UNICEF Nepal Working Paper Series

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WATER, SANITATION AND HYGIENE (WASH) AND NUTRITION IN NEPAL, WITH A FOCUS ON CHILDREN UNDER FIVE

NEPAL MULTIPLE INDICATOR CLUSTER SURVEY (MICS) 2014 FURTHER ANALYSIS REPORT

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This report gives the results of further analysis of the Nepal Multiple Indicator Cluster Survey (MICS), 2014, which was carried out on behalf of UNICEF Nepal by consultant Samik Adhikari. The four reports in this series are *working* documents:

- Working paper 2018/001: Letting Children Flourish From an Early Age: Early Childhood Care and Development In Nepal
- Working paper 2018/002: We Must Do Better: A Closer Look at the Contextual Factors that Drive Child Labour and Discipline in Nepal
- Working paper 2018/003: Access to Communication Media and the Acceptance of Violence Among Adolescents Female in Nepal
- Working paper 2018/004: Water, Sanitation and Hygiene (WASH) and Nutrition in Nepal with a Focus on Children Under Five

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FURTHER ANALYSIS REPORT

EXECUTIVE SUMMARY

Despite making important progress towards achieving the Millennium Development Goals, Nepal continues to perform poorly on water, sanitation, hygiene and some child health-related indicators. This report uses data from the fifth round of the Nepal Multi Indicator Clusters Survey (the 2014 NMICS) to shed light on key domains in the water, sanitation and hygiene (WASH) and nutrition sectors. The main objective is to perform sub-group analysis on indicators of drinking water treatment, open defecation, handwashing, and the safe disposal of child faeces in the WASH domain, and stunting, wasting, underweight, diarrhoea and fever among children under the age of five in the nutrition domain. This analysis helps identify marginalized and vulnerable groups based on geography, wealth, caste and ethnicity and other socio-demographic characteristics.

This further analysis found that four in five of surveyed households with children under five were drinking water directly from the source at the time of the 2014 NMICS. Together with the finding that almost 60 per cent of households tested for water quality had high levels of *E. coli* contamination, the alarmingly low use of drinking water treatment is an important national level policy finding. Similarly, more than 25 per cent of the households with children under five practised open defecation and did not have a place for handwashing in their dwellings, while more than 50 per cent of the households with children under two were disposing of child faeces unsafely. The households in the Tarai region were particularly prone to poor WASH related practices and more than 80 per cent of surveyed Madhesi Dalit households practised open defecation.

Similar socioeconomic differences were seen for the nutrition and child health related indicators. Overall, 37 per cent of children under the age of five were stunted and 30 per cent of them were underweight. High socioeconomic inequality was found in the prevalence of stunting rates among the children with a 40 percentage point difference in stunting rates between those in the poorest and richest income quintiles. Similarly, there was a 35 percentage point difference in the prevalence of stunting between children in the best performing social group (Newars) and the worst performing group (Madhesi Dalits). These stark differences in child nutrition perpetuate the social and economic divide between affluent and marginalized communities. Urgent action is needed to bridge this divide in the spirit of the Sustainable Development Goal (SDG) agenda of leaving no one behind.

Finally, multivariate analysis shed light on household and individual determinants of poor nutrition and health related indicators for the children under five. It found mothers' education to be a strong predictor of the better overall nutrition and health status of children, provided that the education level was above primary level (Grade 5). And, WASH related indicators such as open defecation and lack of handwashing place in the dwelling were associated with the worse overall nutritional status of children. Finally, better overall child health was significantly associated with relative wealth, but only at the wealthiest income quintile.

While this analysis highlights a number of important issues, it has certain limitations. The NMICS is based on a cross-sectional dataset and the results should not be seen as causal since most of the analysis is descriptive. However, the descriptive analysis does highlight the urgency of improving the WASH and nutrition situation of Nepal's poor and marginalized groups.

CONTENTS

TABLES

FIGURES

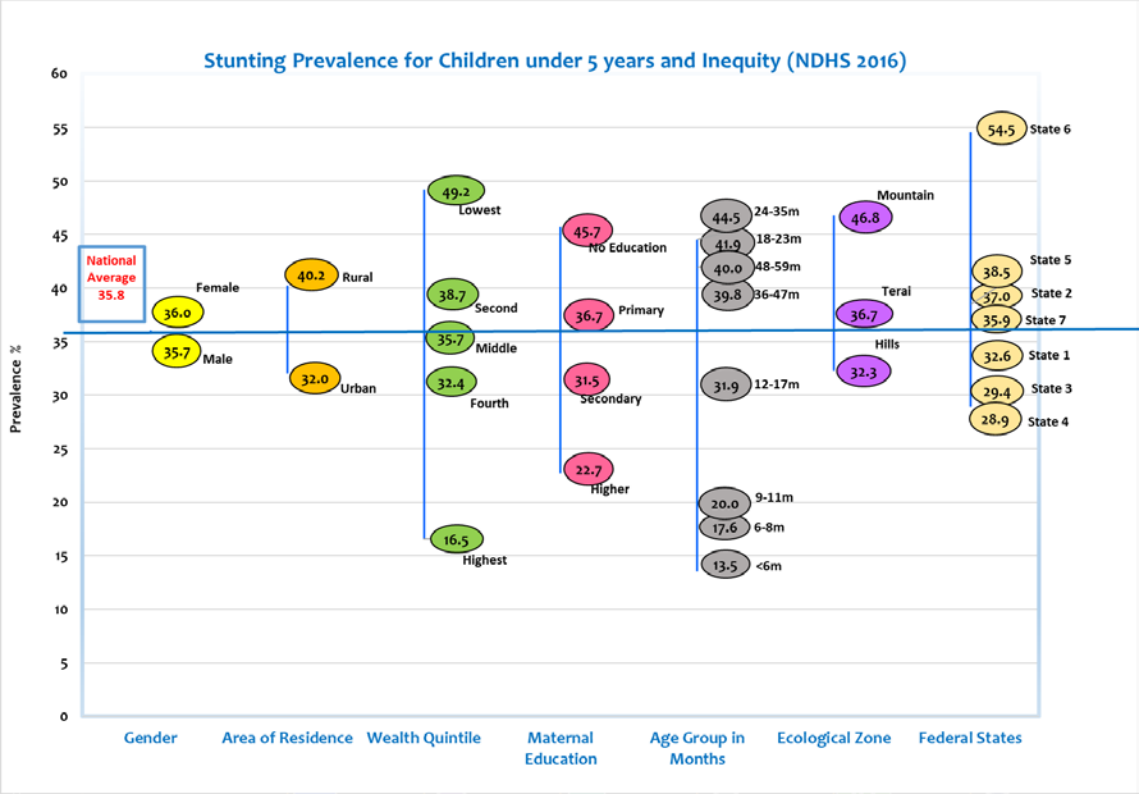
1 INTRODUCTION

According to new global estimates by UNICEF, WHO, and The World Bank, 156 million children under five were stunted in 2015.[1] Regional disparities persist despite good progress in the last 15 years with a decrease in the percentage of children under five who were stunted from 32.7 per cent in 2000 to 23.2 per cent in 2015. South Asia is the region with the second highest proportion of children under five who are stunted (low height-for-age) (34.4 per cent) and the highest prevalence of children who are wasted (low weight-for-height) (14.1 per cent).

The high prevalence of stunting and wasting among children in low and middle income countries has been met with many interventions aimed at improving children's diets, focusing on the adequacy of nutrition. And while most programmes and policies have managed to reduce undernutrition vis-à-vis stunting and underweight, they have had limited impact on the problem of stunting.[2]

Figure 1 shows the status of stunting in Nepal and the differences by gender, urban/rural residence, wealth quintile, level of education, age group, region and province.[3]

Figure 1: Stunting prevalence for children under 5 years in Nepal by sex, place of residence, wealth quintile, level of education and age group (NDHS 2016)



[1] United Nations Children's Fund, World Health Organization and The World Bank, 'Levels and Trends in Child Malnutrition, UNICEF/WHO/World Bank Group, Joint Child Malnutrition Estimates: Key findings of the 2016 edition', UNICEF, New York; WHO, Geneva; The World Bank, Washington, D.C., 2016, <www.who.int/nutgrowthdb/jme_brochure2016.pdf?ua=1>, accessed February 2017.

[2] Mbuya, Mduduzi NN and Jean H. Humphrey, 'Review article: Preventing environmental enteric dysfunction through improved water, sanitation and hygiene: an opportunity for stunting reduction in developing countries', *Maternal & Child Nutrition*, vol. 12, no. S1 (2016): 106-120.

[3] Note that until 2017 Nepal was divided into five development regions – Far Western, Mid-Western, Western, Central and Eastern Development regions (see map at Appendix 1). These have been superseded by the division of the country into seven provinces under the new federal system of governance (see Appendix 2). Appendix 1 also shows Nepal's three ecozones (mountain, hill and Tarai) as used by the NMICS and the NDHS.

An increasing focus is now being placed on the environment that surrounds children and the situation of water, sanitation, and hygiene to understand the links between these and the prevalence of stunting, underweight, wasting and the diseases such as diarrhoea, fever and worm infestations. Researchers have linked stunting prevalence in children to the presence of gut bacteria caused by ingesting particles with high *E. coli* concentrations (such as chicken faeces).[4] They postulate that in this situation most food nutrients go to fighting the resulting bacterial infection rather than for the growth and development of the child.

The fifth and latest round of the Nepal Multiple Indicator Cluster Survey (NMICS) was carried out in 2014.[5] The main purposes of the further analysis of the NMICS that is presented here is two-fold:

- To conduct sub-group analysis that characterizes the distribution of WASH, nutrition, and child health indicator results, especially among the most marginalized and vulnerable groups.
- To conduct exploratory determinant analysis to find out factors associated with WASH, nutrition, and child health indicators, and to test associations between WASH and nutrition-related indicators.

This report is useful in two ways. Externally, the report targets policy audiences, including government ministries, policymaking bodies, and parliamentary committees, as an advocacy tool for evidence-based programming agendas to increase the well-being of children, particularly for their overall hygiene and nutritional status, and especially in the most marginalized communities. Internally, the report informs UNICEF programmes about the characteristics and distribution of WASH and nutrition indicators among children under five to inform the imrpoved design of programmes to improve the lives of children.

1.1 Background

The Sustainable Development Goals articulate the urgent need to improve water and sanitation standards throughout the world with SDG 6 calling for access to water and sanitation for all thus providing a mandate to eradicate poor water, sanitation and hygiene standards. The first two targets of SDG 6 are:

- By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
- By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

The main target under SDG 2 for ending hunger, achieving food security, improving nutrition and promoting sustainable agriculture is: “By 2030, end all forms of malnutrition, including achieving by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.” The entirety of SDG 3 focuses on ensuring healthy lives and promoting the well-being of all, especially children and women.

This further analysis of the 2014 NMICS findings contributes to the evidence on WASH and nutrition in Nepal in two distinct ways. First, it helps identify vulnerable populations and children in the WASH and nutrition domains in Nepal. Second, it uses a diversity of indicators from the 2014 NMICS to identify determinants of child undernutrition, including household and individual characteristics, water,

[4] Ibid.

[5] Central Bureau of Statistics (CBS) Nepal, Nepal Multiple Indicator Cluster Survey 2014: Key findings report, CBS and UNICEF, Kathmandu, Nepal, 2014. <http://unicef.org.np/uploads/files/44234273128039655-nmics-5-key-findings.pdf>, accessed 2 March 2018.

sanitation and hygiene, and childhood illness. This report provide evidence in support of converging WASH and nutrition programmes to achieve better health and nutrition outcomes.

