

# Policy Brief

PB03/2023

## Could A Household's Toilet Affect Child Growth?

### Highlights of Findings

Improved sanitation has implications on child nutrition that can be experienced through incidences of sanitation related morbidities such as diarrhea. This policy brief focuses on the implications of household sanitation on child nutrition outcomes in the country.

The key highlights include:

- (i) Inadequate access to Water, Sanitation and Hygiene (WASH) is associated with communicable diseases such as diarrhea. Furthermore, inadequate sanitation is also associated with stunting, especially among children in households with poor sanitation.
- (ii) Approximately 67 per cent of stunted children live in households that have limited or unimproved sanitation. This comprises of 39.2 per cent of stunted children in households using open defecation and 27.4 per cent under joint monitoring programme unimproved sanitation category.
- (iii) Sanitation initiatives that combine sanitation facilities and behaviour change on hand washing and are likely to improve child linear growth.
- (iv) Open defecation is associated with 39.2 per cent probability of stunting.
- (v) The probability of child stunting reduces linearly with every increase in the Joint Monitoring Programme (JMP) sanitation ladder.

### 1 Introduction

Malnutrition in children aged 5 years and below is a persisting challenge within developing nations, Kenya included. As of 2014, about 26 per cent of children in Kenya were short-for-age, 4 per cent thin-for-height and 11 per cent underweight-for-age translating to approximately over 1.55 million children categorized as being stunted, over 239,000 wasted and over 659,000 underweight (KHDS, 2014). The levels of anthropometric measures, however, improved in 2022 with about 18 per cent of children in Kenya being stunted and 10 per cent underweight. About 5 per cent children were, however, thin-for-height.

The effects of child under-nutrition are both life-threatening and have economic implications. In 2014, Kenya lost approximately Ksh 373.9 billion, which equated to 6.9 per cent national GDP due to child under-nutrition. In addition, malnutrition poses a mortality risk as it is associated

with 52.5 per cent of deaths among children under the age of 5 years. This indicates a need for heightened efforts for under-nutrition prevention to avert preventable deaths and economic losses. One of the possible interventions that can prevent child under-nutrition is use of improved sanitation. Sanitation refers to interventions that increase uptake and use of facilities of human waste disposal, hygiene and access to improved water. Akin to the malnutrition agenda, inadequate sanitation remains a global challenge especially in developing nations.

This policy brief focuses on evidence of sanitation as a determinant of child stunting in Kenya. The findings would provide a basis for synergized WASH-nutrition investments and programmes as a policy approach for stunting reduction in Kenya. The Policy Brief was based on a KIPPRA KNBS Study (Obondo et al., 2023) on effects of sanitation on nutrition status in Kenya.

## 2 Nexus Between Sanitation and Nutrition

### 2.1 Status of sanitation in the global context

Globally, as of 2017, at least 2 billion people lacked access to a basic sanitation facilities while 2.3 billion people lacked access to basic hand-washing facilities in 2020. The lack of such amenities increases the chances of transmitting fecal pathogens orally, which then increase probability for Water, Sanitation and Hygiene (WASH)-attributable diseases and morbidities. Globally, in 2019, an estimated 3.3 per cent deaths were classified WASH-attributable. Further, approximately 60 per cent of diarrheal related deaths in 2016 were WASH-attributable, representing deaths that could have been averted through safe drinking water, improved sanitation services and hand-washing with soap. Among children aged 5 years and below, WASH-attributable diarrhea accounted for 5.3 per cent of deaths in 2016.

#### Box 1: Definition of basic sanitation ladders

Achieving the SDG target 6.2 which calls for access to safe and sustainable WASH for everyone by 2030 requires a strong effort by mandated institutions and citizens to end open defecation practices. In Kenya, sanitation is approached using the UNICEF/WHO Joint Monitoring Programme (JMP) sanitation ladder which classifies infrastructure and practices in five levels as explained below:

- (i) Open defecation - This is the fifth rung and lowest level and is defined as disposal of human faeces in the environment.
- (ii) Unimproved sanitation – This is the fourth rung which refers to disposal of faeces in containers such as buckets or in an uncovered pit latrine.
- (iii) Limited sanitation – This is level three which refers to use of improved facilities (ventilated pit latrines, composting toilets, pit latrines with slab and facilities with a flush system) that are shared with other households.
- (iv) Basic sanitation – This is the second rung in the ladder which refers to use of improved facilities that are not shared with other households.
- (v) Safely managed sanitation – This is the highest level. These are improved facilities that are not shared with other households and further, excreta is safely managed, transported and treated.

