Protecting Health from Heat Stress in Informal Settlements of the Greater Cairo Region

A qualitative vulnerability and adaptation assessment among pregnant women and mothers of children under five

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Bonn, 2017

On behalf of
Federal Ministry for Economic Cooperation and Development (BMZ)
Preface

The Intergovernmental Panel on Climate Change (IPCC) expects the Middle East and North Africa region (MENA) to be particularly severely affected by climate change, and considers Egypt to be one of the most vulnerable countries in the world (IPCC, 2016). Recently, WHO published a climate and health country profile for Egypt that identifies heat as a prominent climate change-associated challenge for public health in the future (WHO, 2015). Because of their higher sensitivity, vulnerable population groups including pregnant women, children under the age of five and people with chronic illnesses such as cardiovascular or respiratory diseases (WHO 2004) are particularly in danger of suffering from extreme heat.

Recognising the need for community engagement to protect public health from adverse effects of climate change in informal areas of the Greater Cairo Region, the Climate Change Adaption and Urban Resilience component of the Participatory Development Programme in Urban Areas (PDP) initiated the Resilient Utilities for Healthy Communities project. The aim of this project is to increase the adaptive capacity of residents with regard to negative climate change-related health outcomes. To help identify local adaptation needs in the project area, the Global Programme for Adaptation to Climate Change in the Health Sector (GV) has supported the PDP by conducting this vulnerability and adaptation assessment in the period from February to October 2016. Recommendations deriving from the assessment form the basis for the development and implementation of future pilot measures.

The Global Programme for Adaptation to Climate Change in the Health Sector, based in Bonn, is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). The Participatory Development Programme in Urban Areas (PDP) is implemented by GIZ together with the Egyptian Ministry of Housing, Utilities and Urban Communities (MoHUUC) and the Egyptian Environmental Affairs Agency (EEAA) on behalf of the BMZ and is co-financed by the European Union (EU).

In this report the authors Dr Julia Katzan and Dr Sophia Owsiannowski present the results of their qualitative vulnerability and adaptation assessment conducted in three informal settlements of the Greater Cairo Region, giving a voice to pregnant women and mothers of children under the age of five. How did they perceive last year’s heat wave? How do they cope with adverse health impacts of extreme heat? What are the gaps and needs to protect their health and the health of their children in a changing climate?

The Global Programme works to support planning and implementation of health-related climate change adaptation measures and promotes national and international discourse on health-related aspects of climate change. We very much hope that report will inspire the conceptualisation and implementation of concrete adaptation measures for the benefit of vulnerable population groups.

Ute Jugert
Head, Global Programme Adaptation to Climate Change in the Health Sector

Economic and Social Development Division
Sector and Global Programmes Department
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<th>Description</th>
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<td>AC</td>
<td>Air conditioning</td>
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<tr>
<td>AB-CCC</td>
<td>Advisory Board on Cities and Climate Change</td>
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<td>BCC</td>
<td>Behaviour change communication</td>
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<td>BMZ</td>
<td>Federal Ministry for Economic Cooperation and Development (Germany)</td>
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<td>CEDSS</td>
<td>Coptic Evangelical Organization for Social Services</td>
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<tr>
<td>EEAA</td>
<td>Egyptian Environmental Affairs Agency</td>
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<tr>
<td>EGP</td>
<td>Egyptian Pound (Currency)</td>
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<td>EMRO</td>
<td>WHO Regional Office for the Eastern Mediterranean</td>
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<td>ERC</td>
<td>Egyptian Red Crescent</td>
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<tr>
<td>E-SNC</td>
<td>Egypt’s Second National Communication to UNFCCC</td>
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<td>EU</td>
<td>European Union</td>
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<td>GCR</td>
<td>Greater Cairo Region</td>
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<td>GDP</td>
<td>Gross domestic product</td>
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<td>GIZ</td>
<td>Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH</td>
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<tr>
<td>GV</td>
<td>Global Programme Adaptation to Climate Change in the Health Sector, GIZ</td>
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<td>HSRP</td>
<td>Health Sector Reform Program</td>
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<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
</tr>
<tr>
<td>MoHP</td>
<td>Ministry of Health and Population (Egypt)</td>
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<tr>
<td>NCDs</td>
<td>Non-communicable diseases</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organisation</td>
</tr>
<tr>
<td>ORS</td>
<td>Oral rehydration solution</td>
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<tr>
<td>PDP</td>
<td>Participatory Development Programme, GIZ</td>
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<tr>
<td>PHU</td>
<td>Public Health Unit</td>
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<tr>
<td>PIP</td>
<td>Participatory Infrastructure Programme</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
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<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
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<tr>
<td>V&amp;A</td>
<td>Vulnerability and Adaptation</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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Acknowledgements

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Our special thanks go to the Egyptian Red Crescent (ERC) and the Coptic Evangelical Organization for Social Services (CEOSS) for supporting the data collection process in informal settlements. Thanks to their expertise and experience in the area of community development and awareness-raising it was possible to adapt the methodology to the local context and successfully involve mothers and pregnant women in the study.

Last but not least, we would like to thank the pregnant women and mothers of children under 5 living in informal settlements and the four local non-governmental organizations (see Annex 5) in Ezbet El-Nasr, Khossoos and Markaz El-Abhath for their participation.

1 GV: Global Programme for Adaptation to Climate Change in the Health Sector
Executive Summary

Egypt’s population is highly vulnerable to the effects of climate variability and change. Higher average temperatures and more frequent and intense heat waves will lead to higher risks of heat-related health problems, according to the World Health Organization (WHO). The effects of these extreme conditions are already being felt: during a severe heat wave in August 2015, dozens of Egyptians died of heat stroke and more than 500 were hospitalised due to heat exhaustion (BBC, 2015). At the same time, evidence indicates a lack of corresponding responses to increase the climate resilience of Egypt’s health sector (WHO, 2015).

This Vulnerability and Adaptation assessment (V&A) is geographically focused on informal settlements within the Greater Cairo Region (GCR). These densely inhabited areas are characterised by substandard physical infrastructure, limited access to social services and poor environmental conditions. Thematically, the focus is on the vulnerability and adaptability to heat-related health problems of pregnant women and children under the age of 5. These two groups were selected as target groups during preparation of empirical data collection. According to the WHO (WHO, 2009) and national stakeholders (ERC, CEOSS) they are considered to be at high risk of suffering from heat-related health problems. On the other hand women and children have successfully been involved in former awareness raising campaigns (ERC) where they have shown to act as active knowledge carriers. The assessment was conducted by the Global Programme for Adaptation to Climate Change in the Health Sector (GV) in close cooperation with the Participatory Development Programme in Urban Areas (PDP), between February and October 2016. The aim was to gain specific knowledge about factors determining the sensitivity and adaptive capacity of pregnant women and children under five against impacts of extreme heat and to identify suitable adaptation measures that could be implemented by the PDP in the future.

The V&A identified socio-economic and environmental factors as decisive determinants for the health of pregnant women and children under 5 in extreme heat conditions. These include sanitary conditions related to sewage systems, waste management, water supply as well as access to basic goods. Good sanitary conditions and access to clean water, for example, increase the resilience of target groups against water related diseases during heat waves. The underlying health status of the target group was deemed an important determinant of physical sensitivity to heat. Better health leads to higher resilience against environmental factors, while at the same time, environmental factors can exacerbate pre-existing physical and psychological conditions.

Awareness of heat-related health problems was generally high among study participants. For example, pregnant women mentioned several physical discomforts that they considered to be heat-related (e.g. hypertension or other cardiovascular problems). The participants reported different personal experiences in coping with heat and heat-preventive behaviours (e.g. staying indoors, taking showers, ventilating their homes, drinking a lot of liquids and taking rest). Despite these protective and health-seeking actions, harmful behaviour was also detected during the interviews, such as regular or excessive showering and excessive consumption of sugary drinks during hot weather.

The study also included an assessment of the accessibility and perceived quality of offered health services within the informal settlements. Moreover, nurseries were included in the study as children spend a lot of time there and they could possibly serve as advisory centres for mothers. Generally, the results reflect a low quality and availability of health care services, with a complete lack of public health facilities in one of the settlements. Study participants perceived facilities with higher costs as offering better services. These findings, however, should be tested by including the perspective of the provider side to draw a more comprehensive picture on health care provision, particularly with respect to heat related health aspects.

Based on the results of this assessment, adaptive gaps among the study population were described, allowing for recommendations on adaptive options to be made. Possible adaptive measures in this context include the implementation of a behavioural change communication (BCC) campaign to increase protective behaviour and the consideration of heat- and health-related aspects in architectural measures in the context of the PDP.
1. Introduction

The effects of climate change on human health on a global level are diverse (see Annex 1): while extreme weather events such as heat waves, storms or natural disasters can directly lead to illness, injury or death, increasing risks of vector-, water- and food-borne diseases and malnutrition are examples of indirect consequences of climate change (WHO, 2009).

Impacts of climate change on health are geographically and socially unevenly distributed. How severely individuals are affected by climate change not only depends on the hazards caused by climate change, but also on the individual sensitivity (e.g. age, gender, health) and environmental conditions such as population density, availability of food and water and socio-economic factors such as level of education and access to basic services (WHO, 2011).

Egypt’s 88 million residents are highly vulnerable to the effects of climate variability and change. According to the World Health Organization (WHO), a growing number of Egyptians will be at risk of heat-related health problems as a result of higher average temperatures and more frequent and intense heat waves. At the same time, the analysis indicates a lack of corresponding responses to increase the climate resilience of Egypt’s health sector (WHO, Climate and Health Country Profile — 2015, 2015). The effects of these changes are already being felt: during a severe heat wave in August 2015, dozens of Egyptians died of heat stroke and more than 500 were hospitalised due to heat exhaustion (BBC, 2015).

The projected rise in average annual temperatures, by as much as 5.6°C over 1990 levels by the end of the century (WHO, 2015), is a particular threat for residents of Cairo’s informal settlements. Approximately 60% of Cairenes live in these densely inhabited areas, which are characterised by substandard physical infrastructure, limited access to social services and poor environmental conditions. There are few trees or open spaces (e.g. parks) to aid night-time cooling, which is essential for people to secure a good night’s sleep and to recover from the heat of the day (Kipper & Fischer, 2009).

During abnormally warm periods, the adverse health impacts of air pollution and heat mutually reinforce each other and lead to worsening of chronic respiratory and cardiovascular diseases and to heat stroke, cramps, exhaustion and, in some cases, heat-related deaths. Vulnerable groups, such as women and children, people with chronic illnesses and the elderly, are among those at greatest risk (WHO, 2009).

In order to foster community engagement to protect public health from heat stress in informal settlements of the Greater Cairo Region (GCR), the Climate Change Adaption and Urban Resilience component of the Participatory Development Programme in Urban Areas (PDP) initiated the Resilient Utilities for Healthy Communities project. In the first phase of this project the aim is to identify adaptation needs in the GCR. In a second step, adaptation measures will be implemented as pilot measures by the PDP.

To date, no targeted investigations concerning the topic of heat stress and health, particularly on the sensitivity and adaptive capacity of vulnerable groups to heat stress, have been carried out in informal areas of the GCR. There is, however, information available about general living conditions including health infrastructure, socio-economic factors and heat exposure. In order to gain access to specific knowledge about factors determining the sensitivity and adaptive capacity of vulnerable population groups against extreme heat within this special urban context, a qualitative vulnerability and adaptation (V&A) assessment was conducted by the Global Programme for Adaptation to Climate Change in the Health Sector (GV) in close cooperation with the PDP between February and October 2016.
2 Background

This assessment is geographically focused on informal settlements within the GCR. Its content focuses on the vulnerability and adaptability to heat-related health problems resulting from hot weather conditions. Paying particular attention to the topic of heat stress, the following section provides background information to help understand the interface between climate change, informal settlements and public health in Egypt.

2.1 Heat in Egypt’s urban setting

2.1.1 Climate and climate projections

Egypt’s climate is generally dry and hot. The average daily temperature ranges from 17 to 20°C along the Mediterranean to more than 25°C in Upper Egypt along the Nile. Egypt’s Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) indicates that in Upper Egypt the number of days of maximum temperatures equal to or exceeding 45°C has increased from 50 to 69 days over the last three decades (EEAA, 2010).

For the GCR, the increases in mean temperature will accelerate in the second half of the century, resulting in an overall increase of up to 3.5°C compared to the reference period of 1961 to 1990. The highest increases are projected during the summer months, which are already the hottest time of the year. In the same period, night temperatures are projected to change even more significantly. Since 2000, night-time temperatures during summer months have increased significantly, staying above 20°C. Night time temperatures above 20°C are defined as a tropical night. Estimations show that climate change will add almost three months of tropical nights by the end of the century (PDP, 2015).

