annual budget deficit) and will have to contractinternational loans with high interest rate (on international market). The current account will also suffer fromthe loss of hard currencies from foreign tourism. Both issues will lead to higher deficit in the balance of payment.

The interruption of Aqaba port activities will affect the trade volume which will be reflected in the trade account. The decrease in import and export will result in some improvement. The domestic export will be affected as assumed above and the value of export may decrease by 25% or about 1.05 billion JOD. Imports will decrease by the same percentage or about 2 billion JOD. Any new way of managing import/export will incur higher transportation cost. It is expected an increase in trade deficit by 310 million JOD.[6]

Fiscal costs

ASEZA collects tax and customs revenues on behalf of the Jordanian government and take a share of these revenues. ASEZ benefits from a specific tax systemthat applies to sales, excise and land and construction. These taxes are shared between ASEZA and government of Jordan.[7]The earthquake will result in slowing the economic activities for at least two years, which will result in decreasing the tax and custom revenues.

ASEZA's tax and custom revenues amounts to around 8 million JOD and the government collects to 20 million JOD.[8]Most of revenue from sales tax and custom, income tax and economic activity related revenue will be lost and from some sectors will be zero. The study estimated this revenue loss to be about 20-25 million JOD.

In addition the government is expected to lose taxes on importations by 177.5 million JOD.

[6] The study assumes 5% increase in the cost of imports, and 20% decrease in the exports.
[7] The Jordanian custom department charge customs and sales tax on all goods that go to Jordan other than ASEZ, while ASEZA charges customs and sales tax on goods within ASEZ.
[8] The financial report for ASEZA is not available to double check this figure.

3. Gender and social vulnerability assessment in Aqaba

This study was carried out by the gender expert Noora El Wer.

1.Determining vulnerability and purpose of the assessment

The term 'vulnerability' is used to describe the conditions "determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards". Accordingly, **social vulnerability is the result of social inequalities and is defined as "the susceptibility of social groups to the impacts of hazards, as well as their resiliency, or ability to adequately recover from them" (Taxonomics approach).** Thus, to determine vulnerability, one needs to adopt the process of predicting and understanding the existence of differentiated impacts on various groups in a society[9].

The concept of vulnerability takes into account the social situation, affirming that people's circumstances change and can be changed by an event such as a natural disaster. **Pre-disaster existing resources are reliable indicators of vulnerability.**

This assessment will first provide the demographic profile for Aqaba, then look at the existing conditionsof existing vulnerability, then assess how the vulnerability will be increased due to the impact of an earthquake. Then the assessment briefly provides existing resilience. Overall the study will identify which segment of the population or groups might be more at risk depending on the type of disaster and because of pre-conditions.

This study is of criticalimportance since it introduces the **human dimension of a potential disaster** in Aqaba. The findings will provide an in-depth analysisfor **ASEZA's newly established DRM unit** and will be incorporated into the **DRM master plan as well as the ASEZA DRM unit action plan.**

2. Aqaba demographic profile

- Aqaba's exposure to natural disasters is continuously increasing as much as its population growth. The population is expected to**more than treble by 2025 (347,000 inhabitants)**.

[9]Blaikie, P., Cannon, T., Davis, I., Wisner, B. (1994). *At Risk: Natural hazards, People's vulnerability, and disasters.* London, Routledge.

- In 2007, the total number of households was 18,423 which include 17,989 private households and 434 collective households. Additionally, the average family size was 4.9 individuals for private households and 18.9 individuals for collective households.
- The **ratio of Aqaba's residents below the age of 30 is quite high at 65%,** but is somewhat lower than that of Jordan as a whole (which is at 67.8%).
- Foreign workers represent some of the most notable numbers, in which **non-Jordanians represent 17.86% of the population**, it is considered notably high compared with the 7.69% nationwide.
- The male/female ratio for non-Jordanians in Aqaba is significantly higher than that nationwide, the former reaching 2.51 compared to 1.44 for the latter.
- **Economic activity rate is around 10% higher** than the national rate. But women are not fully integrated with a low employment rate of 17.8%.This translates into **high dependency on males for finances.**
- **Non-Jordanian residents of Aqaba are almost all foreign workers** plus their families.
- The average individual annual income in Aqaba Governorate was 1,294.5 JOD in 2008 slightly above national (1,027 JOD).
- Poverty rate is one of the lowest: only 3.9% of families or 18,796 persons.

