

# Amman, Jordan

## Disaster Risk Management Profile

Last Update July, 2006

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# Amman, Jordan

## Disaster Risk Management Profile

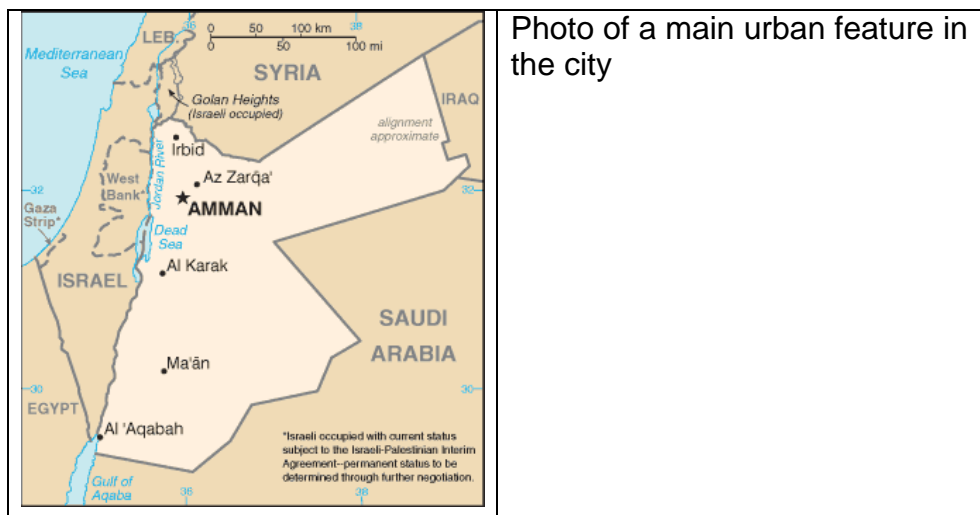


Photo of a main urban feature in the city

### 1 Introduction

#### Demographic, economic, social and cultural characteristics

The nation of Jordan contains a diversity of landscapes and environments, a rich history containing many significant archeological sites, and is bounded to the west by a major fault/plate boundary. Jordan can be divided into four ecological areas: the Jordan Valley, Highlands, Steppe and Badia (Arid) region. Jordan maintains a dry climate throughout 90% of its area.

Jordan's economy has change from an agricultural based to a diversified economy, which includes services and industry as well as agriculture. A population increase occurred when refugees in 1948, 1967, and 1991 can to Jordan. Unfortunatly this population growth created poverty and affected ecologically fragile environments.<sup>1</sup>

Jordan acts as a host country for many United Nations programs for the region. The United Nations Human Settlements Program (UN-HABITAT) opened a central office in Amman to assist UN-Habitat plans for Iraq, Syria, Lebanon, and the occupied Palestinian territories. Jordan will organize all seminars, exhibitions, forums, and meetings regarding Iraq in Amman.<sup>2</sup> As set by the United Nations Millennium Summit and created by the Millennium Development Goals, in 2000, they will use this office the programs objectives (poverty, hunger, disease, illiteracy, environmental degradation

<sup>1</sup> National Report on the UNCCD Implementation, The Hashemite Kingdom of Jordan.

<sup>2</sup> Embassy of the Hashemite Kingdom of Jordan, Washington D.C. [www.jordanembassyus.org](http://www.jordanembassyus.org)

and discrimination against women). This also includes a “road map” on aiding in the “focus on human rights, good governance, and democracy.”<sup>3</sup>

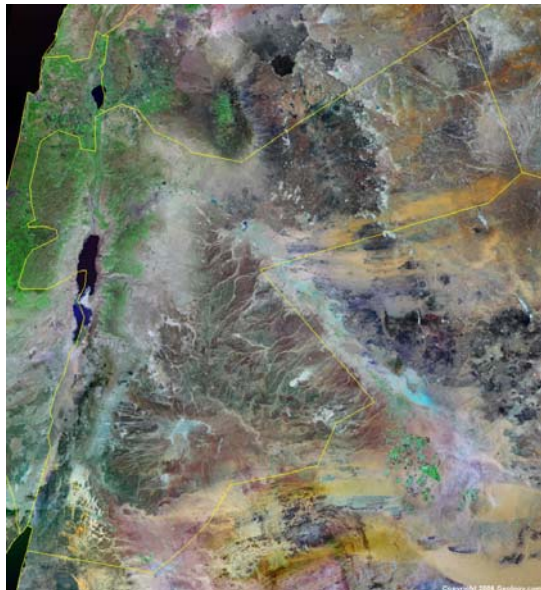


Figure 1. Landsat image of Jordan and surrounding nations. Observe the fault located along the western edge of Jordan. (geology.com)