2.1.2 The urban heat island effect

The high urbanisation rate — 48% of Egypt’s population were living in urban areas in 2015 (The World Bank, 2016a) — and the high population density in mega-cities such as Cairo and Alexandria, make Egypt vulnerable to heat-related health outcomes (see Box 1). Urban dwellers are most affected by heat waves as a result of the urban greenhouse effect and the formation of urban heat. Temperatures are often a few degrees higher in cities than they are in their surrounding rural areas. This temperature discrepancy is the result of a phenomenon known as the urban heat island effect. It occurs when buildings, streets and sealed surfaces contribute to warmer urban temperatures by reflecting heat and create what is called an ‘urban heat island’ (PDP, 2014b).

Box 1: When is a ‘heat wave’ too hot?

When is a ‘heat wave’ too hot?
The so-called heat threshold changes with the respective geographic location, due to the fact that certain countries generally have a higher heat threshold (WMO/WHO, 2015). This occurs due to the usually hotter and longer summers and their proximity to the equator. Subsequently, the labelling of a heat wave is relative to the location’s climate (Guo, et al., 2014). Nevertheless, heat-related deaths have been counted independently of geographic location (Gasparriini, et al., 2015). Heat waves call for urgent preventive action, keeping in mind that even small deviations from the average temperature can lead to negative health impacts.

The table below shows that the minimum temperature in Cairo is increasing faster than the average and maximum temperature (signalling a lack of cooling, most likely caused by the urban heat island effect). Therefore, the daily range of temperatures is smaller in
comparison to other metropolises. Furthermore, an increase in average daily temperatures since 1980 of approximately +5°C (4.84°C) per century has been documented for Cairo (1980–2007) (WHO, 2009, p. 20).

<table>
<thead>
<tr>
<th>City</th>
<th>Maximum (°C)</th>
<th>Average (°C)</th>
<th>Minimum (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johannesburg</td>
<td>+ 2.97</td>
<td>- 1.27</td>
<td>- 3.86</td>
</tr>
<tr>
<td>Cairo</td>
<td>+ 2.62</td>
<td>+ 4.84</td>
<td>+ 6.58</td>
</tr>
<tr>
<td>Delhi</td>
<td>+ 2.08</td>
<td>+ 0.53</td>
<td>+ 0.18</td>
</tr>
</tbody>
</table>

Table 1: Summary of temperature changes per century in selected cities according to regression lines. Source: WHO 2009, p. 21.

While the estimated work ability in Johannesburg (South Africa) remains high throughout the year, in Cairo and Delhi work ability “reaches zero during the most extreme hours in the hottest month” during summer (WHO, 2009, p. 28). A study about potential impacts of climate change on the Egyptian economy published by the United Nations Development Programme (UNDP) estimates that the combination of increased particulate matter concentrations and heat stress could result in a loss of 20 to 48 billion Egyptian pounds (EGP) per year, due to an increase in heat-related deaths (UNDP, 2013, p. 13).

2.2. Heat impacts on health and urban health coverage

2.2.1. Heat impacts on health

Extreme heat, particularly if it occurs unexpectedly, increases illnesses and contributes directly to deaths, mainly from cardiovascular and respiratory diseases (see Box 2) (WHO, 2004). Public health consequences include the increase of extreme weather-related mortality and morbidity, primarily affecting vulnerable groups such as the elderly, the chronically ill, infants and the poor. This situation occurs due to the fact that people’s vulnerability to heat depends not only on climatic factors but also on individual risk factors. These include medical, behavioural and environmental factors (age, gender, pre-existing disease, the use of certain medications, level of hydration, social integration, housing conditions) and the availability of heat mitigating factors such as air conditioning or access to green spaces. In addition, unfavourable external factors such as air pollution, humidity and infrastructural conditions in cities can intensify the impact of heat waves on human health (WHO, 2011).

Box 2: Heat-regulatory mechanisms of and negative heat impacts on the body.
Source: http://www.euro.who.int/__data/assets/pdf_file/0006/95919/E91347.pdf

Negative heat impacts on the body and heat-regulatory mechanisms

The human body senses the outside temperature with the help of thermoreceptors, which are located beneath the skin and in the deep tissue and organs. These receptors signal changes in body temperature to the thermoregulatory centre in the hypothalamus. The goal of thermoregulation is to keep body temperature within the physiological limits, between 36.3°C and 37.4°C, in order to maintain organ functioning. In the event that the body temperature is in danger of falling below or rising above these physiological limits, a regulatory mechanism initiates a change in the blood supply to the skin, and for example triggers sweating in the case of heat. If this mechanism is negatively influenced for instance through the intake of medicines, or overstrained due to extreme temperatures, the outcome can be life threatening. However, not only extreme temperatures are dangerous for human health. Especially people with cardiovascular diseases, respiratory disorders or chronic illnesses are negatively affected by even moderate temperature changes. If exposed to severe heat, vessels of the skin widen to release heat to the outside and slow down the blood flow. In consequence, the heartbeat increases to keep the circulatory system stable, but jeopardises a disadvantaged heart. Additionally, given that liquids from the systemic circulatory system enter the tissue, the viscosity of the blood surges, increasing the risk of thrombosis (clogging of tissue). Sweating enhances this mechanism due to the loss of salt, which is responsible for keeping liquids inside the vascular system (osmotic equilibrium). An imbalance of the salt budget (electrolyte displacement) causes a dysfunction of heart muscle activity, which further strains the circulatory system. A life-threatening heat stroke occurs when thermoregulation of the body breaks down, the transfer of heat from the skin to the outside is blocked and consequently, the body core temperature continues rising. In many cases the outcome is a multi-organ dysfunction requiring intensive medical care. A heat stroke has to be distinguished from sunstrokes (cranial pressure symptomatology due to the swelling of irritated meninges) and heat exhaustion (breakdown of the circulatory system, especially enhanced by additional physical effort).
2.2.2. Health coverage in urban areas in Egypt

According to the World Bank, public spending on health care in Egypt is comparably low, with total health expenditure of 2% as a share of gross domestic product (GDP) (2014). In general, health spending in Egypt amounts to 5.6% of GDP and is highly dependent on private out-of-pocket-payments that amount to 56% of total health expenditure (2014) (The World Bank, 2016b). Health care infrastructure in Egypt is fragmented, consisting of a variety of health care providers and services such as private clinics, public hospitals, health services provided by NGOs, mosques and churches, educational hospitals/university hospitals, private and non-private hospitals linked to medical schools, agency hospitals linked to the army or Ministry of Defence, and general and specialised hospitals such as fever hospitals (Haley & Bég, 2012, p. e85). There is an average of 2.82 physicians per 1,000 inhabitants, last measured in 2009 (WHO, 2016a). The governmental Health Insurance Organization (HIO) provides compulsory health insurance to businesses for its employees and additionally to widows and pensioners. School children are insured under the Student Health Insurance Program. This public insurance system, however, is characterised by insufficient coverage. In order to address inefficiencies in the Egyptian health care sector, a Health Sector Reform Program (HSRP) undertaken by the Ministry of Health and Population (MoHP) was initiated in 1997. Its purpose was to completely transform the way the system is financed and organised. Due to the Egyptian Revolution in 2011, the HSRP experienced a setback in the implementation process, which was formerly expected to reach completion by 2015 and was finally terminated earlier than expected (Haley & Bég, 2012, p. e85).

Although health care in urban areas is readily accessible and relatively modern, lower income urban areas lack comprehensive medical care, comparable to rural areas. This means that service levels differ enormously within a metropolis like Cairo. While on average (i.e. aggregated data on the governorate level) the availability of health facilities may be better in the Greater Cairo Region than in, for example, rural and peri-urban areas of Upper Egypt, the informal settlements in the three governorates of Greater Cairo fall behind the levels of health care provided in the more affluent neighbourhoods. The informality of the settlements is represented in unauthorised development and means that state-owned facilities hardly exist within such areas. Accessibility in geographical and financial terms, and in terms of knowledge and awareness, influences the ability of residents of lower income urban areas to visit health facilities located in richer areas (GIZ, 2016).

2.3. Egypt’s heat risk responses

2.3.1. Adaptation to climate change in the health sector

The national process of adaptation to climate change in the Egyptian health sector (H-NAP) is still in its infancy and not well integrated into the National Adaptation Plan (NAP) process (see Box 3). In 2016, the Egyptian Environmental Affairs Agency (EEAA), which is officially responsible for the National Adaptation Plan, began drafting a Health Sector Adaptation Strategy. At time of writing, this strategy is still in progress.

Within the health sector, the topic of climate change is subordinated to the department of environmental health. The environmental monitoring unit, formally concerned with the topic, has focussed mainly on mitigation and air pollution monitoring in the past. A new environmental health strategy is currently being developed with the support of WHO.²

² This paragraph refers to information collected during a kick-off meeting with the EEAA and MoHP. To our knowledge a coordinated exchange between the EEAA and the MoHP regarding a sectorial climate change adaptation strategy is still insufficient. In specific health matters the EEAA also communicates with experts from the Faculty of Medicine, Cairo University.
Box 3: The national process of adaptation to climate change.

**National adaptation plan (NAP) process on climate change in Egypt**

Adaptation to climate change is a necessary component of planning at all levels. Therefore, the Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC) acknowledged that developing national adaptation plans (NAPs) can enable all developing and least-developed countries to assess their vulnerabilities, to mainstream climate change risks and to address adaptation (UNFCCC, 2012, p. 11). The Ministry of State for Environmental Affairs and its executive arm, the Egyptian Environmental Affairs Agency (EEAA), are the designated lead government bodies responsible for national climate change mitigation and adaptation strategies. In addition, in 1997 a National Committee on Climate Change, an inter-ministerial committee representing a wide range of governmental and non-governmental stakeholders, was formed. The Chief Executive Officer of the Egyptian Environmental Affairs Agency (EEAA) heads the committee, which is responsible for the coordination, establishment and communication of national policies on climate change.

Egypt’s Second National Communication to the UNFCCC (E-SNC) from 2010 refers to direct and indirect climate change-related health impacts. Heat strokes and heat-related phenomena affecting especially the elderly and children, skin cancers, eye cataracts and deaths caused by heat effects are named as direct impacts. Malnutrition, communicable diseases (schistosomiasis, malaria, lymphatic filariasis, Rift Valley fever, tuberculosis, avian influenza, diarrhoea, other water- and food-borne diseases) and non-communicable diseases (cardiovascular diseases, respiratory diseases, cancers, rheumatic fever, rheumatic heart disease) were outlined as indirect impacts (EEAA, 2010).

In 2011, the EEAA issued a National Strategy for Adaptation to Climate Change and Disaster Risk Reduction, also addressing climate change-related impacts on health. In many parts the National Strategy correlates with the E-SNC. Improving health infrastructure and health services (e.g. surveillance systems for infectious diseases and public vaccination programmes) as well as capacity building measures in the field of climate change and health were additionally mentioned as required adaptation measures (ENSA, 2011, p. 89).

### 2.3.2. Official policies and strategies

Systematic and comprehensive incorporation of heat stress prevention measures into Egypt’s health policies is still lacking. As a reaction to the increasing number of deaths during the 2015 heat wave, information material (see Annex 2) was distributed by the MoHP via public and private institutions.

Efforts to protect people from extreme heat in the industrial sector are already defined by law. A law dealing with occupational health that was issued in 1995 ‘specifies the necessary conditions required for a safe working environment with respect to physical, mechanical, electrical, chemical, biological and other hazards’. Special chapters provide for safe levels of physical parameters including heat stress.³

### 2.3.3. Prevention measures by non-governmental bodies

The Egyptian Red Crescent (ERC) launched a Climate Change Adaptation Project in late 2010. This project included in-depth assessments of capacities and resources and vulnerability and adaptation analysis exercises with the aim of developing and integrating appropriate adaptation strategies into risk reduction plans for ERC-targeted communities that could be implemented once funding was available. Due to the political situation in spring 2011 (‘Arab Spring’), this project came to an end midway.

