

IMPROVING NUTRITION OUTCOMES WITH BETTER WATER, SANITATION AND HYGIENE:



PRACTICAL SOLUTIONS FOR POLICIES AND PROGRAMMES

NUTRITION AND WASH

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FOREWORD

Undernutrition is both a cause and a consequence of poverty and is a major contributor to maternal and child mortality in the shorter term as well as noncommunicable diseases (NCD) in the longer term. It negatively affects all aspects of an individual's health and development and impedes economic and social progress at the community and national levels. Proven, simple interventions exist to combat undernutrition, such as exclusive breastfeeding, appropriate complementary feeding practices, micronutrient supplementation where needed, handwashing with soap, and use of hygienic latrines or toilets. However, given the complexity of factors that cause undernutrition, especially lack of access to water and sanitation and poor hygiene, no single intervention alone will achieve effective or lasting results. Effectively and sustainably improving nutrition outcomes requires a coordinated, multisectoral approach among the health, water, sanitation and hygiene (WASH) and agricultural sectors and strong community engagement.

The global nutrition community has repeatedly called for greater attention to and investments in WASH as a means to improve nutrition outcomes. Most recently, at the second International Conference on Nutrition (ICN2) organized by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) in November 2014, country delegates adopted the Rome Declaration on Nutrition and the Framework for Action, which recommends “actions on water, sanitation and hygiene”. This builds upon the call and commitment made at the first International Conference on Nutrition (ICN) in 1992 to improve access to and use of safe drinking-water and sanitation services to further address the nutrition challenges. Furthermore, in 55 countries that have joined the Scaling-Up Nutrition (SUN) movement, partners are working together to implement multisectoral action in order to effectively and sustainably deliver nutrition-specific and nutrition-sensitive interventions. These commitments highlight the need to address underlying causes of undernutrition – including access to and use of drinking-water and sanitation services and improved hand and food hygiene.

This publication, jointly prepared by WHO, the United Nations Children's Fund (UNICEF) and the United States Agency for International Development (USAID), summarizes the current evidence on the benefits of WASH for improving nutrition outcomes and describes how WASH interventions can be integrated into nutrition programmes. It provides practical suggestions, targeted at nutrition programme managers and implementers, on both “what” WASH interventions should be included in nutrition programmes and “how” to include them. It also seeks to help the WASH community to better understand their role, both as providers of technical expertise in WASH interventions and in prioritizing longer-term improvements to WASH infrastructure in areas where undernutrition is a concern.

Sustainable development cannot be realized without nutritional well-being and reaching the 2025 Global Nutrition Targets. Achieving important global health goals, such as ending preventable child and maternal deaths and the global NCD targets, will likewise require addressing malnutrition in all its forms. Integrating WASH interventions into nutrition actions can make a difference. In the dawn of a new era of post-2015 Sustainable Development Goals, which highlight multisectoral engagement, the time is ripe to demonstrate, practically, how nutrition and WASH actions can be integrated, for better health and the betterment of humanity.

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ABBREVIATIONS

A&T	Alive & Thrive
ACF	Action Against Hunger (Action contre le Faim)
AIDS	acquired immunodeficiency syndrome
AIN-C	Atención Integral a la Niñez en la Comunidad
BRAC	Bangladesh Rural Advancement Committee
CDC	Centers for Disease Control and Prevention (USA)
CLTS	community-led total sanitation
DFID	Department for International Development (United Kingdom)
DHS	demographic and health survey
ECHO	European Union Humanitarian Aid and Civil Protection department (formerly European Commission Humanitarian Aid Office)
e-LENA	e-Library of Evidence for Nutrition Actions
FANTA	Food and Nutrition Technical Assistance
HIV	human immunodeficiency virus
HWT	household water treatment
HWTS	household water treatment and safe storage
ICN	International Conference on Nutrition
ICN2	second International Conference on Nutrition
IYCF	infant and young child feeding
JMP	WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation
LSHTM	London School of Hygiene & Tropical Medicine
M&E	monitoring and evaluation
MDG	Millennium Development Goal
NGO	nongovernmental organization
NTD	neglected tropical disease
PPSSP	Programme de Promotion de Soins Santé Primaires (Primary Health Care Promotion Programme)
PSNP	Productive Safety Net Programme
SHOUHARDO	Strengthening Household Ability to Respond to Development Opportunities
SUN	Scaling-Up Nutrition
SWAN	Safe Water and Nutrition
SWAP	Safe Water and AIDS Project
TIP	trial of improved practices
UN	United Nations
UNICEF	United Nations Children's Fund
USA	United States of America
USAID	United States Agency for International Development
UV	ultraviolet
WASH	water, sanitation and hygiene
WHO	World Health Organization

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IN MEMORIAM

This document is dedicated to our distinguished colleague and dear friend Yves Chartier (1958–2012), Public Health Engineer, who was a champion of WASH as an important component of preventive health and led thinking on how to integrate WASH with health initiatives. He was instrumental in developing and implementing the USAID/WHO document *How to integrate water, sanitation and hygiene into HIV programmes* and in initiating this work on integrating WASH and nutrition. He worked tirelessly in the office and the field towards improving access to WASH and better health for all, especially the most vulnerable.