After World War I, the League of Nations awarded the territory, which is now Israel, Jordan, the West Bank, Gaza, and Jerusalem, to the United Kingdom as the mandate for Palestine and Transjordan. In 1922, the British divided the mandate by establishing the semiautonomous Emirate of Transjordan, ruled by the Hashemite Prince Abdullah. The mandate over Transjordan ended on May 22, 1946, and on May 25, the country became the independent Hashemite Kingdom of Transjordan.<sup>4</sup> In 1989, he reinstated parliamentary elections and gradual political liberalization, and in 1994 signed a peace treaty with Israel. King Abdallah II, the son of King

Hussein, assumed the throne following his father's death in February 1999. Jordan acceded to the World Trade Organization in 2000, and began to participate in the European Free Trade Association in 2001. After a two-

year delay, parliamentary and municipal elections took place in the summer of 2003. The prime minister appointed in December 2005 said the government would focus on political reforms, improving conditions for the poor, and fighting corruption.<sup>5</sup>

### Governance style

Jordan is a constitutional monarchy based on the constitution promulgated on January 8, 1952. The king and his council of ministers have executive authority. He appoints and may dismiss all judges by decree, approves amendments to the constitution, declares war, and commands the armed forces. Cabinet decisions, court judgments, and the national currency are issued in his name. The king, who may dismiss other cabinet members at the prime minister's request, appoints the council of ministers, led by a prime minister. The cabinet is responsible to the Chamber of Deputies on matters of general policy and can be forced to resign by a two-thirds vote of "no confidence" by that body.<sup>6</sup>

The head of government is the prime minister, and which is assisted by a deputy prime minister. Both are appointed by the king. The cabinet is appointed by the prime

<sup>3</sup> United Nations Jordan. [www.un.org.jo](http://www.un.org.jo)

<sup>4</sup> U.S. Department of State, May 2006. [www.state.gov](http://www.state.gov)

<sup>5</sup> CIA World Factbook, May 2006. [www.cia.gov](http://www.cia.gov)

<sup>6</sup> U.S. Department of State, May 2006. [www.state.gov](http://www.state.gov)

minister with influence from the King. The Legislative Branch bicameral National Assembly, known as Majlis al-'Umma, consists of the Senate, which is also called the House of Notables (Majlis al-Ayan). The 55 members are appointed by the monarch to serve four year terms. The House of Representatives, also called the House of Deputies (Majlis al-Nuwaab) has 110 seats, and the members are elected by popular vote to serve four-year terms. Six of these seats are reserved for women.

The nation has 12 governorates, also called a muhafazat; Ajlun, Al 'Aqabah, Al Balqa', Al Karak, Al Mafrq, 'Amman, At Tafilah, Az Zarqa', Irbid, Jarash, Ma'an, Madaba.<sup>7</sup>