Poor sanitation also has negative economic impact. A review of 18 African countries estimated that economic losses because of poor WASH is USD 5.5 billion, which is about 1-2.5 per cent of global GDP. The cost benefit ratio for investing in improved sanitation demonstrates that every US\$ 1 invested in universal access to sanitation yields US\$ 2.9 while every US\$ 1 invested to eradicate open defecation leads to a return of US\$ 5.8.

This means that sanitation interventions can save lives and money and bolster sustainable development. The diversity of findings on the WASH-nutrition link, and the global-level attention accorded to WASH investment and undernutrition reduction warrants investigation of the impact on sanitation access on child stunting at a local level.

## 2.2 Delivery of Sanitation Services in Kenya

Kenya has experienced reduction of open defecation and uptake of sewerage sanitation having recorded an increase in proportion and actual numbers of households adopting sewerage sanitation, as well as decrease in proportions and actual numbers of households practicing open defecation (Table 1).

However, these national statistics mask significant regional disparities. While the actual population practicing open defecation is 3,519,758, 83 per cent of open defecation practicing households are in 15 counties whose total population is 10,652,414 which is 24.3 per cent of the national population.

In addition to the 7.4 per cent practicing open defecation, a further 9.4 per cent of Kenya's population use uncovered pit latrine and 0.8 per cent use a bucket latrine. This means a significant population in Kenya practice either open defecation or use unimproved sanitation facilities and therefore use a sanitation practice that exposes them and the immediate community to environmental fecal contaminants.

**Table 1: Population using open defecation and sewerage sanitation**

Year	National population	Proportion of households using open defecation out of total households	Open defecation numbers	Proportion of households using sewerage out of total households	Sewerage numbers
1989	21,448,636	20%	4,289,727	7%	1,501,405
1999	28,686,607	16%	4,589,857	8%	2,294,929
2009	38,610,097	14%	5,405,414	8%	3,088,808
2019	47,564,296	7.4%	3,519,758	9.7%	4,613,737

In a bid to increase proportions using higher sanitation models and eliminate open defecation, sanitation is approached as a joint mandate between the Ministry of Water and Irrigation as well as the Ministry of Health. The Ministry of Water and Irrigation progressively aims at ensuring

access to safely managed sanitation services as well as clean and safe water with a focus on provision of infrastructure development. The Ministry of Health focuses on behaviour change to trigger the uptake of higher sanitation models and ensuring elimination of open defecation.

Overarching objectives of both ministries in sanitation is spelt out in the national 5-year Medium Term Plans (MTPs). The first MTP focused on urban sewerage and open defecation elimination; the second focused on the sated MTP 1 agenda and expanded to include rural water supply, while the third MTP built on the themes of MTP 2 and included provision of water to unserved areas such as informal settlements.

While each sequential MTP has evolved to be more inclusive of regions and pocket areas requiring heightened attentions, a gap in the 5-year plans is inclusion of nutrition outcomes as an outcome of expanded sanitation services. Sanitation services are measured by coverage and access but could be broadened to include reduced illness and undernutrition.

### **2.3 Uptake of Sanitation Services by Place of Residence**

Comparison of sanitation, hand-washing and drinking water amenities by place of residence indicates a sharp rural versus urban distinction in the types of sanitation facilities adopted for households with children aged 5 years and below. Notably, the highest proportion of households in rural areas have adopted the two lowest levels of sanitation. This implies children in rural areas are much more exposed to fecal matter contamination.

