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Assessing Water Supply and Contamination in Cambodia: Challenges and Policy Solutions

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Executive Summary

- ❖ Cambodia is dealing with a critical water supply and contamination challenge, which presents severe public health risks and impedes sustainable development. This challenge is characterised by a significant percentage of the population lacking access to safe drinking water and the widespread presence of pollutants in both urban and rural water sources.
- ❖ According to the World Health Organisation, approximately 76% of Cambodia's population does not have access to improved water sources, highlighting the urgent need for intervention and sustainable solutions (WHO, 2022). Although the country has taken some measures to address these issues, growing challenges stemming from rapid industrialisation, agricultural runoff, and a lack of infrastructure continue to exacerbate water pollution.
- ❖ This brief evaluates the complex factors contributing to contamination, examines its impacts on public health, and reviews existing mitigation strategies. By proposing targeted policy recommendations, including the promotion of sustainable agricultural practices, regional collaboration, and public-private partnerships, this brief outlines a path toward ensuring cleaner, safer, and more reliable water sources for Cambodia's future.

Introduction

Access to clean water is fundamental to both public health and economic development. However, Cambodia is grappling with extensive water supply issues, where many communities, especially in rural areas, lack access to potable water. Water contamination from agricultural runoff, industrial waste, and poorly managed sewage systems further compounds the problem, making it one of the country's most pressing environmental and public health concerns (Rasmussen & Bradford, 1977; WaterAid Cambodia, 2019). This brief provides an in-depth analysis of Cambodia's water crisis, highlighting the factors contributing to contamination, its impact on public health, and proposed policy recommendations to address these issues.

Overview of Cambodia's Water Supply

Cambodia's water resources are primarily derived from the Mekong River, Tonle Sap Lake, and a network of smaller rivers and lakes. These surface waters are vital for the country's agriculture, fishing industry, and domestic use. However, the water supply is inconsistent and heavily reliant on seasonal patterns, with a distinct dry season exacerbating access issues (Poirot et al., 2020). While urban centres such as Phnom Penh have better access to treated

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water, many rural communities remain dependent on unsafe sources, such as untreated river water or shallow wells, which are prone to contamination. As Sok Mom, a mother living with her two boys, expressed, "The river gives us water. It gives us fish. It's our way of getting around" (Luthi, 2023). This reliance on the river not only highlights its essential role in daily life but also underscores the risks associated with using untreated water sources. Limited infrastructure investment in these regions means that a significant portion of the population lacks access to clean drinking water, further endangering their health and livelihoods (Rasmussen & Bradford, 1977; WaterAid Cambodia, 2019).

Sources of Water Contamination

Water contamination in Cambodia is driven by multiple interconnected factors, each contributing uniquely to the degradation of water quality:

- **Agricultural Runoff:** Cambodia's agricultural sector, which employs nearly half of the country's workforce, relies heavily on chemical fertilisers and pesticides to increase yields. However, the excessive and often unregulated use of these chemicals has led to widespread contamination of nearby water bodies. During the rainy season, surface runoff transports these agrochemicals into rivers and lakes, leading to nutrient loading, which causes algal blooms and depletes oxygen levels in water bodies, endangering aquatic life and human health (Stoyanova & Harizanova, 2019). Without sustainable practices in place, the continued reliance on chemicals threatens both Cambodia's water supply and its agricultural future.
- **Industrial Waste:** Cambodia's rapid industrialisation, particularly in garment manufacturing and other factories, has resulted in significant pollution of water resources. Many industries discharge untreated or inadequately treated wastewater directly into nearby rivers, introducing hazardous chemicals such as heavy metals, dyes, and other toxic substances (Open Development Cambodia [ODC], 2016a). These pollutants not only degrade water quality but also accumulate in the food chain, leading to long-term health consequences, including neurological disorders and cancers (Poirot et al., 2020).
- **Domestic Waste:** Inadequate sewage systems and poor waste management practices in both urban and rural areas contribute significantly to water contamination. In many parts of the country, untreated human waste is discharged directly into water bodies, further compromising water quality (ODC, 2016b). This leads to high levels of pathogens in the water, increasing the incidence of waterborne diseases among the population.
- **Naturally Occurring Contaminants:** In some regions of Cambodia, particularly those reliant on groundwater, naturally occurring contaminants such as arsenic present a serious threat. Prolonged exposure to arsenic in drinking water has been linked to various health problems, including skin lesions and an increased risk of cancer (ODC, 2016a). This issue adds another layer of complexity to the country's already strained efforts to ensure a safe water supply.

Existing Mitigation Strategies and Their Limitations

Cambodia has implemented various strategies to mitigate water contamination, though significant challenges remain in their execution and effectiveness:

- **Water Treatment Infrastructure:** Efforts to improve water access, especially through government initiatives and international support, have led to the construction of water treatment plants in urban areas, significantly enhancing access to safe drinking water.