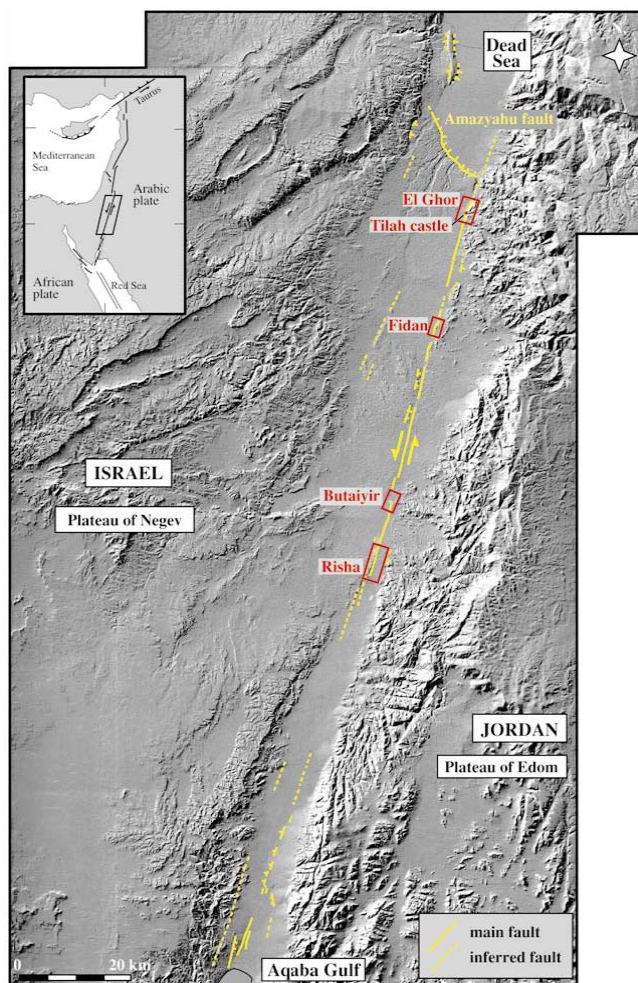


Figure 2. Transform fault and plate boundary that defines the regional seismic risk.

### National hazardscape

Droughts and periodic earthquakes are the main natural disasters. Water and ground water supply is a rising issue not only in Jordan, but regionally.

Jordan, as well as the surrounding nations is vulnerable to strong earthquakes. Documented history of the region provides descriptions of destructive earthquakes going back four thousand years. The Dead Sea rift is a transform boundary between the Arabian and African plates, connecting the Red Sea spreading center in the south to the Taurus-Zagros collision zone in the north. The Dead Sea transform is about 1,100 km in length. The Jordan valley is a major part of the Dead Sea Transform which is the most seismically active region in the Middle East.<sup>8</sup>

### National disaster management structure and relevant legislation

On a national level the national comprehensive plan addresses encountering disasters and major accidents as part of the civil defense law no. 18, 1999, and is an adjustment to law no. 57, 2002. The plan has procedures and actions to be carried out by the civil

<sup>7</sup> CIA World Factbook, May 2006. [www.cia.gov](http://www.cia.gov)

<sup>8</sup> Seismo-engineering characterization of buildings common in the region. The First Workshop Report: Amman – Jordan.

defense. Members of the higher council of civil defense (HCCD) and its' committees in the administrative divisions perform the plan. The HCCD includes the Minister of interior, who is the chairman and the Director general of civil defense as vice chairman. It also includes the additional members:

- Secretariat-General of prime ministry
- Secretary general of all ministries
- Secretary general of the higher council of youth
- Jordanian armed forces deputy assigned by the chairman of Jordanian Armed forces
- Public security deputy assigned by the public security general director
- Amman municipality deputy
- The chairman of the Jordanian red crescent society
- The chairman of the trade chambers union
- A chairman for one of the industrial chambers assigned by the ministry of industry and trade.

The HCCD performs the tasks of:

1. Setting public policy of civil defense to encounter emergencies and resulted consequences.
2. Setting public plans to take necessary procedures to encounter emergencies and disasters, and specifying the duties of private and public parties.
3. Setting necessary plans to provide protection against chemical, radioactive, bacterial contamination, and toxic gases in cooperation with specialized concerned parties.
4. Issuing required directives to organize the council's duties, and managing its operation rooms, operation rooms of parties represented within, and the operation rooms of civil defense committees in the governorates and provinces.
5. Establishing and equipping public shelters
6. Specifying duties and tasks of civil defense committees formed in governorates in accordance with the rules of this law.
7. Setting the duties of Armed Forces and Public Security at emergencies and disasters to support civil defense actions.
8. Forming voluntary teams of civilians with ages ranging from (18) to (50) years to support civil defense actions.
9. Demonstrating alarming techniques to citizens against emergencies and disasters, and specifying required methods.

