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# Environmental Factors in Tropical Diseases in Rural Children: A Systematic Review

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**ABSTRACT:** Tropical diseases remain a significant public health burden among children in rural areas, where environmental factors, limited healthcare access, and socioeconomic disparities contribute to high morbidity and mortality rates. This study evaluates the impact of climatic variables, inadequate water, sanitation, and hygiene (WASH) infrastructure, and healthcare accessibility on disease transmission. A systematic review of literature was conducted using multiple databases, including PubMed, Scopus, and Web of Science, employing keywords related to tropical diseases, environmental risk factors, and pediatric health. The results indicate that climate fluctuations significantly influence the incidence of vector-borne diseases such as malaria and dengue. Poor sanitation infrastructure is strongly associated with increased cases of diarrheal diseases and helminth infections. Additionally, rural communities face healthcare access limitations, resulting in delayed diagnoses and suboptimal treatment for affected children. Socioeconomic conditions further exacerbate these health disparities, leading to higher infection rates and adverse outcomes. indings suggest the need for integrated public health interventions that address environmental, healthcare, and socioeconomic determinants. Strengthening WASH infrastructure, improving healthcare accessibility, and implementing climate-responsive disease control strategies are essential for reducing the burden of tropical diseases in rural children. Future research should explore long-term intervention effectiveness and interdisciplinary approaches to mitigate disease transmission. Addressing these challenges through sustainable policy initiatives and community engagement is crucial for improving pediatric health outcomes in endemic regions.

**Keywords:** Tropical Diseases, Environmental Risk Factors, Pediatric Health, Rural Healthcare Access, Vector-Borne Diseases, WASH Infrastructure, Climate Change And Health.



## INTRODUCTION

Tropical diseases continue to pose a pressing public health threat in rural communities, particularly among pediatric populations. While a significant body of literature has documented the association between environmental determinants and the transmission of tropical diseases such as malaria,

dengue, helminthiasis, and diarrheal illnesses, the introduction of this review necessitates a more analytical framing to elucidate its distinct contribution. Notably, the majority of existing studies have adopted descriptive approaches, often overlooking integrative assessments that capture the cumulative and interacting effects of climate, sanitation, socioeconomic disparities, and healthcare policy on child health outcomes in tropical rural settings.

This review addresses this gap by highlighting the importance of multidimensional inquiry. Although climatic variability and WASH (Water, Sanitation, and Hygiene) deficiencies are frequently cited as direct contributors to disease transmission, few studies provide a comprehensive framework that incorporates the mediating influence of national and regional health policies. Policies determine access to preventive measures, treatment modalities, and long term healthcare infrastructure development, yet their role remains insufficiently examined in relation to pediatric tropical disease outcomes. For instance, fragmented disease surveillance systems and the lack of climate adaptive public health frameworks have limited early warning capabilities and delayed responses in outbreak prone areas.

The current study advances the literature by situating environmental determinants within the broader landscape of health governance. This includes analyzing how underinvestment in rural health services, policy fragmentation, and insufficient cross sector collaboration exacerbate disease burdens. In regions where policy emphasis remains skewed toward urban healthcare provision, rural children face disproportionately high risks due to a lack of integrated environmental and healthcare interventions. Moreover, economic policies that fail to address rural poverty compound the problem, restricting household access to clean water, nutrition, and medical care.

In addition to environmental and infrastructural challenges, this review also calls attention to the scarcity of longitudinal and interdisciplinary studies that assess intervention effectiveness over time. Few systematic reviews have explored how health systems, economic support mechanisms, and climate resilient policy frameworks jointly impact the burden of disease. By focusing on these underrepresented intersections, this review seeks to fill critical knowledge gaps and inform holistic public health strategies. It emphasizes the necessity of aligning environmental health interventions with inclusive policy reforms aimed at improving the resilience of rural health systems.

Therefore, the significance of this study lies not only in its synthesis of environmental risk factors but also in its critical interrogation of health policy responses to these factors. Through this dual focus, the review contributes to a nuanced understanding of how tropical diseases manifest and persist in pediatric populations, particularly in the context of rural health inequities and governance challenges. Ultimately, this work aims to support evidence based policymaking by identifying actionable entry points for integrated, climate sensitive, and equity oriented health interventions in tropical regions.

