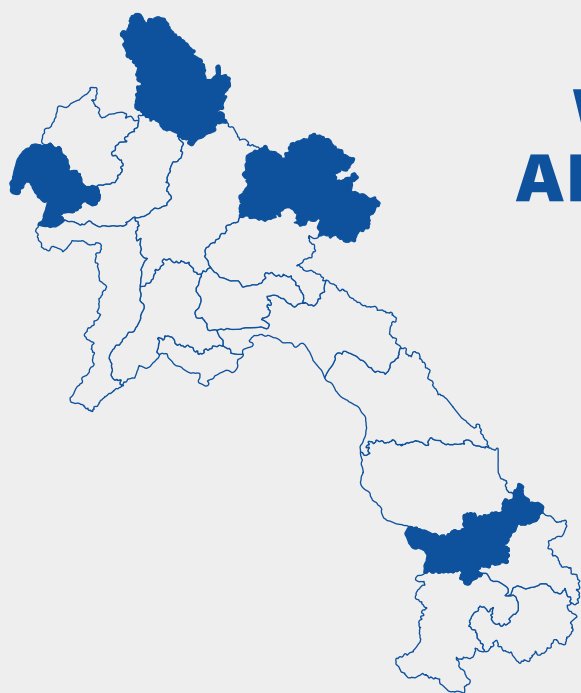


Nutrition Policy Brief



Association between
**WATER, SANITATION
AND HYGIENE (WASH)**
practices and undernutrition
among children (6–59 months)
in Lao PDR

Quantitative evidence from
Bokeo, Huaphanh, Phongsaly
and Saravane provinces



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This policy brief explores the relationship between water, sanitation, and hygiene (WASH) practices and the nutritional status of children aged under five years. Its content will serve as an important source of information to enable policymakers to develop evidence-based nutrition strategies to address malnutrition among children in Lao PDR.



What's at stake?

Children in developing countries experience a range of challenges, such as poor nutrition, inadequate water, sanitation, and hygiene (WASH) practices resulting in slow growth and development⁽¹⁾. In 2020, globally, 22 per cent of children under-five were reported as stunted, 6.7 per cent as wasted, and every seventh child was classified as underweight⁽²⁾. Ninety per cent of these cases occurred in South Asia and Sub-Saharan Africa⁽³⁻⁵⁾. While malnutrition is directly associated with low dietary intake, other contributing factors such as lack of access to safe water and sanitation results in repeated diarrhoea and intestinal infections impacting the growth and development of children. Some 297,000 WASH and diarrhoea-related deaths occur yearly among children under five years⁽³⁻⁵⁾. Studies have shown that intestinal infections among children are associated with stunting which impacts their physical growth, and educational performance⁽⁶⁻⁸⁾. According to UNICEF, limited access to basic health and WASH services and a healthy environment are part of the underlying determinants of malnutrition among children. Approximately 45 per cent of global malnutrition-related child deaths could be prevented by improving WASH conditions and practices^(4, 9-10). The meta-analysis of 10 studies showed a significant association of WASH interventions with reduced stunting in children under-five⁽¹¹⁾.

The world, currently, is not on-track to achieve WASH-related Sustainable Development Goal (SDG) targets⁽¹²⁾. At a global level, one-in-four people lacked safe drinking water, nearly half the global population had access to safely managed sanitation services, and 7-in-10 people had access to basic hygiene services in 2020⁽¹³⁾. As per SDG Gateway Data⁽¹⁴⁾ for 2020, in Southeast Asia, 93 per cent of the population used basic drinking water services, 86 per cent accessed basic sanitation services, and 86.9 per cent had basic handwashing facilities on premises⁽¹⁴⁾.