Currently ERC is implementing awareness campaigns about the environment, mitigation and air pollution-related topics (e.g. energy conservation, environmental protection and the reduction of air pollution), targeting children and adults.⁴

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³ Law No. 4/1994 — Executive Regulation; Prime Minister’s Decree No. 338 of the year 1995; Annex 9
⁴ Movie developed by ERC for children about emergency preparedness and response: [https://www.youtube.com/watch?v=5pCLdLDex3E](https://www.youtube.com/watch?v=5pCLdLDex3E)
A participatory video developed by young children who received training about climate change: [https://www.youtube.com/watch?v=llcNBAqQ45s](https://www.youtube.com/watch?v=llcNBAqQ45s)
School programme: [https://www.youtube.com/watch?v=KZFr66sHlIc](https://www.youtube.com/watch?v=KZFr66sHlIc)
In September 2016, ERC launched a new campaign entitled “Safer Summer with No Heat Strokes”, which is currently being implemented in several areas in Cairo as well as popular summer vacation destinations in Alexandria and the north coast. The campaign targets people of various socio-economic backgrounds and ERC has booths set up in various sporting clubs and popular beachside destinations. The objective of the campaign was to raise awareness about heat stroke and heat stress in several target groups, including athletes and families frequenting sporting clubs and popular summer beaches. The brochure highlighted some precautionary steps that can be taken to avoid heat stress, as well as how to provide first aid assistance to someone who has suffered a heat stroke (for further details see Annex 3).

3. Framing of the assessment

The following sections provide information about the objectives and implementation of the assessment including the selection of the study area, target group and the different steps of data collection and analysis.

3.1. Aims and objectives

The aim of the assessment was to contribute to an evidence base for the design and implementation of future interventions that protect public health from heat related stress. In particular, the results of this study feed into the design of a pilot project on adaptation in informal areas of the GCR supported by the PDP. The study also provides an example to others on how a qualitative vulnerability and adaptation assessment on heat stress and health could be approached.

Specific objectives of the study were:

- To initiate a multi-sectoral dialogue on the effects of climate change on health
- To explore social and individual factors determining health-related sensitivity to heat stress among vulnerable groups in informal settlements of the GCR
- To explore adaptive capacity and adaptive gaps of vulnerable groups to respond to heat-related health outcomes in informal settlements
- To formulate recommendations for possible adaptive measures in the PDP context

3.2. Principles and process

In order to benefit from the extensive knowledge and expertise of different stakeholders, PDP staff, governmental and non-governmental organizations were involved in the design and implementation of the study. During a preparatory mission, stakeholder interviews were performed as part of a scoping exercise. In addition, existing data and knowledge about the situation in Egypt and notably in informal settlements in GCR was collected through analysis of existing reports and assessments by the PDP. A technical committee was established to validate the study concept note, methodology and results (see Annex 8). The overall process of the vulnerability and adaptation (V&A) assessment was carried out between February and October 2016 and was divided into three phases: a desk study, situation analysis (scoping) and empirical data collection at local level. Participation from CEOSS and ERC informed the development of data collection guidelines. Gender and cultural factors were considered during all phases of preparation and data collection.

A situation analysis was carried out at national and partly governorate level during a first mission in March 2016. It included interviews with selected stakeholders (EEAA, WHO, ERC, CEOSS) and an expert meeting on climate change and health, making use of the platform “Advisory Board on Climate Change in Cities in Egypt” (AB-CCC). Further, it included a technical committee meeting with involved stakeholders.

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5 The Advisory Board on Climate Change in Cities in Egypt (AB-CCC) was set up to foster exchange on the impacts of climate change on Egyptian cities and urban areas. It is led by the EEAA and supported by the Participatory Development Programme in Urban Areas (PDP).
stakeholders and project staff. According to recommendations made by the PDP during and after the first mission, an assessment of the sensitivity and adaptive capacity of vulnerable groups as well as the capacity of local health services was planned through involving local health workers as informants. Unfortunately this approach could not be realised within the scope of the PDP. It was therefore decided to cooperate with national and local NGOs as door openers and knowledge carriers to residents of informal settlements and local NGOs. ERC and CEOSS were identified as important stakeholders in the area of communal development in GCR informal settlements. Additionally, ERC was identified as a key actor in the area of public health and possible provider for technical backstopping during planning and implementation of future adaptation measures.

Between June and August 2016, a desk study on relevant PDP documents was carried out and the second mission was prepared with the support of a national consultant. Empirical data collection took place during a two-week second mission in September 2016. A series of preparatory workshops with CEOSS and ERC preceded data collection. During these meetings the study area and target groups were selected and data collection guidelines were adapted (see Annex 4). During data collection study team meetings took place on a daily basis for documentation and evaluation of results. At the end of the mission a debriefing with ERC and CEOSS took place to share and evaluate preliminary results and hypotheses.

3.3. Study team

The study team consisted of the leader of and an advisor to the PDP’s component 2, an advisor to the GV, an international public health consultant and a national public health consultant. Empirical data collection was led by the international public health consultant and the advisor to the GV, supported by the study team, a representative from CEOSS and volunteers from ERC (see actors involved in local data collection in Annex 5).

3.4. Study area

The three study areas were selected from the nine informal target areas of the PDP. Each of the three settlements represents one governorate of the GCR:

- Ezbet El-Nasr/Basateen (Cairo Governorate)
- Markaz El-Abhath/El-Warraq (Giza Governorate)
- Khosoos (Qalyubeya Governorate)

The selection of these areas was based on the following criteria: 1) inclusion into previously conducted studies by the PDP providing data on sensitivity and adaptive capacity against climate change impacts in general, 2) representation of all three governorates, and 3) accessibility (e.g. access to settlements and access to informants within the given time horizon).

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4 The component II of the PDP, in cooperation with EEAA as its national counterpart, was not able to establish a formal working relationship with the MoHP within the time horizon of this assessment.
Map 1: Region of Greater Cairo showing the location of the study areas Ezbet El-Nasr, Khosoos and Masaken Gezeret El-Dahab. Modified from Google Maps.

3.4.1. Ezbet El-Nasr in Cairo Governorate

‘Ezbet El-Nasr is an informal settlement on desert and state-owned land, covering an area of 0.42 square kilometres with 72,190 inhabitants. It is formally attributed to the southern districts of Cairo and the Al-Basateen district. It is bound by the Ring Road to the South, the highway called “Autostrad” to the East and the slaughterhouse to the North. A historic Jewish cemetery is embedded into its western parts. The two highways in the South and the East form both extension barriers and main access ways. The history of the area’s construction goes back more than 40 years and is strongly linked with an influx of rural migrants from Fayoum, Bani Sweif, Menia, Asyout, Sohag and Qena.’ (Upper Egypt) (PDP, 2016a).

Map 2: Ezbet El-Nasr. Source: http://egypt-urban.net/where-we-work/ezbet-el-nasr/
3.4.2. Khososos in Qalyubeya Governorate

‘Khososos City was formally established as a city in 2006. It is one of the cities that resulted from the extension and random growth of some villages of Markaz El Khosoos. The population is approximately 700,000 inhabitants occupying around 6 square kilometres. Khososos is located in Qalyubeya Governorate and is bordered by the ring road and Ismaileyya canal from the East as well as the petrol company street in Mostorod in the North. It is bordered by El-Marg district from the South and the West. The main activities in the city are of industrial and commercial nature. It also has a vibrant informal sector working in waste collection and recycling.’ (PDP, 2016b).

Map 3: Khososos. Source: http://egypt-urban.net/where-we-work/khososos/

3.4.3. Markaz El-Abath (Warraq) in Giza governorate

‘El-Warraq has a total population of approximately 1 million and is located in the North of Giza Governorate. The target area Markaz al-Abhath, a part of El-Warraq, has an area of 0.667 square kilometres and 132,340 inhabitants. Inhabitants of El-Warraq originally come from different governorates in Upper Egypt, such as Beni Suef or Assiut, or from other areas in Cairo such as Rod Al-Farag or Manshiet Nasser. Many residents state that they have lived in the area since the 1960s or 1970s, while others were born in the neighbourhood.’ (PDP, 2016c).

Map 4: Markaz El-Abath. Source: http://egypt-urban.net/where-we-work/markaz-el-abhathel-warraq/
3.5. Study population

During a participatory process led by the study team and in collaboration with ERC and CEOSS, the following groups were identified as vulnerable with regard to heat-related illness in informal settlements (see Box 4):

- Pregnant women
- Children under 5 years of age
- People over the age of 60
- People in jobs with increased exposure to heat
- People with chronic illnesses

Box 4: Vulnerable groups and their risk factors according to perceptions of representatives from CEOSS and ERC, identified during a preparatory meeting.

"Pregnant women are especially at risk because they often ignore the importance of rest during heat because they think that families and neighbours would not permit them to take breaks. This is particularly problematic in the first three months of pregnancy. Investigations done by CEOSS showed that only 35% of women regularly attend antenatal care. They are also in danger of suffering from malnutrition."

'Small children under the age of 5 years are vulnerable to heat-related illness because this group is often malnourished. Also, they are exposed to heat when they do not attend school and play on the streets without anyone making sure that they drink enough fluids.'

'Elderly people over the age of 60-65 years often suffer from multiple health problems. They either live together with their families or in elderly-care houses. It depends on the quality of these institutions whether the elderly are cared for well or not. Some of these care homes are run by religious charity organisations.'

'People who are subject to high exposure to heat due to their occupation (e.g. manual jobs such as baker, metalworker or worker in a cement factory) are vulnerable as well. Many workers in informal settlements mainly work in tiny shops where they use tools that increase heat. The rooms are normally very narrow and without sufficient ventilation. There are only very limited safety measures.'

'People with chronic illnesses, such as hypertension, chronic obstructive pulmonary disease (COPD), asthma, diabetes and hepatitis, are also vulnerable to heat stress. This situation became even more visible during this and last year’s heat wave since Ramadan happened to fall in the summer months. Ill people often didn’t drink during the day, ignoring their illness.’

'Some people in informal settlements are particularly exposed to high air pollution, because of the proximity of their homes to factories (e.g. a cement factory) and places where waste is burned.’

This information correlates with official resources on heat stress from WHO (WHO, 2008b). From these vulnerable groups, pregnant women and children under 5 were selected as target groups. This was due to the relative ease of accessibility to these two groups compared to the other identified vulnerable groups, as well as promising experiences reported by ERC, in which children successfully served as multipliers of knowledge (see Box 5 for more information on the impact of heat stress on pregnant women and children under 5 years).
4. Methodology

This chapter outlines the methodology used to conduct the assessment.

4.1. Vulnerability and adaptation assessment framework

A vulnerability and adaptation (V&A) assessment integrates aspects referring to exposure, sensitivity and the adaptive capacity of a person or a system. Adaptive gaps are then identified based on the information collected (see terminology in Box 6). Depending on the aim and the scope of the assessment, V&A assessments vary in different contexts.

Box 6: Key concepts for a vulnerability and adaptation assessment.

Vulnerability can be understood as the product of exposure, sensitivity and adaptive capacity. ‘Exposure’ is the susceptibility to harm, which can be defined in terms of a population or a location’ (WHO, 2008b). It refers to the extent ‘to which a system [individuals, communities, institutions…] is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes’ (Perry, Canziani, Palutikof, Van der Linde, & Hanson, 2007). ‘From a health perspective, vulnerability to climate change can be defined as the summation of all risk and protective factors that ultimately determine whether a subpopulation or region experiences adverse health outcomes due to climate change’ (Balbus & Malina, 2009).

‘Exposure is the amount of a factor to which a group or individual is exposed; sometimes contrasted with dose (the amount that enters or interacts with the organism). Exposures may be either beneficial or harmful.’ (WHO, 2008b).

‘Sensitivity can be described as an individual’s or subpopulation’s increased responsiveness to a particular exposure. Biological sensitivity may be related to development stage, pre-existing medical conditions, acquired factors (e.g. immunity) and genetic factors’ (Balbus & Malina, 2009). ‘Socioeconomic factors also play a critical role in altering vulnerability and sensitivity, by interacting with biological factors that mediate risk (e.g. nutritional status) or lead to differences in the ability to adapt or respond to exposures or early phases of illness and injury.’ (WHO, 2008b).
Adaptive capacity in this context is the general ability of individuals, communities and institutions to effectively prepare for and cope with the consequences of climate variability and change (WHO, 2008b).

Since the aim of this assessment was to explore the individual sensitivity and adaptive capacity of pregnant women and young children on the individual level, we used qualitative methods for empirical data collection. We assessed socio-economic and environmental factors as well as factors influencing biological sensitivity (e.g. health condition). The assessment of the adaptive capacity included awareness and coping mechanisms, information on everyday life and perceptions of the capacity and accessibility of the health care system (see Table 2 for more details).