1.2 National policies and programmes on WASH and nutrition

The Government of Nepal has ambitious targets to tackle the poor WASH and nutrition status in the country, and has taken important steps towards reaching these targets. On water and sanitation, the government's actions are primarily based on the National Water Plan (2002–2027),[6] which aims to provide universal coverage of basic water supplies and sanitation by 2017.[7] Through its Rural Water Supply and Sanitation National Strategy (2004), the government aims to "provide safe, reliable and affordable water supply with basic sanitation facilities to 100 per cent of the population on priority basis specially targeting the backward people and ethnic groups" by focusing on the "massive renovation, rehabilitation, improvement and expansion works of the existing system and increase the quality of service."[8] So far, there has been only limited success towards achieving the water and sanitation goals. Although a majority of households in Nepal have access to improved drinking water supplies, more than a quarter still practice open defecation.

UNICEF has been a major partner in designing and delivering WASH and nutrition-related interventions to communities in Nepal. For example, it works with the government to achieve the national targets on water, sanitation and hygiene. It regularly tracked 10 specific indicators against the agreed results in its previous Country Programme Action Plan (CPAP), 2013–2017.[9] These indicators included the number of households with access to improved toilets and the number of water supply schemes completed. UNICEF, in coordination with the National Planning Commission, The World Bank, and various ministries, helped formulate and implement the ambitious Multi-Sector Nutrition Plan (MSNP, 2013–2017) and the follow-on MSNP-II (2018–2022), which aim to reduce the intergenerational transmission of stunting by strengthening the national nutrition architecture.[10] The first MSNP was implemented in 28 districts, while MSNP-II will focus on the areas of greatest need and scale up coverage to more districts.

The government's nutrition policies are primarily shaped by its National Nutrition Policy and Strategy (2004).[11] Under this strategy, the government has taken important steps to reduce and eliminate malnutrition and undernutrition through:

- growth monitoring and nutrition counselling at local health facilities and outreach clinics;
- the promotion through the mass media of the exclusive breastfeeding of young babies;
- the implementation of the Breast Milk Substitute Act (1992) and its regulations; and
- the promotion of complementary feeding for over six month old children.

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[6] Ministry of Energy, Nepal, *National Water Plan – Nepal, 2005*, <www.moen.gov.np/pdf_files/national_water_plan.pdf>, accessed December 2016.

[7] Ministry of Urban Development, National Water Supply and Sanitation Policy, 2014, Draft, Government of Nepal, 2014, P. 7, <http://seiu.gov.np/index.php/documents/download-file?path=Acts%2BPolicies%2Band%2BGuidelines%252FWSS%2BPolicy%2BDec14%2BE.pdf>, accessed December 2016.

[8] Ibid.

[9] United Nations Children's Fund, Nepal, 'WASH Development Programme', <www.unicef.org.np/our-work/WASH>, accessed December 2016.

[10] National Planning Commission, *Multi-sector Nutrition Plan for Accelerated Reduction of Maternal and Child Under-nutrition in Nepal, 2013-2017*, 2012, Kathmandu, <https://www.npc.gov.np/images/category/MSNP_english.pdf>, accessed March 2018.

[11] Nutrition Section, Child Health Division, Ministry of Health and Population Nepal, *National Nutrition Policy and Strategy, 2004*, Kathmandu.

Additionally, it has distributed iron tablets and supplements to pregnant mothers, iodized salt to remote communities, high-dose vitamin A capsules to children aged 6 to 59 months nationwide, and implemented an biannual deworming drive for children aged 1–5 years nationwide.

While good progress has been achieved in the WASH and nutrition sectors, there remain unresolved challenges that need urgently addressing. NMICS 2014 found that more than one in three children aged under five were stunted, and almost one in three underweight. In light of this, this further analysis report aims to inform the design of cross-sectoral interventions that target both WASH and nutrition to reduce the poor health and nutrition status of many of Nepal's children, particularly those from marginalized and vulnerable groups.

2 DATA AND METHODS

2.1 Data

The 2014 NMICS covered a total of 12,405 households and provides a comprehensive picture of women and children across all Nepal's regions. Of particular interest in this report are the findings on household characteristics including caste and ethnicity, wealth quintile, rural/urban location, water and sanitation status, and child health, nutrition, and feeding practices.

The NMICS sample analysed 5,663 under 5-year-old children. Where applicable in this further analysis, comparisons are made against the findings of the Nepal Demographic and Health Survey, 2011 (NDHS), that included data on children under five from its nationally representative sample of 10,826 households.[12]

2.2 Data analysis

Two key domains were selected for further analysis:

- The water and sanitation practices of households with children under five
- Undernutrition and recent illness (fever and diarrhoea) in children under five.

Each domain was explored in detail by disaggregating relevant findings by urban/rural residence, wealth quintile, caste and ethnicity and other household and individual characteristics. Confidence intervals were used to assess the significance of differences. Finally, multivariate analysis was used to shed light on household and individual determinants, including the situation of WASH to test associations with poor nutrition and health-related indicators for children under five. This was done using a logistic regression framework. Significance levels were assessed for each association using p-values of the standard errors of the coefficients.

The statistical software Stata (version 14), was used for the analysis. Elements of sample design were taken into account by using Stata's 'svyset' command (including information on sample weight, cluster, and strata). Most graphs were made in Tableau and the maps were made using R and DevInfo.

2.3 Definition of indicators

1. Water, sanitation and hygiene

- Water treatment: Yes (1) if the household did not use any form of treatment of the water they drank; No (0) if used.
- Open defecation: Yes (1) if the household practised open defecation; No (0) if otherwise.
- Cleansing agent present: Yes (1) if soap, detergent, ash, 'mud' or sand (cleansing agents) not seen at household handwashing place; No (0) if seen there.
- Distance to handwashing place: Yes (1) if the handwashing place observed was more than 10 paces away from the latrine; No (0) if 10 paces or less distance away.
- Unsafe disposal of child faeces: Yes (1) if child faeces were disposed of in an unsafe way; No (0) if disposed of safely.

Undernutrition and diarrhoea

- Stunting: Yes (1) if Z-score on height-for-age was below -2 standard deviations; No (0) if otherwise.

[12] Ministry of Health and Population, Nepal, New ERA and ICF International Inc., *Nepal Demographic and Health Survey 2011,* MOHP, ICF International, Calverton, Maryland and New ERA, Kathmandu Nepal, 2012.

- Underweight: Yes (1) if Z-score on weight-for-age was below -2 standard deviations; No (0) if otherwise.
- Wasting: Yes (1) if Z-score on weight-for-height was below -2 standard deviations; No (0) otherwise.
- Diarrhoea: Yes (1) if the child had suffered from diarrhoea in the last two weeks; No (0) if otherwise.
- Fever: Yes (1) if the child had suffered from fever in the last two weeks; No (0) if otherwise.

2.4 Data limitations

The MICS is a comprehensive survey to assess the well-being of women and children globally. However, for the purpose of this report, the survey has its limitations. First, the MICS is a cross-sectional survey and hence this report is limited in the kind of analysis that can be carried out on the relevant domains. It is very hard to draw causal inferences from cross-sectional data. Most analysis in this report is therefore limited to descriptive analysis and the analysis of associations.

Second, there is a likelihood that some of the analysis in this report suffers from a representational problem. Since the analysis presented is limited to 5,663 households with children under five, the findings could potentially be different for households without any children under five. The purpose of this report is, however, to ensure the internal validity in the findings for those 5,663 households without claiming any external validity for the results on other types of households.

Finally, the domains picked for analysis are themselves limited by what questions were asked within each NMICS module. For example, the 2014 NMICS did not administer detailed questions on mothers' nutritional status, which could be a major limitation for studying childhood stunting. The low height (usually <145 cm) and low body mass index (BMI) (<18.5 kg/m^2) of mothers is often a strong predictor of low birthweight and stunting among their children. Further rounds of NMICS will benefit from broadening the focus to cover a wider range of themes.

3 RESULTS

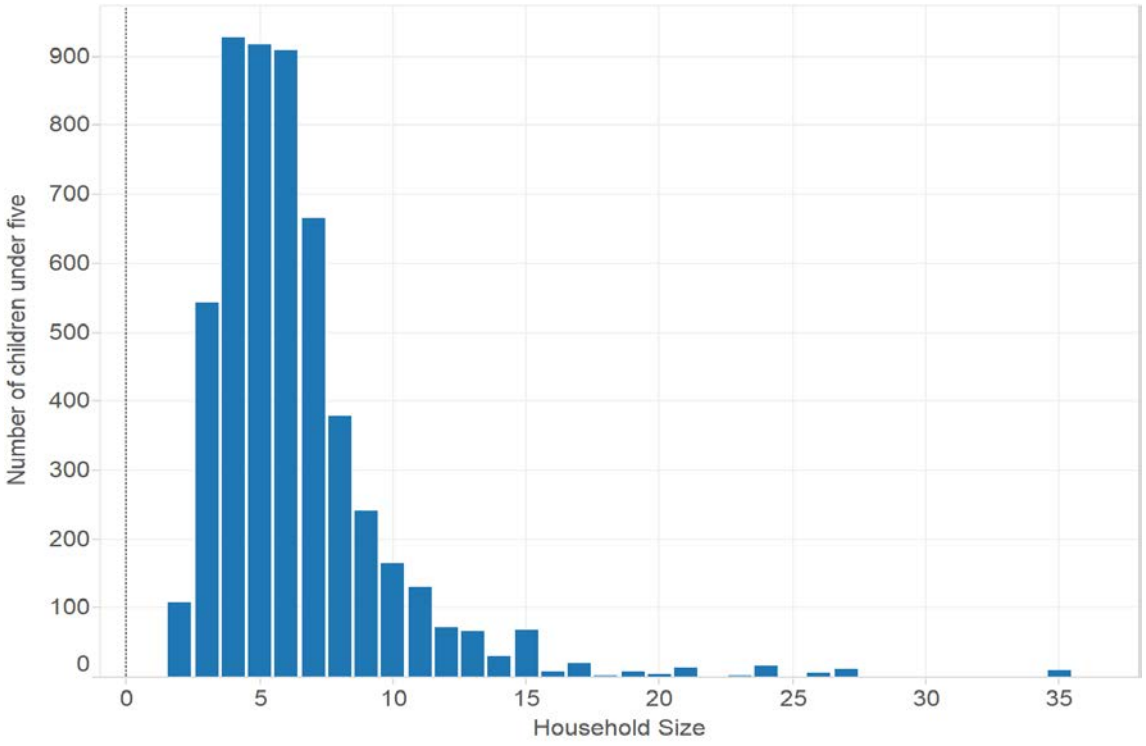
3.1 Basic profile of children under five and their households in Nepal

According to the 2014 NMICS, roughly 10.1 per cent or 5,663 members of survey households had children under five, roughly equivalent to the proportion reported in the National Population and Housing Census of 2011 (9.69 per cent).[13] Thirty-five per cent of the 12,405 households in the NMICS sample had at least one member aged 0-4 years old of whom 48.3 per cent were girls.

3.1.1 Demographics

In the NMICS sample, the children under five on average lived in a household with 6.5 members. Figure 2 shows the distribution of the household sizes with children under five. Close to 50 per cent of the children lived in a household with between four and six members and more than 80 per cent lived in households with seven or less members.

Figure 2: Distribution of children under the age of five by household size (NMICS 2014)



Close to 50 per cent of children under the age of five lived in households with 4-6 members.