10. Setting financial estimation for the budget to encounter emergencies and disasters, and submitting it to the cabinet for confirming and including it within public budget.
11. Recommending the cabinet to obligate concerned local departments, organizations, and authorities for assigning required financial allowances in their annual budgets to carry out duties and tasks determined by the council.
12. Any other duties submitted by the president and approved by the council.<sup>9</sup>

Disaster response is the main task of the GDCD, which is carried out by defense directorates, divisions, and centers at 115 locations. This role is assigned to the Disaster Department, which is responsible for the followings: -

1. Gathering and storing strategic information related to the disaster management.
2. Coordinating with international bodies and NGOs concerned with disaster-related matters.
3. Coordinating with universities and scientific institutes concerned with disaster management. As a result, coordination with Grandfield University took place in Britain for holding qualification courses for civil defense officers and members of the Supreme Council of Civil Defense (SCCD) in the field of disaster management.
4. Making and publishing books and leaflets related to disaster management.<sup>10</sup>

The Jordan Government has two established public emergency storage facilities in the middle and south regions of Jordan. Also, there are many storage facilities maintained by the Red Crescent Society and Jordan Hashemite Charity Organizations as well as private storages, all of which to be used under HCCD instructions during emergencies.

In case of emergencies and disasters the interior minister authorized by the prime minister under Civil Defense Law No. 18, 1999 in accordance with article No. 8 is to give orders and take the following procedures during the time required by these situations:

1. Laying hands on all means of transportation, restricting their moves and moves of drivers, laying hands on their spare parts, and restricting sale.
2. Laying hands on required immovable properties and buildings for establishing public shelters, hospitals, and necessary centers for the purpose of ambulance services, nursing and other civil defense affairs.
3. Taking hold of various types of flammable materials, restricting use and the way of storing
4. Organizing, specifying, distributing foods and all required materials in order to encounter emergencies and disasters for the stability of people's living

<sup>9</sup> National Information Relating with Disaster Risk Reduction, UN-ISDR

<sup>10</sup> Jordan Civil Defense. [www.cdd.gov.jo](http://www.cdd.gov.jo)

5. Organizing the use of electricity and water resources in coordination with concerned parties.
6. Maintaining the work of radio and wired communications
7. Preventing general staff, doctors, pharmacist, male and female nurses, the staff at any institution or utility of public services, the staff of food trading manufacturing field, and transportation laborers from leaving their jobs without signed permission signed by the minister or his representative. Besides, the minister has the right to impose prevention upon any other parties, if their works were necessary for the stability of living.
8. Charging any person- of those whom has the required ability- with contributing in civil defense comprehensive services. If this person works in free business field, he has to put the equipment he has under the disposal of civil defense.
9. Charging any public employee with running civil defense services all the required time.
10. Charging any of the public/private organizations with delegating one of their senior officials for working as liaison officer between the organization and civil defense committees in order to coordinate with as soon as possible.
11. Issuing any directions, orders, and other decisions necessary for comprehensive civil defense requirements.<sup>11</sup>

Also participating in disaster risk reduction is the private sector, societies, NGOs, academics, and media:

- Jordanian Red crescent association
- Jordanian Hashemite charity organization
- The general cooperation for environmental protection
- International Agency for Atomic Energy
- The national committee for determining and rehabilitation
- All universities in Jordan
- Most public and private hospitals and medical centers in Jordan
- UN offices in Amman
- International Red Cross Committee- Jordan.

Some of these sectors are represented as member in HCCD. They are all participating in disaster reduction efforts through the following general aspects:

1. Arising public awareness and education on disaster, protection, and prevention, using all means of media.
2. Participating in different kinds of meetings, assemblies, seminars, workshops.etc, related with disasters concepts.

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<sup>11</sup> National Information Relating with Disaster Risk Reduction, UN-ISDR.

