Participatory Risk Assessment in the Gaza Strip

As part of the Project “Enhancing Drought Resilience through Innovative Water Management in the Gaza Strip”

Diakonie Katastrophenhilfe

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We are grateful for the leadership provided by the Project's Steering Committee, especially the contributions of Eng. Jamal el Dadah, Representative of the Palestinian Water Authority (PWA), Dr. Hatem el Shanty, representative of Al Azhar University, Mr. Abd el Minem Ahmad, and Abd Allah Abu Shanb, representatives of our partner community based organizations (CBOs).

We thank our partner CBOs for facilitating outreach activities and hosting various community-based events essential for the completion of this work. Our partner CBOs include:

- Al Quds Association for the Development of Al Mawasi
- Al Fukhari Association for Rural Development
- Livestock Association
- The Association of Safe Production Procedures
- Rural Women Development Association
- East Association for Agriculture and Development
- Rafah Growers Association
- Youth Development Association
- Association of Palestinian Farmers

We thank each and every member of the water committees in the targeted areas for their efforts and assistance.

Finally, we thank the Palestinian Water Authority, the Coastal Municipalities Water Utility and Gaza municipalities for their cooperation and assistance in providing secondary data used in the creation of many of the Hazard maps, and list of contributors.

LIST OF CONTRIBUTORS

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This innovative Risk Assessment methodology uses a scoring system based on the following DRR components and formulas:

Hazard = (Magnitude + Frequency)/2

Vulnerability = Exposure + Fragility + Lack of resilience

Risk = Hazard x Vulnerability

For further information on the terminology, please consult the UNISDR website: http://www.unisdr.org/

INTRODUCTION

Natural and man-made hazards cause disasters all around the world. Such disasters undermine the ability for communities to function normally, sustain themselves, and prepare for future disasters. These limited capacities sabotage any pursuit of development. Climate change further contributes to the increase in frequency and severity of natural hazards. In the search for ways to **prevent or decrease the impacts of these hazards, the Disaster Risk Reduction (DRR) approach** has become a central theme for governmental and non-governmental actors. Decreasing the risk of disasters can positively contribute to the reduction of poverty, while safeguarding development and climate change adaptation

> The hazard maps help create a thorough understanding of the hazards threatening the Gaza Strip while helping people prevent, mitigate, and cope with such threats"

The Gaza Strip is a unique place that faces a range of natural and man-made hazards; the latest event, storm Alexa of December 2013, remains fresh in everybody's mind. The Gaza Strip also faces a **severe chronic water crisis,** the current focus of our project. Furthermore, the population of Gaza frequently experiences man-made hazards as a result of the political situation of the area. These obstacles highlight the important need to support and strengthen an adaptation of the DRR approach for relief and development measures in Gaza.

Conducting a Risk Assessment (RA) is often the initial stage of any DRR planning process. In October 2013, **PARC started conducting a comprehensive Risk Assessment in the Gaza Strip** with the applications of a participatory RA methodology developed by Diakonie Katastrophenhilfe (DKH). This is the first step towards utilizing disaster preventive approaches as a mechanism for establishing more resilient communities in the Gaza Strip.

PARC is honoured to present the preliminary outcome of this Risk Assessment in this booklet. The booklet is the first of its kind in the Gaza Strip and introduces the audience to a summary of the applied RA methodology. The booklet presents the outcome in detailed hazard maps based on GIS data, which provide a detailed overview of all hazards in the area.

The broad objective of this booklet is to advocate for and raise awareness on risk-prone areas in the Gaza Strip. This information is essential for the development of accurate DRR policies, plans, and projects addressing the impact of hazardous events. **The hazard maps help create a thorough understanding of the hazards threatening the Gaza Strip** while helping people prevent, mitigate, and cope with such threats. This information is a valuable asset for Governmental agencies[1], NGOs and other stakeholders.

PARC invites other interested organizations to adopt this newly **participatory RA approach for better program planning and intervention** purposes. We welcome other organizations and stakeholders to contact us for any further clarification or explanation of this methodology.