In the NMICS sample, only 13 per cent of children under five lived in urban households, compared to 17.1 per cent for the overall sample. This difference is statistically significant and is probably a combined result of higher fertility rates in rural areas and extensive rural to urban migration among working age adults for employment.

Table 1 summarizes the major religions, languages, castes and ethnicities of the sample households with children under five. The majority of children under five were in Nepali speaking Hindu households. Maithili, Bhojpuri, and Tharu were the other prevalent languages. Hill Janajatis (ethnic groups), hill Chhetris, hill Brahmins, and Madhesis (non-Brahmin/Chhetri) made up more than 60 per cent of the

[13] Central Bureau of Statistics (CBS), Nepal, *National Population and Housing Census (National Report), 2011,* <http://cbs.gov.np/image/data/Population/National%20Report/National%20Report.pdf>, accessed March 2018.

ethnic and caste groups with young children. These figures are roughly in line with the proportions of the different social groups in Nepal's 2011 census.

Table 1: Major religions, languages, and ethnicities among children under five (NMICS 2014)

Religion		Language		Ethnicity	
Hinduism	85.6%	Nepali	42.8%	Hill Janajati	18%
Buddhism	5.6%	Maithili	15.9%	Hill Chhetri	18%
Islam	4.9%	Bhojpuri	10.0%	Madhesi (non-Brahmin/Chhetri)	16.3%
Kirat	2%	Tharu	4.9%	Hill Dalit	10%
Christianity	1.3%	Tamang	3.6%	Hill Brahmin	9.9%
Other	0.6%	Newar	1.8%	Tarai Janajati	8%
		Limbu	1.5%	Madhesi Dalit	5.8%
		Baitadeli	1.3%	Muslim	5.2%
		Other	18.2%	Other	8.8%

3.1.2 Family characteristics

Among the children aged 0-4 years, 99 per cent lived with their biological mothers and 69 per cent with their biological fathers. Sixty nine per cent of the children in this age group lived with both their biological parents. The fathers of 23 per cent of these children were working abroad, including in neighbouring India, showing the large scale of labour migration in Nepal. The hill Chhetri, hill Dalit and hill Janajati children were significantly less likely to be staying with both their biological parents than the children from other castes and ethnicities.

3.1.3 Birthweight and child feeding practices

The NMICS collected data on the birthweight of sample children born in the previous two years and the feeding practices of those children up to 36 months of age. According to the final NMICS report, close to 25 per cent of children born in the previous two years had weighed under 2,500 grammes at birth, which is a low birthweight. There was a 10 percentage point difference in the prevalence of low birth weight between children born in households in the poorest and richest quintiles.

The proper feeding of infants and children is crucial for their survival, growth and development. Although direct evidence is hard to find, the appropriate feeding of children during their early years is likely to reduce the potential for stunting caused by malnutrition. The NMICS collected data on breastfeeding and complementary feeding practicess in children aged under two years. About 57 per cent of the children aged 0–5 months were exclusively breastfed[14] and 86 per cent of the children aged 6–23 months continued to be breastfed. More than 93 per cent of the children aged 12–15 months and 86.7 per cent of the children aged 20–23 months had received breast milk on the day preceding the survey. While 74.4 per cent of the children had received solid, semi-solid and soft food at least the minimum times on the day preceding the survey, only 37 per cent had appropriate diversity in their diets. There was no statistically significant difference in children who had appropriate dietary diversity

[14] Exclusively breastfed means only received breast milk, with the exception of oral rehydration solution, vitamins, and mineral supplements.

between the first four wealth quintiles. Only children in the richest quintile had significantly higher appropriate dietary diversity.

3.2 Water and sanitation

In the 2014 NMICS, 81.2 per cent of surveyed households were not using any form of drinking water treatment, irrespective of their source of drinking water. This is potentially serious as the survey also found that more than 20 per cent of the households were consuming drinking water with very high levels of *E. coli*. Additionally, 26 per cent of the households were still practising open defecation, 27.5 per cent had no specific place in their dwellings where a cleansing agent for handwashing was present, and 52 per cent of the households with children under two years of age were not disposing of child faeces safely. These facts and figures suggest that children from households who do not practice good sanitation and hygiene run the severe risk of becoming infected and undernourished due to waterborne diseases.

In this section, the NMICS statistics on water and sanitation practices are further disaggregated by geographic area, wealth quintile, and caste and ethnicity to identify the groups that most lack basic hygiene and sanitation. This kind of analysis helps understand the factors that are most strongly associated with poor sanitation practices, and where policymaking needs to intervene.

3.2.1 Comparison between NDHS 2011 and NMICS 2014 findings

The NDHS 2011 and NMICS 2014 are representative national household surveys that use similar sampling strategies and administer many of the same questions to households in Nepal. As such, it is possible to compare data on indicators related to water, sanitation and hygiene from the two surveys. The NDHS 2011 administered questions on three of the five WASH indicators that are explored in further detail in this section. Note that the NDHS 2011 did not have indicators for the number of households that had a handwashing place less than 10 paces away from the latrine and for the number of households that safely dispose of child faeces.

Some of the WASH-related indicators improved substantially between the NDHS 2011 and NMICS 2014 surveys (Table 2). For example, households practising open defecation reduced from 47 per cent to 31.5 per cent while households with no cleansing agent and water at their handwashing places reduced from 35.7 per cent to 26.8 per cent. However, the percentage of households that used some form of drinking water treatment method remained alarmingly low. And even though other indicators have shown relative improvement, the absolute rate of poor sanitation and hygiene practices was still high.

Table 2: Percentage of households with children under five that did not treat drinking water, practised open defecation and had no cleansing agent for handwashing (in NDHS 2011 and NMICS 2014)

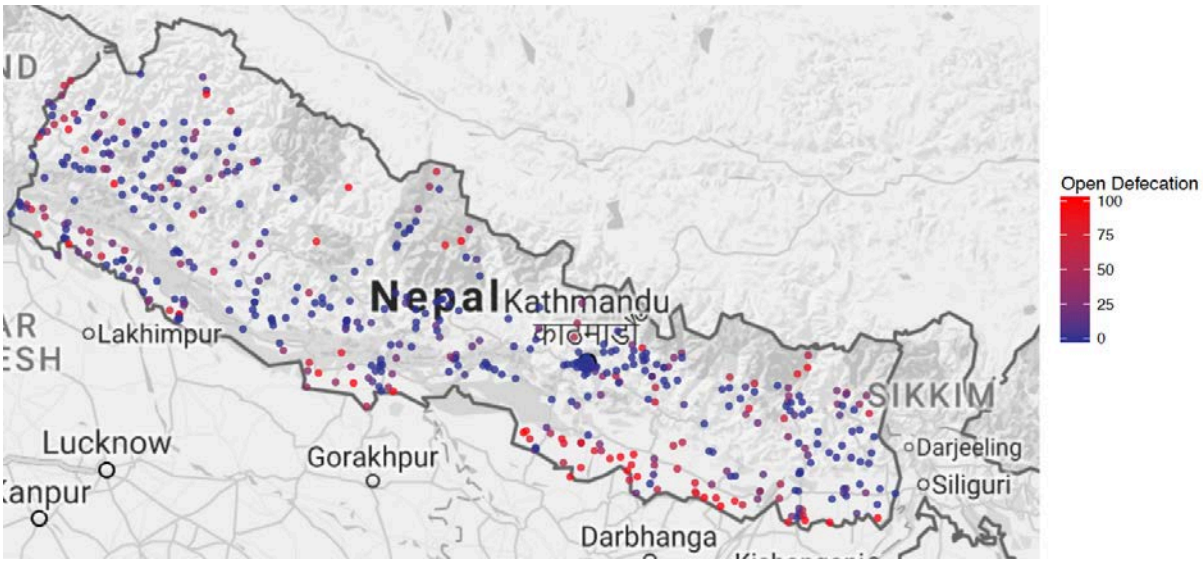
Indicator	No water treatment		Open defecation		No cleansing agent for handwashing	
Source	NDHS 2011	NMICS 2014	NDHS 2011	NMICS 2014	NDHS 2011	NMICS 2014
Mean value	87.6	84.2	47.0	31.5	35.7	26.8
Confidence interval	[85.3, 90.0]	[81.7, 86.8]	[41.2, 52.7]	[26.5, 36.5]	[32.1, 39.4]	[23.7, 29.9]
Number of housholds	**4,380**	**4,154**	**4,380**	**4,154**	**4,380**	**4,154**

3.2.2 Geographic variation in practice of open defecation

Figure 3 shows the geographic variation in open defecationamong households with at least one member under five. [15] Each sampling cluster covered in the NMICS is represented by a dot on the map. Blue dots represent the relatively low incidence of open defecation and red dots the relatively high incidence of open defecation in a sample cluster along the spectrum from blue to red. For example, the value will be 100 per cent for a cluster if all households in that cluster practice open defecation, 50 per cent if a half of all households in the cluster practice open defecation, and so on.

As is clearly seen in Figure 3, the households in and around the Kathmandu Valley have overall good sanitation practices with regards to open defecation while the hill and mountainous regions had less open defecation than the southern Tarai plains.

Figure 3: Percentage of households with children under the age of five years that practised open defecation – by NMICS 2014 sampling cluster



The Eastern and Central Tarai regions had more households defecating in the open than the rest of the country.

3.2.3 Variation based on area, wealth quintile, and caste/ethnicity

Table 3 presents the difference in all five WASH indicators of interest based on whether households with children under five lived in rural or urban locations. The differences were also assessed for their statistical significance. In all five indicators, households in urban settings had universally better water, sanitation and hygiene practices. The urban households were 40.1 per cent points more likely to use some form of drinking water treatment, 28.4 per cent points less likely to practice open defecation, 14.7 per cent points more likely to have a cleansing agent at their handwashing place, 25.2 per cent points more likely to have a handwashing place less than 10 paces from their latrines and 37.5 per cent points less likely to dispose of child faeces unsafely.

[15] See Appendix 3 for similar maps of the results of other WASH indicators.

Table 3: Difference in percentage of households with children under the age of five years that have poor WASH practices – by type and rural/urban residence (NMICS 2014)

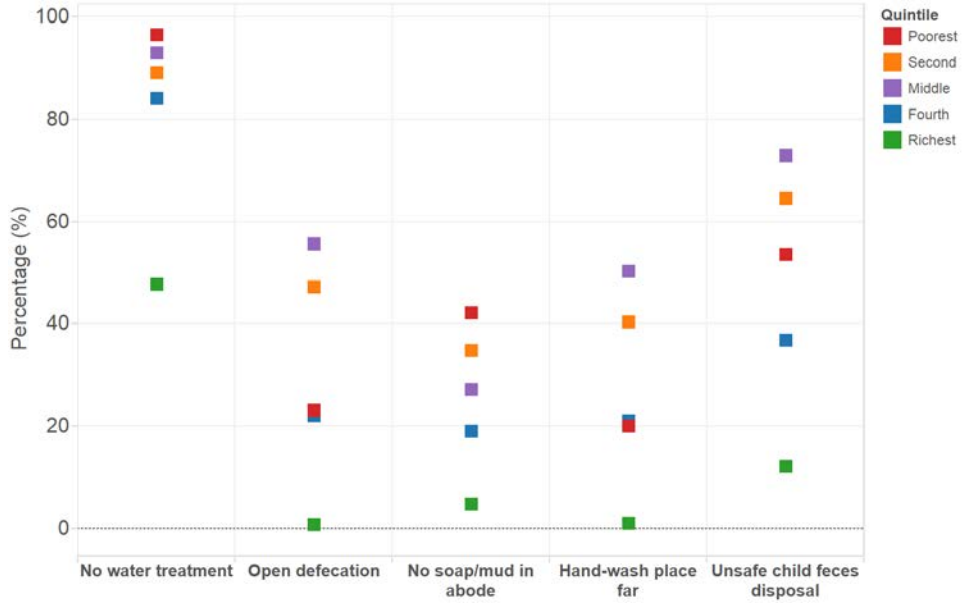
	No water treatment	Open defecation	No cleansing agent at washing place	Handwashing place far away	Unsafe child faeces disposal
Urban households	-0.401*** (0.000)	-0.284*** (0.000)	-0.147*** (0.000)	-0.252*** (0.000)	-0.375*** (0.000)
Observations	5,337	5,302	5,200	5,200	2,879
p-values: * p < 0.1; ** p < 0.05; *** p < 0.01					

The findings on water treatment should concern policymakers. Even among households in the richest quintile, almost 50 per cent of them did not use any form of water treatment and were drinking water that came directly from the source (see *Figure 4*). The lower four quintiles were significantly worse off with more than 80 per cent not using any form of treatment for their drinking water.

