



**Addressing  
undernutrition  
in PNG:  
*What can the WASH  
sector do to contribute?***

*This program guidance note discusses the need to invest in nutrition and the multisectoral response required to address undernutrition.*

*Thereafter, it provides a discussion on the relationship of WASH actions on stunting. Referring to PNG's National Nutrition Policy 2016-2026 (NNP) and the role it outlines for the WASH sector, this brief draws upon global knowledge and provides several suggestions for actions that the Department of National Planning and Monitoring (DNPM) and provinces might consider to operationalize their respective roles in the NNP and contribute to improving the full human potential of PNG's children.*

## Acronyms and Abbreviations

BMI	Body Mass Index
CLTS	Community Led Total Sanitation
DNPM	Department of National Planning and Monitoring
EED	Environmental Enteric Dysfunction
GDP	Gross Domestic Product
HAZ	Height for Age Z-scores
HWT	Household Water Treatment
HWTS	Household Water Treatment and Safe Storage
IYCF	infant and young child feeding
NCD	Non-Communicable Disease
NDOH	Department of Health
NFSP	National Food Security Policy
NNP	National Nutrition Policy
NNS	National Nutrition Survey
NSAP	Nutrition Strategic Action Plan
MTDP	Medium Term Development Plan
ODF	Open Defecation Free
PNG	Papua New Guinea
SBCC	Social and behaviour change communication
SUN	Scaling Up Nutrition
UNICEF	United Nations Children's Fund
WASH	Water, sanitation and hygiene
WAZ	Weight for age Z-scores
WHO	World Health Organization

## Section I: Undernutrition in PNG

### *I. Investing in nutrition is critical for human capital formation and economic growth*

**Undernutrition is the single largest factor contributing to the death of young children.** It increases the mortality risk associated with the major killers of children (respiratory infectious diarrhoea, malaria, measles and other infectious diseases). Nearly one-half of all infant deaths are attributable to undernutrition (1). It holds back the development of full human potential and is responsible for more ill health than any other cause – good health is not possible without good nutrition. The repercussions of child stunting are far-reaching—affecting educational attainment, workforce capacity and productivity, and adult wages—and culminate in decreased likelihood that children will escape poverty as adults. (2-6).

#### **Box 1: Indicators of undernutrition**

The three key indices of physical growth used as measures of child undernutrition are:

**Stunting** or low height-for-age representing chronic undernutrition;

**Underweight** or low-weight-for age representing a combination of long-term and immediate-term undernutrition; and

**Wasting** or low weight-for-height, representing acute under-nutrition.

Each of the above indicators is expressed in standard deviation units (Z-scores) from the median of the reference population (below two standard deviations of the mean for each respective measure)

**The first 1,000 days from conception to age 2 years are the most critical to reduce stunting.** This window of opportunity to improve nutrition is very short. Much of the impact of undernutrition occurs during pregnancy and in the first two years of a child's life. Without appropriate interventions, the damage to physical and cognitive development, future economic productivity and to human development is largely irreversible (4). Given practical difficulties with identifying pregnancies early, adolescence is another potential window of opportunity to improve women's pre-pregnancy health and nutrition as part of a lifecycle approach.