INTRODUCTION

1.1 PURPOSE

Access to safe drinking-water, sanitation and hygiene (WASH) services is a fundamental element of healthy communities and has an important positive impact on nutrition. This document provides an overview of the evidence of nutrition gains that can be achieved with improved WASH, a description of key WASH practices, and practical knowledge and guidance on how to integrate WASH into nutrition programmes, including important monitoring and evaluation (M&E) aspects. The document concludes by providing a suite of case-studies and lessons learnt in integrating WASH with nutrition efforts.

1.2 AUDIENCE

This publication is intended primarily for nutrition programme managers and implementers working in developing countries who are seeking information about key WASH interventions that support nutritional outcomes, how to integrate such interventions into nutrition programmes, and related M&E considerations. An important secondary audience is WASH programme managers and implementers who will find models and platforms at the household, health care facility and community levels for supporting integration efforts and establishing partnerships across sectors. Finally, this publication can be useful for governments, donors, foundations and nongovernmental organizations (NGOs) that are seeking to maximize health gains through greater integration and joint monitoring of nutrition and WASH efforts.

1.3 STRUCTURE

This document is organized into the following chapters:

- **Chapter 2** provides a brief overview of the evidence on nutritional gains associated with WASH interventions and existing global commitments for joint WASH and nutrition actions.
- **Chapter 3** describes key WASH practices that can be included in nutrition programmes.
- **Chapter 4** describes practical actions and how to integrate WASH into nutrition activities through delivery channels at the community and household levels.
- **Chapter 5** proposes an M&E framework, including a set of indicators to measure progress and improve integrated implementation activities.
- **Chapter 6** documents a series of case-studies on the activities, successes and challenges from programmes that have integrated WASH and nutrition.

In addition, a range of links and short descriptions of resources, categorized by topic, are provided at the end of the document.

1.4 DEFINITIONS

For the purposes of this document, integration of WASH into nutrition is defined broadly as including one or more WASH interventions within a nutrition policy or programmatic effort. It may require minimal integration through the co-location of nutrition and WASH efforts or involve a complete integrated package of nutrition and WASH actions, with one budget, shared staffing, M&E and an accountability framework. Integration options and the associated delivery channels are varied, are highly contextual and require joint planning and, ideally, joint monitoring. Integration efforts are not without costs, and therefore the trade-offs of different options, including possibly not integrating WASH and nutrition, should be carefully considered.

The term WASH is used often in this document and refers to the entire suite of interventions that includes handwashing with soap, water quality and quantity, sanitation, food hygiene and environmental hygiene. The specific technical definitions of each are provided in Chapter 2. Throughout the document, hygiene promotion interventions are presented first, as these may require the least amount of financial and infrastructure resources and thus could be feasible for programmes with few financial resources.

2



NU RITION
AND WATER



THE INFLUENCE OF WASH ON NUTRITION: EVIDENCE AND COMMITMENTS

Undernutrition is a major cause of disease and death, affecting billions of people worldwide, especially women and children in impoverished communities. Undernutrition is directly caused by inadequate dietary intake and/or disease and indirectly related to many factors, including contaminated drinking-water and poor sanitation and hygiene. Although notable progress has been made on improving access to WASH and decreasing undernutrition, there is still significant work that remains, especially in addressing the needs among the very poor and vulnerable populations. Therefore, this chapter defines WASH and nutrition interventions (Boxes 1 and 2), describes the links between WASH and undernutrition, summarizes the evidence supporting gains from integrating WASH and nutrition actions, and highlights recent global WASH and nutrition commitments that provide an important platform and the momentum to drive effective action.

2.1 WATER, SANITATION AND HYGIENE

2.1.1 Global WASH situation

2.1.1.1 Households

Inadequate WASH services and practices are a major concern in households worldwide:

- **Water.** An estimated 663 million people worldwide do not have access to an improved drinking-water source (UNICEF/WHO, 2015), and an estimated 1.9 billion people rely on drinking-water that is faecally contaminated (Bain et al., 2014). Improved water sources that are not operated or maintained properly may deliver water that is microbiologically contaminated (WHO/UNICEF, 2011). In addition, microbial recontamination often occurs during collection of water at the source, transport and storage within the home (Wright, Gundry & Conroy, 2004).
- **Sanitation.** An estimated 2.4 billion people, or one third of the world's population, lack access to an improved sanitation facility, and 13% practise open defecation.