Other interesting findings concern open defecation, having a handwashing place within 10 paces of their latrines, and the unsafe disposal of child faeces. Households in the poorest and second richest quintiles had significantly better sanitary practices than those in the second poorest and middle quintiles for these three indicators. A possible cause of this relationship is the variation by geographical area shown in the previous section. Households living in the Tarai usually belong to the second richest and middle income quintiles and also, on average, have poor water and sanitation practices. This may be driving the wealth quintile results in Figure 4. Overall, households in the richest quintile had exponentially better WASH practices than those in the other quintiles. However, households in the poorest and second richest quintiles had marginally better WASH practices than the second richest and middle quintile households.

The data disaggregated by ethnicity and caste clearly shows that there is a more urgent need for policymakers to address the poor sanitation standards throughout the Tarai region.

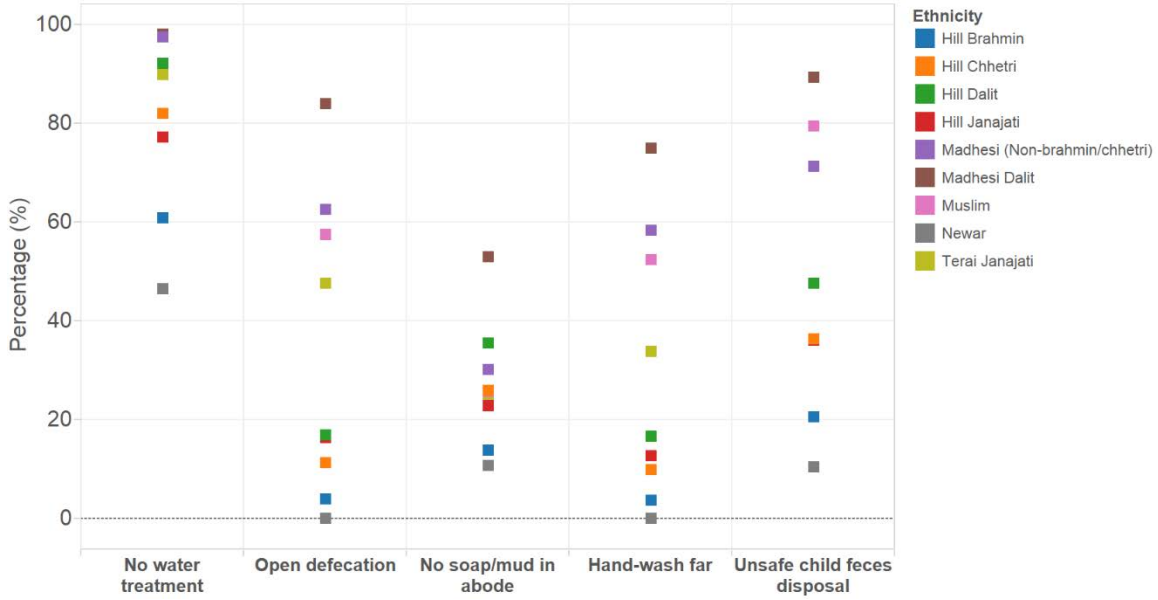
Figure 4: Percentage of households with children under five that have poor WASH practices – by type and wealth quintile (NMICS 2014)



Over 80 per cent of households in the lowest four wealth quintiles did not use any form of drinking water treatment and drank water directly from the source.

Figure 5 shows the differences in water and sanitation practices by caste and ethnicity. Almost no households in the Madhesi, Madhesi Dalit and Muslim households used any form of treatment for their drinking water while more hill Brahmin and Newar households treated their water, although the proportion was still poor on an absolute scale. The Madhesi and Madhesi Dalit households fared relatively poorly for all the other WASH-related indicators.

Figure 5: Percentage of households with children under five that had poor WASH practices – by type and ethnicity (NMICS 2014)



The Tarai-based Madhesi, Madhesi Dalit and Muslim households fared considerably poorly on the sanitation-related indicators compared to the other households.

A clear pattern emerges when disaggregating the 2014 NMICS water and sanitation findings by area, region, wealth, and caste and ethnicity:

- On average, the households in the Tarai region had poor water and sanitation standards.
- Over 80 per cent of households in the lower four wealth quintiles did not treat their drinking water.
- The households in the poorest and second richest wealth quintiles had marginally better water and sanitation standards than households in the second richest and middle wealth quintiles.
- The Madhesi castes and ethnicities, and especially the Madhesi, Madhesi Dalit, and Muslim households had alarmingly poor WASH standards that should concern donors and policymakers.

3.3 Undernutrition, diarrhoea and fever

The 2014 NMICS found a relatively high prevalence of undernutrition in Nepal, with 37.4 per cent of children under five stunted, 30 per cent underweight and 11.3 per cent wasted. And, 12 per cent of these children were reported as having diarrhoea and 20 per cent had episodes of fever in the two weeks preceding the survey. Despite making good overall progress on the Millennium Development Goals, these type of deficiencies in nutrition and health-related indicators are holding Nepal back from providing healthy lives for all its children.

3.3.1 Comparison between NDHS 2011 and NMICS 2014 findings

The NMICS 2014 and the NDHS 2011 both administered questions related to anthropometric measures for children under five. The results show marginal improvements in some stunting from the NDHS 2011 to NMICS 2014 although the overall nutrition status of these children remained largely constant, which should worry nutrition-related policymakers (see Table 4). The prevalence of stunting reduced by four per cent points from 41.6 per cent in 2011 to 37.4 per cent in 2014; but the difference is not statistically significant at the 95 per cent level, while there were no significant changes in underweight and wasting. It is recognised that the four years between the two surveys is a short period for changes to occur.

Table 4: Percentage of children under five who were stunted, wasted and underweight in NDHS 2011 and NMICS 2014

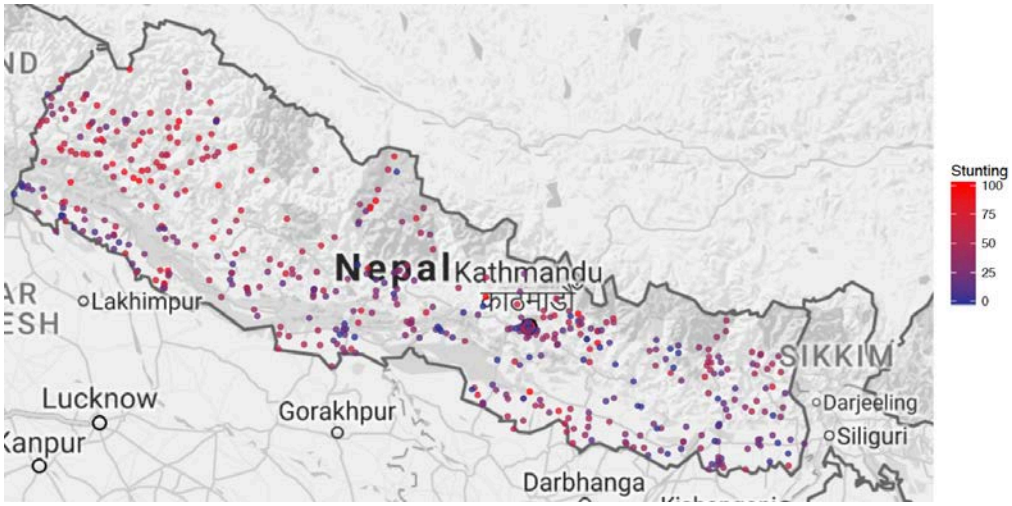
Indicator	Stunting		Wasting		Underweight	
Source	NDHS 2011	NMICS 2014	NDHS 2011	NMICS 2014	NDHS 2011	NMICS 2014
Mean value	41.6	37.4	11.4	11.3	30.1	30.1
95% confid. interval	[38.9, 44.4]	[35.0, 39.7]	[9.8, 13.1]	[9.9, 12.7]	[27.5, 32.8]	[27.9, 32.4]
Number of children	**2,381**	**5,138**	**2,380**	**5,235**	**2,381**	**5,135**

3.3.2 Geographic variation in stunting

Figure 6 shows the geographical variation in stunting among children under five with each NMICS 2014 sampling cluster represented by a dot. [16] Blue dots represent relatively low incidences of stunting and red dots relatively high incidences of stunting in clusters. For example, the value is 100 per cent for a cluster if all children in that cluster are stunted, 50 per cent if half of the children in that cluster are stunted, and so on. As is clearly shown in Figure 6, the western part of Nepal, especially the Mid-Western and Far Western hills and mountains had a higher prevalence of stunting among children under five.[17]

[16] See Appendix 3 for maps of other nutrition indicators.
[17] See Appendix 1 for the location of these regions.

Figure 6: Percentage of children under five who were stunted – by NMICS 2014 sampling cluster



There was more stunting among children under five in the western than eastern parts of Nepal.