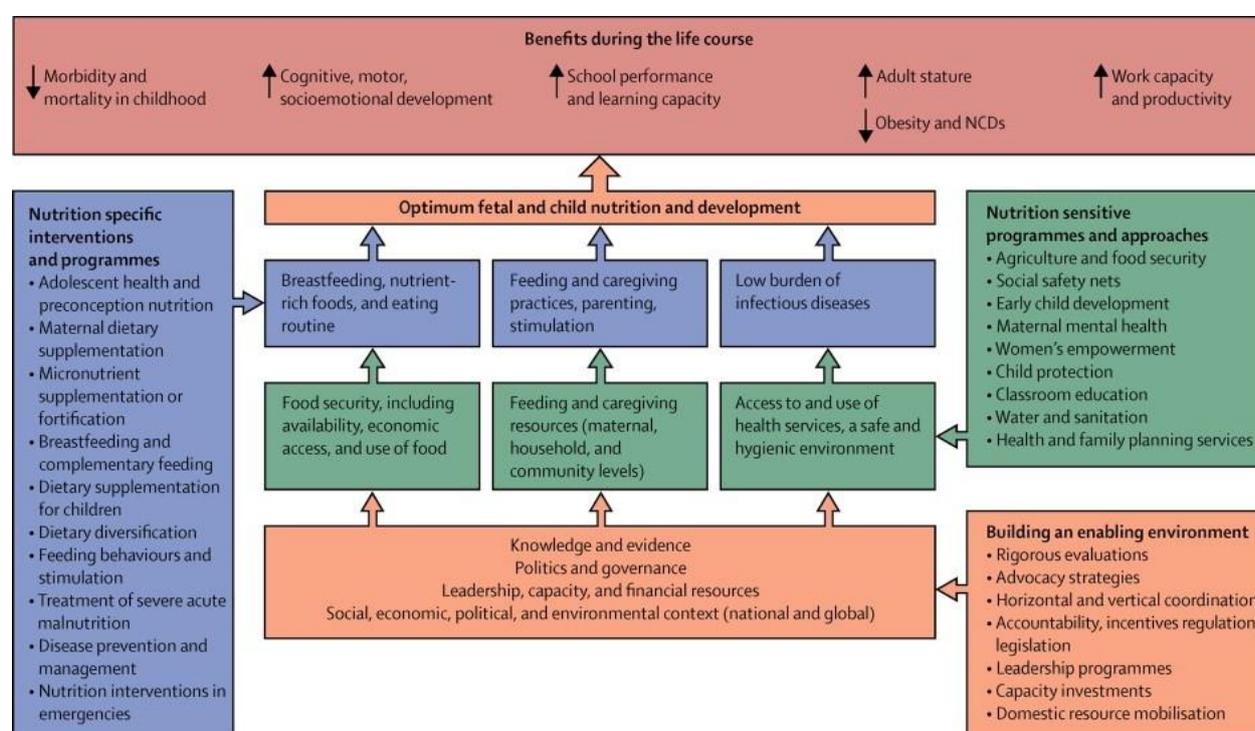
**The consequences of child stunting, or low height for age, are far-reaching and its costs to human and economic development are high.** Stunting, the indicator of chronic undernutrition, is a measure of human capital. Beyond physical growth failure, stunting also affects brain development and cognition and has lifelong impacts. The linkages from nutrition status to long-term well-being are clear, and consequently stunting prevalence is regarded not only as a measure of long-term undernutrition but a marker for national economic growth potential. It affects educational attainment, workforce capacity and productivity and adult wages—and culminates in decreased likelihood that children will escape poverty as adults. The annual loss in GDP associated with malnutrition can be up to 12% in poor countries, primarily as a result of deficits in cognitive development (2-6). It is estimated that malnutrition in all its forms could cost society up to USD 3.5 trillion per year, with overweight and obesity alone costing USD 500 billion per year (7-8). Indirect losses are associated with deficits in cognitive development and schooling, and increased costs of health care. In terms of human development, malnutrition (stunting) in early years is linked to a 4.6cm loss of height in adolescence, 0.7 grade loss of schooling and 7-month delay in starting the school (9).

**The returns on investing in reducing undernutrition are high.** In 2015, 159 million children globally were stunted in their physical and cognitive development, yielding poor learning outcomes and, eventually, premature death and disability with significant long-term economic consequences for future work forces in already constrained economies. Nutrition investments support poverty reduction efforts and have the potential to augment GDP in developing countries by at least 2-3 percent (10). One case of stunting averted 21 percent of GDP per capita based on estimates of the impact of childhood stunting on adult wages (11).

## II. Multisectoral efforts are required to improve nutrition outcomes

**The causes of child undernutrition are multiple and span many sectors.** There are two immediate causes of child undernutrition: (i) Nutrient intake: not having enough, or the right kinds of, food intake; and (ii) Burden of infectious disease, which influences the body's energy needs and ability to absorb and store nutrients. In turn, nutrient intake is influenced by several factors including child care and feeding practices, food availability and security, while the burden of infectious disease is affected by environmental factors, particularly water supply and sanitation, hygiene practices and the availability and utilization of health services. Underlying these are social and institutional factors including gender equity, and economic, institutional and political factors that contribute to economic growth, a key enabler of pro-nutrition interventions, and influence public policy, political willingness and institutional capacity to mount an effective response to undernutrition.

Figure 1: Pathways to reduce child undernutrition (1)



**Since the determinants of undernutrition span many sectors a multisectoral response is required to address stunting.** As the underlying drivers of nutrition status are multisectoral—spanning agriculture, social protection, health, WASH, and education—so too must be the interventions to address them. (12). There is strong evidence of a package of nutrition interventions that address the immediate determinants of foetal and child nutrition and development—spanning the first 1,000 days from pregnancy through the child's first 24 months to improve nutrition outcomes. These interventions, termed nutrition-specific interventions, while effective would result in a decrease of only 20% in global stunting if implemented at 90 percent coverage in high countries. (13,14,4). Furthermore, faced by widespread structural, financial, and capacity constraints, most countries are nowhere near achieving 90% coverage of the package of essential nutrition services. Nutrition-specific interventions are simply not enough to reach global targets for stunting reduction.