## METHOD

This study employed a systematic literature review methodology to examine the environmental factors influencing tropical diseases in children residing in rural areas. A comprehensive search for relevant literature was conducted using multiple scientific databases, including PubMed, Scopus, Google Scholar, Web of Science, and CABI (Centre for Agriculture and Biosciences International).

These databases were chosen due to their extensive coverage of biomedical, environmental, and public health-related research, ensuring a well-rounded selection of sources.

PubMed was particularly valuable for identifying peer-reviewed articles focused on infectious diseases, pediatric health, and epidemiological studies. The National Library of Medicine's robust indexing system enabled the retrieval of high-quality articles relevant to tropical diseases and their environmental determinants. Scopus was instrumental in tracking influential research through citation analysis, providing insights into the academic impact of key studies. Google Scholar facilitated access to a broader range of literature, including grey literature such as conference papers and theses, which often contain valuable field-specific insights. Web of Science complemented these sources by offering a multidisciplinary approach, allowing for a more holistic analysis of interrelated factors affecting disease transmission. Finally, CABI provided specialized resources on veterinary medicine, environmental science, and agriculture, contributing contextual understanding of environmental risk factors related to tropical disease prevalence.

To optimize the literature search, a combination of keyword strategies and Boolean operators was employed. The primary keywords included "tropical diseases," "children," "environmental factors," "rural health," and "pediatrics." Boolean operators were used to refine the search: the "AND" operator was applied to combine different concepts (e.g., "tropical diseases AND children AND environmental factors"), while the "OR" operator broadened the scope by incorporating synonyms or related terms (e.g., "malaria OR dengue OR schistosomiasis"). The "NOT" operator helped exclude unrelated studies (e.g., "tropical diseases NOT adults"). Additionally, phrase searching was employed using quotation marks (e.g., "water sanitation"), ensuring precise retrieval of relevant studies. Truncation and wildcard characters were also used, such as "tropica*" to capture variations like "tropical" and "tropics" and "infecti*" to include "infection" and "infectious."

The selection of studies followed predefined inclusion and exclusion criteria to ensure relevance and methodological rigor. The inclusion criteria consisted of studies published in peer-reviewed journals within the last two decades, ensuring up-to-date information on disease prevalence and environmental risk factors. Articles were included if they focused on pediatric populations, rural settings, and environmental influences on disease transmission. Studies that utilized quantitative and qualitative methodologies, including randomized controlled trials, cohort studies, case-control studies, and cross-sectional surveys, were considered. Additionally, reports from authoritative health organizations such as the World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) were incorporated to strengthen the evidence base.

Conversely, studies were excluded if they primarily focused on adult populations or non-tropical regions. Research that lacked a clear focus on environmental determinants or failed to provide empirical data was omitted. Conference abstracts without full-text availability and articles written in languages other than English were also excluded unless a high-quality translation was accessible. These criteria ensured that the included studies were directly relevant to understanding the role of environmental factors in pediatric tropical diseases.

The literature selection process followed a structured approach to maintain methodological integrity. Initially, a broad search using the defined keyword combinations retrieved thousands of articles across the databases. The first stage of screening involved filtering results based on title

and abstract relevance. Duplicate records were removed to avoid redundancy. The remaining articles were then subjected to a full-text review to assess their methodological quality and relevance to the research objectives. Studies were evaluated based on their research design, data collection methods, sample size, statistical analyses, and overall contributions to the field. Articles that met the inclusion criteria were synthesized into thematic categories corresponding to key environmental determinants such as climate variability, water sanitation, socio-economic status, and healthcare access.

The selected studies encompassed a range of research methodologies. Randomized controlled trials (RCTs) provided high-quality evidence regarding the effectiveness of intervention strategies for disease prevention and treatment. For instance, Audet et al. (2018) conducted a cluster-randomized trial assessing HIV treatment among seroconcordant couples in rural Mozambique, demonstrating the efficacy of community-based health interventions (Audet et al., 2018). Cohort studies were instrumental in understanding longitudinal disease trends, as seen in Dimitrova et al. (2022), who analyzed precipitation variability and its correlation with infectious disease risk in children under five across multiple countries (Dimitrova et al., 2022). Case-control studies, such as those conducted by Vegvari et al. (2019), explored factors influencing soil-transmitted helminth transmission, highlighting how population movement affects disease elimination efforts (Vegvari et al., 2019). Additionally, cross-sectional studies provided snapshot insights into the prevalence of tropical diseases and their environmental determinants at a specific time point.