Lao PDR also faces significant WASH challenges. The LSIS II (2017) survey revealed sub-optimal access to WASH services by children under-five, with 58 per cent of households only having basic water supplies, 29 per cent still practicing open defecation and 50 per cent lacking basic hygiene services. Furthermore, 85 per cent of households consumed water contaminated with variations of *E. coli*⁽¹⁵⁾. Despite an improvement in the quality and quantity of WASH services in Lao PDR during the past decade, more than 20 per cent lack basic hygiene and sanitation services – especially in rural settings. However, there is limited research and information available on the relationship between poor WASH practices and the undernutrition of children aged under five years in Lao PDR.

Research Design

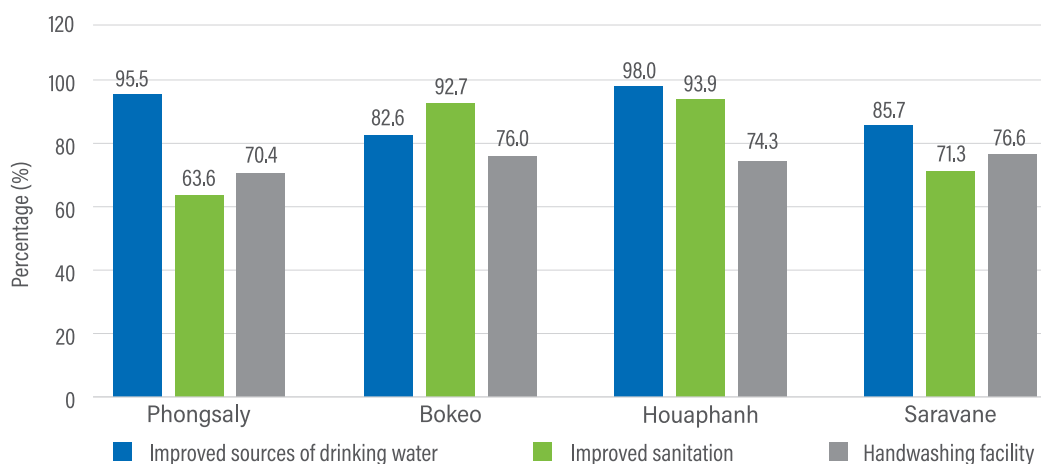
The findings of this paper are based on the Provincial Household Survey (PHS) 2022 in four provinces (Bokeo, Huaphan, Phongsaly, and Saravane) carried out in April 2022 by the Lao Bureau of Statistics (LSB) and UNICEF and funded by the European Union. These provinces were selected based on the high prevalence of malnutrition reported by the LSIS 2, 2017 survey. The analysis is based on a sample size of 10,321 (boys 5,274, girls 5,047). Both descriptive statistics and multivariate analyses were performed. Associations between WASH predictors (use of safe drinking water, improved sanitation, and handwashing facility), mothers' education, mothers' age at birth, and village type (urban versus rural) were estimated by logistic regression (crude and adjusted odd ratio) and children under-five with a 5 per cent confidence interval (CI) using binary logistic regression models.

Key Findings

Water, sanitation, and hygiene (WASH) services

Efforts by the national government and development partners to improve the quality of WASH practices and services in Lao PDR are reflected in the increased use of safely managed water, improved sanitation, and prevalence of basic handwashing facilities compared to the findings of the LSIS II (2017) in all four provinces of interest. The PHS pooled analysis shows that 92 per cent of households consume improved sources of drinking water, but Bokeo made the least progress of 82.6 per cent. Also, the treatment of household drinking water stood at 76 per cent from the pooled analysis with the lowest percentage in Bokeo and Saravane (55.4 and 54.7 per cent, respectively). The use of improved sanitation facilities is lowest in Phongsaly (63.6 per cent), but still a noticeable improvement from LSIS II (34.9 per cent). Access to basic hygiene services was between 74.4–76.6 per cent in all provinces (Figure 1).

