



שם: פאהאוט אליקס

Climate risk, vulnerability and adaptation in a hot, dry climate: mixed methods **שם העבודה:** investigation within the rapidly urbanizing minority Arab population in Israel

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Abstract

Climate change and health

The global climate and environmental crisis is “the greatest threat to global public health”, “risk[ing] catastrophic harm to health”, according to a joint editorial authored by the editors of health journals worldwide.¹ The existing and potential impacts of current and future climate change on health stem from direct exposures (e.g. to floods or heat stress), indirect exposures via natural systems (e.g. allergens, disease vectors), and economic and social disruption (e.g. agriculture and food systems).²

Adaptation to climate change in urban contexts

With the still-limited success of global mitigation efforts, the past two decades have brought increasing policy, financing and research focus on adaptation to climate change. ‘Adaptation’, sometimes also referred to as ‘preparedness’, refers to taking measures to limit the harms of climate change, as well as to leverage potential benefits. Cities are areas of particular potential vulnerability – first, due to the fact that by definition they are a site with large amounts of people living and working there. Moreover, many cities feature urban heat island effects and vulnerability to flooding. At the same time, urban authorities are considered to be key actors in adaptation as their authority scope include highly relevant fields like land use regulation, urban design or emergency planning.³

Climate vulnerability assessments

Organized adaptation to climate change usually starts with climate vulnerability assessments, which aim to identify areas and populations of greater vulnerability in order to prioritize efforts and resources. Such assessments often combine measures of exposure to a climate-related hazard with measures of sensitivity and existing adaptive capacity. Researchers reviewing existing climate vulnerability assessments have highlighted that many of them provide an understanding of vulnerability that is too shallow and/or too top-down to be successful in terms of informing or influencing policymaking.⁴⁻⁶ In this context, this study’s scoping review (objective 1) will critically



evaluate the different contributions of qualitative, quantitative and participatory methods to the understanding of urban vulnerability.

Urban climate vulnerability assessments often focus on large cities, coastal cities, or informal settlements, while smaller cities have been understudied. This study will quantitatively and qualitatively assess vulnerability for a small city inhabited by an ethnic minority. The quantitative assessment will calculate an index of vulnerability to heat taking into account physical exposure and socio-economic indicators, and analyzing the association between this measured index and perceived risk measured via questionnaire (objective 3). The qualitative assessment will use focus groups and interviews to characterize community and professional perceptions (objectives 4, 5). These three objectives will also add to the urban climate vulnerability literature for the Middle East, which is currently very limited despite the region being in a climate change 'hotspot' due to its geography, already experiencing a higher warming of mean temperatures than global mean warming.⁷

Public open spaces as urban-level adaptation

An example of adaptation at the urban level is enhancing access to green and/or shaded public open spaces such as park and playgrounds, which can also have benefits in terms of public health by supporting physical activity, social connectivity and psychological relaxation. However, the extent of such possible benefits to public health depends on the actual use of public space, as the presence of a park or playground does not guarantee usage. Shade is a known desired attribute and has been shown in experimental studies to increase use of public spaces.⁸ Similarly, studies find that mild weather is associated to higher visitation of public spaces.⁹ However, virtually no studies look at the combination of temperature and characteristics like shade together with other factors related to playground usage, such as distance from housing, type of facilities or presence of incivilities like garbage. Furthermore, studies looking at playground usage often focus only on presence and physical activity, and do not consider other health and wellbeing-related behaviors such as social interaction and awareness of the environment.¹⁰

In this context, this study's observation-based cross-sectional study of usage of playgrounds and qualitative characterization of perceptions related to playgrounds will provide insight into usage into a less-studied context: non-Western urban communities that have only recently (and only partially) gained walking-distance access to playgrounds (objectives 6a and 6b). Both the qualitative and quantitative data will be analyzed using the socio-ecological model of behavior. As more countries will face hotter or longer summers, it is important overall to understand how heat interacts with other usage-related factors, and critically reflect on the existing and potential usability of spaces like playgrounds in these conditions.

Individual-level adaptation



Lastly, adaptation/preparedness also involves individual-level behaviors, such as purchase of flood insurance, conserving water, personal heat protective measures, etc. Existing research using individual-level theories of behavior such as protection motivation theory disproportionately focuses on factors like risk perception and previous experience of natural hazard, as opposed to factors that may have stronger relationships with behavior, such as self-efficacy and descriptive norms.¹¹ This study's questionnaire-based cross-sectional study will be the first to investigate factors relating to individual-level climate change adaptation behavior in Israel, including factors like self-efficacy that have been globally understudied in this context (objective 2).