	Female headed household	Male headed Household	Average Aqaba
Mean Family Size	3.72	4.95	4.88
Mean Age of Head of Household	52.26	40.60	41.26
Economic ActivityStatus of head of household			
% Employed	12.04%	87.65%	83.36%

3. Conditions leading togreater vulnerability

3.1 Prevailing Fatalistic approach

Most of the population believe that''natural disaster'' is an act of God. This fatalistic attitude prevents families and community from building resilience and taking necessary precautions. The current ASEZA-UNDP project already addressed this issue through the invitation of the Aqaba religious authorities. The latter emphasize that, according to the Quran, communities have the duty to get prepared. More dissemination of this interpretation is required.

3.2 Limited access and control to resources

Economic and financial factors play a major role in recovery in post-disaster situations. Some of the resources essential for survival and recovery post-disaster were identified in key studies as:

- Secure employment; work experience.
- Health and nutrition; food security.
- Appropriate, secure housing.
- Functional education; administrative skills.
- Close family networks.
- Low rate of adult dependency in the household.
- Access to public and/or private transport.
- Time.
- Social networks; community integration.
- Political power and influence.
- Power in the household; access to, and control of, household resources.
- Access to emergency resources (information, shelters).

These resources are distributed unequally in all societies, which means that in equally risky environments, people and social groups are impacted in different ways. As a result, the following groups of people might be more severely impacted:

- Poor and low-income households.
- Single-parent households.
- Socially isolated households.
- Recently arrived residents, immigrants, foreigners.
- Senior citizens, children and young people.
- People with a disease or a mental or physical disability.
- Undocumented residents.
- Institutionalized populations; homeless residents.
- Women.

Poverty is important as a component of the vulnerability of individuals and the various social groups.

In addition, low income families and individuals are expected to be more vulnerable because they **are more likely to live in houses with poorer infrastructure in the high-risk areas.** So they would be more vulnerabletophysical injuries and to loss of assets. Assets play a more significant role among the poor because if damaged, it would be harder for people with low income to replace them.

Vulnerability	Expected Severity				
Physical					
Economic					
Psychological					
Social					

3.4 Gender

Women in Aqaba face a range of recurrent vulnerabilities prior to disaster that might magnified. they are more likely to suffer from lower incomes, lack of jobs, dependency on men's incomes, having their productive labor unrecognized, limited access to resources and lower potential to produce income, and are more likely to live in hidden poverty.

Women are also more socially vulnerable as they continue to face social stigmas, inequity, and strict gender roles. For examplewomen might face additional distress due to limited hygiene which is considered as their responsability within the family.

Aqaba had already relatively high rates of **gender-based violence**(National Department of Statistics).They might face violence (depending on how the government responds to the disaster) such as fights, assault, harassment, and even murder. Experience around the world shows that good social behaviours disappear at time of disaster because the protection from family or police will no more exist.

Women could therefore be psychologically vulnerable and not able to make key decisions due tolack of access to information/knowledge on what to do if disaster strikes.

The sense of powerlessness already exists asover a third of women in Aqaba reported in 2007 that they do not have a say in major household purchases, another third did not have a say in purchases for daily household needs, neither alone, nor jointly with their husbands.

Vulnerability	Expected Severity				
Physical					
Psychological					
Social					

3.5 Illiteracy

Lack of access to critical information before, during, and after disaster increases vulnerability.

Information related to safety usually does not include illiterate people as part of its audience. Information package may require a certain literacy level. The project produced a comics-style booklets but their target are the youngest school children.