3. Providing all assistance needed during preparedness stage, response stage, or recovery stage of disasters, also for man powers, equipment, essential materials, or financial support.
4. Participating in establishing, improving, and providing refugee camps.
5. Participating in mine awareness and demanding programs.
6. Providing all medical and aid assistance needed depending on previous and mutual agreed plans.
7. Participating in all training programs of JCD on first aids, firefighters, rescue, and dealing with disasters and emergencies.<sup>12</sup>

#### National land use management system and relevant legislation

The Ministry of Public Works and Housing published the National Building and Fire Prevention Code in 1990, which includes an updated version regarding seismic risk. Buildings constructed before 1990 often do not meet the code's standards.<sup>13</sup>

Due to the large amount of history and archeological significance within Jordan the conservation of cultural heritage sites has been addressed by UNESCO, ICOMOS, and other international organizations. They have initiated conventions, charters, and suggestions to preserve these areas. These include the Convention for the Protection of Cultural Property in the Event of Armed Conflict: the Hague Convention in 1954, and the International Charter for the Conservation and Restoration of Monuments and Sites: The Venice Charter of 1964.<sup>14</sup>

#### Significance of the city to the nation

The city of Amman has a long history and is one of the oldest continuously inhabited cities. An excavation in 1994 uncovered homes and towers built 7000 BC. Around 1200 BC it was the capital of Rabbath-Ammon, of the Ammonites. In the 3<sup>rd</sup> century BC it was named Philadelphia after the Ptolemaic ruler Philadelphus. In 64 BC the Roman general Pompey created an alliance with the city of Philadelphia, called the Decapolis League that included ten free city-states with alliances to Rome. Roman influence resulted in reconstruction of the city (colonnaded street, bathhouses, an amphitheater, and public buildings). During the Byzantine period the city acted as the seat of a Christian bishop and many large churches were built. In 613 AD the city was run by Persian Sassanians. In 635 Arabian armies took hold of the city and renamed it Ammon. The city size then was reduced due to loss of trade from changing trade routes.<sup>15</sup>

In 1878, the Ottomans resettled in Amman, and their descendants live there today.<sup>16</sup> In 1909, the first municipal council established for Amman. At this time the city's

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<sup>12</sup> National Information Relating with Disaster Risk Reduction, UN-ISDR.

<sup>13</sup> National Information Relating with Disaster Risk Reduction, UN-ISDR.

<sup>14</sup> Sultan Z. Barakat and Rami F. Daher, (2000), The Cultural Heritage and the Nature of Disasters in Jordan and Palestine, CRM, No 6.

<sup>15</sup> History of Jordan, July 2006. [www.jordanembassy.org.au](http://www.jordanembassy.org.au)

<sup>16</sup> History of Jordan, July 2006. [www.jordanembassy.org.au](http://www.jordanembassy.org.au)



population was only 2,000 people or 300 families.<sup>17</sup> In 1921, after the Great Arab Revolt, Emir Abdullah bin al-Hussein made Amman the capital of Transjordan. From this point in time the city began to grow, with political events in the region effecting the population growth. Amman took in more than a million Palestinian refugees from the wars in 1948 and 1967. In 1990-91, during the Gulf Crisis Amman took in more immigrants from Iraq and Kuwait.<sup>18</sup> Amman also has taken in Jordanians looking for work from Badia and other rural regions.<sup>19</sup>

### Geographical setting of the City

Amman is built on seven hills, or jabals, each of which defines a neighborhood. The layout is described as eight circles that form the “spine of the city,” with the downtown area as the first circle and from there extending to the west.<sup>20</sup> There are no major rivers in or near Amman. Currently, the land area of the City is ~700 km<sup>2</sup>.<sup>21</sup>

## **2 Inter-City Linkages**

### Internal division of the City

The Greater Amman Municipality (GAM) has a population of 1,800,000 and covers an area of 688 km<sup>2</sup>. It is divided into 20 administrative regions and each region has a full staff of employees. The GAM Council is made up of 40 members and is headed by the Mayor. The GAM has “several service departments working diligently to keep the City functioning, clean and presentable.” The goals of the Municipality of Amman include:

1. Laying out a 20-year strategic plan.
2. Developing financial resources.
3. Administrative development.
4. Achieving knowledge-based management.
5. Optimum use of resources.
6. Reducing costs of services through citizens’ increased collaboration.
7. Improving the City’s environmental and health situation.
8. Improving traffic movement throughout the City.
9. Achieving ‘e-Municipality’.
10. Social and economic development.
11. Fighting desertification and increasing green areas.
12. More attention to cultural affairs.
13. Promoting tourism.
14. More attention to heritage.
15. Promoting interest in sports.<sup>22</sup>