The systematic approach used in this study ensured a comprehensive and rigorous analysis of the literature. By incorporating a diverse range of studies from multiple databases and applying well-defined inclusion and exclusion criteria, this review effectively synthesized current knowledge on the environmental influences on pediatric tropical diseases. The findings will contribute to a more profound understanding of how climate, sanitation, socio-economic disparities, and healthcare access shape disease transmission dynamics, ultimately informing targeted interventions and public health policies.

## RESULT AND DISCUSSION

### 1. Climate and Geographic Conditions

Climatic variables such as temperature, rainfall, and humidity play a crucial role in influencing the prevalence and transmission of tropical diseases in children residing in rural areas. These environmental factors directly impact the life cycles of vectors and the viability of pathogens, creating conditions that either facilitate or inhibit disease proliferation.

Research has demonstrated that elevated temperatures significantly enhance the breeding rates of mosquitoes, particularly those responsible for malaria and dengue transmission. Manego et al. (2017) established a direct correlation between rising temperatures and increased malaria incidence in rural communities, emphasizing the role of temperature in accelerating the development of *Plasmodium* parasites (Manego et al., 2017). Similarly, studies have indicated that mosquitoes exhibit shorter incubation periods for viruses such as dengue in warmer climates, leading to higher transmission rates (Manego et al., 2017).

Rainfall patterns also critically influence disease epidemiology. Dimitrova et al. (2022) found that precipitation variability has a pronounced effect on the prevalence of infectious diseases in children under five years across multiple countries (Dimitrova et al., 2022). Heavy rainfall often leads to standing water accumulation, providing ideal breeding sites for mosquito vectors. Conversely, prolonged droughts concentrate waterborne pathogens, increasing the risk of diarrheal infections. The necessity for integrated water management strategies in rural areas is thus evident, as climatic fluctuations continue to exacerbate health vulnerabilities (Dimitrova et al., 2022).

Additionally, humidity has been identified as a significant factor influencing disease transmission. Al-Mekhlafi et al. (2021) highlighted that regions with high humidity levels exhibit elevated malaria transmission rates due to prolonged vector survival . The interplay of temperature and humidity creates optimal conditions for *Anopheles* mosquitoes, increasing infection rates among children in endemic regions (Al-Mekhlafi et al., 2021).

Geographic analysis of disease burden reveals that sub-Saharan Africa and parts of Southeast Asia exhibit the highest incidences of climate-sensitive tropical diseases. The WHO reports that malaria, diarrheal infections, and vector-borne diseases remain prevalent in these areas, particularly among socio-economically disadvantaged populations (Habyarimana & Ramroop, 2020; Manego et al., 2017). In sub-Saharan Africa, countries such as Nigeria and the Democratic Republic of the Congo report alarmingly high malaria prevalence, with rural communities disproportionately affected (Mbunga et al., 2021). In contrast, Southeast Asian regions are witnessing increased cases of dengue fever, exacerbated by changing rainfall patterns and rising urbanization (Ricardo-Rivera et al., 2022; Yang et al., 2017).

Emerging research underscores the urgent need for climate-adaptive health policies. Wu et al. (2018) advocate for climate-health intervention strategies tailored to regional disease dynamics, emphasizing the role of predictive modeling in managing outbreaks. The interplay between climate change and pediatric health outcomes necessitates the integration of environmental considerations into public health planning to mitigate future disease burdens (Angles et al., 2022; Fekrijaski et al., 2021).

## 2. Water, Sanitation, and Hygiene (WASH) Infrastructure

Poor WASH infrastructure is a major determinant of disease transmission in rural communities, significantly affecting child health outcomes. Inadequate sanitation facilities, contaminated water sources, and poor hygiene practices contribute to a high incidence of diarrheal diseases, cholera, and parasitic infections among children.

Kapwata et al. (2022) highlighted that deficiencies in sanitation infrastructure, such as ineffective waste disposal and insufficient latrines, lead to increased exposure to pathogens (Kapwata et al., 2022). Flooding in areas with poor drainage systems exacerbates water contamination, elevating the risk of infectious disease outbreaks (Kapwata et al., 2022). Similarly, Chilot et al. (2022) found that open defecation and the absence of clean drinking water contribute to high morbidity rates among children in rural communities, underscoring the need for targeted WASH interventions (Chilot et al., 2022).