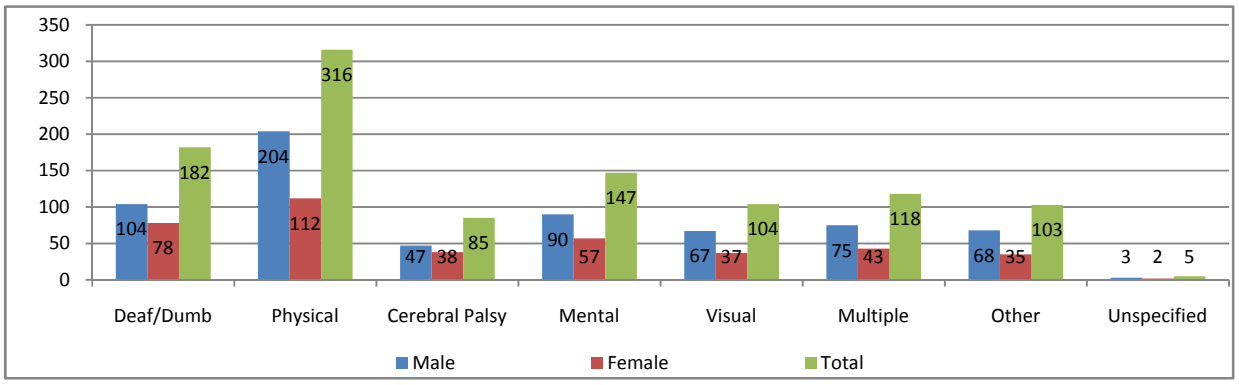
Since illiterate people are mostly in the elderly age groups (64.3% of women and 24.5% of males ages 60 and above are illiterate), this group does not have any knowledge unless they get it from relatives.

Elderly people constitute 61% of illiterate individuals in Aqaba, and also almost half of disabled persons have the same condition. It results in a perception of powerlessness and high dependency thus increasing psychological vulnerability of this group.

Vulnerability	**Expected Severity**				
Physical					
Psychological					

3.6 Disability

So far, 1,060 People with Disability (PwD) were reported in Aqaba Governorate in 2004 (of which are 402 are females and 658 are males) or an estimated 1,475 PwD in 2011. This figure is already an underestimation because some families do not report having disabled children to census staff due the social stigma associated with PwD.



PwD already face **multiple barriers** and are exposed to several vulnerabilities: physical, psychological, and economic. Their life is most at risk due **to their reduced mobility and capacity to understand the unfolding events**. Dangerous panicking or paralysis could be their immediate reactions.

PwD might **not receive proper support** during and after disasters due to lack of recognition of their specific needs.So far no specific training materials or programs for emergency and for PwD and/or their families exist.
PwD who are unable to make it to a shelter (due to loss of public transportation services, damage to roads, road blockages, etc.) would be exposed to potential physical and psychological vulnerability/stress.
For PwD housed in shelter, their condition might get worse due to inability to communicate (if caregivers or specialized staff are absent) or receive their usual medication/therapy

Vulnerability	**Expected Severity**				
Physical					
Psychological					
Social					
Economic					

3.7 Foreign nationality and legal/illegal status

Non-Jordanian nationals might face social and informational barriers. For example non-Jordanians - whether residents or visitors – do not have the social support and safety net that Jordanians have; if their mother-tongue is not Arabic, they will be unable toaccess any information made available to Aqaba residents.

3.7.1 Foreign Workers

Non-Jordanians residents in Aqaba make up 17.86% of the population, which is notably higher than the ratio for foreigners in Jordan (7.69%).

Non-Jordanian residents of Aqaba are almost all foreign workers and their families (the economic activity rate is overwhelmingly high with an extremely low unemployment rate). 43% of them reside in the 8 most vulnerable areas.So far no organization provides disaster information for this group.

Private sector companies employ a large number of foreign workers but the extent to which they are committed to disaster preparedness is not known.

The legal status will define the level of vulnerability of this group. Preventive Policeis officially in charge of handling the cases of non-Jordanians; and shelters for non-Jordanians would be placed in different locations (supposedly in the compound of the Public Security Directorate) that be considered “military shelters”.

The Preventive police is the only institution authorized to contact embassies which will in turn provide information to the relatives in respective countries. For foreign workers, the responsibility of the police is to communicate with their sponsor. It is expected some confusion.

Vulnerability	Expected Severity				
Physical					
Economic					
Social					

3.7.2 Illegal foreign workers

Their status will obviously increase their existing vulnerability. They have more limited access to basic public services; they have a sense of limited safety and (economical) stability as they fear deportation. They are less likely to be employed by large companies therefore they can neither rely on sponsors nor on Preventive police, unless for emergency case such as health emergency.