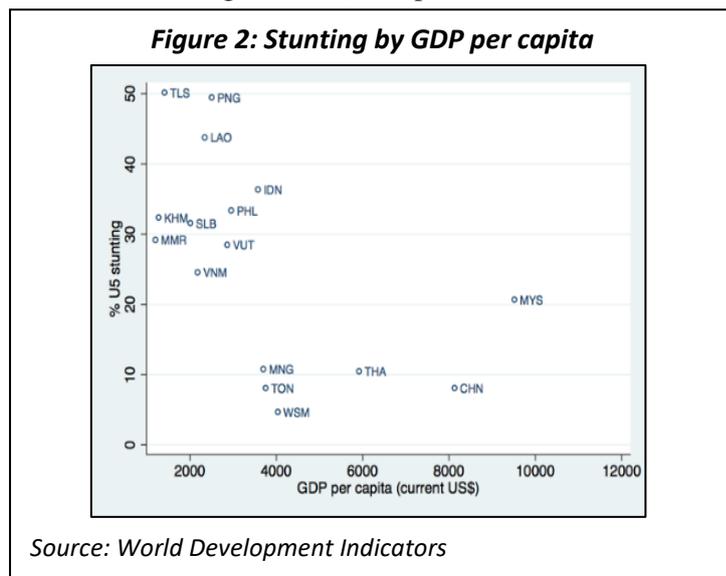
**To achieve ambitious nutrition and human development goals, nutrition specific interventions must be complemented by nutrition sensitive interventions.** In order to get beyond the potential 20% reduction in stunting afforded by nutrition-specific intervention—we must increase our capacity to translate

nutrition-sensitive principles into practice across all key sectors. Nutrition-sensitive interventions target the underlying determinants of undernutrition such as poverty, food insecurity, access to health care, water and sanitation services and call for applying a nutrition lens to existing sector interventions with a view to improving their impact on nutrition outcomes (15). These initiatives to address nutrition can strengthen nutritional outcomes in three ways: i) Accelerating action on determinants of malnutrition; ii) Integrating nutrition considerations into programs in other sectors, which may be substantially larger in scale; and iii) Increasing ‘policy coherence’ across sectors. (16)

**Interventions in a number of key sectors can contribute to reduce stunting.** Health, agriculture and food security, social protection (especially social safety nets), poverty reduction (although it is not a traditional “sector”), education (especially girls’ education), water and sanitation are the key sectors that can contribute to improved nutrition. Gender and governance issues are crosscutting across several of these traditional sectors and need special consideration. Factors of success common across all sectors include: being designed specifically to impact nutrition, being informed by an evidenced-based theory of change; being of high-quality implementation that is true to its design; addressing multiple pathways; and incorporating well-designed and well-implemented behaviour change communication (BCC) (12). Figure 1 depicts how nutrition-specific and nutrition -sensitive interventions effect nutrition outcomes.

### III. Reducing stunting is an urgent priority in PNG

**Stunting and other forms of child undernutrition are unacceptably high in PNG.** With almost every second child being stunted (48.2 percent of children under five years of age are stunted), PNG has the



fourth highest child stunting rate in the world with a rate that is more than double the global average and the second highest prevalence of stunting in the East Asia Pacific region, double that of other countries with comparable GDP per capita. ‘Hidden hunger’ or micronutrient deficiencies are also rampant. 25 percent of children aged 6 to 59 months have vitamin A deficiency and 48 percent are deficient in iron (National Nutrition Survey 2005), and suspected incidence of cretinism (Cretinism is a condition of severe retardation of physical and mental growth due to untreated congenital deficiency of thyroid hormone, usually occurring due to maternal hypothyroidism largely due to deficiency of iodine)<sup>1</sup> (17).

**While stunting rates are the highest among children from poor households, they are not insignificant among children from wealthier households. Regional differences are also significant.** Around 28 percent of the children in the country are underweight and 5-15 percent are wasted. The burden of stunting is highest amongst the poorest quintile (55 percent). However, stunting rates amongst the richest quintile are also high (36 percent) clearly indicating that stunting is a problem that spans wealth quintiles (see figure 2). The Highlands region has the highest prevalence of stunting (58 percent), while the Islands Region has the lowest rate of stunting at 38.1 percent. In fact, high levels of stunting across the board in PNG point to a widespread problem.

**Stunting and other forms of child undernutrition in PNG impose a high economic cost.** The costs of undernutrition in PNG are now gaining increasing attention. A recent report estimated the economic costs of undernutrition to PNG's economy at USD 508 million (2.81 percent of its annual GDP) in the financial year 2015-16 (18). These costs are inflicted through three main pathways: i) losses in productivity from a reduction in labour force due to increased childhood mortality, estimated at USD 46 million (0.26 percent of GDP); ii) losses in potential income and productivity from poor physical status and reduced cognitive function, estimated at USD 459 million (2.54 percent of GDP); and iii) losses from increased health care expenditure in treating diseases associated with childhood. This significantly exceeds PNG's budgeted expenditure for 2017 for both the health sector and education sector (USD 385 million and USD 366 million, respectively) (19).

**Stunting is eroding PNG's future growth, development and quality of life: A child born in PNG today will be only 38 percent as productive as she could be.** Evidence shows that a child will suffer long-lasting cognitive and physical impairments if they are undernourished in the first 1000 days of life. Estimates suggest stunting contributes to as much as 76 percent of under-five deaths in PNG. Addressing stunting is therefore critical to build human capital and unleash the productive potential of PNG's young and growing population. Undernourished mothers are three times more likely to have stunted children, contributing to an intergenerational cycle of poverty and inequity. Furthermore, every dollar spent on nutrition in the first 1,000 days of a child's life can yield a saving of an average \$45 - \$166 over the course of a citizen's life (4).