Additionally, we encourage organizations to become actively involved in establishing a Disaster Risk Reduction Platform aimed at creating a dynamic and comprehensive DRR culture of awareness in the Gaza Strip.

1, Global Assessment Report (GAR) on Disaster Risk Reduction; UNISDR publication http://www.preventionweb.net/english/hyogo/gar/2013/en/home/index.html

The Risk Assessment is one of the key components of the project "Enhancing Drought Resilience through Innovative Water Management in the Gaza Strip".

Funded by: the Federal Ministry of Economic Cooperation and Development – Germany (BMZ) Implemented by: Agricultural Development Association (PARC) in close partnership with Diakonie Katastrophenhilfe (DKH).

Main activities of the project are:

- **Conduction of a participatory Risk Assessment**
- Mobilization of CBOs and capacity building activities
- Construction of greenhouse rainwater harvesting reservoirs for farmers
- Establishment of roof rainwater harvesting units at household level
- Extension visits and training for targeted farmers
- Water management training to targeted households
- The conduct of a comprehensive study on people's coping mechanisms and adaptation strategies towards the water crisis in Gaza
- Continuous multi-media awareness campaign on water management & good practices

The DKH RA methodology is a process that assesses the potential disaster risks by looking at the hazards and vulnerability levels in a specific area.

RISK ASSESSMENT PROCESS OVERVIEW

The DKH RA methodology is a process that assesses the potential disaster risks by looking at the hazards and vulnerability levels in a specific area. The method seeks to identify the communities and households that are most at risk for hazards, and therefore **differs from the traditional and commonly used needs assessment approach.** In addition to identifying the most vulnerable people, the methodology also takes into consideration the specific hazardous environments where people live. It can be used for a range of other projects aimed at key development sectors such as food security, health or education.

The Risk Assessment methodology is applied worldwide by many other partner organizations of DKH. It is in line with the international strategy reflected in the post 2015 Hyogo Framework for Action approach[2]. Studies, research and consolidated practices encourage the involvement of communities and the adoption of a more participatory approach towards Risk Management. **Participatory Risk Management is the most cost-effective and sustainable mechanism for reducing risks, especially in communities with limited resources.**

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2 HFA - http://www.unisdr.org/we/coordinate/hfa

DKH RISK ASSESSMENT METHODOLOGY IN THE GAZA STRIP

What are the steps of the DKH Risk Assessment process, as applied in the Gaza Strip?	What is the linkage between Risk Assessment outcome and project implementation?
1. Hazards identification and municipality hazard mapping	Selection of most hazard-prone municipalities
2. Community Hazard Mapping 3. Community Vulnerability Assessment	Selection of most hazard-prone municipalities
4. Households Vulnerability Assessment	Selection of beneficiaries

Hazard Identification and Municipality Hazard Mapping

This RA selects, based on secondary data sources, the most important natural and man-made hazards that impact the Gaza Strip. Some hazards directly correlate with the chronic water crisis in the Gaza Strip, while others represent environmental pollution, war destruction, and (flash) flooding. **All hazards are given an equal importance in the compiled multi-hazard mapping process.** The technical teams of PARC utilize highly accurate Geographical Information System (GIS) software to produce the maps.

The Risk Assessment process uses a ranking system from 1 to 3, in which hazards score 1 = low, 2 = medium, 3 = high. **The score is calculated based on the magnitude and the frequency of each hazard.** The eight hazards were measured and received a score in each municipality of Gaza using local primary and secondary data. **This process resulted in the development of eight Hazard Maps for the Gaza Strip.** Gaza city is presented in the maps as two sub-entities, Eastern Gaza City and Western Gaza City, because of its relatively large area and population.

The next step compiled all eight hazards scores into one Multi-Hazard Map. **This Multi-Hazard Map shows Southern Gaza municipalities as the most hazardous areas in the Gaza Strip.** The municipalities with the highest hazard score are then selected for the second step of the RA process, the community level hazard mapping.