With regard to hand-washing, 39 per cent of urban households had a handwashing station observed in the place of residence, compared to 22.6 per cent in rural areas (KDHS, 2014). Of the 22.6 per cent hand-washing stations observed in rural areas, 40.7 per cent did not have water, soap or any cleansing agent compared to 50.9 per cent in urban areas that had water and soap.

Drinking water similarly displays distinct rural-urban divide in terms of access to safe drinking water. Children in rural areas are more exposed to open defecation which is the fifth rung and lowest level of sanitation. A high proportion of children in urban areas access improved safe drinking water and the highest level of safely managed sanitation (improved facilities that are not shared with other households and further, excreta is safely managed, transported and treated). This means children in rural areas have high likelihood of drinking water with the highest potential of fecal contamination.

With regard to nutrition status by anthropometry, it is noticed that the national stunting average of 26 per cent differs sharply between rural and urban areas at 19.7 per cent stunting for children in urban areas and 29.3 per cent stunting for children in rural areas. Other malnutrition indices have slight rural urban disparity but not as sharp as the stunting disparity. Similarly, the disparity in the proportion of children with diarrhea was not very distinct between children in

rural areas (16.1%) compared to urban areas (15.3%).

In essence, Kenya displays a distinct rural-urban divide regarding access to sanitation facilities, hand-washing amenities and access to safe drinking water, with a significant proportion of children in rural areas at risk of exposure to fecal pathogens.

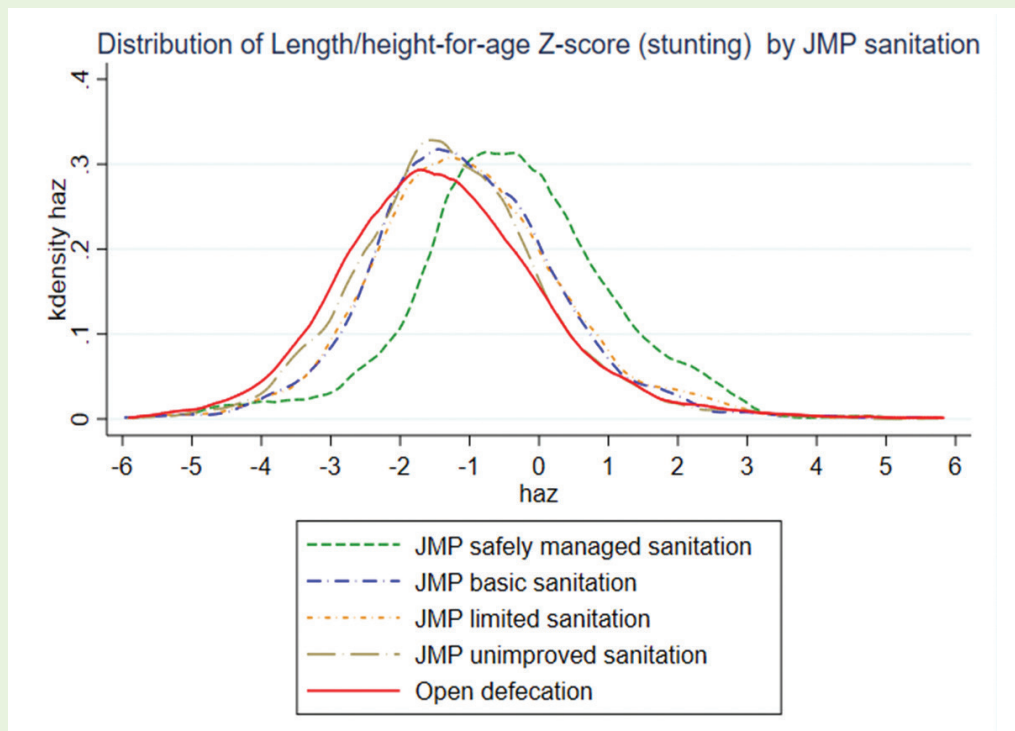
In addition, child stunting prevalence similarly display a rural-urban divide pattern (29.3 per cent in rural and 19.7 per cent in urban). This implies that with regard to sanitation, hygiene, access to safe water and child stunting, rural areas of Kenya are distinctively disadvantaged compared to urban areas.