**A young and growing population, high rate of poverty and high rates of under and unemployment underscore the importance of human capital to PNG's future.** 53.8 percent of the population were 25 and under, (2011 census) 18 percent between the ages of 15-24. The youth bulge, and high population growth (3.1 percent per annum), has increased pressure on service delivery and will continue to do so as the population ages. Investing in PNG's young population will support future growth and development. Improvements in human capital will further assist the 38 percent of the population who live below the international poverty line of \$1.90 per day (20).

#### *IV. PNG has committed to addressing its huge burden of undernutrition and stunting*

**High-level commitment to nutrition in PNG, a Human Capital Project Early Adopter, has increased considerably in recent years, and PNG is committed to a multi-sectoral response.** PNG is a member of the Scaling Up Nutrition movement. The recently adopted multisectoral National Nutrition Policy, 2016-2026, frames nutrition as a core development issue. The institutional responsibility for nutrition now rests with the Department for National Planning and Monitoring, a central agency with considerably greater leverage to lead and coordinate actions across sectors than a line Ministry. The recently launched Medium Term Development Plan III (MTDP III 2018-2022) includes an ambitious target to reduce stunting among children under 5 years from current levels of 48 percent to less than 30 percent by 2022. PNG is a Human Capital Project Early Adopter, with the Deputy Prime Minister designated the country's human capital champion (16).

**Despite this commitment, the current state of response to undernutrition in PNG could be strengthened considerably, particularly in light of the country's ambitious target to reduce stunting.** There are clear opportunities to improve policy coherence for nutrition. MTDP III clearly identifies the reduction of stunting as a policy priority. Undernutrition is positioned as a food security concern in MTDP III, however, although its causes in PNG extend well beyond food security. This points to the importance of advocacy to position nutrition appropriately as a core development issue with causes that extend across multiple sectors, and to sensitize key actors at national and sub-national levels. At the implementation level,

a multi-sectoral response to address undernutrition is not yet in place, although the National Nutrition Policy presents clear guidance on this front.

***Box 2: PNG's multisectoral approach to nutrition (17)***

**This National Nutrition Policy draws together a multi-sectoral response to address malnutrition in PNG. The objectives of this policy are:**

**Objective 1:** Strengthen nutrition governance, coordination, communication, partnerships and research to effectively plan, implement, monitor and evaluate nutrition activities across sectors. For successful implementation of the policy all the members acknowledge and embrace their responsibility. Stakeholders at all levels from the community to the national level, including the public sector (sectoral ministries and institutions, regional secretariats and local government authorities), higher learning and training institutions, professional bodies, private sector, development partners, civil society, media and the community.

**Objective 2:** Improve nutrition capacity including pre-service training, cross sector in-service training, supportive supervision, work force development, career structures and operational resources. This would be achieved by developing national pre-service (including undergraduate and postgraduate) training in nutrition and dietetics, developing criteria for national registration of nutritionists and dietitians and ensuring that nutrition is adequately covered in existing health and other courses delivered by all training institutions/

**Objective 3:** Implement and strengthen interventions to prevent, control and treat under nutrition, including low birth weight, stunting, wasting and underweight across the lifecycle (focusing on adolescents and women of childbearing age, pregnant and lactating women, children under 5, pre-school and primary school children).

**Objective 4:** Strengthen interventions to prevent and control micronutrient deficiencies including iron, vitamin A, iodine, zinc and other micronutrients.

**Objective 5:** Implement interventions to prevent and control overweight and obesity to reduce the risk of diet related lifestyle diseases. To prevent, control and treat under nutrition, including low birth weight, stunting, wasting and underweight across the lifecycle (focusing on adolescents and women of childbearing age, pregnant and lactating women, children under 5, pre-school and primary school children). Health, Education, Agriculture & Livestock, Community Development sectors shall develop and implement comprehensive strategies to prevent and manage under nutrition, specifically stunting, wasting, low birth weight, and low BMI among women.

**Objective 6:** Strengthen interventions to prevent and control malnutrition among vulnerable groups, in particular, people living with HIV (PLHIV), TB, mental illness and disabilities, and people living in institutions.

**Objective 7:** Strengthen interventions that protect resilience and support recovery of households from the impact of nutrition emergencies and other vulnerabilities

## Section II: WASH and Undernutrition in PNG

### V. *WASH is important for nutrition*

**Stunting is a complex problem and addressing it requires the collective efforts of many sectors.** As noted in Section I, the causes of stunting are multifactorial and inter-linked, spanning biological, social and environmental spheres. Water, sanitation and hygiene (WASH), feature in frameworks on stunting not only as an immediate or proximal risk factor but also as underlying determinant of stunting. As noted previously, achieving nearly universal coverage of the most effective nutrition specific interventions in high burden countries would only reduce stunting by 20 percent globally, suggesting a critical role for nutrition-sensitive interventions across sectors such as WASH, agriculture and education to accelerate the reduction.