Figure 1. Status of WASH practices in four provinces

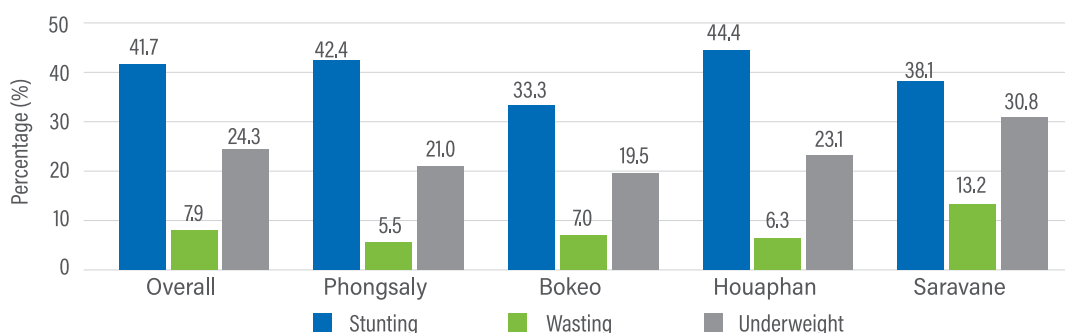


PHS, 2022: Authors' analysis

Nutritional status of children

Undernutrition levels in children aged 6–59 months remains high in Lao PDR. The analysis at pooled and provincial levels underlines a worrying trend in the four provinces with a prevalence of stunting (≤ -2 Z score) which is considered **very high** (≥ 30 per cent) as per WHO thresholds of classification⁽¹⁶⁾. The highest prevalence was recorded in Houaphanh (44.9 per cent), followed by Phongsaly (42.7 per cent). The prevalence of wasting is within acceptable levels in Bokeo, Houaphanh and Phongsaly. However, Saravane province has a prevalence of 13.3 per cent, classified as **high** (≥ 10 and ≤ 15 per cent) according to WHO thresholds⁽¹⁶⁾.

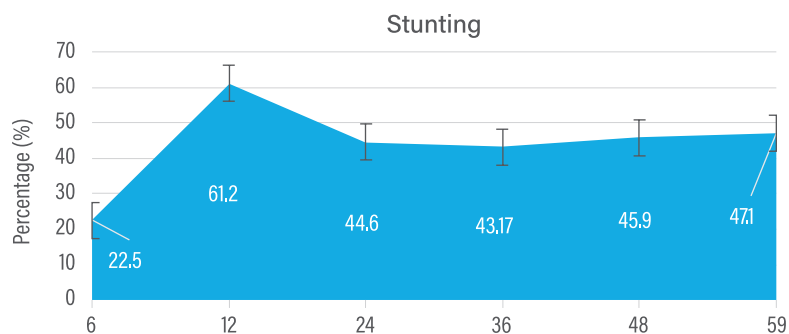
Figure 2. Prevalence of undernutrition in under-five children in four provinces



PHS, 2022: Authors' analysis

The results of the age disaggregated analysis revealed that the prevalence of stunting peaked at 12 months of a children's life in the four provinces, indicative of challenges during the critical first 1,000 days period (Figure 3). The prevalence of stunting peaked at 12 months, then leveled off to 59 months.

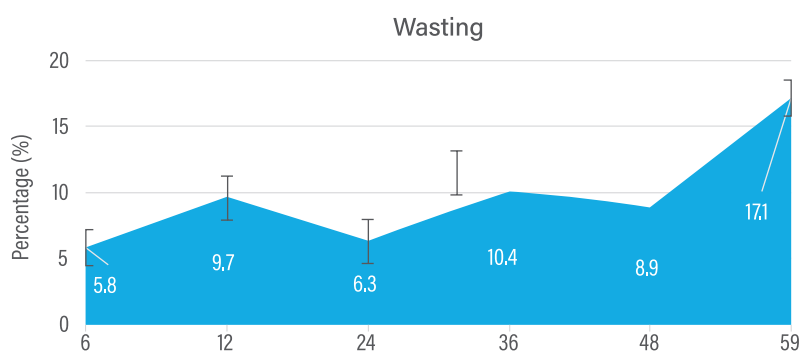
Figure 3. Stunting profile of children under-five disaggregated by age



PHS, 2022: Authors' analysis

The prevalence of wasting fluctuated among children aged 6–47 months, then peaked at 59 months (Figure 4).