VULNERABILITY ASSESSMENT

The **exposure rate** to a hazard measures the percentage of the community and economically significant lands (i.e. agricultural lands) exposed to hazards (i.e. flash floods)

The level of **fragility** is determined by the socioeconomic, health, and infrastructural weaknesses of the community

Lack of resilience is defined as the lack of socioeconomic, health, and infrastructural resources to counteract the impact of hazards once they hit communities

“The RA is used as a participatory method to determine the scope, nature, magnitude of hazards affecting communities and households”

Community Hazard Mapping

Community hazard mapping aims at defining hazard variations at the community level within the selected municipalities. The PARC project team has defined a Community as a group of less than 10,000 people within the same geographical area who share similar socioeconomic and livelihood conditions.

The community hazard mapping is a highly participatory method. PARC’s project team uses the **Focus Group Discussion** (FGD) as method to **actively involve the community in the design of their own community hazard maps.** In each selected community, three separate FGDs are performed in order to ensure equal participation of community leaders, as well as male and female community members. During the FGDs the community members identify the five hazards that most frequently affect their community. **This process leads to the development of five Hazard Maps and one Multi-Hazard Map in each community.**

This participatory approach is a very efficient tool to collect primary data at the community level. The Multi-Hazard Map also raises awareness regarding the most hazard prone areas within communities. Community members learn what hazards they face, and what locations are unsafe. The maps can be used for advocacy purposes when displayed in community centres, CBOs, and other public places that are easily accessible for all community members.

After the community hazard mapping, the RA methodology conducts a Community Vulnerability Assessment in order to calculate the **Risk Scores of each community.**

Community Vulnerability Assessment

The level of vulnerability for hazard-prone communities is assessed using the participatory FGD method as well. Communities assess their own vulnerability by rating their level of **exposure to hazards, fragility and lack of resilience.** This assessment process is facilitated by the PARC project team using a questionnaire. This vulnerability score multiplied by the multi-hazard score calculates the risk score of the community. **Based on this ranking target, communities are selected** for either establishing the agricultural rainwater harvesting ponds or the household rainwater harvesting systems.

Besides the development of the Community Hazard Maps and the Community Vulnerability Assessment, the FGDs allow for a better understanding of the context of the assessed areas. In each FGD, community members assess and discuss their resources, develop annual hazard and seasonal calendars, hazard timelines, and discuss coping strategies. The gathered information is essential to visualize and understand the hazards' interaction with the community livelihood, culture and socioeconomic conditions.

The process allows communities to reflect upon their vulnerabilities, resources and coping strategies. This newly acquired knowledge strengthens communities' resilience and understanding of their specific needs.

Household Vulnerability Assessment

After selecting the target areas, the last step of the RA process entails the **Vulnerability Assessment at household level in order to reach a final beneficiary selection.** Similar to the Community Vulnerability Assessment, the Household Vulnerability Assessment uses Exposure, Fragility and Resilience as main indicators for vulnerability. However, the sub-indicators are adjusted to a household level. Then the pre-defined technical specifications are assessed for the installation of rainwater harvesting systems.

LOOKING AHEAD

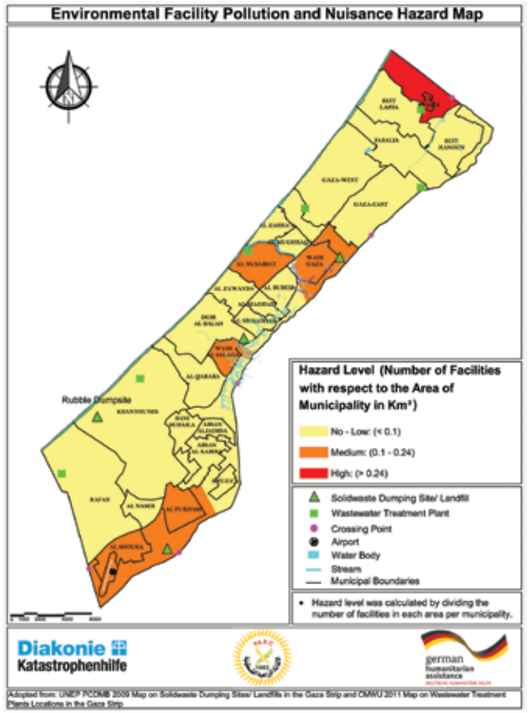
The DKH Risk Assessment process is the first step of analysis for ultimately reducing the risk of disasters. Considering the variance between hazards and vulnerability, it allows us to objectively determine the communities and households most at risk.