**Inadequate access to clean water, safe sanitation and hygiene practices increase the risk of infectious diseases that contribute to stunting, and to other forms of undernutrition in low and middle-income countries.** WASH-related diarrhoea is responsible for 1.9 million deaths of under five year olds each year, primarily through repeated diarrhoea or intestinal nematode infections. (23) Repeated episodes of diarrhoea in young children is believed to contribute to stunting (24). WASH-related infections that cause blood loss and inflammation—such as malaria, acute respiratory infections, diarrhoea, and hookworm infection (25)—are a major cause of anaemia; an indicator of poor nutrition and contributor to stunting (26, 23). Environmental enteric dysfunction (EED), characterized by small intestinal inflammation, a condition that may have far-reaching impacts on child growth, health, and development is strongly associated with stunting (low height-for-age). (27)

### VI. *WASH nutrition linkages*

**Poor Water, Sanitation and Hygiene practices are associated with stunting.** Poor WASH practices directly contribute to unhealthy environments affecting a child’s access to a healthy environment and are known determinants of undernutrition and health, and pathways of their interactions are well-established

and proven. WASH also influences household food security, maternal and infant care practices, and access to health services.

#### **Box 3: The elements of WASH**

- ‘Water’ interventions including two elements: i) water quantity relates to interventions that improve the quantity of drinking water available to the household’; and ii) ‘water quality ‘relates to interventions that improve the microbial quality of drinking water, whether this is at the water source or at the point of use or consumption.
- ‘Sanitation’ concerns technologies and behaviors that serve to safely contain excreta, preventing human contact,
- ‘Hygiene’ is commonly used to mean washing with soap at critical times (e.g. after defecation and before eating) and maintaining environmental cleanliness. (27)

❖ Diarrhoea, enteric infection and protozoa/helminth infection (roundworm, whipworm and hookworm) are all caused by faecal contamination via hands, soil, water, and food. (23). Environments in many low-income contexts are highly contaminated with faecal matter as a result of poor-quality sanitation, widespread open defecation practices,

and freely roaming animals. (28-30) Humans and animals unknowingly carry faecal pathogens picked up on shoes, feet, hands, etc. in the community into the home, (31) where members of the household – especially infants and young children– are then exposed. (32) Flies serve as another vector carrying pathogens from one place to another, particularly onto food. (33,23,32)

- ❖ Helminths can survive for months in the soil and infect humans when ingested (e.g., via contaminated water or food), by direct contact with the skin (e.g. when walking barefoot on contaminated soil), or indirect contact (e.g. via objects carrying the infection organisms). (23)
- ❖ Hygiene and sanitation practices are important secondary barriers – handwashing with soap at key times (e.g. after defecation or handling children’s faeces, and before storing and preparing food and

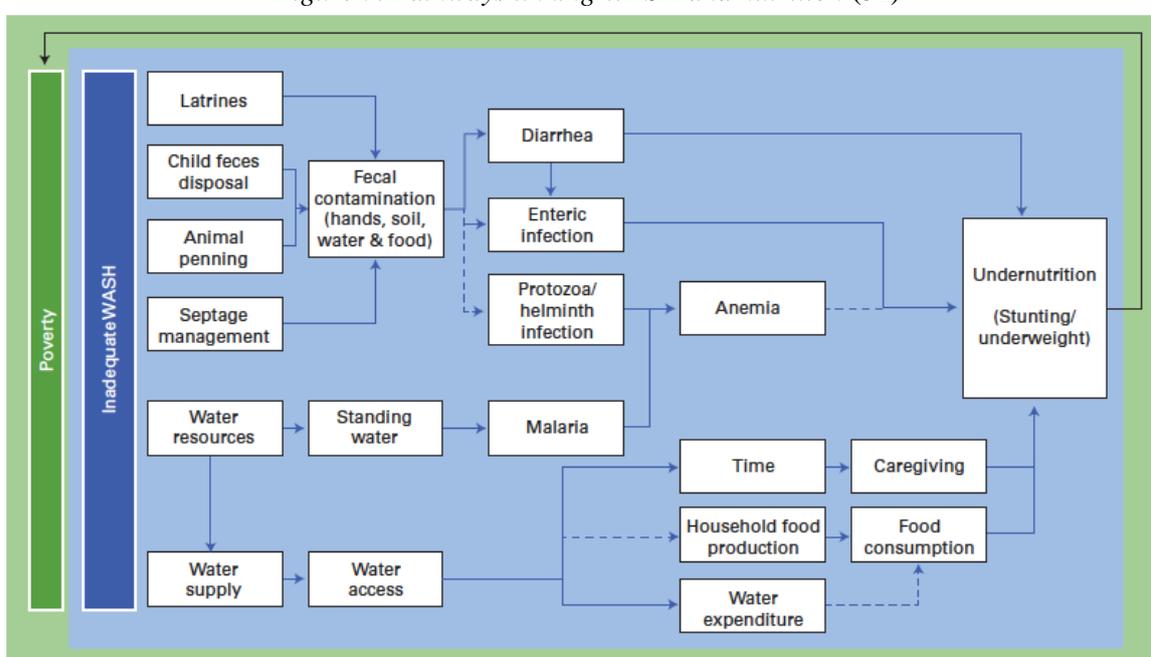
water, before eating, and before feeding babies and children) and treatment of drinking water can interrupt faecal-oral transmission of disease. (23)