3.3.3 Variation based on area, wealth quintile, and caste and ethnicity

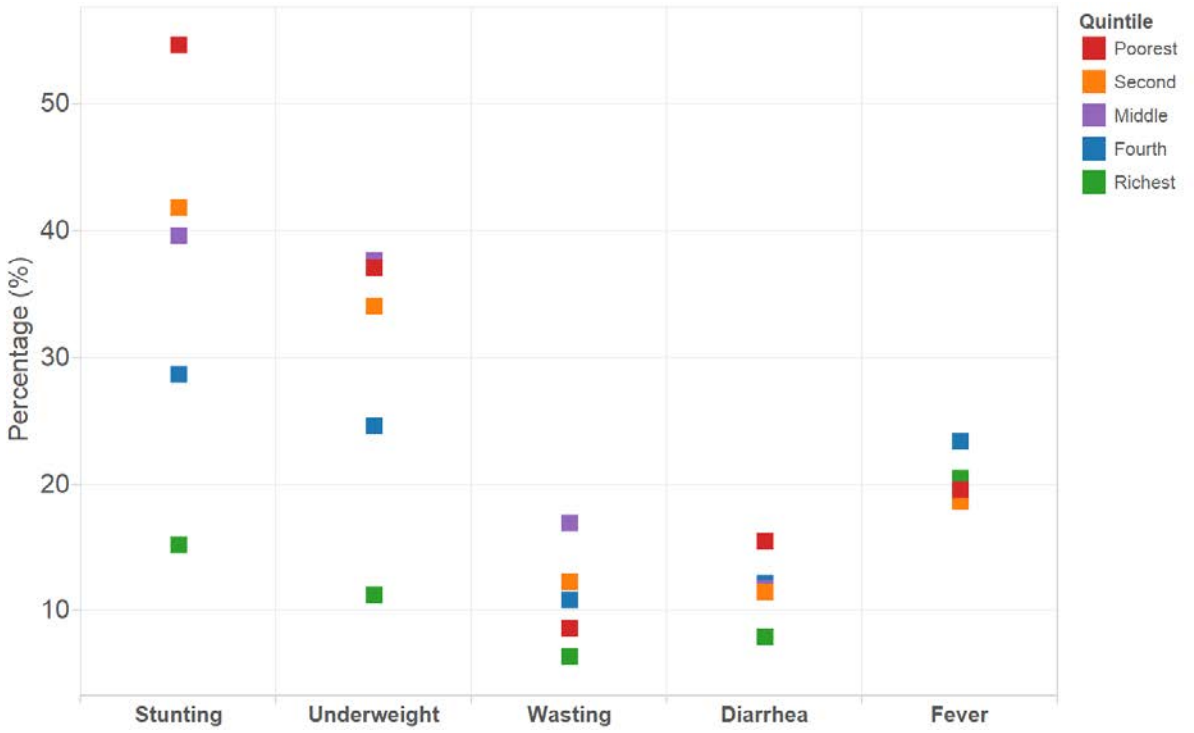
The NMICS 2014 found that children in urban households were less likely to be stunted, underweight, wasted, and have had diarrhoea or episodes of fever compared to children in rural households (see *Table 5*). However, the extent of this difference varied by indicator. For example, urban children were 15.7 percentage points less likely to be stunted, and 15.6 percentage points less likely to be underweight than children in rural households. However, they were only 6.1 percentage points less likely to be wasted and 2.6 percentage points less likely to suffer from diarrhoea than the children in rural households. There was no statistical difference in urban and rural children in terms of episodes of fever in the last two weeks.

Table 5: Difference in percentage of children under five years with poor nutrition and health outcomes – by type and rural/urban distinction (NMICS 2014)

	Stunting	Underweight	Wasting	Diarrhoea	Fever
Urban households	-0.157*** (0.000)	-0.156*** (0.000)	-0.061*** (0.000)	-0.026* (0.076)	0.020 (0.339)
Observations	5,138	5,235	5,135	5,345	5,349
p-values: * p < 0.1; ** p < 0.05; *** p < 0.01					

Figure 7 shows the differences between undernutrition, diarrhoea and fever based on the wealth quintile of households with children under five. The indicator with the highest variation is stunting, which ranges from over 50 per cent prevalence for children in the poorest quintile to around 15 per cent for children in the richest quintile. Surprisingly, there was no significant difference in stunting between children in the poorest three quintiles. Children in the second richest and richest quintiles were significantly less likely to be stunted and underweight, while children in the richest quintile were significantly better off for every indicator except fever. Interestingly, for wasting, children in the richest and second poorest quintiles were significantly better off compared to children in the middle wealth quintile.

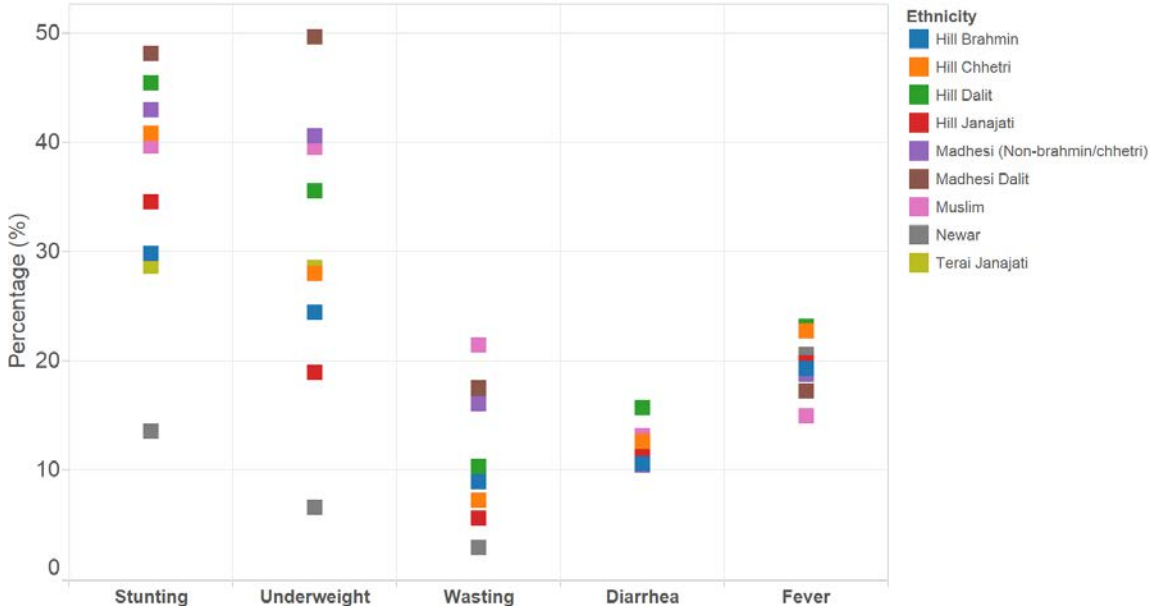
Figure 7: Percentage of children under five with poor nutrition and health outcomes – by type and wealth quintiles (NMICS 2014)



There was a 40 percentage points difference in the prevalence of stunting between children in the poorest and richest wealth quintiles

Figure 8 shows the differences in the overall nutrition and health status of children under five by caste and ethnicity. Newar children had the least stunting of all the caste and ethnic groups. Almost 50 per cent of Madhesi Dalit children were underweight compared to only 6.6 per cent of Newar children. Interestingly, no social group was significantly different when it came to the prevalence of diarrhoea and fever among under five-year-olds. Surprisingly, hill Brahmin children had only average performance on these indicators, despite this community doing significantly better on most other social and economic indicators. Children in the Madhesi, Madhesi Dalit and Hill Dalit communities fared significantly worse than the children from the other major social groups.

Figure 8: Percentage of children under five with poor nutrition and health outcomes – by type and ethnicity (NMICS 2014)



Almost 50 per cent of the Madhesi Dalit children were both stunted and underweight.

Overall, there was significant variation in undernutrition, diarrhoea, and fever status by geography, wealth quintile and caste and ethnicity among the children under five. While these three factors had very little influence on the prevalence of diarrhoea or fever, the three nutrition-related indicators (stunting, wasting and underweight) were significantly affected by urban or rural residence, wealth quintile and whether children were Madhesi Dalits or Newars. Thus, the most vulnerable children to stunting, wasting and underweight were those who lived in rural households, belonged to the poorest three quintiles and were from the Madhesi, Madhesi Dalit, hill Dalit and Muslim communities.

3.4 Logistic regression analysis of the determinants of undernutrition, diarrhoea and fever

This section explores the determinants of stunting, underweight, wasting, diarrhoea and fever among children under five in the NMICS 2014 sample. Using a logistic regression framework, this analysis controls for a host of household and individual characteristics to determine associations with the dependent variables of undernutrition, diarrhoea and fever among children.

The reference categories and the variables were selected based on the descriptive analysis in previous sections and the literature on the subject.[18] For geography, the Mid-Western region was selected as the reference category as large parts of this region lag behind on WASH and nutrition-related indicators. Madhesi Dalits were selected as the reference category for ethnicity because the above descriptive analysis found this group performing worse on both sets of outcome variables explored. Other variables chosen for analysis were wealth quintile, urban/rural residence, level of mother's education, household size and WASH-related indicators. While these 11+ variables were selected based on the context and the preceding analysis, it is probably not a comprehensive list of the factors that affect the outcome variables in question. As such, this section should be treated as further exploratory analysis. No interactions between variables were explored in this analysis.

[18] For example, see: Parasuraman, Sulabh, Sunita Kishor, Shri Kant Singh, and Y. Vaidehi, 'A Profile of Youth in India. National Family Health Survey (NFHS-3), India, 2005-06', 2009, International Institute for Population Sciences, Mumbai; ICF Macro, Maryland.

Two models were used. In the first model, four WASH-related variables were used as independent variables (see results in *Table 6*). The fifth variable of the unsafe disposal of child faeces was not included as the 2014 NMICS only collected information on this in households with children under the age of two. In the second model, the unsafe disposal of child faeces is included as a predictor variable (Table 7). The sample size for the latter model is smaller. Reference categories were taken for each characteristic and the odds ratios calculated for the non-reference categories as they varied from the reference category on the likelihood of being related to stunting, underweight, wasting, diarrhoea and fever.

3.4.1 Determinants of poor nutrition, diarrhoea and fever among children under five

Table 6 shows the logistic regression framework where 11 WASH-related variables were used separately as dependent variables, with the unsafe disposal of child faeces not being used as a predictor. Reference categories were taken for each characteristic and the odds ratios calculated.

The results show that in this analysis a number of key factors are associated with different forms of undernutrition, diarrhoea and fever in children under five:

- The analysis shows that geographical area (as represented by development region), was strongly associated with certain indicators measuring undernutrition, diarrhoea and fever. For example, children in the Eastern region were less likely to suffer from stunting compared to children in the Mid-Western region. On the contrary, children in the Eastern region were significantly more likely to suffer from fever than children in the Mid-Western region. Children from the Far Western region were significantly more likely to suffer from wasting compared to children in the Mid-Western region. And the incidence of diarrhoea was significantly less likely among children in the Central and Far Western regions compared to chidlren in the Mid-Western region.
- The mother's level of education was strongly related with most of the undernutrition and diarrhoea-related indicators. However, children under five with mothers who had only primary education did not fare any differently to children with mothers with no formal education. Only the children of mothers with secondary or higher levels of education were significantly less likely to be stunted and underweight.
- Caste and ethnicity was another predictor of overall nutrition status, fever and to some extent diarrhoea. Children in the Newar, Madhesi Brahmin/Chhetri, hill Dalit and hill Janajati households were significantly less likely to be stunted and underweight than those in the reference Madhesi Dalit households. Overall, children in the Newar households had significantly better nutrition and health status than children in the Madhesi Dalit households after controlling for socioeconomic differences.
- Wealth was another predictor of stunting and underweight among the under five-year-olds. However, the relationship between wealth and undernutrition is not linear. Children in the richest quintile were significantly more likely than those in the poorest to be stunted and underweight.
- Among the WASH variables, open defecation was significantly associated with stunting, while not having a cleansing agent at the handwashing place was strongly associated with wasting and fever. And, the children of households not treating their water were more likely to be underweight.