## 2.4 How Does Child Stunting Compare with the Status of Household Sanitation?

When stunting distribution is assessed based on the type of sanitation model a household adopts, a difference is noticed in z-scores which is especially distinct for children in households practicing open defecation versus safely managed sanitation. The curve with children in households that practice open defecation is skewed to the left with its peak clustering at -2 SD while the curve with children in households that practice safely managed sanitation leans towards the right with its peak clustering between -1 and 0.

This implies that a larger proportion of children in households with safely managed sanitation have height-for-age z-scores that are closer to standard, while a larger proportion of children in open households have height-for-age z-scores that are lower than standard.

**Figure 1: Distribution of stunting based on sanitation model adopted**



In terms of distribution, when the 26 per cent of children that are stunted in Kenya are distributed based on the sanitation ladder their homes have adopted, the largest proportion are in households adopting unimproved sanitation (41.6%) followed by limited sanitation (22.0%) and then open defecation (20.9%) (Table 2).

**Table 2: Distribution of stunting based on household sanitation from highest to lowest**

Sanitation ladder	Stunted (%)
JMP unimproved sanitation (level 4)	41.60%
JMP limited sanitation (level 3)	22.00%
JMP open defecation (level 5)	20.90%
JMP basic sanitation (level 2)	13.20%
JMP safely managed sanitation (level 1)	2.30%

Note: JMP represents Joint Monitoring Programme

This indicates that the proportion of stunted children does not mirror the JMP sanitation ladder linearly. Further, when households with the highest two levels of sanitation include improved access to safe water and/or improved hygiene, the result is a lower proportion of stunting in children and higher proportions of children that are not stunted. This implies that the form of sanitation a household adopts is likely to be protective of or causative to child stunting and that adoption of combined WASH is likely to translate to reduced proportions of child stunting.

## 2.5 The Effect of Adopting a Type of Sanitation Model on Child Stunting

With regard to the effect of household sanitation on stunting, the probability of a child being stunted is highest (at 39.2 per cent) if the child lives in a household that uses open defecation (Table 3). Notably, having a better sanitation facility is associated with reduced probability of child stunting in a linear manner as one moves higher up the sanitation ladder from open defecation, JMP unimproved, JMP limited to JMP basic and JMP safely managed.

**Table 3: Potential outcome means based on sanitation ladder**

Sanitation Model	Potential Outcome Means (%)
Open defecation	39.2%
JMP Unimproved	27.4%
JMP Limited	26.7%
JMP Basic, JMP Safely managed	24.7%

Note: JMP represents Joint Monitoring Programme

In summary, a higher proportion (67 per cent) of stunted children are in households adopting lower-level sanitation. The largest proportion of stunted children are based in households with unimproved sanitation, followed by limited sanitation and households practicing open defecation respectively. The distribution of stunted children is not linear across the sanitation ladder. This suggests that improving sanitation facilities in households with limited and unimproved sanitation is likely to have an impact in terms of total number of stunted children.

Sanitation combined with improved water sources and/or improved hand hygiene facilities leads to a lower proportion stunted children and are likely to improve child linear growth. This suggests combined WASH to be protective of child linear growth. The probability of child stunting reduces linearly with every increase in the Joint Monitoring Programme (JMP) sanitation ladder.

Open defecation has the highest negative impact on child stunting of 39.2 per cent probability of stunting. This suggests need for a practical approach to stunting reduction through deliberate sanitation interventions that prioritize open defecation elimination.

Based on the significant proportion of stunted children residing in homes with limited and unimproved facilities and cognizant of other studies that indicate higher negative effect of mid-level sanitation facilities on child stunting compared to open defecation households, stronger protection on child linear growth in Kenya would be realized by adoption of the two highest sanitation models.

