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The Complex Interplay between Everyday Risks and Disaster Risks: The Case of the 2014 Cholera Pandemic and 2015 Flood Disaster in Accra, Ghana

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ABSTRACT

Large urban agglomerations in Sub-Saharan Africa such as Accra face multiple vulnerabilities due to overlapping risks. These include everyday risks related to poor quality water and sanitation, to city level air, water and industrial pollution risks and vulnerabilities to natural disasters such as floods, earthquakes, storms and pandemics. Some of the bio-climatic disasters may be amplified by climate change. The paper argues that the complexity of everyday risks and associated health conditions suffered principally by the poor are interconnected with disaster risk. It examines these inter-relationships in the context of the cholera pandemic of 2014 and the 2015 flood disaster events, as city-wide events which affected both the poor and the wealthy. The paper reflects on the implications of these events - which are to a large extent socially constructed - for thinking about everyday and disaster risk in an urban context, and for policies to address multiple sets of overlapping risks.

1. Introduction

As late urbanisers, African cities face multiple vulnerabilities due to overlapping risks which result from localized, everyday hazards as well as global-scale risks associated with climate change and globalization processes.

Large urban agglomerations such as Accra face a fourfold risk overlap. These include: local public health hazards; poor city-region air quality, water and industrial pollution; vulnerabilities to natural disasters such as floods, earthquakes and storms; and amplification of some of these factors by the local impact of climate change especially with regards to floods and storm surges [20, p. 4], see also [14, p. 8], [8]. At one level, the urban poor - the majority - suffers multiple risk overlaps at the local and city-regional levels. Yet, at another level, the entire population suffers risk overlaps associated with global climate change, historically largely driven by the global North [9] (see Table 1).

Small everyday hazards related to the brown or environmental health agenda account for the greatest burden of disease and premature death and serious injury in Accra and other human settlements in Ghana [18,22, p.66]. This overall picture is true for the Africa region as a whole. Their economic and social costs fall on poor families with little political fallout for city and national governments.

These local environmental problems of the home and neighbourhood tend to build into city-wide and settlement-wide problems. These include surface and ground water pollution, and the city-wide accumulation of garbage which eventually chokes drains and exacerbates flooding. Also, the unplanned nature of human settlements because of poor local governance leads to fire disasters and crowding related diseases. The impacts of small and especially major disasters tend to be most dramatic and catastrophic even if in total they account for a much smaller share of the burden of disease and death in comparison to everyday hazards [20, pp. 30–31,14, p. 34]. This vulnerability of urban populations to disasters is not 'natural', but is "constructed and amplified by economic, social and political systems. Changes in these systems can greatly reduce vulnerabilities" [3, p. 196].

In the context of systems thinking, initial change often calls forth supporting changes rather than countervailing ones which moves the system in the same direction as the first change but much further depending on the nature of the first change. This may lead to a downward spiral if the initial impetus is an adverse one – such as the accumulation of everyday risks - in what Myrdal describes as a process of circular and cumulative causation [11]. Relating this concept to a risk continuum one observes negative feedback loops linking everyday hazards to disaster risks as the accumulation of local hazards such as uncollected garbage and poor sewage disposal over time become city-wide problems that can aggravate urban floods and the spread of common infectious diseases such as malaria, cholera and other diarrhoeal diseases. Diarrhoeal diseases such as cholera may be indirectly linked to water pollution, vector proliferation and inadequate hygiene and get worse in conditions of floods. By contrast, a more effective reduction of everyday risks can positively reinforce disaster risk reduction efforts by mitigating the impact of disaster events.

This paper examines these inter-relationships and their implications in the case of cholera pandemics associated with everyday risks such as

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Table 1
Examples of urban environmental burdens of different scales in relation to air, water and waste.
Source: [9, p. 22], see also, McGranahan et al. [10].

	Local	City-regional	Global[a]
Air	Indoor air pollution	Ambient air pollution	Contributions to carbon emissions
Water	Inadequate household access to water	River water pollution	Virtual water consumption
Waste	Unsafe household and neighbourhood waste handling	Unsafe or ecologically destructive disposal of collected wastes	Aggregate waste generation

[a] The global burdens are defined here as the water consumed, carbon emitted and waste generated in producing and supplying all the goods and services consumed in an urban centre. Virtual water consumption has been defined to include such consumption and to follow the same terminology one could refer to virtual carbon emissions and virtual waste generation.

lack of access to potable water, sanitary facilities, poor food hygiene, inadequate solid waste management and flood waters.

Section 2 outlines the methodologies underpinning the analysis drawn on in the paper, discusses the city context, including the historic environmental-health-hazard pathways experienced in Accra. In this light, Section 3 discusses the causal pathways underpinning the 2014 cholera pandemic and the 2015 flood disaster and their relationship to interconnected everyday risks. The final section concludes with recommendations for policy action in Accra to address multiple overlapping risks.