Figure 4. Wasting profile of children under-five disaggregated by age



PHS, 2022: Authors' analysis

The analysis revealed significant disparities in the use of WASH services and nutrition outcomes among children under five years. Table 1 presents an overview of WASH practices and a pooled profile of undernutrition among children under-five in all four provinces. From the table, it can be seen that children living in rural areas without roads had less access to improved sanitation and handwashing facilities than those in urban areas. Also, children living in rural areas without roads were twice as likely to be stunted as those in urban areas.

Table 1. Location, WASH practice, and undernutrition profile

	WASH (%)			Undernutrition (%)	
	Improved sources of drinking water	Improved sanitation	Handwashing facility	Stunting	Wasting
Urban	94.88	97.14	87.49	26.06	6.38
Rural with roads	91.60	83.63	75.00	41.20	8.06
Rural without roads	94.28	76.98	56.68	51.06	7.98

PHS, 2022: Authors' analysis

Association of WASH and nutrition outcomes

The overall association using logistic regression (chi2, OR (odd ratio) and AOR (Adjusted odd ratio)) between WASH and undernutrition among children aged under five years is significant, particularly between improved sanitation and handwashing facilities and the prevalence of undernutrition in this age group when adjusted for other determinants (Table 2). The odds of undernutrition (stunting, wasting, and underweight) decrease with improved sanitation and handwashing facilities when adjusted with other determinants (improved sources of drinking water and improved sanitation). However, the odds of undernutrition are less significantly associated with improved sources of drinking water when adjusted with improved sanitation and handwashing facilities.

Table 2. Association between WASH and nutrition outcomes

	Stunting	Wasting	Underweight
Improved sources of drinking water	OR 0.89 (CI 0.76 – 1.04)	OR 1.29 (CI 1.00 – 1.67)	OR 1.15 (CI 0.97 – 1.36)
	AOR 0.79 (CI 0.67 – 0.94)	AOR 1.14 (CI 0.88 – 1.50)	AOR 1.06 (CI 0.89 – 1.28)
Improved sanitation	OR 1.69* (CI 1.52 – 1.88)	OR 1.64* (CI 1.38 – 1.95)	OR 1.76* (CI 1.57 – 1.97)
	AOR 1.72* (CI 1.53 – 1.94)	AOR 1.72* (CI 1.43 – 2.08)	AOR 1.76* (CI 1.55 – 1.99)
Handwashing facility	OR 1.38* (CI 1.26 – 1.52)	OR 1.25* (CI 1.06 – 1.48)	OR 1.31* (CI 1.18 – 1.45)
	AOR 1.32* (CI 1.20 – 1.46)	AOR 1.15 (CI 0.97 – 1.36)	AOR 1.22* (CI 1.09 – 1.35)

*Crude Odd Ratio (OR) and Adjusted Odd Ratio (AOR) are significant at 5 per cent

PHS, 2022: Authors' analysis

Association of background characteristics and nutrition outcomes

Additionally, logistic regression was run to assess the association between mother's age at delivery, mother's education, village type (rural versus urban), and undernutrition in children under-five. Table 3 shows that mothers' age at delivery has a significant association with the prevalence of stunting and being underweight. Young mothers less than 20 years old have a high prevalence of stunted children compared to those who deliver after the age of 20 years. Disparities were also observed in mothers' education. The prevalence of stunted and wasted children was significantly less common with mothers having completed secondary and higher education when adjusted with other predictors. When looking at the association between undernutrition and village type (rural versus urban), the odds are less remarkable though significant. However, stunting and wasting are more prevalent in rural rather than urban areas.