<sup>17</sup> Greater Amman Municipality, May 2006. [www.ammancity.gov.jo](http://www.ammancity.gov.jo)

<sup>18</sup> History of Jordan, July 2006. [www.jordanembassy.org.au](http://www.jordanembassy.org.au)

<sup>19</sup> Greater Amman Municipality, May 2006. [www.ammancity.gov.jo](http://www.ammancity.gov.jo)

<sup>20</sup> History of Jordan, July 2006. [www.jordanembassy.org.au](http://www.jordanembassy.org.au)

<sup>21</sup> Greater Amman Municipality, May 2006. [www.ammancity.gov.jo](http://www.ammancity.gov.jo)

<sup>22</sup> Greater Amman Municipality, May 2006. [www.ammancity.gov.jo](http://www.ammancity.gov.jo)

### Governance/management style

The Greater Amman Municipality (GAM) is a financially independent private corporation. The functions are administered by the GAM Council, which includes the Mayor of Amman (Council President). The Council is the Municipality's highest governing body.

Amman Mayor is considered the top of the administrative pyramid in the Municipality's organizational structure. The CM votes to select the Mayor and Deputy Mayor from within the 40 members of the GAM Council. The Mayor is assisted in his duties by the Deputy Mayor. The Council of Ministers consists of 20 Amman residents elected to the Council and 20 appointed to the Council to represent official, commercial, and economic bodies as well as other services departments within the city of Amman. The Council term is four years.

The Council is assisted by several Council-delegated committees, where each committee deals with a specific task. Listed are a few of many tasks that the Council-delegated committees deal with:

- Green areas
- Acquisition and properties
- Financial affairs
- Health
- Development affairs
- District zoning and building<sup>23</sup>

### Formal arrangements

*To be completed*

### Relevant legislation/regulations

The responsibilities of the Municipality of the City are dictated in the Municipalities Law No. 29 of 1955 and amendments. Listed are a few of many related to the issues addressed in this document:

- "City and Street Planning: Roads - constructing new roads, canceling or changing the routes of others; determining and constructing their sidewalks, width, route; paving, maintaining, cleaning, and lighting them; numbering the buildings along them; preventing encroachment upon them; conduct landscaping and planting alongside; and monitoring what may fall on them from open lands, and ordering owners of said lands to erect walls."
- "Building Licenses: Monitoring the construction and destruction of buildings; and ordering changes their design; installation of elevators in them; granting of

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<sup>23</sup> Greater Amman Municipality, May 2006. [www.ammancity.gov.jo](http://www.ammancity.gov.jo)

licenses for such works; determining the form and shape of a building and its area relative to the land on which it is to be built; and ensuring the existence of sanitary conditions in them.”

- “Water: providing residents with water; determining the specifications for its supply, such as water meters, pipes; regulate its distribution; determine its prices and the cost of subscription to the service; preventing pollution of springs, water channels, tanks and wells.”
- “Public Parks: establishing, monitoring and regulating public squares, public parks, gardens, baths, places for swimming in pools and lakes.”
- “Fire Stations and Fire Prevention: taking precautions to prevent fires; monitoring and regulating the sale and storage of fuels and flammables, and determine their prices; maintaining fire stations.
- “Precautions against Flooding: taking precautions to prevent damage caused by floods and overflowing streams.”
- “Helping Victims of Disasters: providing aid to victims of fires, floods, earthquakes, and other disasters; and collecting donations for them and distributing these among them.”
- “Sanitation: collect, transport and get rid of street trash and garbage from homes and public places.”
- “Public Health: take all measures and necessary precautions to maintain public health and prevent the spread of diseases.”
- “Risk Prevention: take all necessary precautions to protect individuals and properties; prevent damages and harms caused by any acts mentioned in this article.”
- “Destruction of Dilapidated Buildings: destruction of dilapidated buildings that pose a risk of collapsing or constitute a public health hazard, once a notice is given to the owner.”
- “Right-of-Way: sale and make use of right-of-way lands and what is acquired for public projects.”
- “Budget: approve the annual budget, final account statement and personnel salaries prior to referral to responsible authorities.”
- “Disbursement of Municipality Funds: managing Municipality properties and funds, and constructing, leasing, selling and purchasing needed buildings on such property, in accordance with the provisions of this Law. Also, receiving grants, donations and endowments.”<sup>24</sup>