The framework (see Table 2) and methods were based on the following materials and guidelines:


<table>
<thead>
<tr>
<th>Aspect and sub-aspect</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td></td>
</tr>
<tr>
<td>Socio-economic and environmental factors</td>
<td>-What factors determine the socio-economic sensitivity to heat stress-related health impacts of women and children under 5? (e.g. living conditions)</td>
</tr>
<tr>
<td>Biological factors</td>
<td>-What kind of health-related aspects determine the biological sensitivity to heat stress-related health impacts of women and children under 5? (e.g. nutritional status)</td>
</tr>
<tr>
<td>Adaptive capacity</td>
<td></td>
</tr>
<tr>
<td>Awareness, coping mechanisms</td>
<td>-Are pregnant women and mothers aware of the problem? How do they cope?</td>
</tr>
<tr>
<td>Health-care infrastructure</td>
<td>- Is health care of good quality accessible for pregnant women and children under 5?</td>
</tr>
</tbody>
</table>

Table 2: Vulnerability and adaptation assessment framework: Guiding questions to assess the sensitivity and adaptive capacity of pregnant women and children under 5 living in informal settlements to heat-related illness.
4.2. Empirical data collection and analysis

Study participants and site selection
85 women participated in this study, 14 of whom were pregnant women and 71 were mothers of children under five. Interviews were conducted in local NGO facilities within the study areas. Site selection was facilitated by CEOSS and PDP area coordinators.

Focus group interviews
Nine focus group interviews were carried out, two groups with pregnant women and seven groups with mothers of children under 5. Each group consisted of 3–11 women (Annex 6). For that purpose two different semi-structured guidelines (see Annex 6) were developed previously, one for pregnant women and one for mothers (as care givers) of children under 5 years of age (see Table 3). The age range of participants was between 24 and 47 years.

<table>
<thead>
<tr>
<th>Study site/population</th>
<th>Number of groups (pregnant women)</th>
<th>Number of participants (pregnant women)</th>
<th>Number of groups (mothers of children under 5)</th>
<th>Number of participants (mothers)</th>
<th>Total number of groups</th>
<th>Total number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markaz El Abhath</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>11</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>El Khosoos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ezbet El Nasr</td>
<td>1</td>
<td>11</td>
<td>5</td>
<td>9, 10, 11, 11, 9</td>
<td>6</td>
<td>61</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>14</td>
<td>7</td>
<td>71</td>
<td>9</td>
<td>85</td>
</tr>
</tbody>
</table>

Table 3: Overview of focus group interviews and study participants.

Data documentation and analysis
All statements made during group interviews were noted by ERC volunteers. These notes, together with the notes from observers (one in each group), were compiled in tables after the interview. In a second step, statements from all group interviews were synthesized according to the guideline questions and then encoded. Based on these text elements overarching categories were built independently by two study team members. Each category had similarities and differences compared to the others. Whilst the interpretation of the results and theories built was based on the preunderstanding of the data analysts (e.g. preventive and non-preventive behaviour), the perspective of the interviewees (original wording and context) and authenticity of the results was maintained throughout the process.

5. Results and conclusions

This chapter presents the findings and conclusions based on empirical data collection.

Several primary themes were identified based on inputs from ERC and CEOSS during guideline preparation and participants’ responses during the interviews. The boxes in the following sections describe each primary theme using direct quotes to illustrate the meaning.

The primary themes were grouped into six broader thematic areas partly reflecting the guiding questions of the V&A framework. These were in turn categorised as addressing either sensitivity or adaptive capacity (see Table 4). The former addressed socio-economic and environmental factors, as well as health-related factors that determine the sensitivity to heat-related health consequences, whereas the latter addressed awareness and coping mechanisms, as well as perceptions of nurseries and health care services.

By organising the results in such a manner, it was possible to identify and describe adaptive gaps that are increasing the vulnerability of the study population. These are discussed at the end of this chapter.
<table>
<thead>
<tr>
<th>Category</th>
<th>Thematic group</th>
<th>Primary themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>Socio-economic and environmental factors</td>
<td>Cost of services, sewage system, waste management, water supply (availability and quality), electricity supply</td>
</tr>
<tr>
<td></td>
<td>Health-related factors</td>
<td>General health problems of pregnant women, common health issues of children &lt;5</td>
</tr>
<tr>
<td>Adaptive capacity</td>
<td>Awareness mechanisms</td>
<td>Heatwave 2015, heat-related health problems, participation in awareness-raising events</td>
</tr>
<tr>
<td></td>
<td>Coping mechanisms</td>
<td>Preventive behaviour, non-preventive behaviour, self-medication, harmful behaviour</td>
</tr>
<tr>
<td></td>
<td>Perceptions (of health care services)</td>
<td>Health facilities near settlements, accessibility, quality</td>
</tr>
<tr>
<td></td>
<td>Perceptions (of nurseries)</td>
<td>Attendance, quality, price, nurseries as advice centres</td>
</tr>
</tbody>
</table>

Table 4: Organisational structure of the interview results.

5.1. Sensitivity

5.1.1. Socio-economic and environmental factors

Socio-economic and environmental factors are decisive for public health. They include sanitary conditions such as sewage systems, waste management, water supply, and access to basic goods. Improved household sanitary facilities have been linked to improved population health, in particular that of vulnerable groups (WHO, 2008b). Consequently, insufficient sanitary conditions lead to a population being more vulnerable to external factors like changing climatic conditions.

Box 7: Costs of basic services

<table>
<thead>
<tr>
<th>Costs of basic services</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Suffering from water bill and electricity bill and garbage collection bill; they pay for services that they do not receive.’ MCu56E27</td>
</tr>
<tr>
<td>‘Electricity: before they paid for only what they used, now it’s a new system — a card (like a prepaid card) which tells you when you have to pay money for electricity again.’ MCu54E27</td>
</tr>
<tr>
<td>‘Electricity is too expensive (we pay a lot no matter what we consume), availability is improving [comment: electricity bill includes other fees like garbage collection and clean streets, cost depends on the area and on the income]’ MCu58E28</td>
</tr>
<tr>
<td>‘Prices for most things have increased, even have problems buying bread, now they have subsidy cards they use for basic goods (rice, pasta etc.).’ MCu53K</td>
</tr>
<tr>
<td>‘More expensive, even food items.’ MCu59E28</td>
</tr>
</tbody>
</table>

14
During the interviews, the women voiced their complaints about high costs of basic services. Prices of basic goods and services, including food, electricity, water and waste collection, have increased. The pricing structure is not very transparent, and increases in prices have not been accompanied by improved services. ‘Subsidy cards’ have been introduced for families to buy basic goods, however their distribution varies according to location and family income. Furthermore, administrative barriers (lack of income records) are hindering access to these cards, as some families are unable to prove their low income.

Box 8: Sewage system

**Sewage system**

‘The sewage pipe broke and the contents flooded the street, also near a school.’
MCu54E27 & MCu59E28

The interviews revealed that the sewage system is susceptible to damage and may not be regularly maintained. The interviewed mothers in Ezbet El-Nasr reported a broken sewage pipe near a school building and expressed their concern for the risks to their children. Sewage systems must be regularly maintained to ensure the quality and safety of the infrastructure (pipes). Leaky pipes can cause waste water to mix with drinking water, increasing the risk of water-borne diseases.

Box 9: Waste management

**Waste management**

‘The trash collector takes EGP 5 per trash bag and three per week; after that he just throws it in the street.’ MCu52W
‘The district collects the garbage from the street, but it’s never enough.’ MCu52W
‘The government does not collect garbage in the informal settlement.’ MCu59E28
‘They burn garbage: acute respiratory illnesses and allergies, gastrointestinal problems.’ MCu53W, MCu55E27, MCu59E28
‘Allergies in the eyes because of smell in the area.’ PW1W

Waste disposal was a key issue for the interviewees, with all focus groups mentioning the issue. Waste disposal seems to be non-functional in all three settlements. Women spoke of only one state-run system that is provided in parts of Markaz El-Abhath. Here, the study group complained that the paid collectors throw the rubbish on the street and that the collection of this waste by the district is insufficient. in Khosoos and Ezbet El-Nasr, on the other hand, have no official waste removal system. In these settlements, the women made direct links between waste-burning practices and negative health consequences, such as allergies, respiratory illnesses and gastrointestinal problems which in turn can be exacerbated during extreme weather conditions. Furthermore, open waste disposal areas which can become a breeding ground for pathogens and diseases have been reported near schools and youth centres.
**Box 10: Water supply: water availability and water quality**

<table>
<thead>
<tr>
<th>Water supply: water availability and water quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Not regularly, one time for three days no water.' MCu52W</td>
</tr>
<tr>
<td>'Water: a lot of outages.' MCu53K</td>
</tr>
<tr>
<td>'Water: when pressure is low, people in upper buildings might not have water.' MCu54E27</td>
</tr>
<tr>
<td>'Not clean, mixed with waste, sometimes water is black, people who can’t afford filter or bottles they drink it.' MCu53K</td>
</tr>
<tr>
<td>'Bad quality, comes up black; filter change every week, smells like sewage, contains sand.' MCu56E27</td>
</tr>
<tr>
<td>'Unclean yellow water, store water because of water outages, boiled water looks white, pot turns black.' MCu55E27</td>
</tr>
<tr>
<td>'Water is yellow, unclean (that’s why the sister of one woman got sick with typhoid; if that happens to a child it could die).’ MCu58E28</td>
</tr>
<tr>
<td>'Cause of many health issues: kidney failure, virus C, cancer.' MCu56E27</td>
</tr>
<tr>
<td>'Unclean yellow water, store water because of water outages, boiled water looks white, pot turns black, disgusted so better not boil it.' MCu55E27</td>
</tr>
<tr>
<td>'The cheapest water filter costs 450p, sometimes boil the water instead.' MCu58E28</td>
</tr>
<tr>
<td>'Too expensive to buy filters.' MCu59E28</td>
</tr>
<tr>
<td>'People who can’t afford a filter or bottles, they drink it [probably most families have filters].’ MCu53K</td>
</tr>
<tr>
<td>'Water filter smells bad”; she makes her own filter: cotton and gauze.’ MCu52W</td>
</tr>
</tbody>
</table>

**Water availability and quality** varied across the study locations. In Markaz El-Abhaith and Khosoos, water supply tends to be irregular, whereas in Ezbet El-Nasr interruptions were uncommon. However, occasional poor water pressure was cited in the latter, meaning that occupants of higher storeys were sometimes left without water. Bad water quality seems to be a general problem, with only one group in Ezbet El-Nasr stating that the water was fine. Water has been described as being of yellow, whitish or black colour or tasting like chlorine. Yellow water was sometimes associated with illnesses such as typhoid, kidney failure, Hepatitis and cancer. Preventive measures against water-borne diseases include boiling or filtering the water to improve quality were mentioned. However, these measures were not always implemented by the women, either because of disturbing residues formed when boiling water or the high costs of water filters. Bottled water was considered unaffordable for many households.
Availability of electricity is an important factor that influences sensitivity to heat. While electrical supply has improved immensely, with blackouts occurring very rarely, continuous access presents a problem for poor households. Due to the high costs of electric appliances and electricity, the use of ventilators and more significantly air conditioners is often not affordable for families living in informal settlements. Women living in Khosoos explained that power outages occurred more frequently when the weather was hot, and reported many accidents caused by explosions and fires in previous years. Nonetheless, the biggest problem with power supply remains the price. Prices are high and fixed, i.e. costs do not depend on household usage.

5.1.2. Health-related factors

Box 12: Health problems in pregnant women

Health problems in pregnant women

- fainting/syncope
- fatigue/exhaustion
- nervousness
- nose bleeding
- unstable blood pressure
- high blood pressure/hypertension
- loss of appetite
The underlying health status of pregnant women and children under 5 determines their physical sensitivity to heat. Better health leads to higher resilience against environmental factors. At the same time, environmental factors can exacerbate pre-existing physical and psychological conditions. For instance, the interviewees stated that their health problems (see Box 12) worsened during summer. Women from Markaz El-Abhath also said that their individual perception of heat is stronger during pregnancy.7

The predominant pathologies in children under 5 reported by mothers were abnormal skin conditions and respiratory tract infections. Mothers also mentioned hypersensitivity; allergies and gastrointestinal problems, amongst others (see Box 13). The ailments relating to weak bones, loss of weight and concentration problems point to unhealthy eating habits or malnutrition. Malnourished or undernourished children are generally more sensitive to infectious diseases, and also more sensitive to heat-induced illnesses. Dehydration in combination with extreme heat can prove to be a death sentence for especially weak children.