Table 3. Association of background characteristics and nutrition outcomes

	Stunting	Wasting	Underweight
Mother's age at delivery	OR 1.32* (CI 1.19 – 1.48)	OR 1.02 (CI 0.83 – 1.24)	OR 1.19* (CI 1.05 – 1.34)
	AOR 1.33* (CI 1.19 – 1.48)	AOR 1.04 (CI 0.86 – 1.27)	AOR 1.21* (CI 1.07 – 1.36)
Mother's education	OR 1.48* (CI 1.36 – 1.61)	OR 1.30* (CI 1.12 – 1.52)	OR 1.47* (CI 1.34 – 1.62)
	AOR 1.42* (CI 1.31 – 1.55)	AOR 1.28* (CI 1.10 – 1.50)	AOR 1.43* (CI 1.31 – 1.58)
Village type (rural vs urban)	OR 0.46* (CI 0.39 – 0.54)	OR 0.78 (CI 0.58 – 1.03)	OR 0.57* (CI 0.47 – 0.68)
	AOR 0.52* (CI 0.46 – 0.62)	AOR 0.85 (CI 0.64 – 1.12)	AOR 0.65* (CI 0.54 – 0.78)

*Crude Odd Ratio (OR) and Adjusted Odd Ratio (AOR) are significant at 5 per cent

PHS, 2022: Authors' analysis

Policy recommendations

Advocacy – use of improved sanitation and handwashing practices

This study shows a significant association between the use of improved sanitation and handwashing facilities, and the prevalence of stunting. Increased handwashing practices is associated with a lower stunting rate, especially in urban areas.

Considering the well-documented evidence of environmental enteropathy and malnutrition due to poor hygiene practices, the promotion of handwashing with soap should be intensified – especially in rural areas. Where resources permit, government and development partners may promote and support the use of low-cost and local technologies for handwashing stations, especially in rural areas. Lastly, since handwashing with soap hinges on behavioral change, it will be useful to have Social Behavioral Change (SBC) in local languages that address the needs of all ethnic groups in the country.

Access to clean water

Household access to clean water should be a priority not only for WASH practices, but due to the indirect role that water access has on child nutrition. For example, water that is contaminated with fecal matter (E. coli) may result in worm infestations, diarrhoea-related diseases and other infections among children. This compromises children's immunity and makes them susceptible to undernutrition.

Government and nutrition stakeholders should invest in making clean water accessible to the general population for drinking and domestic uses, such as home gardening. Water can assist households to have vegetable gardens to increase the availability and accessibility of diverse food.

Women's empowerment

“Child marriage is a violation of human rights that limits girls in reaching their full potential. This harmful practice is closely associated with deprivations in education, health, access to resources and empowerment⁽¹⁷⁾. Children born to women married during adolescence are more likely to have children with stunted growth^(18,20). The analysis of data identified a disparity in the prevalence of undernutrition in children based on their mother's age. Children born to younger mothers (less than 20 years), were more likely to suffer from malnutrition.

Also, the study clearly indicates a low prevalence of undernutrition in children of mothers who have secondary or higher education compared to those with primary or no education. A multisectoral approach is required to address the drivers of early marriage and teenage pregnancy in the country. Promoting education among girls to become empowered to make well-informed decisions for their well-being, growth and development should be pursued, especially in rural areas.