- ❖ Standing water creates an ideal breeding site for mosquitos that contributes to the spread of malaria, which causes anaemia.
- ❖ Finally, caregiving practices and food consumption—both key drivers of nutrition—can be affected by the impact of water access on caregiver time, household food production, and household water expenditure. Although the exact mechanism is not clear, decreasing the amount of time that caregivers spend fetching water reduces diarrhoea and improves nutritional outcomes in children under-five. (32-41).

**WASH can contribute to stunting reductions and improvements in other forms of undernutrition.**

The pathways for WASH interventions to improve stunting are well established and well supported by observational studies. WASH interventions affect linear growth through three key pathways. Figure 3 describes the routes through which this happens.

Figure 3. Pathways linking WASH and nutrition (32)



Each pathway is supported by several observational studies. The following matrix presents a summary of the evidence base for how through each pathway WASH interventions contribute to improvements in stunting.

Table 1: Evidence for pathways linking WASH with stunting

**Pathways for improving stunting**

1. Improved Nutrition through **Reduction in Diarrheal Diseases and enteric infections** Due to Reduction in Fecal Contamination of the Environment

**Evidence for the pathway**

- Fecal contamination of the household environment (28,31)
- Soil contaminated with human and animal faeces (31,34)
- Unsafe disposal of infant and child faeces (42)
- Handwashing with soap reduces diarrhoea by 40 percent (43)

## Pathways for improving stunting

2. Improved Nutrition through ***Reduced Exposure and Infection with Protozoa and Helminths*** Due to Improved WASH

3. Improved Nutrition through ***Reduction in Anemia*** Due to Improved WASH

4. Improved Nutrition through ***Reduction in Time Spent Fetching Water and Caring for Sick Children, and Time and Costs of Seeking Treatment***

## Evidence for the pathway

- Improved sanitation reduces diarrhea by 28 percent
- Improved water supply reduces diarrhea by 34 percent.
- Enteric infection (or environmental enteropathy) is the main route through which poor WASH causes stunting (44).
- These infections can cause poor appetite, nutritional deficiencies, and anemia, and exacerbate malnutrition (45-48)
- Improved sanitation helps reducing the risk of soil-transmitted helminth infection (49-51) and Giardia infection (52)
- Blood loss and inflammation due to WASH-related infections, including malaria, acute respiratory infections, diarrhea, and hookworm infection (53) are a major cause of anemia (26).
- Better access to water may enable improved hygiene practices (35,36), make more time available for childcare (37-40) or income-generating activities (41).
- Households further away from a water source may face barriers to home gardening and other income-generating activities that have a direct or indirect effect on improving nutrition (54).

## VII. WASH interventions and stunting – what does the evidence say?

**There is a large body of work to support strong associations of WASH with stunting.** Furthermore, the dual burden of poor WASH and undernutrition is common in areas with high rates of poverty. Together Sub-Saharan Africa and South Asia account for the highest burden of child undernutrition (1) and poor WASH globally. (32). Several observational studies have shown that WASH interventions such as improved latrines, improved water sources, and reduced open defecation are associated with linear growth (67, 68, 69, 70) and weight-for-age Z-scores (WAZ) (71, 67). There is evidence that poor WASH conditions (e.g. faecal contamination of the household environment, soil contaminated with human and animal faeces), and unsafe disposal of infant and child faeces) contribute significantly to diarrhoeal disease. (42, 31, 28, 34, 32). In fact, it is estimated that 58 percent of annual deaths caused by diarrhoea are attributable to poor WASH conditions (34).

**Rigorous empirical evidence for the impact of WASH interventions on nutrition is mixed and several gaps remain.** A recent systematic review of five cluster randomized trials of WASH interventions (55-59) found a statistically significant though small direct effect (i.e., not through diarrhoea) of water and hygiene interventions on height-for-age Z-scores (HAZ) in children less than five years old, but not on weight-for-age Z-scores (WAZ). The three non-randomized studies (60-62) included in the review did not find a statistically significant impact of WASH interventions on weight-for-age Z-scores. Two of the five trials describing the effect of sanitation intervention on stunting (63, 64) reported significant effects on stunting, and three found no effect (65-67). All three trials that did not show effect, two in India (66-67) and one in Indonesia (65), had very low levels of uptake and compliance, which may explain their findings of no effect. By contrast, Pickering *et al.* report that access to sanitation increased substantially and open defecation reduced as a result of the intervention evaluated in Mali, West Africa. (63) while the intervention evaluated by Hammer & Spears in India achieved more modest increases in sanitation access (75). Three

recent rigorous trials did not find any effect of WASH interventions on child growth or anaemia or on EED. (72, 73, 74). One of the trials found that the effect of behavioural change interventions was not sustained beyond intense intervention period. (72)