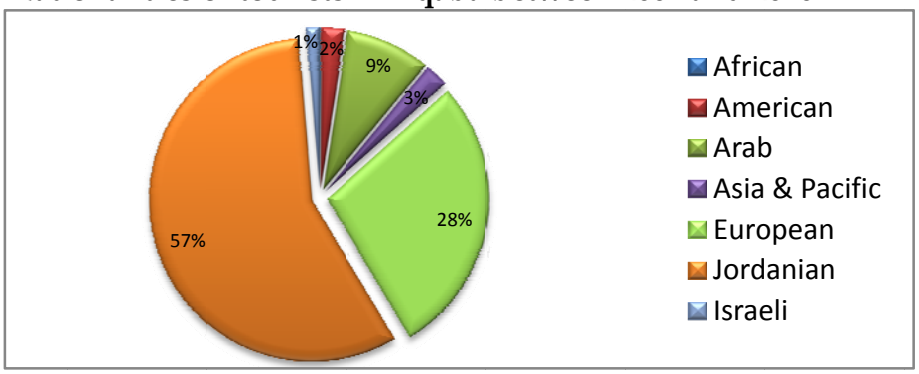
This group is also more isolated and it does not have access to public basic services and they seldom seek it. The social isolation of this group would make it more probable that they do not have access to the available information on disasters.

Vulnerability	Expected Severity				
Physical					
Economic					
Psychological					
Social					

3.7.3 Tourists

In peak season, tourism in Aqaba could account for a 50% increase in population. Hotels and motels have an occupancy of 78,111 rooms (2010) and between the years 2004 – 2010, 2,7 million tourists stayed in Aqaba's hotels and motels, over 1,2 million of them were non-Jordanian.

Nationalities of tourists in Aqaba between 2004 and 2010



So far, **tourists do not have access on information regarding potential natural hazard and best ways to react**. ASEZA is keen to encourage the tourism industry to consider these threats withoutcreating panic among travel agencies.

Hotel staff is trained in evacuation (mainly related to fire). But tourist might panic due to their limited understanding of the event and limited language skills.

In addition foreign tourists cannot rely on social network. Their situation will be dealt with official instructions from Preventive police. Embassies are expected to mobilize assistance for their nationals. However this capacity is not well defined or tested: worldwide experiences demonstrate relative limited capacity (Tsunami, Thailand during Christmas holidays).

Tourists could also be more vulnerable to violence if the security situation is not fully restored.

Vulnerability	**Expected Severity**				
Physical					
Psychological					

Summary of findings

	Rationale	Estimated numbers
Gender	Women have, to some degree, limited access to and control of resources because of their expected role as housewives and their low economic participation. Some women suffer from recurrent inequity and social stigma, and decreased status. Therefore there is a risk that women will not be able to access resources for their survival and recovery thus might be exposed to violence.	
Disabled (mentally or/and physically)	A disabled person faces reduced capacity to flee, lack of access and control to resources, high dependency, high illiteracy, social stigma, low level of environmental adaptation, and sometimes exclusion from social and public lives.	1,475 (2010)
Legal Foreign Worker	A foreign worker cannot rely on social support and faces low access to resources. At time of recovery they might be discriminated against in terms of access to resources.	17,300 (2007)
Illegal Foreign Worker	Their status of illegality will increase their existing social isolation and lack of access to services (health, security, etc). Their low income will not allow any capacity to recover and will eventually force to displace to other parts of the country or heading back to home country	N/A
Foreign Tourist	These tourists might be at risk due to the language barrier and their inability to access to monies (financial system will be disrupted). However they might also benefit from specific support from their respective embassies.	10,000 – 25,000 (2011)
Family member in low income household (income =<300)	Poverty is the main obstacle to resilience and recovery: Poor people will have to rely on even more limited resources. Their high dependency ratio, low control of and access to resources create conditions for vulnerability and increase exposure to hazards.	18,796 (2008)
Illiterate person	Elderly persons and persons with a disability are more prone to be illiterate. They will face some limitations in terms of access to information.	3,822 (2007)

4.Conditions leading to greater exposure: geographical areas

The populations living and/or working are at greater risk:
Due to flash floods, the areas are the **north** of the city:**the expanded residential expansion area, the Aqaba International Industrial Estate, the King Hussein International Airport and light industries**. Other vulnerable areas include **Wadi T, Wadi Shallaleh, and the Central Urban area.**

Flashflood is a localized high impact-medium to high frequency: in 2006, flash floods hit the alluvial fans of Wadi Yutum, which causedfive human casualties, the destruction of 18.5 km of water pipelines and water production wells, and damage to the airport. A container company's yard located at the tip of Wadi Mabrak was also hit with one casualty.