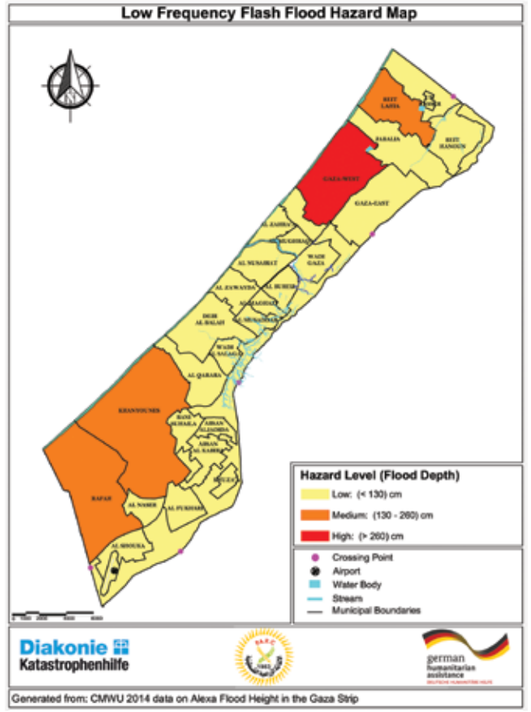
The Risk Assessment approach is highly participatory and actively engages communities in Disaster Risk Reduction planning. For this project and for other interventions, Risk Assessments provide a valuable tool for targeting the most at-risk communities and the most vulnerable households within an area. The assessment provides significant information that is essential for designing relevant and applicable project measures.

This effort by PARC and guided by DKH is the first attempt at using this type of Risk Assessment approach in the Gaza Strip. This booklet shall be viewed as a work in progress, where lessons learned are shared, and continuous reflection is needed.

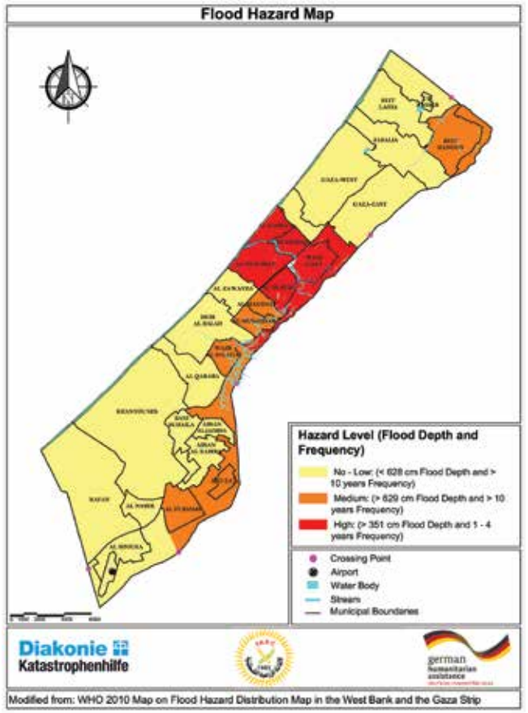
For interested readers/stakeholders, we are open to share our comprehensive Risk Assessment report on the Gaza Strip, and collaborate for a more resilient Gaza Strip that is able to successfully tackle potential future hazardous events.