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7 No information regarding health-related aspects was available from pregnant women from Khosoos or mothers from Khosoos and Markaz El-Abhath.
5.2. Adaptive capacity

5.2.1. Awareness

Box 14: Perception of 2015 heatwave

<table>
<thead>
<tr>
<th>Perception of 2015 heatwave</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘44–50 degrees [Celsius] last year.’ MCu56E27</td>
</tr>
<tr>
<td>‘Really felt the heat, felt exhausted, tired, some fainted.’ MCu53K</td>
</tr>
<tr>
<td>‘Remember it, a lot of people suffered from it, many got sunstroke and fever; agriculture was influenced.’ MCu54E27</td>
</tr>
<tr>
<td>‘In Il Liyat district several deaths in school children.’ MCu59E28</td>
</tr>
<tr>
<td>‘Remember it, some people died in Ezbet El Nasr.’ MCu55E27</td>
</tr>
<tr>
<td>‘Yes, remember it but no dead in our area, rather in elderly in Upper Egypt.’ MCu58E28</td>
</tr>
</tbody>
</table>

The interviewed pregnant women and mothers reported different personal experiences during the 2015 heatwave (see Box 14). With temperatures reaching 50 degrees Celsius, daily lives were strongly affected, with women feeling exhausted and tired. Women in Markaz El-Abhath spoke of a very intense heatwave and that the heat has increased over the years. The women also spoke about the deaths they had heard of, however the study team was unable to confirm whether these were related to the heatwave. No difference concerning heat was reported in Ezbet El-Nasr between 2015 and the previous year, although some women recalled deaths in other regions. Many spoke about deaths in Upper Egypt (Ezbet El-Nasr) or in the Li Livat district.
Box 15: Awareness of heat-related health problems

Awareness of heat-related health problems

‘Fainting happens frequently — happened last week, went to private clinic, and they gave liquids; normally many people around when it happens luckily’ PWW (pregnant women from Markaz El Abhath (Warraq))

‘Every condition you might have worsens in the summer’ PWW

‘Eat less because of heat; baby gets weak — baby has problems like jaundice, prematurity, viruses; appetite gets better when at the edge of the Nile, but I cannot force myself to eat’ PWW

Health problems pregnant women mentioned that are affected by heat:

- hypertension and other cardiovascular problems
- fainting/syncope
- tiredness
- nervousness
- nose bleeds
- sensitive skin
- loss of appetite

Health problems mentioned in children that increase during the summer:

- cold and fever
- sunstroke
- spoiled food
- general skin diseases
- fungal infections
- sore throats
- respiratory infections
- diarrhoea and dehydration
- exhaustion
- loss of appetite

Awareness of heat-related health problems was generally high amongst the study population. The pregnant women mentioned several physical discomforts (see Box 15) that they considered to be heat-related. Heat can act as an additional stressor to persons with hypertension or other cardiovascular problems, and was also linked to pathologies in newborns. Several pregnant women worried about possible health risks for their babies, such as jaundice, prematurity and susceptibility to viruses, especially if they did not eat enough due to heat. Several women claimed that their baby moved too much in their abdomens when it is hot.

Mothers of children under five mentioned several health problems that they believed increased over the summer, illustrating their awareness of the issue (see Box 15). Generally, mothers seemed to consider environmental factors important for their children’s health, such as clean water, cleanliness (child and environment), safety and healthy nourishment (pesticide-free food, drinking milk). Additional determining factors, such as sports, access to playgrounds, private tuition or mental health, were rarely mentioned.
Box 16: Awareness-raising events (general)

<table>
<thead>
<tr>
<th>Awareness-raising events (general)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Various events have taken place for different groups:</td>
</tr>
<tr>
<td>- Environmental topics: pollution, recycling, global warming and climate change, rooftop farming</td>
</tr>
<tr>
<td>- Health-related: hygiene and environmental health, female genital mutilation, personal hygiene, dental hygiene, hepatitis C, eye diseases, diarrhoea and nutrition</td>
</tr>
<tr>
<td>- Income-generating: sewing and handicrafts, business management</td>
</tr>
<tr>
<td>- Social topics: sexual harassment, women and development, ‘you are precious’ campaign, children’s behaviour and dealing with youth</td>
</tr>
<tr>
<td>- Last year’s heatwave campaign</td>
</tr>
</tbody>
</table>

The participation of women in various **awareness-raising events** (see Box 16) has yielded several benefits for the GCR communities. Tangible results that can be applied to the women’s everyday lives were deemed most effective because the women retained most knowledge from these events. Furthermore, the fact that women perceive these activities in a positive light should be an encouragement for NGOs to continue such activities, and make them relevant to the communities by designing events using a participatory approach.

5.2.2. Coping

Box 17: Preventive behaviour

<table>
<thead>
<tr>
<th>Preventive behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘We drink a lot, we drink as long as we feel thirsty’ MCu56E27</td>
</tr>
<tr>
<td>‘By staying at home, multiple showers, staying under fans or AC, cold drinks’</td>
</tr>
<tr>
<td>‘Cleaning home with water all day long (wet floors)’ PWW</td>
</tr>
<tr>
<td>‘Spend time at the Nile’</td>
</tr>
<tr>
<td>‘Only go outside after sunset’</td>
</tr>
<tr>
<td>‘Let them wear light clothes, white, and cotton cloths’ MGU52W</td>
</tr>
<tr>
<td>‘Give them lots of fluids and water’ MCu59E28</td>
</tr>
<tr>
<td>‘Stay at home most of the time, keep them at home almost all summer’ MGU58E28</td>
</tr>
<tr>
<td>‘Her mother or only one of the three women goes to the market and brings the food for all [comment from study team: all women live in the same building].’ PW1W</td>
</tr>
</tbody>
</table>

Interviewed pregnant women were aware of the negative impacts that heat has on their health and the health of their unborn child (for example prematurity). They also had knowledge of **preventive behaviours** such as staying indoors, taking showers, ventilating their homes, drinking a lot of liquids and taking rest. Most women said that they spend a lot of time in the kitchen, outside in the market, or accompanying their children to school or kindergarten. During summer, they also accompanied their children to private tuition and were therefore subjected to heat (more so in Markaz El-Abhath).
The women mentioned several coping strategies that would protect them and their children from heat (see Box 17), many of which included reducing activities, staying at home, resting, cooling down and staying hydrated. Drinking hibiscus tea was cited as being particularly good to regulate blood pressure; cold tea against high blood pressure and warm against low blood pressure. Mothers of children under five tried to protect children from heat stress by keeping them cool and hydrated. This usually meant keeping children indoors, preventing excessive activities and dressing them appropriately.

When their children were dehydrated, many mothers mentioned that they administered an oral rehydration solution (ORS), and if things did not improve or in severe cases they would go to the doctor or visit a hospital. In cases of overheating or fever, measures mentioned included cold towels, showers and if there was no improvement, they would visit a hospital. These actions are helpful from a medical viewpoint (protective behaviour), while others, such as self-medication, may be harmful if administered wrongly or without consulting a health professional.

Box 18: Health seeking behaviour

<table>
<thead>
<tr>
<th>Health seeking behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>'When worse, when a big problem they go to the private doctor or to the hospital (cheaper)' MCu52W</td>
</tr>
<tr>
<td>'When private doctor is not good, then they go to a hospital' MCu52W</td>
</tr>
<tr>
<td>'Dehydration solution from pharmacy when diarrhoea and vomiting, then to hospital if it doesn’t get better' MCu55E27</td>
</tr>
<tr>
<td>'In the morning we go to the hospital, in the evening we go to the private doctor (available 24h)' MCu52W</td>
</tr>
<tr>
<td>'Like seeking doctors’ opinions, think that mothers-in-law might have outdated knowledge' MCu53K</td>
</tr>
<tr>
<td>'One woman has follow-up with paediatrician (check weight every month, child care programme, that’s why it’s affordable, goes on until the age of 5)'</td>
</tr>
<tr>
<td>'If they have allergies or skin rash they bring children to the doctor and there they often get the cream calamine (zinc oxide, ferric oxide).’ MCu52K</td>
</tr>
<tr>
<td>'If fever does not go down they go to Fever Hospital.’ MCu5928EEN</td>
</tr>
<tr>
<td>'Don’t ask anyone else; one woman said that her husband tells her to go to the doctor every time there is something wrong, the others say their husbands are useless in that.' PWWE</td>
</tr>
</tbody>
</table>

Many of the statements regarding heat-related health problems were not related to a specific health problem, but exhibited general coping strategies. However, several mothers said that they go to the doctor if more serious symptoms such as skin problems or fever occur (see Box 18). Similarly, pregnant women in Markaz El-Abhath said that they would visit a public hospital for minor health problems. In cases of emergency, or when they felt unwell at night, they would consult a private hospital.

Despite the many protective and health seeking actions, harmful behaviour was also detected during the interviews with mothers of children under five, such as: regular or excessive showering (can exacerbate skin conditions or make skin more vulnerable to disease) and excessive consumption of sugary drinks (juices and sodas), ice or watermelons (excessive sugar consumption can lead to chronic health conditions such as diabetes).

Amongst the pregnant women, eating behaviour was problematic; even if the women were aware that it was not good for their babies, they still did not eat enough or regularly enough because they were too busy, tired, or suffering from a loss of appetite. Further maladaptation measures included self-prescribed medication that is based on previous experience with similar symptoms (self-medication).
The study group seemed to try to find the best solution to an individual health problem based on their attitudes, knowledge, options and available resources. In case of fever, dehydration and diarrhoea, for example, the child would be kept in a cool space, given oral rehydration solution and, if possible, be presented to a doctor.

The interviewed women sometimes consulted pharmacists in case of health problems before consulting doctors. Women also said they would consult family members, care givers and neighbours on health related issues. The confidence in their opinion, however, seems to vary a lot. The opinion of women from the previous generation (mothers, mothers-in-law) was questioned by some interviewees since their knowledge could be outdated. Men do not seem to play a dominant role when it comes to health-related aspects, but in most cases, together with the mother-in-law, are asked for permission before a health facility is consulted.
5.2.3. Health care facilities

Box 19: Health care facilities within the settlements

<table>
<thead>
<tr>
<th>Facility name</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small clinic</td>
<td>Private; within settlement; vaccinations; requires out-of-pocket payments</td>
</tr>
<tr>
<td>El Youm El Wahed Day Care Hospital</td>
<td>Private; outside settlement</td>
</tr>
<tr>
<td>Basateen Health Centre</td>
<td>Public; outside settlement; nearest for antenatal care; vaccinations</td>
</tr>
<tr>
<td>Ahmed Meher Teaching Hospital</td>
<td>Public; outside settlement; emergency care</td>
</tr>
<tr>
<td>Hussein Educational Hospital</td>
<td>Public; outside settlement; emergency care</td>
</tr>
<tr>
<td>El Khalif Hospital</td>
<td>Public; outside settlement; emergency care</td>
</tr>
<tr>
<td>Abasseya Fever Hospital</td>
<td>Public; outside settlement; emergency care</td>
</tr>
<tr>
<td>El Rish Hospital</td>
<td>Public; outside settlement; emergency care</td>
</tr>
<tr>
<td>Darlebom Centre</td>
<td>Public; outside settlement; emergency care</td>
</tr>
<tr>
<td>Saqr Quraish</td>
<td>Public; outside settlement; vaccinations</td>
</tr>
</tbody>
</table>

2. Khosoos

<table>
<thead>
<tr>
<th>Facility name</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public health unit (PHU)</td>
<td>Public; within settlement; vaccinations; requires out-of-pocket payments</td>
</tr>
<tr>
<td>El Matareya Educational Hospital</td>
<td>Public; outside settlement</td>
</tr>
<tr>
<td>El Demerdash</td>
<td>Outside settlement; emergency care and serious illness</td>
</tr>
<tr>
<td>El Shefa</td>
<td>Outside settlement; emergency care and serious illness</td>
</tr>
<tr>
<td>Monira Hospital</td>
<td>Outside settlement</td>
</tr>
</tbody>
</table>

3. Markaz El-Abhath

<table>
<thead>
<tr>
<th>Facility name</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public health unit (PHU)</td>
<td>Public; within settlement; follow-ups and vaccinations; requires out-of-pocket payments</td>
</tr>
<tr>
<td>Markaz El Warraq El Gidid Clinic</td>
<td>Day time emergencies</td>
</tr>
<tr>
<td>El Sehel Hospital</td>
<td>Night-time emergencies (24h service)</td>
</tr>
</tbody>
</table>
Box 20: Accessibility and perceived quality of health services

<table>
<thead>
<tr>
<th>Accessibility and perceived quality of health services</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Good and cheap hospital is only open in the morning and crowded, and because it's crowded the quality is bad because the turnover is high.” MCu52W</td>
</tr>
<tr>
<td>“If you need an operation they are asked to bring their own blood bags.” MCu52W</td>
</tr>
<tr>
<td>“Sometimes they ask them to pay upfront for an operation and they cannot afford it.” MCu52W</td>
</tr>
<tr>
<td>“Sometimes, depending on how much money they have, they go to this doctor or to another.” MCu52W</td>
</tr>
</tbody>
</table>

State-run PHUs providing mother and child care (MCH) are available in Khosoos and Markaz El-Abhat, but not in Ezbet El-Nasr, even though the number of children under five is highest in the latter. In severe cases and emergencies, residents have to seek help in public or private clinics outside the settlement. Even though the information collected during this assessment permits only assumptions about the capacity of the local health system, and is based on perceptions of the interviewees (user-side), it appears that the local health system does not meet the needs of the target groups and is unable to provide adequate prevention and treatment of heat-related health conditions. In order to perform an objective analysis of the capacity of the health care facilities mentioned in this study, it would be necessary to collect data from the provider-side.