For example, the National Strategy for Rural Water Supply, Sanitation, and Hygiene (2011-2025) aims for 100 per cent rural sanitation coverage by 2025 (World Bank Group, 2020). However, rural areas still face substantial gaps in infrastructure, with only 20 per cent of rural residents having access to clean water compared to 70 per cent in urban centers (Harrendorf & Cambodia, 2020; WaterAid Cambodia, 2019). This disparity is compounded by insufficient funding, with many water projects remaining underfunded or incomplete due to reliance on international aid, which often lacks stability and long-term planning (Bensen, 2023). The absence of adequate maintenance for existing infrastructure also exacerbates the gap between urban and rural water quality.

- **Community Education:** Educational programs focused on water safety, such as promoting the use of water filters, boiling water, and proper waste disposal, have been effective in reducing contamination at the household level in communities where they are implemented (Bensen, 2023). Despite their benefits, these programs remain limited in scope and are not widely available across the country, especially in remote rural areas. A key challenge to scaling these programs is limited institutional capacity. Regulatory bodies and local authorities often lack the necessary resources and personnel to effectively implement and monitor education campaigns, leaving many rural communities without access to critical information and resources that could improve health outcomes.
- **Regulation and Enforcement:** Cambodia has established regulations, such as the Law on Environmental Protection and Natural Resource Management (1996) and the Sub-Decree on Water Pollution Control (1999), to regulate industrial and agricultural waste disposal. However, enforcement remains a challenge due to the absence of comprehensive data on water quality and industrial pollution hampers the government's ability to assess the full scale of the problem, thus weakening its capacity to enforce standards (Harrendorf & Cambodia, 2020). Moreover, inconsistent monitoring and the absence of stringent penalties for non-compliance allow many polluters to operate unchecked (ODC, 2016a). Limited institutional capacity further exacerbates this issue, as regulatory agencies are often under-resourced and lack training, making it difficult to enforce existing regulations. Stronger coordination between local and national bodies is necessary to improve compliance and enforcement of environmental standards.
- **Alternative Water Sources:** In some areas, communities have resorted to alternative water sources like rainwater harvesting and groundwater extraction due to unreliable and contaminated surface water. While these strategies provide temporary relief, they are unsustainable without proper management. For example, groundwater is often contaminated with naturally occurring substances like arsenic, and without proper testing and filtration systems, these sources pose significant health risks (NCSD, 2019). The fragmented policy framework in Cambodia further complicates the management of alternative water sources. Different sectors—agriculture, industry, and health—often have competing priorities, leading to inefficiencies and conflicts in water resource management (Poirot et al., 2020). An integrated water resource management system is needed to ensure collaboration between these sectors and address the long-term sustainability of water resources.

Although progress has been made in certain areas, the scale of the water contamination issue requires more comprehensive and sustained efforts. Rapid population growth, urbanisation, and climate change continue to place additional stress on Cambodia's water resources, making it imperative to adopt long-term strategies that address both infrastructure development and environmental conservation.

Policy Recommendations

To address Cambodia's water supply and contamination challenge effectively, the following policy recommendations are proposed:

- **Promote Sustainable Agricultural Practices:** The government should incentivise farmers to adopt sustainable farming practices, such as integrated pest management (IPM) and organic farming, to reduce the harmful effects of chemical runoff into water bodies. Subsidies and training programs can be provided to support farmers in transitioning to these practices, which will not only benefit water quality but also enhance soil health and long-term agricultural productivity (Stoyanova & Harizanova, 2019).
- **Strengthen Regulatory Frameworks and Enforcement:** Enhancing the regulatory framework governing industrial waste management and agricultural practices is crucial. This includes imposing stricter penalties for non-compliance and providing training and resources for local authorities to monitor and enforce regulations effectively. Collaborating with NGOs and international partners can provide the necessary technical expertise and capacity-building support (ODC, 2016a).
- **Invest in Water Infrastructure:** Increased investment in water supply infrastructure is essential for improving access to clean water in both urban and rural areas. The government should prioritise projects that expand the reach of water treatment facilities and promote the use of affordable water filtration technologies for households. Public-private partnerships can be explored to mobilise additional resources for infrastructure development (Bensen, 2023).
- **Enhance Data Collection and Research:** Establishing comprehensive water quality monitoring systems is critical for informed decision-making. The government should collaborate with research institutions to improve data collection on water sources and contamination levels across the country. This data can help identify priority areas for intervention and track progress over time (Harrendorf & Cambodia, 2020).
- **Foster Community Engagement and Education:** Empowering local communities through education and engagement initiatives is vital for promoting responsible water management practices. Programmes that educate residents about the importance of water conservation, proper waste disposal, and the health impacts of contaminated water can foster a sense of ownership and responsibility (WaterAid Cambodia, 2019).

Conclusion

Cambodia's water supply and contamination issue presents a multifaceted challenge that demands urgent attention. The interplay of agricultural runoff, industrial waste, inadequate sanitation, and insufficient infrastructure poses serious threats to public health and sustainable development. By adopting a comprehensive approach that prioritises sustainable practices, strengthens regulations, invests in infrastructure, enhances data collection, and engages communities, Cambodia can pave the way for a healthier and more resilient future. The need for collaboration among government agencies, NGOs, and local communities is paramount in addressing this pressing issue. With concerted efforts, Cambodia can turn the tide while ensuring access to clean and safe water for all its citizens.

The opinions expressed are the author's own and do not reflect the views of the Asian Vision Institute.

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