Due to Earthquake, the 8 neighborhoodsmost exposed are: **Al-Shalaleh, Old City, Al-Kazan, East region-Industrial South, Al-Radwan, Al-Naser, Al-Rawdah Middle, and Al-Remal.**

5. Expected impacts of an earthquake

Social impacts	1. Breakdown of family/community protection 2. Violence/ competition over resources
Economic impacts	1. Loss of assets 2. Loss of production and distribution of resources 3. Loss of income sources
Health & environmental impacts	1. High number of lives lost 2. High number of injured requiring surge in capacity 3. Loss of supplies (food, medicine, energy) 4. Possibility of epidemics
Infrastructural impacts	1. Loss of basic services (police, fire, emergency) 2. Loss of housing, increasing need for shelter 3. Loss of communication 4. Loss of essential infrastructure (hospitals, local government/ administrative buildings schools and colleges , bridges)

The impact would vary considerably depending **on the timing of the earthquake**.
During daytimeon a regular week day, almost a third of the population would be in school and another third in offices.The Civil Defense and the Education Directorate are concerned about the quality of emergency training and drills in schools and about the level of organization and any chaos might cause further injuries.

During the weekend, more residents are expected to be at home and a higher number of visitors (non-residents) to be present around the city.
During night,most people would be at home.

Individuals will have to face different situations that might place them in a vulnerable position:
The three scenarios are the following:-

1. House severely damaged, stay in the street.
2. House severely damaged, moved into a shelter;
3. House not severely damaged, stay in the house;

In the first case,part of the population might resist to moving into a shelter and will prefer staying in the street instead for a variety of reasons:

a. Some people might view living conditions in a shelter conditions as unfavorable (in terms of food, sanitation, lack of privacy) and thus staying on the streets could be perceived as more favorable;
b. Others may choose to stay on the street close to the house to watch their belongings and protect them from theft or looting;
c. People are emotionally attached to their home/neighborhood; they might prefer to stay as close as possible to their livelihoods.

Shelterswill require having a high number of police (men and women), social workers, health practitioners, and volunteers to ensure shelters are safe and people have access to much needed services and resources. Their interventions will alleviate the physical, economic, social, and psychological strain on people.

6. Coping structure and Resilience

Resilience is the process of adapting better to adversity, trauma, tragedy, threats, or even significant sources of stress. It means "bouncing back" from difficult experiences.

The following structures were identified:

a.) Emergency response institutions (Public Security, Civil Defense, Armed Forces). They have developed their respective response plans and set up response capacities in different strategic locations. However the main (and old) Civil Defense building is not seismic proof. The role of these institutions is to improve resilience of the community and alleviate the impacts of a disaster. They can be considered as one of the main coping mechanisms for supporting vulnerable groups without discrimination.

b.) Local community structures (voluntary committees, neighborhood committees, first aid committees). The level of solidarity between members of a community is a key component in community resilience.

Informants stated that in general local community members are expected to have a fair level of solidarity; however, the pots disaster reaction of individuals/ families/ communities is an unknown. Aqaba can rely on a number of competent and well established community organizations. It is expected they will participate actively to the search & rescue operations, first aid, psychological support, and information gathering/sharing. Their main instrument is the neighborhood committees that are present in some of the oldest and high risk areas (Old Town, Al-Shallaleh, Al-Khazzan).**c.) Family – immediate and extended.**It is the main coping structure for the residents. Relatives and neighbors are the first to save lives. They will also provide psychological and physical support to their members, in particular the most at risk individuals such as women, elderly, children, PwD, and illiterate. Unfortunately Non-Jordanians living alonecannot count on this safety net as Jordanian.

d.) The religious institutions (mosques and churches). Faith and hope are two critical key features for resilience, starting with the reduction of psychological vulnerability. These institutions can also provideeconomic alleviation.