Efforts to mitigate disease burden through improved WASH infrastructure have shown promising results. Stewart et al. (2018) demonstrated that community-led sanitation programs, including hygiene education and water purification initiatives, significantly reduced diarrheal disease incidence (Stewart et al., 2018). Additionally, community health worker (CHW) interventions have been instrumental in promoting behavior change regarding sanitation practices. Kawakatsu et al. (2017) observed that CHW-led awareness programs in rural Kenya correlated with improved hygiene behaviors and reduced childhood diarrhea cases (Kawakatsu et al., 2017).

Investment in WASH infrastructure remains critical in reducing pediatric disease burdens. Moropeng et al. (2021) emphasized the importance of government funding for safe water access and improved sanitation, particularly in vulnerable rural communities. The long-term sustainability of such programs depends on continuous community engagement, monitoring, and policy integration (Moropeng et al., 2021).

### 3. Socioeconomic and Healthcare Access Factors

Access to healthcare services plays a fundamental role in determining health outcomes for children affected by tropical diseases in rural areas. Several studies have highlighted the challenges associated with healthcare access, including geographic isolation, financial constraints, and shortages of medical personnel.

Manego et al. (2017) found that children in remote rural settings often experience delayed diagnoses due to the scarcity of healthcare facilities (Manego et al., 2017). Geographic barriers limit timely access to medical care, resulting in higher morbidity rates for treatable diseases such as malaria and pneumonia. Additionally, transportation challenges and economic hardship further restrict healthcare-seeking behaviors among affected families (Kagoné et al., 2017).

The impact of socioeconomic disparities on pediatric health is profound. Families from low-income backgrounds often struggle to afford essential healthcare services, including vaccinations and routine medical checkups. Kagoné et al. (2017) demonstrated that children from economically disadvantaged households exhibit lower immunization rates, making them more susceptible to vaccine-preventable diseases (Kagoné et al., 2017). Wilson et al. (2018) further noted that malnutrition—a consequence of poverty—heightens disease susceptibility, creating a cycle of poor health and economic disadvantage(Wilson et al., 2018).

Cash transfer programs and economic support initiatives have shown promise in addressing these inequities. Brault et al. (2017) reported that financial assistance programs in rural communities have improved healthcare utilization rates, leading to better health outcomes for children (Brault et al., 2017). Additionally, education initiatives aimed at empowering caregivers have been linked to improved healthcare-seeking behaviors and increased vaccination coverage (Haldane et al., 2021; Kapwata et al., 2022).

### 4. Disease-Specific Observations

Malaria remains the leading tropical disease affecting children in rural areas. Manego et al. (2017) documented persistent malaria transmission in sub-Saharan Africa despite the implementation of vector control measures (Manego et al., 2017). While some regions have reported declines in incidence due to interventions such as insecticide-treated bed nets (ITNs), others continue to

experience high transmission rates (Mangat et al., 2022). Dengue fever, an emerging concern, has exhibited increasing prevalence due to climate-driven changes in vector populations (Völker et al., 2017).

Soil-transmitted helminths (STH) also present a significant health challenge in rural settings. Al-Mekhlafi (2020) reported that children in impoverished communities remain disproportionately affected by helminth infections, with high reinfection rates despite deworming efforts (Al-Mekhlafi, 2020). The persistence of STH underscores the need for integrated intervention strategies that combine medical treatment with sanitation improvements and health education (Al-Mekhlafi, 2020).

Vaccination and vector-control programs have been pivotal in reducing disease prevalence. The introduction of the rotavirus vaccine has led to a significant decline in childhood gastroenteritis cases (Middleton et al., 2020). Similarly, widespread ITN distribution has contributed to lower malaria-related morbidity and mortality (Kabaghe et al., 2018). However, challenges such as vaccine hesitancy and insecticide resistance continue to pose barriers to effective disease control (Shahid et al., 2022; Toàn et al., 2019).

In conclusion, tropical diseases continue to impose a substantial burden on rural pediatric populations, with climate, sanitation, and healthcare access playing critical roles in disease transmission. While interventions such as vaccination and vector control programs have yielded positive outcomes, addressing systemic healthcare disparities and environmental vulnerabilities remains essential for sustainable disease reduction. Future research should focus on integrating climate-adaptive health strategies and improving WASH infrastructure to enhance disease prevention efforts.