Environmental facilities; landfills and wastewater treatment plants are essential for the environmental and public health of Gaza. The facilities nonetheless cause smell, rodent, and stray of animal's nuisances to those living in the surroundings. Malfunctioning of these facilities imposes significant health risks. The number of facilities per km^2 indicates the hazard level. The map makes use of information collected from a UNEP map and information from the Coastal Municipalities Water Utility.





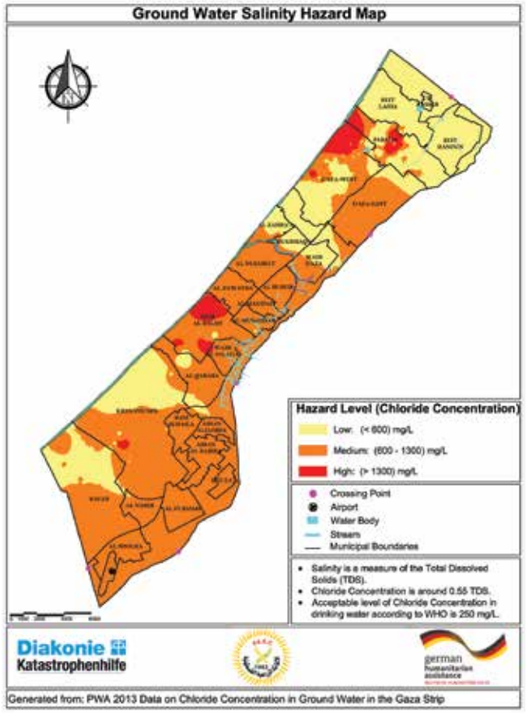
Heavy rainwater events cause frequent flashfloods in Gaza. However, the storm Alexa that hit Gaza in December 2013 caused significant damages including injuries, and fatalities and led to eviction of people living in lowland neighborhoods in Gaza. The low frequency flashflood hazard map is based on magnitude's data from flash floods caused by this storm.

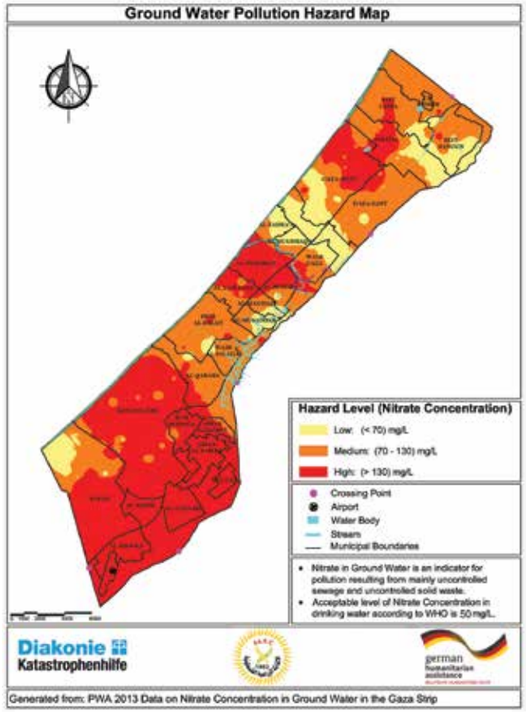


This **Flood Hazard Map** is based on a stream flood magnitude map developed by WHO in 2010. The primary data on frequency levels of this hazard is derived from the municipalities that are frequently affected by such floods.

Ground water salinity is caused by either seawater intrusion, especially in Western Gaza, or by decreasing groundwater levels, as in Eastern Gaza. This map uses data from Palestinian Water Authority (PWA) on chloride concentration levels in domestic water wells. As a ground rule, salinity is two folds the concentration of chloride.

WHO standards for acceptable levels for chloride in freshwater = 250 mg/L.