**Although there is need for more research to study the WASH-nutrition causal relationship, current knowledge is sufficient to warrant continued investments in WASH.** While some gaps remain in our understanding of the full set of factors in the environment that impact stunting -- such as the role of animal fecal matter in the environment on stunting, even when it is free of human fecal matter, e.g., when Open

**Box 4: Guiding principles for Nutrition-sensitive WASH**

WASH interventions can be modified to improve their impact on nutrition outcomes by:

- Improving geographic and demographic targeting to reach populations where water and sanitation coverage is low, and undernutrition is high;
- including at a minimum a checklist of behavioural proxies that are relevant for the project; and
- measuring and monitoring outcomes beyond access to services, such as usage, maintenance of infrastructure, and behavioural change.

Defecation Free (ODF) is achieved, or how long after ODF does the environment become free of previous fecal contamination, or the combined effect of multiple interventions on stunting – merit further investigation, the large body of knowledge on the statistically significant association between WASH and stunting support the fundamental principles of WASH promotion. Furthermore, WASH interventions can be modified to improve their impact on nutrition outcomes by making these more ‘nutrition-sensitive’. Box 4 outlines key ways to make WASH interventions nutrition-sensitive.

A full set of nutrition-sensitive WASH

interventions is presented in Box 5.

### **VIII. WASH program approaches**

Program actions to improve the impact of WASH on nutrition typically include:

**(1) Improving water access through construction or improvement of water supply systems or services.** (e.g., piped water on-site, public standpipes, boreholes, protected dug wells, protected springs and rainwater); strengthening water safety planning and capacity for the operation and maintenance of new and existing systems; installing “tippy taps” at key locations (e.g. the latrine and cooking and feeding areas).

**(2) Promotion of safe water at point of use: safe storage, safe collection and transport of water.** Treatment of water (e.g., filtration, sterilization); safe storage of water; safe use practices. A growing body of evidence demonstrates that the use of Household Water Treatment and Safe storage (HWTS) products improves the microbiological quality of household water and reduces the burden of diarrhoeal disease in users. In addition, there is evidence to suggest that distribution of HWTS through health care providers can improve uptake of antenatal services and thereby further support improved nutritional outcomes (76, 77, 33).

(3) **Improving sanitation.** This includes actions such as keeping animals away from food preparation,

**Box 5: Suggested program interventions for nutrition-sensitive WASH**

**For Water:**

- Provision or rehabilitation of/ connection to supply systems
- Support to operation and maintenance (O & M) of supply systems
- Training and follow-up on household water treatment and safe storage (HWTS)
- Provision of HWTS products (e.g. water filters, aquatabs, jerry cans, feeding bottles, cups)

**For Sanitation:**

- Provision or rehabilitation of improved sanitation (full containment of faeces, no flies or odours)
- Increasing awareness and demand for improved sanitation
- Awareness raising about safe excreta and waste disposal (incl. animal faeces, burial of faeces and solid waste disposal)

**For Hygiene:**

- Provision or rehabilitation of handwashing facilities at cooking places and latrines
- Promotion of key behaviours like hand-washing at critical times, hygienic preparation and covering of food
- Hygiene promotion for mothers/ caretakers
- Hygiene promotion/education for children
- Increasing the availability and affordability of soap

child feeding and play areas, and water sources; reducing contamination of children’s play and feeding areas by human and animal faeces; controlling disease vectors such as flies, mosquitoes, cockroaches and rats by covering food, improving drainage and safely disposing of garbage into a waste receptacle or protected pit; and cleaning surfaces, e.g., latrines, basins and kitchen floors and surfaces with soap and water (and bleach if available); and increasing access to sanitation through Community-Led Total Sanitation (CLTS)<sup>2</sup>. Recent experimental evidence of the effect of sanitation on child nutrition comes from CLTS intervention in Mali in which

children were taller and less likely to be stunted in villages where CLTS had been implemented, leading to a reduction of open defecation. Improvements in weight and a reduction in the proportion of children underweight were also observed, but these results were not significant (76).