According to the interviewees no public health facility is available in Ezbet El-Nasr. Therefore, women need to cover long distances in order to seek health care. Limited affordability is another barrier. Even residents who provide the necessary resources to pay for health care find the situation more difficult than in other areas, as the range of services provided by private facilities in the settlement is limited. In Markaz El-Abhat, conversely, public health facilities are available within the settlement, but factors including high costs and limited opening hours restrict access.

Interviewees from all three settlements complained about the poor quality of the health care services due to a lack of equipment, lack of medication, long waiting hours, misdiagnoses and overcrowding. Several interviewees in Ezbet El-Nasr complained about disrespectful behaviour by doctors. Interviewed mothers in Markaz El-Abhat claimed that the service provided in private facilities was better as more time and effort was dedicated to diagnosing and interacting with patients.
5.2.4. Nurseries

Box 21: Attendance, quality, price, and nurseries as advice centres and environmental determinant

| Attendance, quality, price, and nurseries as advice centres and environmental determinant |
| 'Keep them at home during extreme heat or cold.' MCu52W |
| ‘…crowded, prone to get sick from each other (chicken-pox, eye infections → parents); 70-80 pounds.’ MCu52W |
| 'They do not like the nursery, because it’s a small apartment with a small room, no entertainment, they don’t care for food, no education.' MCu54E27 |
| 'Child must ask to eat and to go to the bathroom.' MCu59E28 |
| 'The difference is in quality of education, ventilation, spaciousness, cleanliness, bathroom/toilets/number of children per class and overall.' MCu52W |
| 'More expensive nursery has smaller classroom size, number of children, (300p+).’ MCu52W. |
| 'One of the mothers was a nursery teacher: says that they split kids into age groups and then depending on age group they do different things with the children (prepare for school, make them eat, …).’ MCu54E27 |
| 'Nurseries are normally indoors, many children in tiny room; more expensive nursery is better because they educate the kids; costs start at 50-80p per month.’ MCu54E27 |

Child nursery attendance proved to be a sensitive subject. It depends primarily on the mothers’ financial resources and/or general household income. Several women from Markaz El-Abath and Ezbez El-Nasr reported that they sent their children to a nursery all year round, except in the summer. Others stated that they sent their children to a nursery above the age of three, but not earlier. Generally, the children remain indoors, since the facilities are all located in apartments and are therefore protected from direct exposure to the sun.

The point of view held by the interviewed women regarding the quality of the institution correlated with the price. Lower price facilities were cited as being cramped, humid and conducive to the spread of illness. The lower the quality, the higher the likelihood that the facility does not provide air conditioning or fans, and that drinking water is not offered on a regular basis. More expensive facilities had smaller class sizes, and provided food, drink and education for the children. The nurseries with personnel who actively ensure that the children have enough to drink also display heat-protection behaviour.

Some of the interviewed mothers have the financial resources to send their children to nurseries. The degree to which these facilities take heat-preventative measures depends on the facilities’ perceived quality, which, in turn, according to the interviewees, depends on the price. The same accounts for the trust that mothers have in the caregivers: whether or not they are consulted in the event of health issues depends on the perceived quality of the facility.

The question whether the mothers would seek advice from the nursery caregivers was answered in many different ways. Several mothers do not consider the caregivers to be qualified; others think they look after the children better than the parents. Some reported that they asked pedagogical questions. Generally, the women provided valuable guidance on determining whether nurseries could serve as health behaviour promoters among mothers and caregivers.
5.3. Adaptive gaps

5.3.1. Gaps linked to environmental factors (infrastructure and living conditions)

Pregnant women and mothers of children under 5 living in the three study areas are exposed to severe limitations in their living conditions that determine their resilience to heat-related health impacts but lie mainly outside their control. This includes particularly the bad water quality, chemical environmental pollution and limited access to health care. A family's socio-economic status largely determines their access to health services, good nutrition and education. Families living in conditions with comparably higher heat exposure (e.g. Ezbet El-Nasr, where the peri-urban architecture facilitates the urban heat island effect) are especially vulnerable to heat-related health consequences (PDP, 2014a).

5.3.2. Gaps linked to behaviour

The awareness shown by pregnant women and mothers in informal settlements is based more on individually perceived negative health outcomes than official information. The behavioural response (coping strategy) also depends on the existing resources (including time resources) and possibilities that mothers and pregnant women have. Overall, the assessment found that women are protecting themselves and their children mainly to the best of their abilities and stick to heat coping behaviours that provide heat relief, for example ventilation of houses. However, daily duties (e.g. bringing children to school, going to the market for shopping) keep them from adequately protecting themselves from heat exposure.

While most of the environmental limitations lie outside of the women’s control, poor adherence to water purifying practices (boiling or filtering) can only partly be explained by obvious (financial) reasons. It was stated, for example, that the fact that dirt becomes more visible when water is boiled or filtered causes fear and is therefore avoided by some women.

The assessment did also identify a few protective and reactive actions which may be considered as maladaptation (behaviour that harms more than it benefits): showering frequently can actually exacerbate skin conditions, and the widespread consumption of sugary drinks and ice cream to stay cool is also problematic from a health perspective. A huge problem is the widespread practice of self-medication. This behaviour most likely arises due to insufficient access to health care and health professionals, and can be seen as weather a last resort mechanism or a misjudgement in this context.

The empirical data collection revealed that the women in the study groups are very engaged in informal networks, which include friends and family, and could therefore act as efficient health knowledge promoters within their social networks.

5.3.3. Gaps linked to health care and nurseries

Several gaps concerning the provision of health care and nursery offers were also identified. The general perception of the interviewed women reflected a lack of access to affordable health care. Although trust in conventional medicine among the residents and willingness to make use of medical care offers is high, financial and geographical constraints lead to insufficient health care provision. In this regard, the lack of contact to health care professionals can be seen as a missed opportunity to spread information about (preventive) health behaviour during heat waves.

Finally, gaps in the nursery care system were detected. Only women who have a higher household income at their disposal were able to obtain high-quality nursery care for their children. The higher the care level in the respective nursery, the better the environmental conditions (e.g. availability of AC, water supply), and the more care is provided to every single child. Through education in nurseries, children could develop habitual patterns of heat preventive behaviour at an early stage of life and could also pass them to friends and younger siblings.
6. Recommendations for adaptive options

6.1. Implement a behavioural change communication (BCC) campaign

Rationale
The assessment showed that even though the interviewed women were aware of the problem of heat stress, not all behavioural responses can be considered as preventive measures, with some even being potentially harmful. A BCC campaign could be implemented to increase preventive behaviours in pregnant women, mothers of children under 5, and children under 5 years in Ezbet El-Nasr, Khosos und Markaz El-Abhath. Key messages used in such a campaign should be based on the results (statements) from qualitative data collection and analysis. They are not presented in necessary detail for operationalization in the following sections. The topic of heat stress prevention should be linked to other factors that women consider important in their everyday lives (including bad living conditions) and relate to their health and the health of their children according to the results presented in the previous chapter.

Training of trainers approach
During the data collection it became clear that awareness-raising campaigns are probably more successful when linked to tangible results that reflect the everyday lives of the women. One option addressing this issue could be to develop a physical toolkit containing information material for different target groups (NGO workers, personnel in nurseries, teachers and other groups of care givers, children) and some practical assets such as a water filter. Material toolkits could be distributed during special events organised by NGOs in schools and nurseries. Mothers and children could be trained during these events and encouraged to share information within their informal networks of neighbours and family members. In order to incentivise the on-going process of awareness-raising, special events or celebrations could be organised. Those involved in awareness-raising could use these events as platforms to share experiences and further encourage others to take part.

Heat hotline
Additionally, a ‘heat hotline’ or mobile messaging could be set up during the summer months to provide information and advice on heat-related problems and corresponding preventive behaviours. Residents could be given timely information about upcoming heatwaves and preventive measures, for example ‘stay at home if possible’, ‘drink more water’, ‘let the children play inside’, ‘do x when heat rashes occur’ etc. The precondition for implementation of such a heat hotline is an appropriate institutional setup and ownership of this hotline or service. A possible approach could be to enable an NGO to own this platform and (i) respond to phone inquiries during the summer on health issues related to heat, and (ii) refer people to appropriate health clinics or units in specified areas.

Targeting children
Awareness-raising and communication campaigns by ERC targeting children have been very successful in the past (personal communication from ERC, March 2016; see materials in Annex 3). It is therefore recommended to use results from this assessment to design easily understandable infographics for children. This approach is also useful for reaching individuals with low literacy levels. The infographics could be presented as cartoons and drawings, for example. Cartoons are useful tools as they are easily understood by children and illiterate persons, and are likely to be remembered due to their inherent colourful and fun nature. Drawing books containing the cartoons could be handed out at clinics and in waiting rooms; this would provide a constructive distraction for children during long waiting times. Materials could be displayed in nurseries, health units and pharmacies to increase visibility.

8 Alternative water filters made of mud/clay could be used as well in order to avoid high costs. It must be considered that normal water filters need to be replaced on a regular basis (2/3 weeks) and therefore their use could be unsustainable due to lack of affordability (maintenance costs).

9 Information and advice given by the holders of the heat line cannot substitute a medical diagnosis and should not be communicated as such.
Capacity development for opinion leaders

The assessment identified several actors as important contact persons for mothers seeking advice. These included pharmacists, health care personnel and sometimes teachers and personnel in nurseries. Capacity development for these groups could therefore lead to a reduction in maladaptive behaviours and an increase in protective behaviours. It is important to consider that activities targeting personnel working in the public health sector should be carried out in close cooperation with the official bodies in the health sector. Furthermore, institutional capacity assessments would be necessary in order to assess adaptive gaps in public health facilities and institutions. Opinion leaders and key stakeholders should be made knowledge carriers and contact persons for vulnerable groups. Measures targeting care givers in schools or nurseries, women themselves or personnel from local NGOs could be similar to those described in the previous section.

6.2. Consider heat- and health-related aspects in architectural measures

Architectural measures are supported by different PDP components and the upcoming Participatory Infrastructure Programme (PIP). Since heat presents a major health risk to the target communities, it would be vital to take heat adaptation measures into consideration during the planning process of future measures. Climate proofing of health facilities and other new public buildings is essential to protect public health. 10

Component II of the PDP specifically addresses climate change risks in cities (Climate Change Adaptation and Urban Resilience). It develops architectural measures to increase climate resilience in informal settlements. Among these measures are: wall plastering/painting; wall greening and/or street greening; rooftop farming/greening; rooftop shading and/or street shading with the aim of creating a cooler microclimate in buildings and surrounding spaces. The vulnerability of women and small children as well as their daily routines should be taken into account when creating cool spaces, for example. Localities that are close to health facilities, schools, council centres, NGOs or central spaces for shopping would be especially suitable to protect these groups.

The ‘cool spaces’ could be painted in a heat-protecting colour and be equipped with clay water jars 11, as well as communication materials. Established cool spaces could also be used for events such as training and group sessions concerning heat preventive behaviour and discussions about this topic.

6.3. Foster exchange between sectors and build capacities

PDP aims to strengthen abilities and knowledge about preconditions, objectives and methods of climate-adaptive processes. One approach here is to foster intersectoral exchange through dialogue and strategic development. Involving the health sector in such an exchange could foster cooperation between sectors and civil society with the aim of protecting people from negative health outcomes. The technical committee that has been set up for this project would be a good starting point for such a format.

The topic of climate change and health should also be integrated into official political processes and strategic documents (‘health in all policies’ and ‘climate action’). The PDP should advocate for the integration of the topic into official policy documents at national and governorate level and political discourse whenever possible. Examples are the Ministry of Housing’s Informal Settlements Strategy or the Giza Governorate’s Local Climate Strategy, which are currently in process. The Advisory Board on Cities and Climate Change (AB-CCC) that has been established by the PDP together with the EEAA can be utilised as a platform for political dialogue.