Table 6: Determinants of poor nutrition, diarrhoea and fever among under 5-year-olds (NMICS 2014)

	Odds ratios				
Background characteristics	**Stunting**	**Underweight**	**Wasting**	**Diarrhoea**	**Fever**
1. Region					
Ref. category: Mid-Western					
Eastern	0.479***	0.818	1.380	1.056	1.450**
Central	0.855	1.199	1.448	0.521***	0.848

Western	0.904	1.222	1.330	0.858	0.872
Far-western	0.954	0.910	1.458*	0.706**	0.942
2. Household size					
Ref. category: Small (1–4)					
Medium (5–8)	0.995	0.941	1.003	1.069	1.047
Large (8 or higher)	1.054	1.136	0.915	0.977	0.745**
3. Urban/rural					
Ref. category: Rural					
Urban	1.106	1.000	0.712	0.999	1.059
4. Mothers' education					
Ref. category: None					
Primary	0.920	1.095	1.144	0.821	1.141
Secondary	0.687***	0.819*	1.252	0.649***	1.058
Higher secondary	0.439***	0.475***	0.768	0.881	1.131
5. Ethnicity and caste					
Ref. category: Madhesi Dalit					
Hill Brahmin	0.846	0.746	0.733	1.606	1.351
Hill Chhetri	0.790	0.526***	0.474**	1.544	1.693*
Newar	0.407***	0.180***	0.235**	2.004	1.452
Madhesi Brahmin/Chhetri	0.112***	0.198***	1.204	0.965	2.416**
Hill Dalit	0.694	0.544***	0.624	1.871*	1.967**
Hill Janajati	0.682*	0.289***	0.349***	1.480	1.411
Tarai Janajati	0.522***	0.563***	0.992	1.416	1.458
Other	1.030	0.824	0.904	1.265	0.866
Muslim	0.816	0.741	1.333	1.650	0.996
Madhesi (non-Brahmin/Chhetri)	1.019	0.846	0.977	1.287	1.422
6. Wealth quintile					
Ref. category: Poorest					
Second	0.634***	0.735***	1.081	0.857	1.067
Middle	0.586***	0.696**	1.211	0.953	1.162
Fourth	0.426***	0.495***	0.943	1.027	1.491**
Richest	0.249***	0.280***	0.859	0.686	1.214
7. Father abroad					
Ref. category: Father not abroad					
Father abroad	0.954	0.910	1.458*	0.706**	0.942
8. Water treatment					
Ref. category: Treats water					
No water treatment	1.050	1.371*	1.486	0.918	0.915
9. Defecation					
Ref. category: Uses latrine					
Open defecation	1.381*	1.075	0.991	1.604	1.031
10. Cleansing agent at handwashing place					
Ref. category: Has cleansing agent at handwashing place					
No cleansing agent at washing place	1.029	1.045	1.275**	1.091	1.441***
11. Handwashing					
Ref. category: Handwashing facilities close to latrine					
No handwashing facilities close to latrine	0.776	0.985	1.001	0.744	0.903
Sample size (N)	**4,933**	**5,026**	**4,927**	**5,132**	**5,136**
p-values: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$					

3.4.2 Determinants of poor nutrition, diarrhoea and fever among children under two

The analysis in Table 7 used the same 11 variables as Table 6 for children under two years of age, and added the predictor variable of the unsafe disposal of child faeces. Since this variable is only administered among a subset of the households, the sample size reduces by almost one-third. Table 7 also shows similar key determinants of undernutrition – diarrhoea and fever among children under two.

- The analysis shows geography playing a similar role to the analysis for children under five shown in Table 6, with children in the Eastern region less likely to be stunted than children in the reference Mid-Western region. However, children under two-years-old in the Far Western region did not fare better on the diarrhoea indicator. Children in the Central region were more likely to be wasted and less likely to have diarrhoea compared to children in the Mid-Western region.

- The level of mothers' education and wealth quintile had similar associations for under two-year-olds as for under five-year-olds. The relationship between wealth and undernutrition is non-linear for stunting and underweight prevalence in two-year-olds. Children with mothers who had secondary education or higher were significantly less likely to be stunted.
- Interestingly, in this analysis, children whose fathers were abroad were significantly less likely to be stunted. This has important contextual and policy implications in Nepal as almost one-third of working age men work abroad.
- Finally, among the WASH-related indicators, the unsafe disposal of child faeces was not significantly correlated with the undernutrition, diarrhoea and fever-related indicators. However, this is not to say that the safe disposal of child faeces is not important. This result may be driven by the fact that households that practice other forms of poor sanitation like open defecation are probably also more likely to dispose of child faeces unsafely. As for the under-fives, children under two in households that practised open defecation were significantly more likely to be stunted and have diarrhoea. Similarly, under two-year-olds in households that did not treat drinking water were significantly more likely to be underweight, and children in households that did not have a cleansing agent at their handwashing place were significantly more likely to suffer from episodes of fever.

Table 7: Determinants of poor nutrition, diarrhoea and fever among under two-year-olds (NMICS 2014)

	Odds ratios				
Background characteristics	**Stunting**	**Underweight**	**Wasting**	**Diarrhoea**	**Fever**
1. Region					
Ref. category: Mid-Western					
Eastern	0.500***	0.810	1.560	1.003	1.363
Central	0.828	1.363	1.627*	0.522***	0.741
Western	0.924	1.146	1.392	0.905	0.993
Far Western	1.013	1.024	1.268	0.706	0.915
2. Household size					
Ref. category: Small (1–4)					
Medium (5–8)	0.878	0.904	1.090	1.067	1.017
Large (8 or higher)	0.830	1.067	1.038	1.003	0.746
3. Urban/rural					
Ref. category: Rural					
Urban	1.085	0.880	0.885	0.907	0.957
4. Mother's education					
Ref. category: None					
Primary	0.900	1.326*	1.221	0.936	1.169
Secondary	0.640***	0.919	1.101	0.679**	1.031
Higher Secondary	0.421***	0.513***	0.709	0.819	1.021
5. Ethnicity and caste					
Ref. category: Madhesi Dalit					
Hill Brahmin	0.540*	0.508**	0.913	1.352	1.178
Hill Chhetri	0.594	0.334***	0.354***	1.352	1.211
Newar	0.194***	0.0587***	0.176**	1.511	0.926
Madhesi Brahmin/Chhetri	0.106**	0.272**	1.264	0.851	2.431*
Hill Dalit	0.615	0.466**	0.622	1.679	1.455
Hill Janajati	0.438**	0.190***	0.308***	1.418	1.075
Tarai Janajati	0.505*	0.426**	0.983	1.408	1.164
Other	0.726	0.707	0.919	1.253	0.486
Muslim	0.555	0.383***	0.876	1.205	0.538
Madhesi (non-Brahmin/Chhetri)	0.743	0.579*	0.923	1.168	1.128
6. Wealth quintile					
Ref. category: Poorest					
Second	0.608***	0.612***	0.880	0.798	0.997
Middle	0.583***	0.711*	0.816	0.950	0.938
Fourth	0.402***	0.406***	0.828	0.994	1.441*
Richest	0.236***	0.253***	0.688	0.706	1.294
7. Father abroad					

Background characteristics	Stunting	Underweight	Wasting	Diarrhoea	Fever
Ref. category: Father not abroad					
Father abroad	0.754**	0.847	1.047	0.764	1.164
8. Water treatment					
Ref. category: Treats water					
No water treatment	0.919	1.027	1.888**	0.885	0.863
9. Defecation					
Ref. category: Uses latrine					
Open defecation	1.643*	1.183	0.752	1.916**	1.564
10. Cleansing agent at handwashing place					
Ref. category: Cleansing agent present					
No cleansing agent present	0.914	1.077	1.249	0.846	1.267*
11. Handwashing					
Ref. category: Handwashing facilities close to latrine					
No handwashing facilities close to latrine	0.651*	0.892	1.089	0.619	0.756
12. Disposal of child faeces					
Ref. category: Safe disposal of child faeces					
Unsafe disposal of child faeces	0.956	0.964	1.262	0.933	0.824
Sample size (N)	**2,651**	**2,707**	**2,642**	**2,759**	**2,760**

p-values: ** p < 0.1; ** p < 0.05; *** p < 0.01*

4 DISCUSSION AND CONCLUSIONS

This analysis highlights two key domains related to the overall health of children under five in Nepal. First, the analysis of several WASH-related indicators shows that the overall status of water, sanitation and hygiene is poor in Nepal. Over 80 per cent of households surveyed by the 2014 NMICS did not treat their drinking water despite the high prevalence of *E. coli* in most of the households sampled for water quality testing. Furthermore, more than a quarter of the households practised open defecation, and over a half with children under two did not dispose of child faeces safely. This indicates that, despite considerable progress over the past two decades, crucial water, sanitation and hygiene challenges remain in Nepal.

Second, this analysis looked at indicators related to undernutrition, diarrhoea and fever among children under five. As for the first domain, the children fared relatively poorly for stunting and low weight. Additionally, over 20 per cent of children under five had suffered episodes of fever in the two weeks preceding the survey.

The WASH and nutrition-related indicators were further disaggregated by geography (development region), wealth quintile and ethnicity to identify the groups most likely to have poor sanitation and hygiene practices. This found that the status of water, sanitation and hygiene was considerably worse in the Tarai than in the hills and mountains. This finding was corroborated by findings disaggregated by wealth quintile, and in certain WASH-related indicators such as the practice of open defecation where households in the middle income quintile (many of whom are Madhesi community households) fared significantly worse than those in the poorest quintile. Similarly, the Madhesi social groups in general and Madhesi Dalits, Muslims, and Madhesi (non-Brahmin/Chhetri) in particular had poorer WASH status than households from other ethnicities and castes.

The nutrition-related status did not show as distinct a variation by geography, but was markedly different when disaggregated by wealth quintile and ethnicity. There was a 40 percentage point difference in the prevalence of stunting between children in the poorest and richest quintiles, and a 30 percentage point difference between the same two groups for children being underweight. Similarly, children in the Madhesi Dalit households were 40 percentage points more likely to be underweight and 35 percentage points more likely to be stunted than Newar children.

Finally, logistic regressions were used to identify individual and household characteristics associated with undernutrition, diarrhoea and fever. The mother's level of education was strongly associated with less undernutrition among children under five when the mother had secondary or higher level education. Wealth had a non-linear effect on the nutrition-related indicators with households in the richest quintile performing considerably and significantly better than households in the lowest four quintiles. Finally, the cross-sectoral linkages between the WASH and nutrition indicators were analysed. The households practicing open defecation were found to have more stunted children. This is consistent with findings from India where researchers found a strong correlations between open defecation and stunting.[19]

This report thus sheds light on the WASH and nutritional status of children under five in Nepal. Concerned policymakers and practitioners should use these findings to develop ways of overcoming the

[19] See for example, Spears D, Ghosh A and Cumming O (2013), *Open Defecation and Childhood Stunting in India: An ecological analysis of new data from 112 districts*, 2013, PLOS ONE 8(9), <https://researchonline.lshtm.ac.uk/1236263/1/pone.0073784.pdf>, accessed December 2016. The researchers found that a 10% increase in open defecation led to an increase of both stunting and severe stunting by 0.7 percentage points.

inequities suffered by the most marginalized geographic, income and social groups related to the domains analysed to prevent these inequities from being perpetuated.