(4) **Behaviour change communication to improve personal hygiene and WASH-related care practices,** such as handwashing with soap at critical times (e.g. before preparing food or cooking, before eating or

feeding a child, after cleaning a child’s bottom, after defecation); keeping a clean environment for handling food (e.g. handwashing, cleaning key surfaces and utensils, protecting food preparation areas from insects, pests and other animals); and using safe water. Some evidence indicates that changing social norms and behaviours may be more effective at sustaining positive WASH-related behaviour changes. BCC approach that go beyond educating people about the health benefits of WASH practices to apply convenience, and affiliation for changing sanitation

**Figure 4: Making core-WASH interventions nutrition-sensitive**

	Conventional WASH		Nutrition-sensitive Addition
<b>Sources of contamination</b>	Human Faeces	+	Animal faeces
<b>Vectors of feco-oral transmission</b>	<ul style="list-style-type: none"> <li>• Fingers</li> <li>• Fluids</li> <li>• Flies</li> <li>• Fields</li> </ul>	+	Fingers of caregivers and baby hands
<b>Targeted behaviours (behavioural/process indicators)</b>	<ul style="list-style-type: none"> <li>• Disposal of faeces</li> <li>• Handwashing with soap</li> <li>• Water treatment</li> </ul>	+	<ul style="list-style-type: none"> <li>• Disposal of animal stool and child faeces</li> <li>• Handwashing with soap focusing on both caregiver and baby hands</li> <li>• Food hygiene</li> <li>• Exclusive breastfeeding</li> </ul>

Source: German WASH Network, 2017

<sup>2</sup>Community Led Total Sanitation (CLTS) is an innovative methodology for mobilising communities to completely eliminate open defecation (OD). Communities are facilitated to conduct their own appraisal and analysis of open defecation (OD) and take their own action to become ODF (open defecation free).

and hygiene practices (23, 32) and principles of behavioural economics have been suggested to affect decision-making and maximize impact of WASH investments on nutrition outcomes (78). Behavioural changes are required to see impact on WASH and nutrition outcomes, (32), but sustaining behaviour change of WASH behaviour beyond the period of intervention is challenging (72). Behaviour change communication interventions that promote “small doable actions” work when practiced consistently and correctly and contribute to an improved health environment. (23).

(5) **Baby-WASH:** Young children frequently mouth their fingers and other objects during exploratory play. Playing in areas contaminated with human and animal faeces from poor waste disposal practices exposes them directly to faecal contamination. (32). Baby-WASH actions include keeping children’s play environment free of faecal contamination, promote the use of diapers/nappies, safe disposal of faecal matter into toilets (e.g. potties and scoops, and making latrines ‘child friendly’), and safe washing of diapers. (23)

## *IX. Suggestions to enhance WASH interventions in PNG to improve nutrition*

**The poor water supply, hygiene and sanitation conditions in PNG are likely to be major contributors to stunting.** About 41 percent of the population rely on a river, stream, lake or pond for their water (48.5% in rural areas), with a further 11.8 percent relying on rainwater. Only 12.1% of the population have tap water piped into their homes (although this is as high as 59.6% in the urban areas) and 13.7% have water piped into their village or community. The average time taken to reach the water source is 13 minutes (7 minutes in urban areas). The WHO/UNICEF 2013 (Joint Monitoring Programme) for PNG reports a figure of only 19 percent having improved sanitation facilities, 66 percent having unimproved facilities and 12 percent practising open defecation based on national Government data. While 56 percent of urban households had improved sanitation facilities, only 13 percent of the rural population had these (23). Given the pathways through which WASH influences nutrition (see page 8), these are likely to be major contributors to country’s stunting burden.

**PNG’s National Strategic Action Plan (NSAP) 2019–2023 and the National Nutrition Policy identifies WASH as an important set of nutrition sensitive interventions to address and prevent under nutrition.** The three key WASH approaches noted in NNP include: (i) increase access to clean drinking water; (ii) Community led total sanitation; and (iii) promotion of hand washing with soap. The Department of National Planning and Monitoring (DNPM) is responsible for WASH-related activities in PNG. The DNPM also has leadership of PNG’s multisectoral response to addressing undernutrition and houses the SUN Secretariat. With both bodies being located in the DNPM, coordination between WASH and nutrition can be maximized.

**The WASH approaches recommended in the NNP are fully consistent with the core work of the sector.** Given the double burden of grim WASH situation (poor water and sanitation condition) and the high prevalence of stunting in the country, it is imperative for the DNPM to plan to expand coverage and quality of WASH interventions and mobilize the resources necessary and support provinces to do so. PNG’s National Water, Sanitation and Hygiene (WASH) Policy is fully aligned interventions as mentioned in NNP. Provision of safe drinking water for all, improved sanitation facilities and hygiene practices, ODF community and total sanitation are the key actions recommended for the WASH sector in the NNP. These are all integral to PNG’s WASH policy, and progress will benefit both the sector as well efforts to reduce stunting. The sector must however, ensure that the relevant principles be incorporated into their future activities and plans (see Box 4).

**One of the key steps outlined for each department/sector in the NNP is to develop their own strategy to combat malnutrition.** A well-formulated strategy will enable DNPM to incorporate all of its actions as outlined in the NNP (and beyond if required for a robust strategy) – national, provincial, district and local - in the strategy. The key elements for action should, at a minimum include: capacity building at all levels;

strengthening curriculum of agriculture functionaries to make it nutrition-sensitive; establish appropriate data collection, monitoring, reporting and evaluation systems. Finally, drawing up costed action plans, and mobilization of adequate resources will be crucial. The sector should consider this as an opportunity to strengthen the entire WASH program.

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