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10 For further information see: http://egypt-urban.net/climate-change-adaptation-and-urban-resilience/ This includes for example the covering of water jars in order to prevent the creation of nesting sites of mosquitoes.

11 These should be covered in order to prevent the creation of nesting sites of mosquitoes.
6.4. Involve key actors to assure sustainability

Establishing a formal working relationship with the Ministry of Health is crucial to assure sustainability and widespread impact. It is important that the planned pilot measures are not undertaken in isolation from the health sector. Official health authorities should also be involved at the governorate level. The launch of this assessment could be a possible starting point for further cooperation.

In order to assure the quality of future measures, it would be beneficial that the technical committee, especially ERC and CEOSS, are consulted prior to, during and after implementation processes. As the technical committee informed the process of this assessment, their feedback, insights and assistive capacity could be valuable for the implementers of adaptation measures.

6.5. Disseminate knowledge

The results of this assessment provide a valuable source of information for NGOs and governmental institutions, such as health authorities and healthcare facilities within and in the immediate surroundings of informal settlements. They could build on the results to frame activities and formulate messages that are well adjusted to pregnant women and children under 5 years living in similar contexts. For example, this could be done within the scope of specific heat-stress related measures or integrated in health care services that focus on mothers and children.

7. Limitations

Study context
The study team was unable to establish a formal working relationship with the Ministry of Health in the given time horizon. Therefore the team had no access to health facilities or health professionals. Conclusions on the adaptive capacity of the local health system could therefore only be made based on statements from the interviewed women.

Methodology
No official framework for heat health-related V&A was available for local level studies. The methods used had to be adapted from other guidelines and experiences and had not been tested before. Moreover, no access was available to quantitative data, accurate historical data or climate trends over the past 30 years. Available data on physical sensitivity (see Annex 7) and other pre-existing PDP assessments have only been included punctually in the results section.

Representativeness of study results
Results from this assessment are not representative in statistical terms but based on a purposive sample. The sample size of 85 women can be considered relatively small. For logistical reasons, only two groups with pregnant women could be conducted which limits the validity of results.

Target groups
Because of a limited accessibility to these groups, the assessment did not include highly vulnerable groups such as the elderly or chronically ill in the study.

Data analysis
The interview statements were not transcribed. Data analysis was done from systematically structured notes that are less accurate. Even though preliminary results were evaluated by ERC and CEOSS, data triangulation could not be provided systematically.
8. List of References


9. ANNEX

Annex 1: Effects of climate change on human health

Figure 1: Centers for Disease Control and Prevention, CDC.
Source: https://www.cdc.gov/climateandhealth/effects/
Annex 2: Instructions for heat stroke and sun stroke

In case of muscle strains or convulsions

- decrease sugar intake in food or drinks
- prevent adding salt to food
- complete rest in cool place
- drink cool fluids
- no physical activity after several hours from the end of convulsions

In case of heat rash

- be in a cool place with less humidity
- be in a dry place
- usage of powder or soothing creams

Drugs that increase the body temperature should be avoided if applicable

Psychological drugs e.g. Haloperidol, chloropromazine, drugs to treat Parkinson, sedatives and tranquilizers e.g. Phenothiazide, diuretics.

Figure 2: Instructions for heat stroke and sun stroke. Source: currently released by the Egyptian Ministry of Health and Population (translated from Arabic).
Annex 3: ERC sun stroke campaign

Visit to the Heat-Stress Awareness Campaign – Ezbet Zeinhom (Cairo)
Monday September 5th, 2016

The campaign in Ezbet Zeinhom was carried out in two days. The first day (day of visit) focused on door-to-door visits and talking to community members on the streets. The volunteers handed out colourful brochures with clear illustrations to the community members, covering the following points:

- How heat strokes happen
- Which are the most vulnerable groups
- How to protect yourself to prevent heat strokes
- How to treat someone who suffers from heat stress

Volunteers also distributed water bottles and briefly explained the information provided in the brochures.

The second day of the campaign was aimed at children and provided them with a more interactive awareness session.

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<tr>
<td>10:00-12:00</td>
<td>Kick-off meeting PDP/GV</td>
<td>10:00-10:45: Briefing PDP &amp; GV</td>
<td>10:00-15:00: Exchange on 'CC and health'</td>
<td>10:00-12:00</td>
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<tr>
<td>12:30-13:30</td>
<td>Lunch break</td>
<td>11:00-13:00: Study Team meeting</td>
<td>13:00-15:00: Individual expert meeting with ERC</td>
<td>13:30-17:30</td>
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<tr>
<td>13:30-18:00</td>
<td>Preparation of meetings and workshop with NGOs</td>
<td>13:00-14:00: Lunch break</td>
<td>15:00-18:00: Preparation of individual expert meetings</td>
<td>15:00-16:00: Meetings with area coordinators, PDP</td>
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<tr>
<td>10:00-15:00: Preparation of workshop with CEOSS &amp; ERC</td>
<td>10:00-13:00: Individual expert meeting with ERC</td>
<td>16:00-18:00: Documentation of individual meetings</td>
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<td>Data collection in Giza - Warraq - El Khoosos - Lunch break</td>
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<td>Data documentation</td>
<td>9:30-13:30</td>
<td>Data collection in Quayubeya - El Khoosos - Lunch break</td>
<td>9:30-14:00</td>
<td>Data collection in Cairo - Ezbet El-Nasr - Lunch break</td>
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<td>Preparatin of debriefing with participating NGOs</td>
<td>14:30-16:00</td>
<td>Debriefing meeting of Study Team: update and next steps</td>
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<td>Preparation of technical committee meeting</td>
<td>18:30-19:30</td>
<td>Debriefing with Head of Component 2/PDP</td>
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Annex 5: Actors involved in local data collection

Annex 5.1: Profile of hosting local NGOs in the three targeted informal settlements

- Markaz El Abhat: El Raedat for Development Association
- El Khosoos: Horus Association
- Ezbet El Nasr: Dar El Om Center, Fayoum Agro-Organic Development Association (FAODA) and Alwan & Awtar

Markaz El Abhat

_El Raedat Association for Development_

Based in El Warraq, El Raedat Association for Development works on reducing unemployment in the area and changing youth perceptions of the value of work. The NGO provides training for beneficiaries as well as technical support for trainees who have the desire to establish individual or collective projects in the field of garments manufacturing, and assists them in marketing their products through Productive Families Exhibitions.

El Khosous

_Horus Clinics and Association_

Horus Clinics and Association offer medical services as well as education and awareness. Medical services include physical therapy, OBGYN, dentistry, optometry, orthopaedics and medical testing. Their education services provide around 250 students with primary school tutoring in all subjects. They also provide day-care services for children with disabilities as well as speech and behavioural therapy. Horus Association works on raising health awareness among women and has several initiatives to improve household incomes through micro-credit.

Ezbet El Nasr

_Altan wa Awtar_

Established in December 2005, Alwan wa Awtar (A&A) is a non-profit organisation registered with the Ministry of Social Affairs (reg. no 6320) with the aim of providing a safe haven where children can nurture their artistic senses, develop their creativity and intellectual abilities and experience self-discovery in a stimulating non-judgmental environment. Situated in the heart of the community they serve, A&A programmes offer children access to artistic and cultural activities, as well as interactive educational activities that promote love of learning and self-development.

A&A targets children and youth in marginalised communities who have little or no access to after-school activities, let alone visual and performing arts. The organisation offers an innovative setting, which combines art and non-formal education; a setting that is designed to enrich the learning experience of the children. Children embark upon a learning journey that both inspires and informs them, that provides them with tools that develop their thinking skills and eventually leads to a brighter future. A&A continues to be guided by its beneficiaries and the local community, focusing on the priorities they feel are most important.

A&A adopts a participatory approach across all its activities. It believes that the trainer and trainees are partners in the learning process, each enriching learning through their own unique experiences, abilities and skills. A&A believes that each learning situation is a chance to develop the children’s and young people’s life skills such as communication, critical and analytical thinking, respect for differences, citizenship and social responsibility.

_Fayoum Agro Organic Development Association (FAODA)_

FAODA is a non-governmental organisation founded in 2001 as a committee affiliated to one of the first farmer’s associations created by CARE International in Fayoum, through a team of young, promising people with multi-expertise in the El- Basionia area - Fayoum, who gained considerable experience of training provided by the agricultural information for export project (AgReform) implemented through CARE International.

While most of their activities relate to agriculture, they were awarded a grant to implement a project in the field of education. The project title is Contributing to Improving the Educational Process in Ezbet El Nasr Area (CIEP). The project’s main goal is to provide
high-quality learning opportunities for children aged 4 to 6 through 2 pre-school classes, and for children aged 9 to 14 through arts classes. FAODA, in implementing CIEP, manages to empower parents, especially women, through meetings of a Mothers’ Committee that tackles various topics such as the importance of education, good nutrition, health, etc.

*Dar El Om Center*

A private reproductive health clinic, Dar El Om Center also provides awareness sessions to pregnant women.

**Annex 5.2: Persons involved in local data collection**

No names provided in online version of this document. Please contact ute.jugert@giz.de for further information.
Annex 6: Guidelines for focus group interviews with pregnant women and mothers of children under 5 years

Annex 6.1 Guideline for pregnant women

| General remarks                                                                                      |
|                                                                                                     |
| - Try to read the expressions of the participants/body language                                   |
| - Make participants talk                                                                            |
| - Sitting order: circle                                                                             |

| Introduction                                                                                         |
|                                                                                                     |
| - CEOSS intro & thanks                                                                              |
| - Egyptian-German Cooperation                                                                      |
| - PDPs work in informal settlements                                                                 |
| - C2 CC                                                                                                |
| - Work more in health & CC/heat in the future                                                       |
| - Understand heat impacts on vulnerable groups’ health                                             |
| - Talk with you about your experiences with pregnancy and the heat                                 |

**Introduction round:**
- Everyone should introduce herself with name, number of children and age of children, trimester of pregnancy
- Explain guidelines for focused conversation

| Concrete experience/heat/pregnancy                                                                 |
|                                                                                                     |
| - (1) Last summer we experienced a very bad heatwave, do you remember it? What were your experiences? |
| - Do you spend most of your time outdoors?                                                          |
| - How do you deal with heat?                                                                        |
| - Any difference now that you’re pregnant?                                                          |
| - How much water or other liquids do you drink?                                                      |

| CEOSS التعاون المصري- الألماني/ شكرا ل- مشروعة PDP في 9 مناطق عشوائية مشروع عن تغير المناخ (C2) |
|                                                                                                     |
| - دراسة عن إرتفاع درجة الحرارة وتثاقرها على الصحة وبالخصوص على السيدات الحوامل                  |
| - هدف الدراسة: تعرف أكثر عن تأثير ارتفاع درجة الحرارة عن صحة السيدات الحوامل                    |
| - تعريف على المجموعة: الإسم، عدد الأطفال، وسنهم، مرحلة الحمل                                      |

| Arabic                                                                                               |
|                                                                                                     |
| - كان في موجة حرارة جامدة أوي السنة الفاتت. فاكرينها؟ هل تأثرت هنا في منطقتك؟ ازاي؟                  |
| - هل بتقدموا وقت كثير بره البيت؟ ازاي؟                                                              |
| - هل بتعاملوا مع الحرارة بطريقة مختلفة مع الحمل؟                                                      |
| Physical conditions, behaviour | • (2) What are the physical discomforts that you are experiencing?  
- Dehydration  
- Hyperthermia/Fever  
- Edema  
- Exhaustion  
- Nausea  
- Cardiovascular problems/syncope | • (2) What are the physical discomforts that you are experiencing?  
- How do you deal with these discomforts?  
- • (3) Do you think heat impacts your baby? How?  
- Do you take precautions to protect your baby? What are they? | • (2) What are the physical discomforts that you are experiencing?  
- How do you deal with these discomforts?  
- • (3) Do you think heat impacts your baby? How?  
- Do you take precautions to protect your baby? What are they? | • (2) What are the physical discomforts that you are experiencing?  
- How do you deal with these discomforts?  
- • (3) Do you think heat impacts your baby? How?  
- Do you take precautions to protect your baby? What are they? | • (2) What are the physical discomforts that you are experiencing?  
- How do you deal with these discomforts?  
- • (3) Do you think heat impacts your baby? How?  
- Do you take precautions to protect your baby? What are they? |