### 3 Policy Recommendations

#### **Inclusion of nutrition in WASH policies and WASH in nutrition policies**

Informed infusion of WASH and nutrition in respective sector policies and programmes will ensure the nation accelerates undernutrition reduction while attaining improved sanitation goals, thereby achieving two national development agenda concurrently. This potential is heightened by the demonstrated evidence of the contribution of WASH to nutrition outcomes.

It is important that future WASH policies and strategies include nutrition intentions in WASH programmes. Specifically, reduced malnutrition needs to be included as a marker/outcome of successful WASH interventions in addition to coverage and access to improved sanitation models. Likewise, nutrition policies need to include sanitation from an evidenced perspective of the potential outcome of stunting based on poor sanitation models and their effect, not just on individual households but to the immediate environment.

#### **Scale up geographically targeted interventions**

**Rural areas:** The distinct rural-urban divide in stunting distribution and coverage of lower sanitation models in rural areas indicates an urgent need to scale-up behaviour change messaging and provision of infrastructure to accelerate uptake of higher sanitation models in these regions.

**Targeting by sanitation ladder:** Another criterion for programme targeting is mapping regions with high coverage of households adopting sanitation models that had the highest proportion of stunted children or households adopting sanitation model that pose the highest probability of stunting. This translates to regions with a high coverage of households adopting unimproved sanitation, limited sanitation and open defecation. These are likely to be informal settlements in urban areas and certain geographical sections in rural areas.

## **Implement comprehensive water, sanitation and hygiene interventions**

Acceleration of stunting reduction through WASH requires a holistic focus. Sanitation initiatives that promote both infrastructure uptake and behaviour change are likely to improve child linear growth especially if combined with hand hygiene and safe water to inhibit oral transmission of fecal pathogens.

## **Implement robust WASH-related behaviour change communication and infrastructure development interventions**

Rather than a practical approach to stunting reduction that prioritizes open elimination, infrastructure investment and behaviour change information gradually through the philosophy of the sanitation ladder, this study recommends ambitious planning and programming that aims at the two highest levels of sanitation.

Such an approach is likely to be most protective of children in terms of preventing stunting based on probability of a child being stunted (highest in open defecation practicing households) as well as the households with the highest proportion of stunted children (households with unimproved and limited sanitation). This will ensure the nation accelerates undernutrition reduction while attaining improved sanitation goals, thereby achieving two national development agenda concurrently.