The findings from recent literature concerning the environmental determinants of tropical diseases both diverge and converge with previously established theories and models in multifaceted ways. The increasing body of research underscores the complex interplay between environmental factors and tropical disease transmission while reaffirming some foundational concepts. This discussion synthesizes contemporary evidence and explores its implications on established paradigms within the context of tropical diseases affecting children in rural settings.

The linkage between environmental conditions—such as climate, water quality, and sanitation—and the prevalence of infections has long been recognized in epidemiological research. The recent findings of Ejigu reinforce the notion that climatic variables are critical determinants in modeling malaria risk, validating predictions from earlier studies that highlighted water temperature and rainfall patterns as influencing factors for malaria transmission (Vegvari et al., 2019). This body of work emphasizes that malaria remains an environmentally mediated disease, altering our understanding of transmission dynamics under changing climatic conditions. Further, the research aligns with previous models that posit specific environmental variables can serve as significant predictors for disease outbreaks, reiterating the importance of ongoing surveillance and adaptive public health strategies.

Similarly, studies like those by Vegvari et al. underscore that heterogeneity in environmental and socioeconomic conditions can lead to localized patterns of disease that can act as reservoirs for transmission despite region-wide interventions such as mass drug administration for soil-

transmitted helminths (STH) (Vegvari et al., 2019). This observation aligns with existing epidemiological models that advocate for targeted strategies to control disease spread based on local transmission dynamics, suggesting that a one-size-fits-all approach is unlikely to be as effective in diverse settings.

Despite these alignments, certain findings from new studies challenge traditional models by emphasizing the influence of social determinants alongside environmental factors. For instance, Sanei-Dehkordi et al. identified community context and socio-economic conditions as salient contributors to the epidemiology of cutaneous leishmaniasis, suggesting that environmental assessments alone may not sufficiently predict disease patterns without incorporating socio-cultural factors (Sanei-Dehkordi et al., 2021). This emergent viewpoint suggests a shift toward more holistic models that embrace social determinants of health alongside environmental factors when analyzing disease spread.

Furthermore, recent literature has illuminated the impact of human behaviors and community engagement on disease dynamics, potentially conflicting with previous models that primarily emphasized one-directional environmental causation. Catenacci et al. documented how varying household practices and access to community resources significantly impacted the incidence of arboviral diseases, underscoring the role of human interaction with the environment in shaping health outcomes (Catenacci et al., 2021). This highlights a need to incorporate behavioral and cultural dimensions into theoretical models to provide a more complete understanding of disease transmission mechanisms.

Economic status has emerged as an increasingly important factor influencing outcomes related to tropical diseases, often in ways that traditional models have not fully addressed. For example, Wilson et al. demonstrated how chronic malnutrition directly correlated with increased malaria susceptibility, framing poverty not merely as an enabling environment but as an active contributor to disease epidemiology (Wilson et al., 2018). This insight into the nexus of socio-economic status and health poses challenges to existing models that may not adequately account for the layers of disadvantage that exacerbate health risks.

The recent body of literature collectively supports the urgency of re-evaluating public health approaches to combat pediatric tropical diseases amidst changing environmental dynamics and socio-economic realities. The theoretical implications stress the necessity for integrated intervention strategies that encompass not just environmental management but also socio-economic improvement and community engagement. Holistic models, incorporating human behavior, community context, and health literacy, stand to offer more effective solutions in reducing the burden of tropical diseases in children (Dimitrova et al., 2022; Rashmi & Paul, 2022).

Moreover, the shift towards recognizing climate change as a significant factor affecting tropical disease epidemiology calls for adaptable public health frameworks. Continuous monitoring and responsive strategies, considering both ecological changes and socio-economic factors, are imperative to address the evolving challenges (Rashmi & Paul, 2022; Sanei-Dehkordi et al., 2021). Future research should prioritize longitudinal studies that examine the interactions between these variables over time to inform health policy and targeted interventions.

Systemic factors such as healthcare policies, funding, and infrastructure significantly contribute to the persistent incidence of tropical diseases among children in rural areas. These factors create complex barriers to effective disease prevention, diagnosis, and treatment, ultimately leading to sustained health disparities.