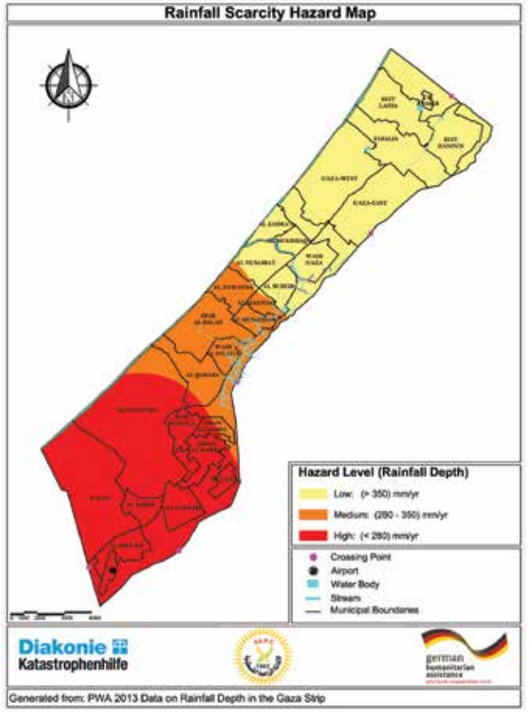


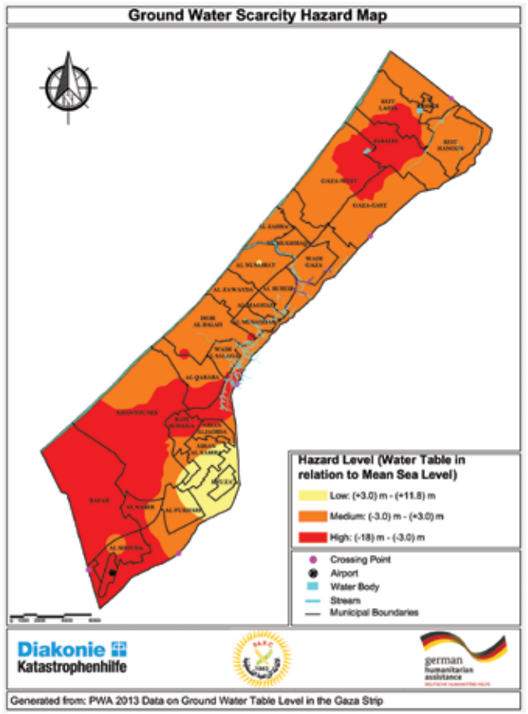


Ground water nitrate pollution is often the result of excessive use of fertilizers, and/or wastewater pollution. In Gaza this type of pollution comes from using cesspits or leaking wastewater treatment ponds. The map makes use of data collected from the PWA.

WHO accepted standard level for nitrate concentration in freshwater = 50 mg/L.

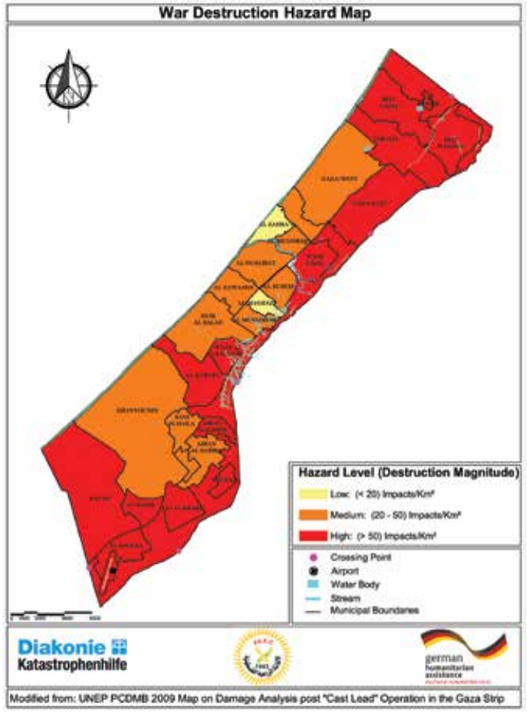
Rainwater is the only renewable resource of water in Gaza. Gaza is a semi-arid area. The average rainfall levels in Gaza range between 211 and 417 mm/yr. The produced map uses rainfall data from PWA.