| Awareness & behaviour | • (4) In case of (X) what do you do?  
- Whom do you seek advice from? | • (4) In case of (X) what do you do?  
- Whom do you seek advice from? | • (4) In case of (X) what do you do?  
- Whom do you seek advice from? | • (4) In case of (X) what do you do?  
- Whom do you seek advice from? | • (4) In case of (X) what do you do?  
- Whom do you seek advice from? |

| Access to health care/quality of health care? | • (5) Where do you go for health-related issues and why?  
- In case of an emergency and for regular follow-ups, where do you go and why?  
- What is the availability and quality of services? | • (5) Where do you go for health-related issues and why?  
- In case of an emergency and for regular follow-ups, where do you go and why?  
- What is the availability and quality of services? | • (5) Where do you go for health-related issues and why?  
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- What is the availability and quality of services? | • (5) Where do you go for health-related issues and why?  
- In case of an emergency and for regular follow-ups, where do you go and why?  
- What is the availability and quality of services? | • (5) Where do you go for health-related issues and why?  
- In case of an emergency and for regular follow-ups, where do you go and why?  
- What is the availability and quality of services? |

| Barriers | • (6) What are the challenges faced in seeking health care? | • (6) What are the challenges faced in seeking health care? | • (6) What are the challenges faced in seeking health care? | • (6) What are the challenges faced in seeking health care? | • (6) What are the challenges faced in seeking health care? |

| Attitudes | • (7) What are the health-related issues you give priority to? And in general? | • (7) What are the health-related issues you give priority to? And in general? | • (7) What are the health-related issues you give priority to? And in general? | • (7) What are the health-related issues you give priority to? And in general? | • (7) What are the health-related issues you give priority to? And in general? |

| Infrastructure/living conditions | • (8) What other priority issues are there in your community?  
- Is water available on a regular basis?  
- What is the quality like?  
- How many cups of water and other liquids do you drink per day?  
- Are there a lot of power outages? | • (8) What other priority issues are there in your community?  
- Is water available on a regular basis?  
- What is the quality like?  
- How many cups of water and other liquids do you drink per day?  
- Are there a lot of power outages? | • (8) What other priority issues are there in your community?  
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- Are there a lot of power outages? | • (8) What other priority issues are there in your community?  
- Is water available on a regular basis?  
- What is the quality like?  
- How many cups of water and other liquids do you drink per day?  
- Are there a lot of power outages? |

| Awareness-raising campaigns? | • (9) Have you experienced awareness activities? What were the topics? How did you receive it? What is impactful? | • (9) Have you experienced awareness activities? What were the topics? How did you receive it? What is impactful? | • (9) Have you experienced awareness activities? What were the topics? How did you receive it? What is impactful? | • (9) Have you experienced awareness activities? What were the topics? How did you receive it? What is impactful? | • (9) Have you experienced awareness activities? What were the topics? How did you receive it? What is impactful? |
| Do you, and if yes where do you wait for your children when they are at school? |
| بتستني عيالك عند المدرسة؟ فين؟ وبتستنا اد إيه؟ |

Closure: Thank you for your contribution! Do you have any questions?
Annex 6.2. Guideline for mothers of children under 5

| General remarks | • Try to read the expressions of the participants/body language  
|                 | • Make participants talk  
|                 | • Sitting order: circle  
| Introduction    | • CEOSS intro & thanks  
|                 | • Egyptian-German Cooperation  
|                 | • PDPs work in informal settlements  
|                 | • C2 CC  
|                 | • Work more in health & CC/heat in the future  
|                 | • Understand heat impacts on vulnerable groups health  
|                 | • Talk with you about your experiences with children and the heat  
| Introduction round: | - Everyone should introduce herself with name, number of children and age of children, trimester of pregnancy  
|                 | - Explain guidelines for focused conversation  

| Concrete experience/heat/children | (1) Last summer we experienced a very bad heatwave, do you remember it? What were your experiences?  
|                                  | How do you deal with heat with your children?  
|                                  | Does your child spend most of the time outdoors?  
|                                  | What do you do to protect your child from heat?  
|                                  | How many cups of water and other liquids do you drink per day?  

| Physical conditions, behaviour | (2) What health issues do your children experience? What aspects are worsened during summer time?  
|                               | How do you deal with these conditions?  

التعاون المصري-الألماني/ شكراً لأنشطة PDP مشروعاً عن تغير المناخ (C2) دراسة عن ارتفاع درجة الحرارة وتأثيرها على الصحة هدف الدراسة: نعرف أكثر عن تأثير ارتفاع درجة الحرارة تعرف على المجموعة: الإسم، عدد الأطفال، وسنهم  

(1) كان في موجة حارة جامدة أوي السنة الفاتت. فاكرينها؟ هل تأثرتموا هنا في منطقكم؟ ازاي؟ هل الأطفال يتعرضون وقت كثير؟  

طب طيب بينام فين؟ ازاي يتعرضوا مع الحرارة مع الأطفال؟  

.setItem: "يعتمدوا إيه عشان تحموا أطفالكم؟  

بتشربوا مياه وسوائل إيه يوميا؟  

(2) إيه هي المشاكل الصحية عند الأطفال؟ إيه المشاكل التي تزيد مع الحر؟  

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<td>(Fever) convulsions</td>
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<td>Syncope</td>
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<td>Diarrhoea</td>
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- (3) In case of (X) what do you do? |
- Whom do you seek advice from? |
- Who is the decision-maker? |

- (4) Where do you go for health-related issues and why? |
- In case of an emergency! Regular check-ups? Vaccinations? |
- What is the availability and quality of services? |

- (5) What are the challenges faced in seeking health care? |

- (6) What aspects do you think are most important for your child's health? |

- (7) Who takes care of your child? |
- Do you take your child to a nursery? |
- What do you think of the nursery? |
- How do they spend their time indoors, outdoors? |
- Are they given water regularly? |
- Would you seek advice from the caregivers? Like what? |

- (8) What other priority issues are there in your community? |
- Is water available on a regular basis? |
- What is the quality like? |
- Are there a lot of power outages? |

- (9) Have you experienced awareness activities? What were the topics? How did you receive it? What is impactful? |
- Do you, and if yes where do you wait for your children when they are at school? |

- (3) In case of (X) what do you do? |
- Whom do you seek advice from? |
- Who is the decision-maker? |

- لو حصل X، بتتعاملوا مع الحالات دي ازاي؟ |
- يتاحدي رأي مين في حالات دي؟ |
- مين إللي بيقرر هتعملوا ايه؟ |

- (3) In case of (X) what do you do? |
- Whom do you seek advice from? |
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- لو حصل X، بتتعاملوا مع الحالات دي ازاي؟ |
- يتاحدي رأي مين في حالات دي؟ |
- مين إللي بيقرر هتعملوا ايه؟ |
Annex 7: Physical sensitivity

The physical sensitivity in an urban district relates to man-made structures such as buildings, roads, vegetation or ground. These structures and natural features determine the living conditions and thus the comfort of the residents in urban areas.

A study of the exposure to climate change showed that the changes in air temperature represented the greatest change to which the residents in the Greater Cairo Region (GCR) were exposed and in the future probably will continue to be.12 For this reason, the work performed on behalf of the PDP in selected settlements including Ezbet El-Nasr and Markaz El-Abhath investigated these physical features with regard to their contribution to the sensitivity of the inhabitants, with the focus on heat build-up or cooling down potential over roads, in buildings or over open places. Four factors here are crucial: (1) heat build-up in buildings, (2) heat build-up over open spaces and streets, (3) street ventilation, (4) and the park cooling effect.

In both of the settlements selected for this assessment, the physical sensitivities manifested themselves very differently. As the results of the assessment of the four factors mentioned above shows, Ezbet El-Nasr has a much higher physical sensitivity than Markaz El-Abhath.

Ezbet El-Nasr is the settlement with the highest heat build-up potential in buildings and over open spaces and streets of the four settlements under investigation by the PDP. It is a densely built-up urban area, but to the north and west of the area of investigation there are large open spaces without buildings. Building heights are generally lower than in the other three urban areas, in particular there are some very low buildings in the north-western and southern parts and thus less shading effects in many parts of the area of investigation. The north-western extension of the settlement with basically one-storey buildings is a special case as this neighbourhood is currently in the process of being constructed (typical for an urban transition zone).

The outskirts of Ezbet El-Nasr are home to more developed-housing stock and business hubs. Most internal streets are unpaved. Ezbet Al-Nasr is in many ways physically and socially segregated from the rest of the city. Although many basic urban services are actually present on site, quality and maintenance of these are often unsatisfactory.' Cited from: http://egypt-urban.net/where-we-work/ezbet-el-nasr/

Ezbet El-Nasr generally contains few open spaces within the area of investigation, with the exception of some partly sealed areas in the northwest corner and in the southern part. The "unprotected" large open spaces around the area (including the major streets) have the highest heat build-up potentials. Ezbet El-Nasr is the worst ventilated of the four compared settlements due to a very irregular street network. On average, streets are also narrower. However, the oldest part of Ezbet El-Nasr, in the eastern tip of the area, has a very dense network of narrow streets in a north-south direction, which can take advantage of the predominant winds coming from the north.

Ezbet El-Nasr's most important park cool island (PCI) is the Jewish cemetery, which is located between different parts of the settlement. Consequently the cemetery's PCI would penetrate into the built-up area of Ezbet El-Nasr.

In contrast, Markaz El-Abhath exhibits relatively low heat build-up potential values for its buildings and open spaces and consequently more shaded streets. It is a densely built-up urban area with most of its buildings being five to nine floors high. But there are also some buildings with ten or more floors, which are primarily located in the centre and just outside the southern edge of the investigated area. Markaz El-Abhath has comparatively few open spaces inside the area of investigation and none of them are vegetated. However, there are large open spaces with mainly bare soil to the south and east (towards the Nile River). The few open spaces inside and to the south and east of the area of investigation are more exposed to the sun, and thus have relatively high heat build-up potential.

Also street ventilation in Markaz El-Abhath is on average much better than in Ezbet El-Nasr. This is due to the fact that it exhibits a very regular street pattern and that the majority of streets have a north-south extension and are also wider than in Ezbet. Most of the investigated area is not within close reach of potential cool islands (PDP, 2014a, p. 6ff).

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Annex 8: Terms of reference: Technical Committee on Heat-Health Vulnerability and Adaptation Assessment in Informal Settlements in Greater Cairo

I. Project background

Recognising the need for community engagement to protect public health from adverse effects of climate change in informal areas of greater Cairo, e.g. heat stress, the Climate Change Adaptation and Urban Resilience component of the Participatory Development Programme in Urban Areas (PDP) has initiated the Resilient Utilities for Healthy Communities project. Part of this project is to identify local adaptation needs in the project area through a heat-health vulnerability and adaptation assessment that will be conducted with the support of the Global Programme for Adaptation to Climate Change in the Health Sector (GV).

The project covers in particular (i) the framing and conceptualisation of the V&A, (ii) the process of conducting the V&A and (iii) the analysis and dissemination of the results. As a next step selected adaptation measures will be implemented as pilot measures by the PDP.

Data collection takes place during two missions: a first mission for situation analysis in March 2016 and a second mission for data collection in September 2017.

The V&A will be implemented within the context of the PDP. The global programme is responsible for development of the study design, data collection and analysis. Concrete implementation of the study will be in the hands of a multidisciplinary study team.

The study aims to contribute to an evidence base for the design and implementation of future interventions by exploring context-specific vulnerability factors in Cairo’s informal settlements as well as factors that shape the adaptive capacity to heat stress of the local health system and community resilience.

II. Organisation

A Technical Committee on Heat-Health Vulnerability and Adaptation Assessment in Informal Settlements in Greater Cairo is to be established that includes national and local stakeholders. A first meeting will take place on 18 August, at GIZ PDP premises (Office Zamalek, 1 El Saleh Ayoub St., 7th Floor, 11211 Cairo). A second meeting is planned to take place at the end of the mission (end of September 2016).

III. Tasks of the committee

The members of the technical committee are invited to fulfil the following tasks:

- Provide technical input and give approval to the proposed study design and methodology (as described in concept note)
- Reflect on the eligibility of the proposed study design in the Egyptian context, e.g. with regard to feasibility, relevance and possible use of results
- Support implementation of the study, e.g. help providing access to health facilities and relevant stakeholders
- Evaluate/reflect on first results after the mission (2nd steering committee meeting)

IV. Members of the committee

No names provided in online version of this document. Please contact ute.jugert@giz.de for further information.
V. Annexes

1. Mission report on first mission (March 2016)
2. Concept note of second mission (September 2016)