2. Methods

The paper is based on a synthesis of results drawn from different studies undertaken in Accra from the 1990s to the present. The first set of studies were based on a city-wide survey of 1000 representative households with a focus on everyday risks such as water, sanitation and hygiene, solid waste, pests and pesticide use, food contamination, household air pollution and crowding. It involved a proportional stratification according to residential categories [2].

While this 1993 study provided considerable depth it lacked coverage and continuity and it also failed to consider the interconnectedness of everyday and disaster risks as they accumulated over time. This was addressed with the development and regular application of proxy indicators for rapid assessment of environmental health and disaster related conditions in the city. The method was applied in three studies and the results presented in three publications (see [17,18,21,22]).

This provides a basis for trend analysis of the inter-connections between everyday risks and disaster risks [3].

These scoping surveys indicated risk accumulation processes; a synthesis of which is presented here complemented by results from other studies by [5,20,23] which equally point to the links between everyday risks and disaster risks with especial reference to urban floods in Accra and cholera pandemics. Mixed methods were therefore employed in the 2005, 2009 and 2013 studies.

2.1. The city context

The city of Accra constitutes a major urban agglomeration known as the Greater Accra Metropolitan Area (GAMA). It serves as Ghana's national capital and major industrial, commercial, financial, cultural and transportation hub. It includes what used to be defined as the Accra Metropolitan Area (AMA), Tema District (TD) and the Ga District (GD) which have been subdivided into eight administrative areas for more effective governance (see Fig. 1). As a lower middle income city it shares all the typical features of both a low income city and a middle income city in terms of the constellation of risks and hazards from everyday risks such as poor sanitation to city-wide risks more typical of middle income cities such as city-wide water pollution. These problems are common in poor neighbourhoods such as the High Density Indigenous Sector (HDIS), Medium Density Indigenous Sector (MDIS), High Density Low Class Sector (HDLCS) and the Rural Fringe (RF). Environmental quality is much higher and better in the Low Density High Class Sector/Low Density Newly Developing Sector (LDHCS/LDNDS) and the Medium Density Middle Class Sector/Low Density Middle Class Sector (MDMCS/LDMCS).

GAMA, with a combined population of 2.7 million in 2000 currently has a population of about 4 million according to the 2010 Census figures [6]. The citizens of GAMA face pressing needs for adequate environmental and housing services, employment and secure livelihoods and human security. This is as a result of jobless growth and massive informalization of labour markets as a result of structural adjustment and globalization [21]. Globalization and neoliberal policies led to the collapse of most local industries due to external competition, particularly from Chinese goods.

Yet the conditions in which GAMA's population finds itself may not be inconsistent with that of other cities in transition from low to middle income status experiencing overlapping risk accumulation processes.

2.2. The environmental health hazard pathway in Accra: historic evidence

The major environmental problems and associated risk factors confronting the majority of Accra's residents occur at the household and neighbourhood levels and within work places. These relate to the water and sanitation infrastructure that allows the faecal-oral transmission of diseases, indoor air pollution from the use of biomass fuels, housing problems, solid and liquid waste disposal, pests and pesticide use, poor hygiene behaviour and industrial pollution. As a result malaria, acute respiratory tract infection, diarrhoea, skin diseases and acute eye infections are still among the top ten diseases reported at outpatients facilities today as it was at the time of the 1993 study – suggesting that the underlying drivers and pre-existing conditions have not changed substantially [18,21,22]

An ecological model presented in Fig. 2 summarizes the interplay of everyday risks and associated health outcomes for residents in the city of Accra. The ecological subsystem is both a product of natural and anthropogenic factors and the associated pathogens and vectors together with other hazards. These include human induced stress, violence, insecurity and disaster risks [16,20]. These derive from the natural and urban micro-climate, underlying geology and the presence of naturally occurring toxic chemicals such as radon. Also included are ever-present flood risk and earthquake hazards. Anthropogenic factors which are dominant in the urban ecology include "type of housing, crowding including room and bed crowding, problems of waste disposal and potable water supply including smoke from industry and domestic biomass fuels. All these influence vector, pathogen, parasite prevalence and general disaster risk" [20, pp.12–13].

Results from the 1993 study [2,16] showed area based variations in environmental conditions among the socio-ecological zones or residential strata employed in our classification of residential areas. More importantly, there were even clearer relationships between household wealth and environmental burdens since the residential sectors were rather variegated and not as homogenous as the wealth groups identified for the study. Some of the most relevant intra-urban inequalities were with regards to access to environmental services such as potable water and sanitation.

While most wealthy households have in-house piping typically connected to overhead containers the urban poor typically relied on the informal water vendor or communal standpipes with in-house water storage in drums. This often results in downstream water contamination before it reaches the mouth and the poor must pay more per litre for the water which must also be carried home. This downstream