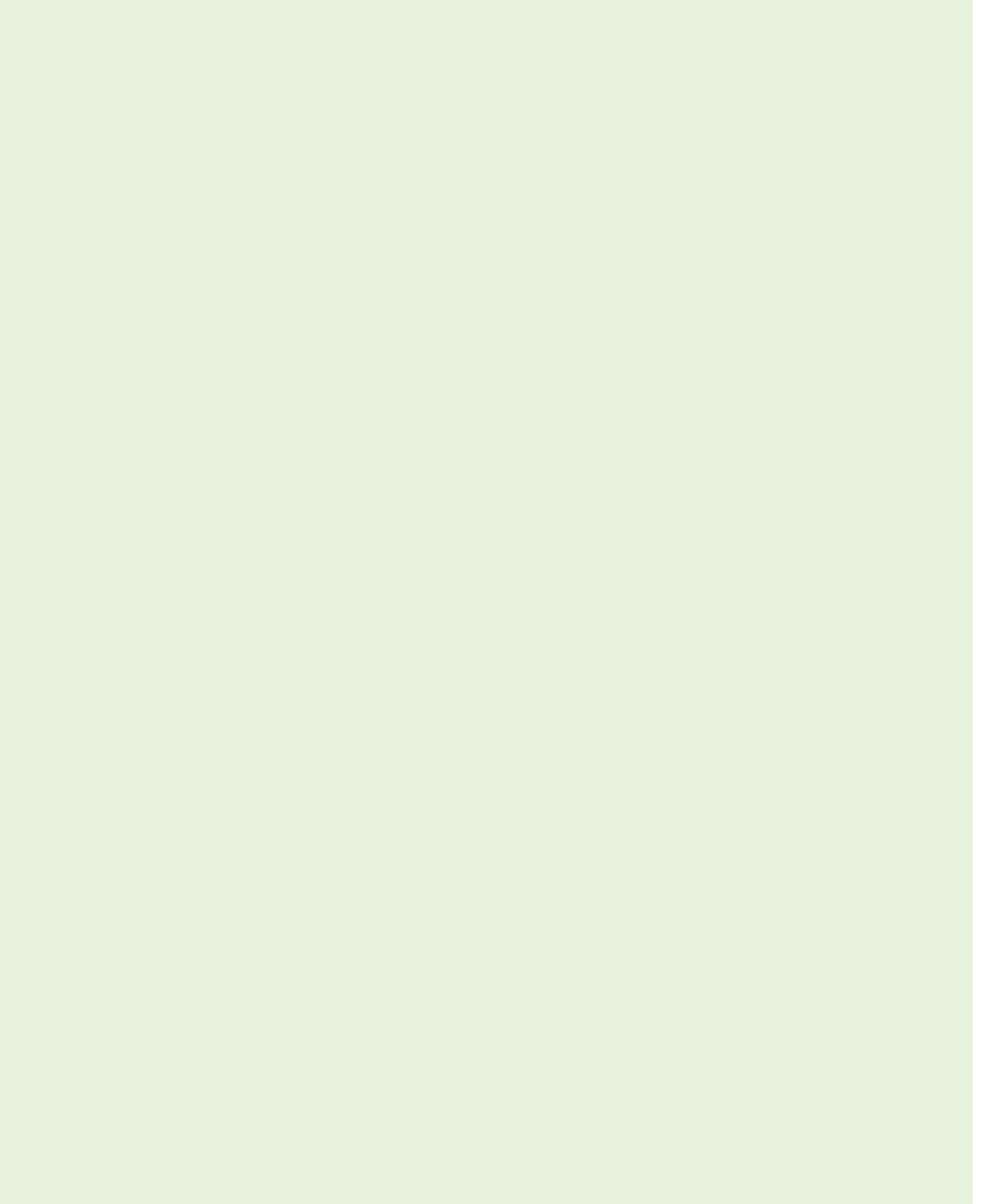
### **Reference**

Karanja, L. Opondo, M. Kurumba, M. Macharia, E. and Musavi, E. (Forthcoming), Influence of Household Sanitation on Child Stunting in Kenya. Nairobi: Kenya Institute for Public Policy Research and Analysis / Kenya National Bureau of Statistics.

### **Acknowledgement**

The policy brief was prepared by Lillian Karanja (KNBS-NIPFN), based on the paper developed by Karanja, L. (KNBS-NIPFN); Karumba, M. (State Department of Economic Planning); Opondo, M. (Ministry of Water, Sanitation And Irrigation); Macharia, E. (KNBS-NIPFN); Kiriro, M. (Ministry of Health); Kipruto, S. (KNBS-NIPFN); Musavi, E. (Ministry of Water, Sanitation And Irrigation); Ntwiga, J. (UNICEF); Laibuni, N. (KIPPRA); Kihui, E. (KIPPRA); Nyasani, B. (Ministry of Health). The preparation of the policy brief was coordinated by Dr Rose Ngugi (Executive Director, KIPPRA), Dr Eldah Onsomu (Director, Economic Management, KIPPRA) and Mr James Gatungu (KNBS-NIPFN).









**Kenya Institute for Public Policy Research and Analysis**  
Bishops Road, Bishops Garden Towers  
P.O. Box 56445-00200, Nairobi  
Tel: +254-2719933/4, Cell: 0736712724, 0724256078  
Email: [admin@kippra.or.ke](mailto:admin@kippra.or.ke)  
Twitter: @NIPFNKENYA

**Kenya National Bureau of Statistics**  
Hospital Road, Real Towers, Upper Hill  
P.O. Box 30266-00100, Nairobi.  
Tel: +254-735-004-401, +254-202-911-000, +254-202-911-001  
Email: [info@knbs.or.ke](mailto:info@knbs.or.ke); [directorgeneral@knbs.or.ke](mailto:directorgeneral@knbs.or.ke)