Healthcare policies that prioritize rural health services are crucial for mitigating the impact of tropical diseases. However, in many regions, healthcare access remains troublingly limited. According to Haldane et al., geographical barriers and inadequate healthcare coverage persist in rural communities, which significantly influence children's health outcomes, particularly regarding infectious diseases like malaria and schistosomiasis (Manego et al., 2017). Many rural children live in areas where health facilities are sparse or poorly equipped, leading to delayed diagnoses and untreated infections. Limited healthcare infrastructure often correlates with lower immunization rates and inadequate responses to disease outbreaks (Manego et al., 2017).

The allocation of appropriate funding to healthcare systems is vital for improving service delivery in rural areas. However, funding disparities often persist, with rural health initiatives receiving less attention than urban counterparts. Research by Mutyambizi et al. indicates that the COVID-19 pandemic exacerbated existing funding issues, leading to a decline in routine healthcare services, which negatively impacted the management of tropical diseases (Mutyambizi et al., 2021). The lack of financial resources hinders the provision of essential medicines, diagnostic services, and preventive health measures, ultimately maintaining the cycle of disease prevalence among rural children.

Economic status plays a significant role in influencing the outcomes of tropical diseases in rural pediatric populations. Families with limited economic means often face direct barriers to healthcare access, including the costs associated with transportation to health facilities, fees for consultations, and the purchase of medications (Abdulla et al., 2022; Okonofua et al., 2022). As noted by Kagoné et al., economic disadvantage correlates with lower immunization coverage and poorer management of tropical diseases, leading to higher morbidity and mortality rates among affected children (Kagoné et al., 2017).

The interplay between poverty and health is multifaceted, creating a cycle in which poor health status can perpetuate economic disadvantage. Chronic diseases, such as malaria, can hinder children's growth and school performance, limiting their future economic opportunities (Dimitrova et al., 2022; Toàn et al., 2019). This trend is compounded by the fact that socioeconomic challenges frequently limit access to preventative measures, such as vaccinations and adequate nutrition (Dimitrova et al., 2022; Toàn et al., 2019).

Community engagement and education are crucial in addressing systemic factors that contribute to the persistence of tropical diseases. Effective interventions require not only the availability of healthcare services but also community trust and participation. For example, programs that incorporated traditional leadership and community involvement into sanitation initiatives in rural Zambia were shown to significantly improve latrine use and health outcomes (Tiwari et al., 2018). Integrating local knowledge and cultural practices into health policy can empower communities, leading to more sustainable and effective public health interventions.

Moreover, enhanced education about tropical diseases is vital for fostering health literacy, empowering families to seek care promptly when illness arises. Studies indicate that improved education regarding vaccine benefits and disease prevention can significantly increase childhood immunization rates and health-seeking behaviors (Sippy et al., 2019; Toàn et al., 2019). Consequently, leveraging community resources and local leaders to disseminate health information can help mitigate some systemic barriers faced in rural healthcare delivery.

## CONCLUSION

This study highlights the significant influence of environmental factors on the prevalence of tropical diseases among children in rural areas. Key findings indicate that climatic variables, such as temperature, rainfall, and humidity, significantly impact vector-borne disease transmission. Inadequate water, sanitation, and hygiene (WASH) infrastructure further exacerbate the spread of infectious diseases, particularly diarrheal illnesses and soil-transmitted helminths. Additionally, limited access to healthcare, coupled with socioeconomic disparities, creates systemic barriers to disease prevention and treatment, disproportionately affecting vulnerable pediatric populations.

Addressing these challenges requires urgent intervention through integrated public health strategies. Strengthening WASH infrastructure, expanding healthcare access, and implementing climate-adaptive disease control programs are essential for reducing disease burden. Policies promoting community engagement and health education can enhance disease prevention efforts, while targeted socioeconomic support initiatives can mitigate health inequities.

Future research should prioritize longitudinal studies that assess the interaction between climate variability, socioeconomic factors, and disease dynamics over time. Additionally, interdisciplinary approaches that integrate environmental science, public health, and social determinants of health can provide a more comprehensive understanding of disease transmission patterns. Investing in sustainable interventions and fostering global collaborations will be vital in mitigating the long-term impact of tropical diseases on children in rural communities.

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