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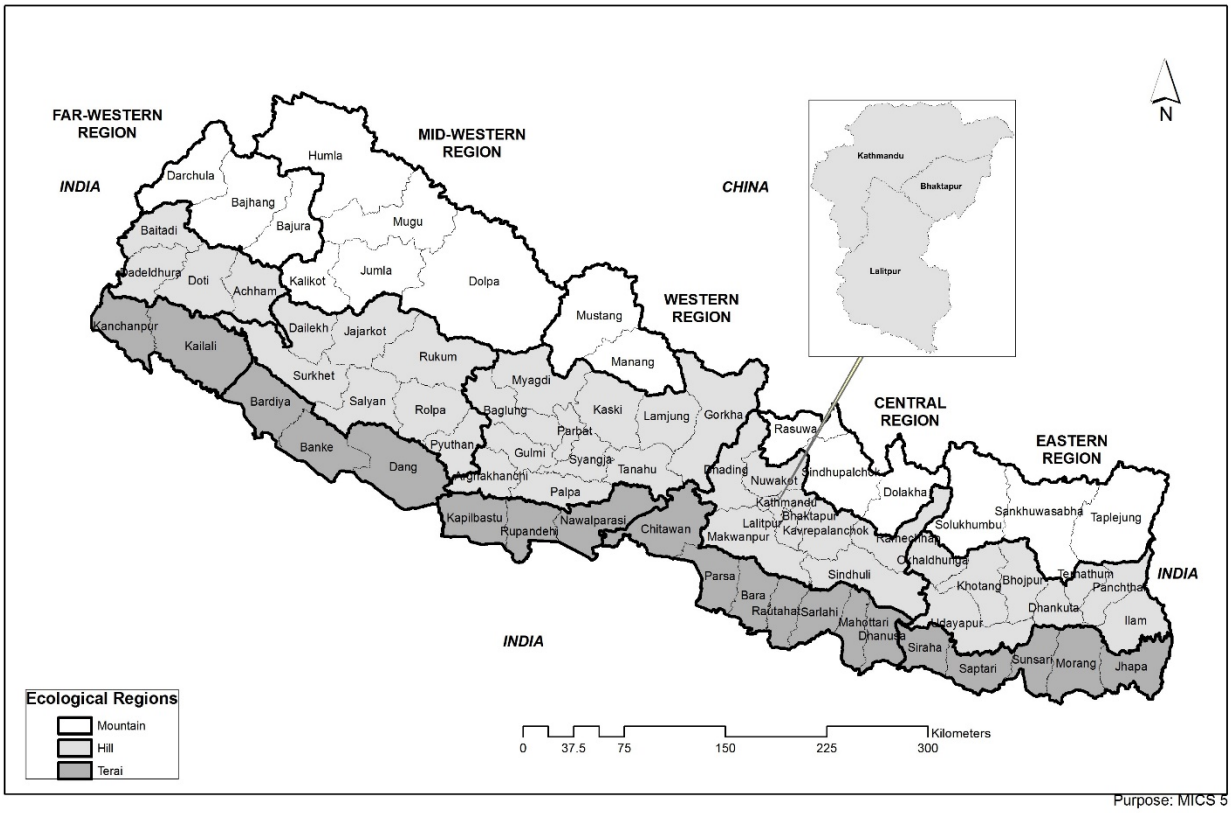
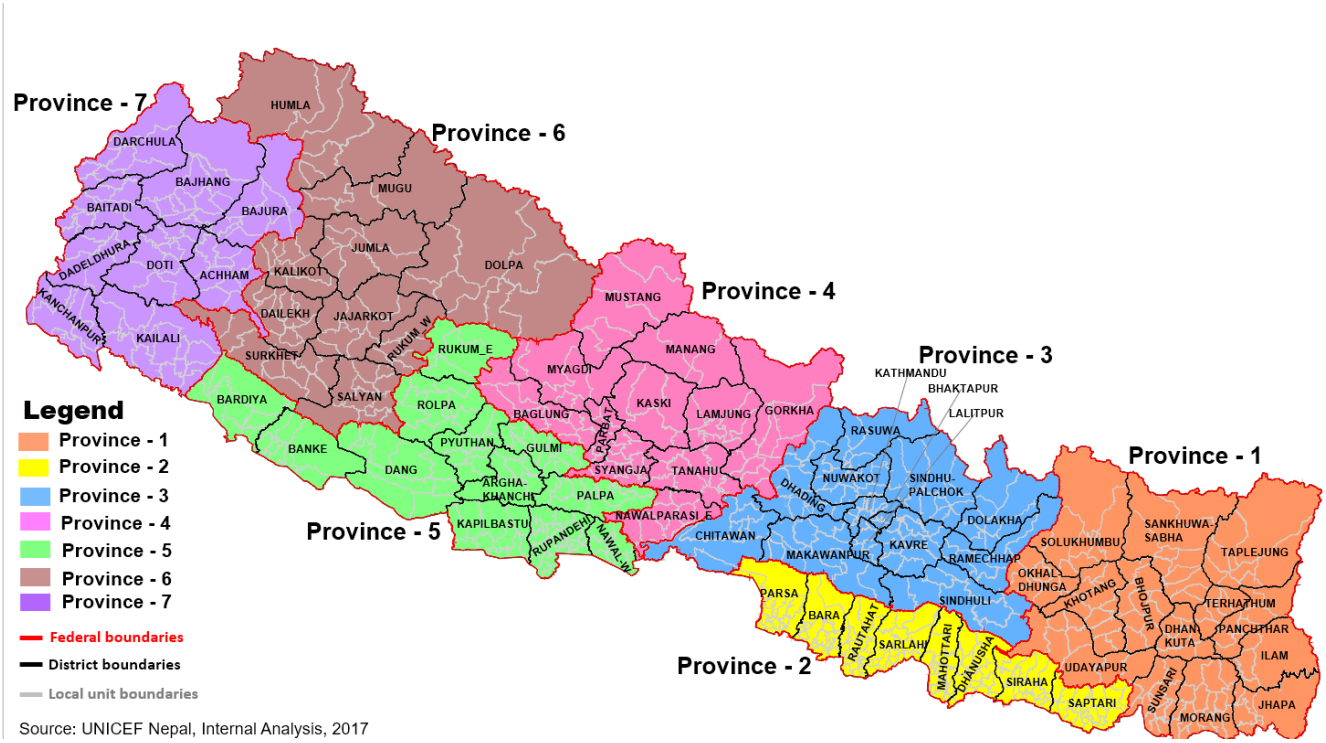
Appendix 1: Map of the NMICS ecozones and Nepal's former development regions



Appendix 2: Map of Nepal's provinces



Source: UNICEF Nepal, Internal Analysis, 2017

Appendix 3: Additional maps showing results of further analysis of NMICS 2014

1. WASH

Figure A1: Percentage of households with children under five that did not treat their drinking water – by NMICS 2014 sampling cluster

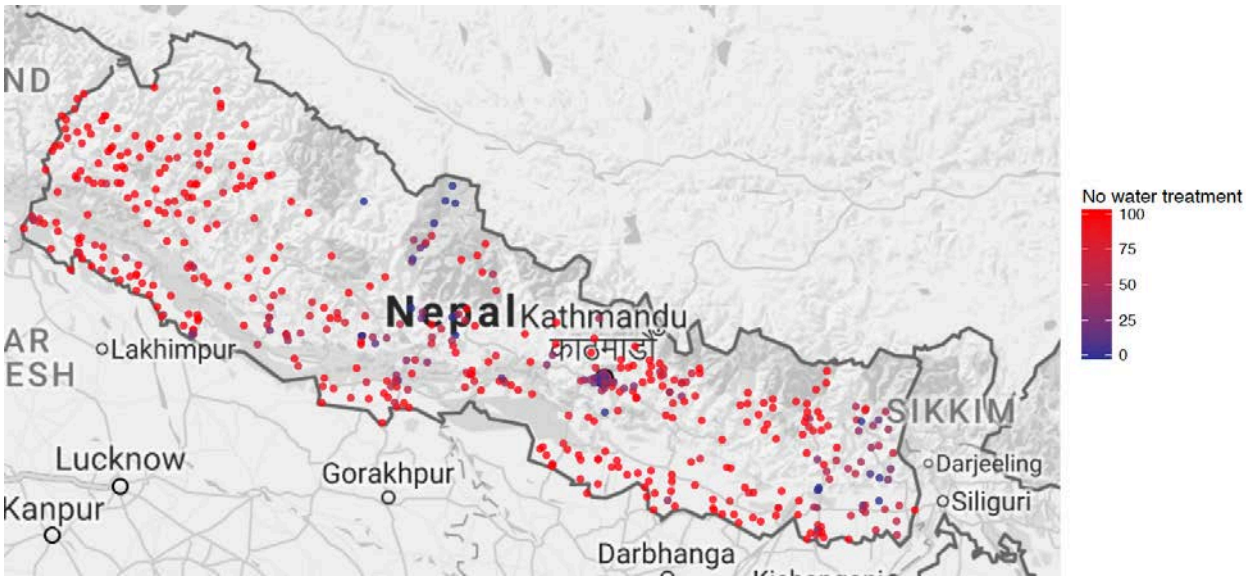


Figure A2: Percentage of households with children under five that did not have a cleansing agent at their handwashing places – by NMICS 2014 sampling cluster

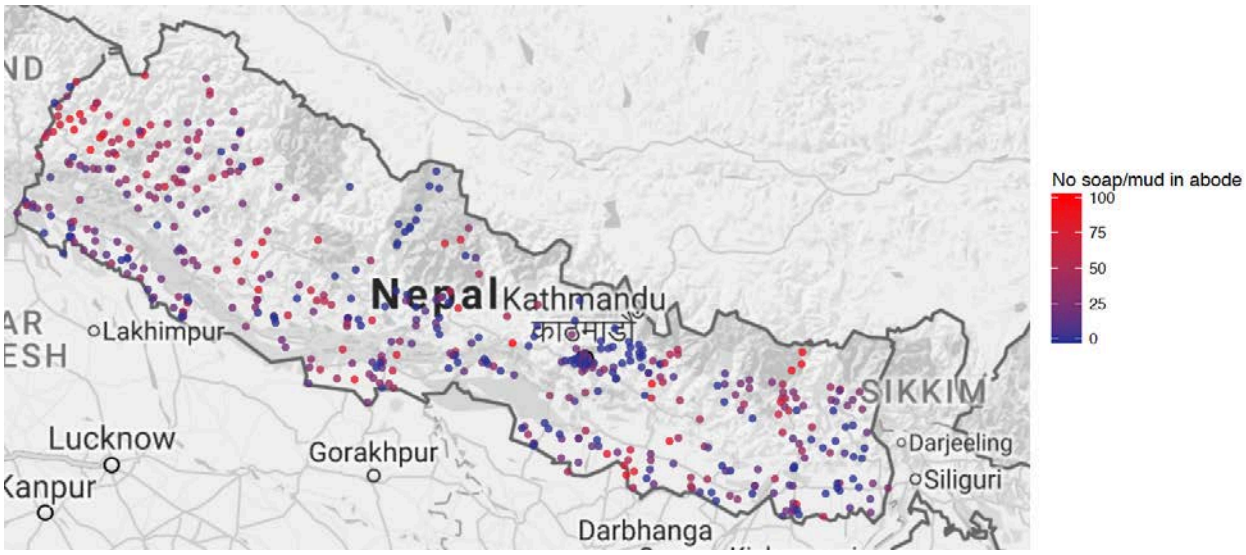


Figure A3: Percentage of households with children under five that had a handwashing place more than 10 paces away from their latrine – by NMICS 2014 sampling cluster