### **3 Land Use Management**

#### Relevant legislation

The City of Amman does not have any specific codes or laws, and instead applies from the national level. The national policy includes the Towns and Villages Planning Law of 1966, and the Building and Zoning Code of 1979.<sup>25</sup>

<sup>24</sup> Greater Amman Municipality, May 2006. [www.ammancity.gov.jo](http://www.ammancity.gov.jo)

<sup>25</sup> Greater Amman Municipality, May 2006. [www.ammancity.gov.jo](http://www.ammancity.gov.jo)

Responsible agents and their relationship

On a national level the Housing and Urban Development Corporation (HUDC) deals with housing issues. HUDC's tasks are to "study, formulate, and implement" laws and codes relative to the Housing and Urban sector as well as improving urban areas. The HUDC addresses issues such as the poor and their housing needs by getting private developers involved. The main issue and agenda of private developers is the financial resources needed to give them an incentive to aid in these housing projects. To accomplish this HUDC:

- "Recommend to the Council of Ministers the general housing policies and its relation with land-use zoning and environment, in collaboration with relevant government agencies."
- "Follow-up of the National Housing Strategy and arrange for any relevant legislation."
- "Carry out studies and research for the establishment of new neighborhoods within the zoned and municipal boundaries."
- "Carryout housing, social, health and environmental studies related to the housing and urban sector, so as to locate the housing need and the low-serviced urban pockets."
- "Encourage small industries and vocational training within HUDC's projects."
- "Facilitate granting of loans to beneficiaries of HUDC projects from financial agencies."
- "Execute investment projects directly or through contracts with the private developers, and in accordance with HUDC mission."
- "Design and construction of any public buildings requested by the council of Ministers."<sup>26</sup>

Effectiveness of current arrangements

*To be completed*

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<sup>26</sup> Housing and Urban Development Corporation, July 2006. [www.hudc.gov.jo/hudc](http://www.hudc.gov.jo/hudc)

## **4 Vulnerability Issues**

### At-risk groups

The city of Amman, due to its' geographical boundaries and climate, has limited water resources. Amman experiences a water shortage in the summer of 1993, and in 1998 the water supply of western Amman was contaminated. Both cases alerted the city that actions need to be taken to improve water management.<sup>27</sup>

### At-risk locations

### Non-engineered dwellings

### City policies on vulnerability alleviation

The water issue has been addresses on the national level. The Water and Irrigation Ministry provided a plan for 1998-2010 costing JD3.5 billion. The plan includes building dams in the southern region of Jordan, improving wastewater treatment, and using groundwater from the Disi basin. These new sources will be directed toward the domestic and agricultural use.<sup>28</sup>

## **5 Disaster Risk Management Arrangements**

### Functional arrangements

### Risk Assessment

On a national level the Jordan government through the HCCD is carrying out hazard assessment. This follows the national comprehensive plan for encountering disaster and major accidents as in the law of civil defense of 1999. Administrative Divisions, which are formed from committees HCCD, use this for the preparedness stage to response stage. The HCCD and the technical committee look at seismic hazard assessment. This includes:

- Characteristics
- Impacts
- Historical Data
- Geological and topographic maps

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<sup>27</sup> Pella Museum of Jordan. [www.pellamuseum.org](http://www.pellamuseum.org)

<sup>28</sup> Pella Museum of Jordan. [www.pellamuseum.org](http://www.pellamuseum.org)

- National strategies
- Multi-hazard approach<sup>29</sup>

In October 1999 the Earthquake Hazard Assessments for Building Codes project was funded by US-AID and Middle East Regional Cooperation (MERC) program. It involves the combination of Seismology and Engineering Seismology to effectively quantify earthquake threats. This project includes seismic hazard assessments that will be applied to engineering practices and applied to building codes. This helps aid the governmental institutions in Jordan, as well as in Israel and Palestinian National Authority, in the process of preparing and updating their building codes. The following studies and surveys to be conducted have the following goals:

- “A unified catalogue of earthquakes.”
- “Determination of seismogenic zones.”
- “Regionalization of seismogenic zones and assessment of their seismic capabilities.”
- “Scaling laws of dynamic source parameters of local and regional earthquakes and attenuation of seismic energy across the region.”
- “Implement state of the art procedures for earthquake hazard assessments and testing new approaches.”<sup>30</sup>

The Government of Jordan, in 1983, established a seismological observatory to monitor earthquakes in Jordan. Project funding was by the government of Jordan and the US Agency for International Development. The observatory included eight stations located around Amman. These locations were determined by the Natural Resources Authority (NRA) of Jordan and the US Geological Survey (USGS). The seismic network has expanded as part of the Program for Assessment and Mitigation of Earthquake Risk in the Arab Region (PAMERAR) and was funded by the Government of Jordan, the Arab Fund and the Islamic Development Bank. It now includes 26 stations throughout the country. This seismic network is operated by the Jordan Seismological Observatory (JSO) from its headquarters at the NRA in Amman. In 1998, the NRA, the USGS, and the University of California Lawrence Livermore National Laboratory (LLNL) included two broadband seismic stations to observe the “long-period constraints on earthquake source mechanisms in the Dead Sea rift (e.g., moment magnitudes, moment tensor descriptions) and other regions of the Middle East, to characterize regional seismic wave propagation and to improve estimates of crust and upper mantle structure in the region.”<sup>31</sup>

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<sup>29</sup> National Information Relating with Disaster Risk Reduction, UN-ISDR.

<sup>30</sup> Shapira, Avi., Abdel-Qader F. Amrat, and Jalal Al-Dabbik, Earthquake Hazard Assessments for Building Codes, The First Workshop Report, Amman, Jordan, 27-30 March 2000.

<sup>31</sup> David B. Harris, Arthur J. Rodgers Jr., Stanley D. Ruppert, Kenneth M. Skinnell, Jennifer L. O'Boyle, Jon P. Lewis, Frederick Simon, Abdel-Qader Amrat, Tawfiq Al-Yazjeen, and Ahmed Al-Gazo, (2000), Broadband Stations in the Hashemite Kingdom of Jordan, Observatories and Research Facilities for European Seismology, Orfeus Newsletter, Vol. 2, no. 2.

## Risk Communication

Jordan uses the national system through the JCD, who is responsible for providing, organizing, and supervising a disaster alarm system. However, the JCD and NGO's have public awareness programs that discuss disaster risk reduction.<sup>32</sup>

## **6 Disaster Risk Management Vision**

Jordan, as a member of the Reducing Earthquake Losses in the Eastern Mediterranean Region (RELEMR) Program, which is supported by UNESCO and the U.S. Geological Survey (USGS), associated with the Council of Europe through the Open Partial Agreement for Major Hazard, and it is cooperating with EMR earth science organizations, was launched in 1993. This program assesses, evaluates, and reduces expected earthquake losses. The program also includes data exchange from countries and Lawrence Livermore National Laboratory (LLNL) and Observatories and Research Facilities of European Seismology (ORFEUS), which was organized by the European-Mediterranean Seismological Center (EMSC).

The RELEMR Program has produced a list of methods to reduce future losses from earthquakes in the Eastern Mediterranean Region. These include the implementation of:

- “Seismotectonic framework studies using geological, geophysical, geodetic, seismological, archaeological and historical techniques to improve understanding of the cause and nature of the seismicity.”
- “Earthquake monitoring using modern seismograph networks and strong-motion instrument arrays to determine earthquake parameters and characteristics.”
- “Assessment of earthquake hazards to estimate locations, recurrence intervals, and effects of future earthquakes.”
- “Assessment of risks to evaluate potential losses.”
- “Implementation of earthquake risk reduction measures to reduce vulnerabilities and losses.”<sup>33</sup>

## **7 Issues**

*To be completed*

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<sup>32</sup> National Information Relating with Disaster Risk Reduction, UN-ISDR.

<sup>33</sup> Projects Reducing Earthquake Losses in the Eastern Mediterranean Region (RELEMR), Natural Disaster Reduction, United Nations Education, Scientific and Cultural Organization (UNESCO). [www.unesco.org/science](http://www.unesco.org/science)

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