

Environmental and Health Impacts of Urban Sanitation Services in Côte d'Ivoire

Equitable access to urban sanitation services is necessary for populations' welfare and well-being and is one of the Millennium Development Goals. This study highlights how the lack of access to urban waste management infrastructure and services impacts human health and the environment. K. Parfait^{1,2}, D. Kouassi^{1,2}, H. Nguyen-Viet^{3,4,5}, Ch. Zurbrügg³, B. Bonfoh^{1,4}, B. Jean¹

Introduction

Since 2002, as a response to the adoption of the Millennium Development Goals, scientists and development agencies have been making efforts to find practical solutions to urban sanitation problems and to improve populations' wellbeing in developing countries worldwide. However, despite these attempts, recent statistics indicate that the urban sanitation situation in Sub-Saharan Africa remains very challenging [1, 2]. In Côte d'Ivoire, in particular, the urban sanitation problems are multiform. For instance, there is a lack of an institutional framework, an unsuitable intervention planning process, the absence of viable funding and inadequate infrastructure. The result is an exacerbation of health and environmental risks. This study evaluates the health and environmental impacts linked to the lack of access to sanitation services in Yamoussoukro, the capitol of Côte d'Ivoire.

Methodological approach

This study was conducted in Yamoussoukro, (6°30–7°35 North latitude, 4°40–5°20 West longitude) a city of approximately 450 000 inhabitants and the capital of Côte d'Ivoire. It entailed an interdisciplinary approach that included: a geographical survey to map uncontrolled solid waste disposal sites, cross-sectional surveys of 492 households to assess the link between sanitation and health

status, and a seasonal analysis of the water bodies, including lake water and groundwater, to assess nitrogen contamination.

Environmental risk factors

The lake water and groundwater constitute the main water sources in Yamoussoukro and the water supply is outside the city. Chemical analysis of the lake water showed that it had concentrations of nitrates that varied from 0.3 to 8.3 mg/L and of ammonium from 0.1 to 4.5 mg/L. Organic pollution was between 10 to 39 mg/L for BOD₅ and 14 to 30 mg/L for COD. In the groundwater, the averages for nitrates and for ammonium were 22.8–80.3 mg/L and 0.06–7.5 mg/L, respectively. These results indicate a high risk of nitrogen [3].

Exposure status and disease burden

Household surveys attest to the potential health risks in the study areas of Yamoussoukro, finding evidence of three main water-borne diseases. These surveys also recorded the spatial distribution of the diseases. The geographical survey showed 172 illegal solid waste disposal sites in the city. About 90 % of city households have septic tanks, while 40 % of the peri-urban area households use pit latrines. The lack of sanitation negatively impacts the environment and places children at higher risk of exposure to diseases (See Photo 1). People living in



Photo 1: Exposure routes and health risks in Yamoussoukro.

settlements without sustainable sanitation services, i.e., Dioulakro, Nzuessy, Sopim, and Morofé, suffer from higher disease impacts than people in settlements with such services (See Figure 1).

Conclusion

Although Yamoussoukro is recognized as a model of a planned town, there is major environmental and health degradation in the city, especially in poor and low-income settlements. The lack of a well-functioning urban waste management infrastructure is one of the main causes of these environmental and health problems. Establishing integrated sanitation infrastructure and services in Yamoussoukro could reduce environmental pollution and hazards, and decrease human exposure to health risks.

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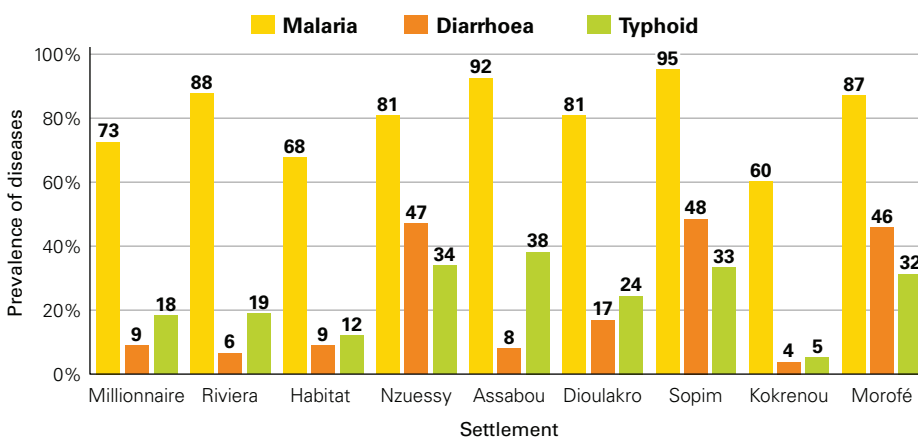


Figure 1: Distribution of water borne diseases in the settlements of Yamoussoukro.

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