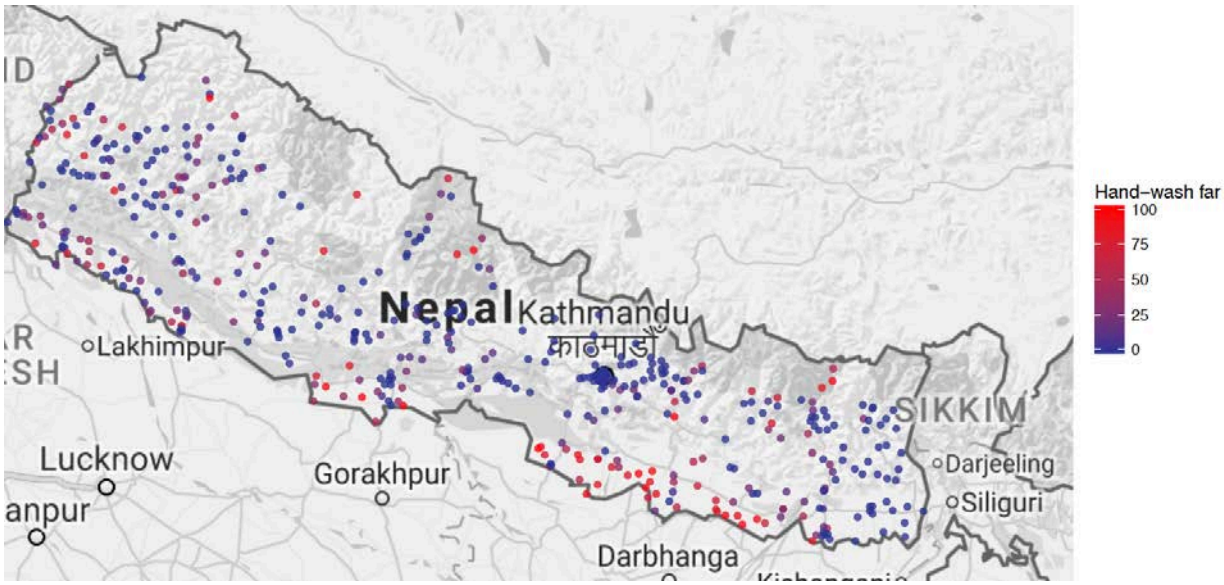
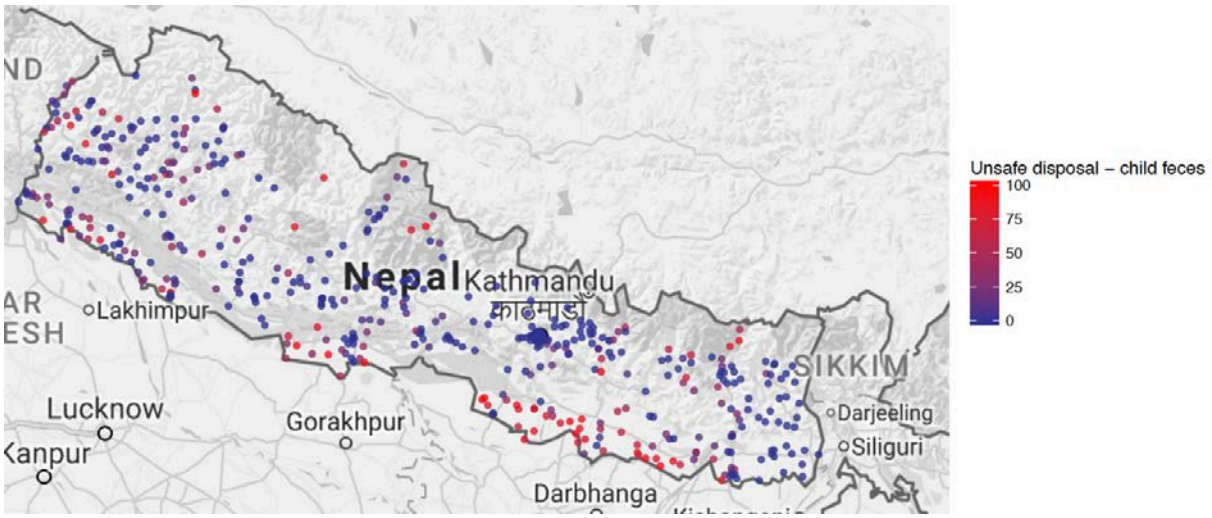


Figure A4: Percentage of households with children under two that did not dispose of child faeces safely – by NMICS 2014 sampling cluster



2. Nutrition and child health

Figure A5: Percentage of under fives who were underweight – by NMICS 2014 sampling cluster

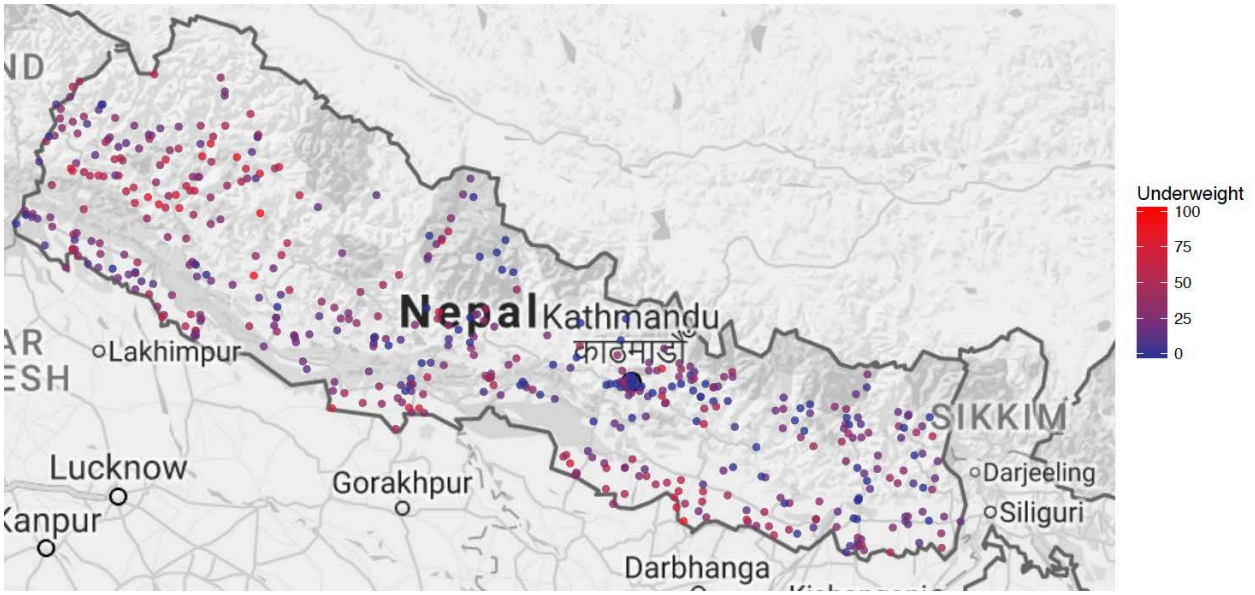


Figure A6: Percentage of children under five who were wasted – by NMICS 2014 sampling cluster

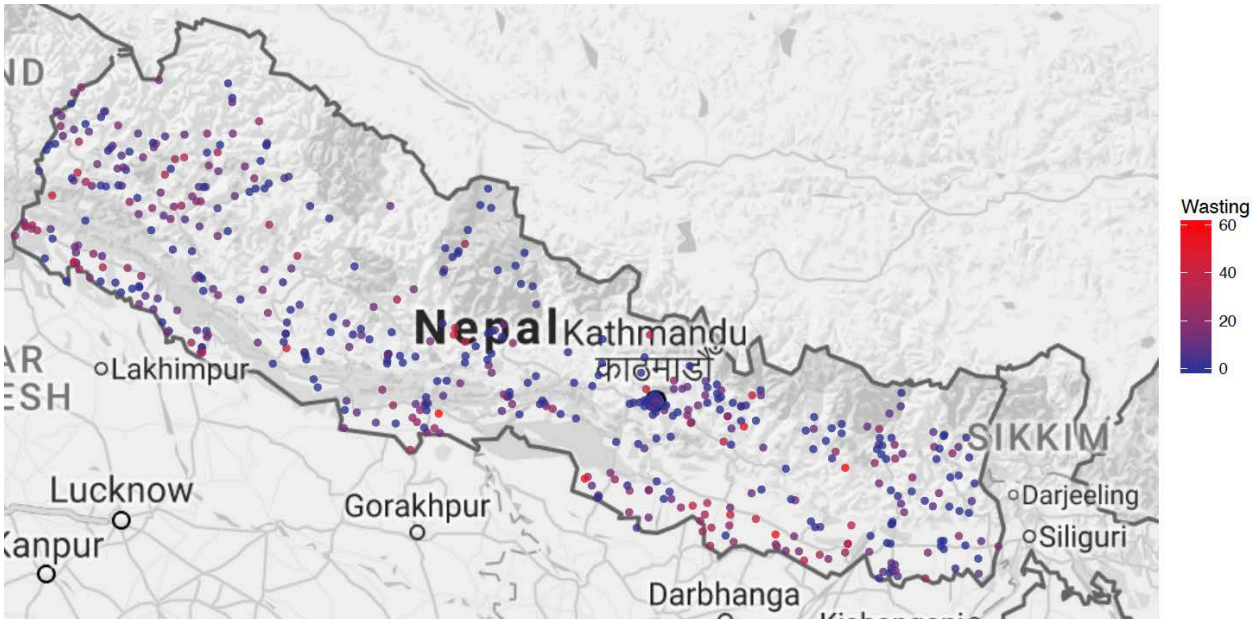


Figure A7: Percentage of children under five who had suffered from diarrhoea in two weeks preceding the survey – by NMICS 2014 sampling cluster

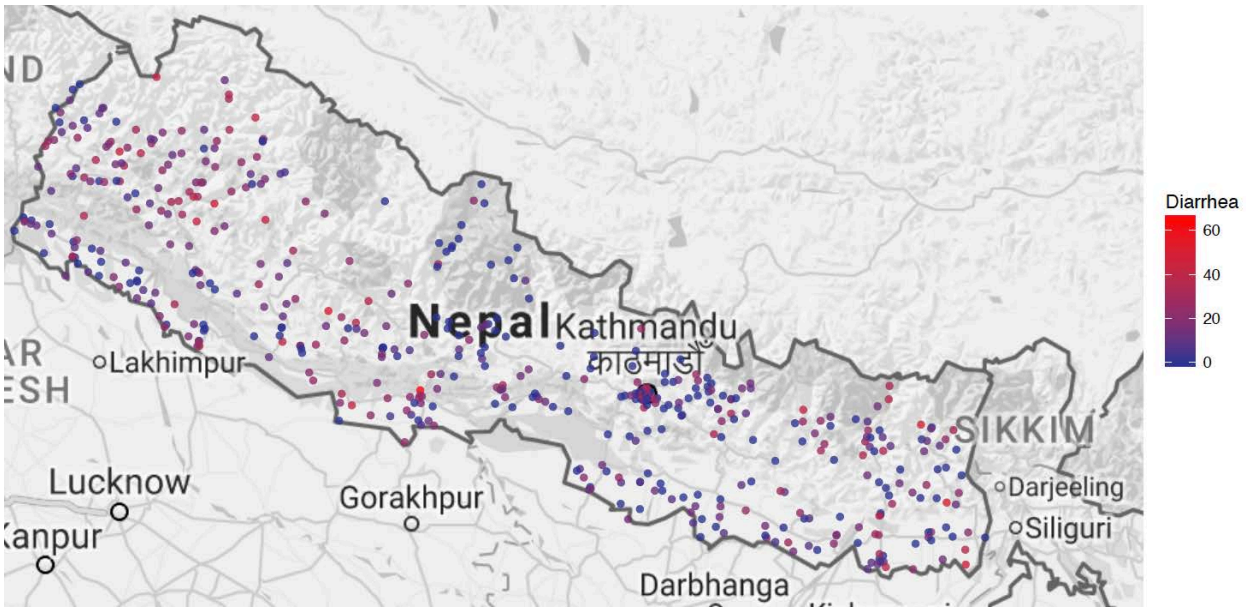


Figure A8: Percentage of children under five who had suffered from fever in the two weeks preceding the survey – by NMICS 2014 sampling cluster