References

1. Grimes JET, Tadesse G, Gardiner IA, Yard E, Wuletaw Y, Templeton MR, et al. Sanitation, hookworm, anemia, stunting, and wasting in primary school children in southern Ethiopia: baseline results from a study in 30 schools. *PLoS Negl Trop Dis*. 2017;11: e0005948.
2. UNICEF/WHO/World Bank. Levels and Trends in Child Malnutrition UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates Key Findings of the 2021 Edition. *World Heal. Organ*. 2021, 1–32.
3. Waage J, Banerji R, Campbell O, Chirwa E, Collender G, Dieltiens V, et al. The millennium development goals: a cross-sectoral analysis and Principles for goal setting after 2015: Lancet and London International Development Centre Commission. *Lancet*. 2010; 376:991–1023.
4. Adelo B, Temesgen S. Undernutritional status of children in Ethiopia: application of partial proportional odds model. *Etiyopyadaki Çocukların Yetersiz Beslenme Durumu Kısmi Oran Hand washing facility sal Odds Model Uygulaması*. 2015;7: 77–89.
5. Mshida HA, Kassim N, Mpolya E, Kimanya M. Water, sanitation, and hygiene practices associated with nutritional status of under-five children in semi-pastoral communities Tanzania. *Am J Trop Med Hyg*. 2018; 98:1242–9
6. Gelaw A, Anagaw B, Nigussie B, Silesh B, Yirga A, Alem M, et al. Prevalence of intestinal parasitic infections and risk factors among schoolchildren at the University of Gondar Community School, Northwest, Ethiopia: a cross-sectional study. *BMC Public Health*, 2013;5;13;304
7. Nokes C, Bundy DAP. Does helminth infection affect mental processing and educational achievement? *Parasitol Today*. 1994; 10:14–8.
8. Curtis V, Cairncross S. Effect of washing hands with soap on diarrhea risk in the community: a systematic review. *Lancet Infect Dis*. 2003; 3:275–81.
9. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, de Onis M, et al: Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet*. 2013; 382:427–51
10. Accessed on 18 April 2023: <https://www.unicef.org/media/91741/file/UNICEF-Nutrition-Strategy-2020-2030>
11. Zemichael Gizaw and Alemayehu Worku: Effect of single and combined water, sanitation, and hygiene (WASH) interventions on nutritional status of children: a systematic review and meta-analysis. *Italian Journal of Pediatrics*. 2019, 45:77
12. Accessed on 25 April 2023: <https://www.unwater.org/news/un-reports-world-track-water-and-sanitation-goal#:~:text=The%20world%20is%20not%20on,water%2C%20sanitation%20and%20handwashing%20facilities>
13. WHO/UNICEF. (2021). Five years into the SDGs progress on household drinking water, sanitation, and hygiene who/UNICEF joint monitoring program for water supply, sanitation, and hygiene. In joint water supply, and sanitation monitoring programme: <https://www.oecd.org/dac/>
14. Accessed on 26 April 2023: <https://dataexplorer.unescap.org/>
15. Brief.pdf Ministry of Health and Lao Statistics Bureau 2018. Lao Social Indicator Survey II; 2018; Vol. 53.
16. Accessed on 25 April 2023: <https://apps.who.int/nutrition/landscape/help.aspx?menu=0&helpid=391&lang=EN>
17. Accessed on 12 May 2023: <https://data.unicef.org/resources/child-marriage-and-education-data-brief/>
18. Pintu P, Pradip C, Ankita Z.: Impact of child marriage on nutritional status and anaemia of children under five years of age: empirical evidence from India. *Public Health* 2019, 177, 97 - 101
19. Accessed on 12 May 2023: <https://blogs.worldbank.org/health/child-marriage-persistent-hurdle-health-and-prosperity>
20. Accessed on 12 May 2023: https://www.icrw.org/wp-content/uploads/2018/02/ICRW_Brief_ChildHealth-1.pdf



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Brief developed by

Dr. Nelofar A. Sheikh

International Data Analysis Advisor
NIPN

Mr. Ouphachay Thongsamouth

National Data Manager
NIPN

Ms. Soulita Vansilalom

National Statistician
NIPN

With contributions from

Dr. Sitthiroth Rasphone

Director General, DRI,
MPI

Mr. Viengkhone Buaphachanh

Head of the Division, DRI,
MPI

Mr. Phoudthachan Tonpheng

Deputy Head of the Division, DRI,
MPI

Mr. Vongphachanh Xayalath

Deputy Head of the Division, DRI,
MPI

Mr. Somsai Phongvenxay

Technical Officer, DRI,
MPI

Mr. Khampasird Keovongsoudthi

Technical Officer, DRI,
MPI

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