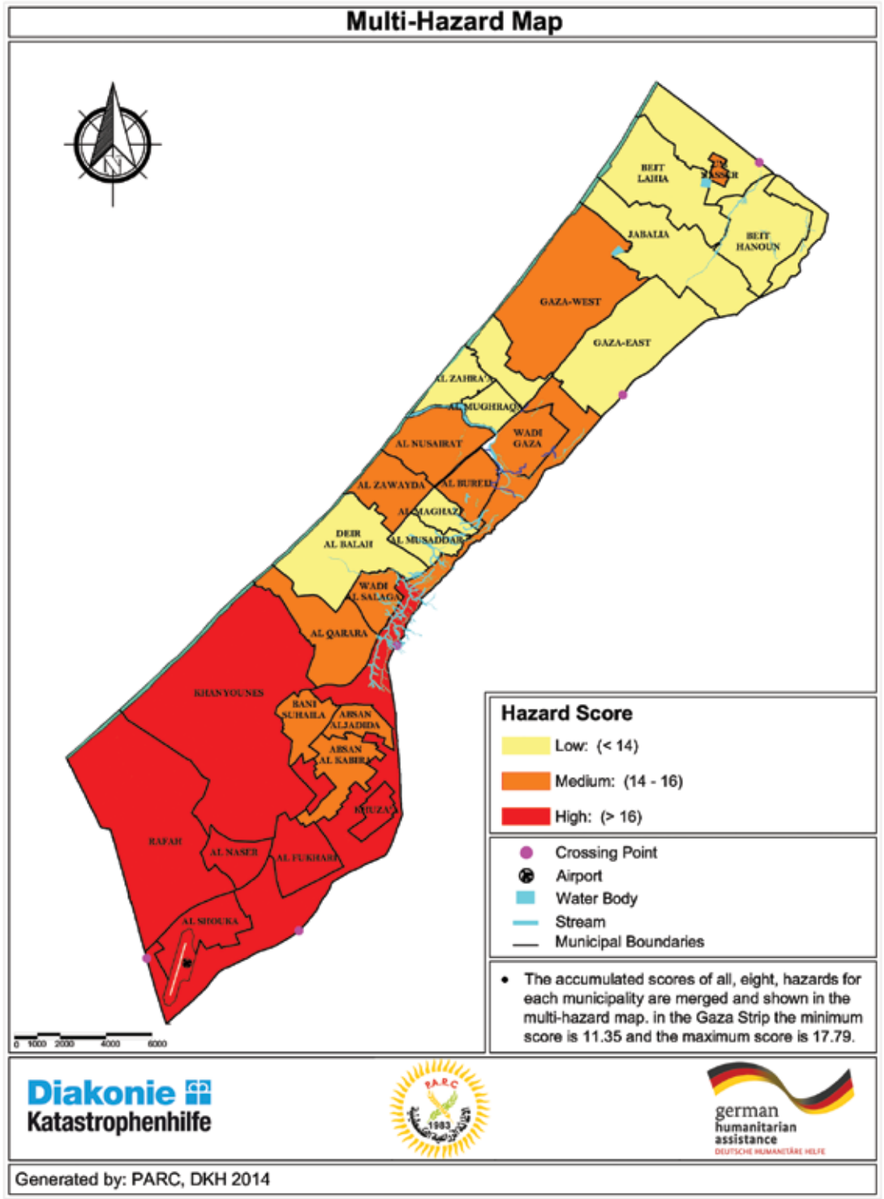




Rainwater has not been sufficient to satisfy the demand of the fast growing population of Gaza for decades. Consequently, groundwater became the major source of freshwater in Gaza. Years of overexploitation caused accelerating depletion of the groundwater aquifer. Such depletion is measured by the decline of the groundwater level. This hazard map is based on groundwater level data gathered by the PWA.

The **war destruction rate** is based on the impact density (impact/km2) map created by UNEP. The UNEP map portrays the destruction caused by the Israeli war in Gaza in 2008/2009, the most destructive one since 1967. The destruction map provides a significant representation of potential war damages in the future.





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