Among the world's regions, sub-Saharan Africa and South Asia continue to have the lowest sanitation coverage (WHO/UNICEF, 2015).

- **Hygiene.** Unlike household access to drinking-water and sanitation, no global mechanism exists to monitor handwashing practices in homes and communities. Furthermore, it is difficult to obtain reliable global estimates on handwashing with soap. However, in a recent systematic review of 42 studies of observed handwashing with soap in 19 countries, it was estimated that only 19% of people worldwide wash their hands after potential contact with excreta (Freeman et al., 2014). Despite indications of their importance for health and nutrition, few rigorous data exist on food and environmental hygiene practices.

2.1.1.2 Other settings: Health care facilities

Inadequate WASH services and practices are also a major concern in health care facilities. For example, a recent multicountry review representing 66 101 health care facilities in 54 low- and middle-income countries revealed that 38% of health care facilities do not have any water source, 19% do not have improved sanitation and 35% do not have water and soap for handwashing (WHO/UNICEF, 2015). This suggests that there are huge gaps and urgent needs to ensure that health care facilities are equipped to provide safe and good quality services to care seekers.

2.1.2 Preventing transmission of WASH-related diseases

WASH interventions can interrupt the transmission of faecal pathogens from the environment to humans through several pathways, as highlighted in the F-diagram (Fig. 1). By removing faeces from the environment, sanitation acts as a primary barrier, preventing faecal pathogens from entering water sources and agricultural fields and from contaminating fly populations.

Box 1.**WASH definitions**

WASH typically refers to activities aimed at improving access to and use of safe drinking-water and sanitation as well as promoting good hygiene practices (e.g. handwashing with soap at critical times). Interventions are generally categorized as follows:

- **Water quantity:** Provision of facilities and services that increase the amount of water available for drinking, cooking and maintaining good hygiene practices within households, health care facilities or schools; and reduce the time and effort required to collect the water.
- **Water quality:** Improvement and protection of the microbiological (or chemical, such as arsenic) quality of drinking-water through water treatment and safe storage or by improving existing water sources to protect them from outside contamination. Improved water sources, as defined by the World Health Organization (WHO)/United Nations Children's Fund (UNICEF) Joint Monitoring Programme for Water Supply and Sanitation (JMP) for the purposes of measuring progress towards the United Nations' Millennium Development Goals (MDGs), include piped water on-site, public taps or standpipes, tubewells or boreholes, protected dug wells, protected springs and rainwater (WHO/UNICEF, 2015).
- **Sanitation:** Provision and use of facilities and services that safely dispose of human urine and faeces, thereby preventing contamination of the environment. Improved sanitation facilities as defined by the aforementioned JMP are those that hygienically separate human excreta from human contact and include flush or pour-flush toilets to piped sewer systems, septic tanks or pits, ventilated improved pit latrines, pit latrines with slab, and composting toilets (WHO/UNICEF, 2015).
- **Hygiene:** Practice of handwashing with soap after defecation and disposal of child faeces, prior to preparing and handling food, before eating, and, in health care facilities, before and after examining patients and conducting medical procedures. In this document, hygiene also refers to interventions such as food hygiene (safe food handling, including preparation, storage and serving) and environmental hygiene, such as safely disposing of household solid waste (Adams, Bartram & Chartier, 2008).

Box 2.**Nutrition definitions**

Malnutrition: Malnutrition refers to all forms of nutrition disorders caused by a complex array of factors, including dietary inadequacy (deficiencies, excesses or imbalances in macronutrients or micronutrients), and includes both undernutrition and overnutrition and diet-related noncommunicable diseases.

Undernutrition: Undernutrition occurs when the body's requirements for nutrients are unmet as a result of underconsumption or impaired absorption and use of nutrients. Undernutrition commonly refers to a deficit in energy intake from macronutrients (fats, carbohydrates and proteins) and/or to deficiencies in specific micronutrients (vitamins and minerals). It can be either acute or chronic (WHO, 2013b).

Indicators of nutritional status: Anthropometric indicators (height and/or weight for a given age and sex) are commonly used to measure child growth and nutritional status. Indicators of undernutrition include stunting, wasting and underweight:

- **Stunting** (low height-for-age) is an indicator of chronic undernutrition and often reflects general poor health and more distal economic and social factors.
- **Wasting** (low weight-for-height) is an indicator of acute undernutrition and is associated with increased mortality.
- **Underweight** (low weight-for-age) reflects both chronic and acute undernutrition.

Other indicators of nutritional status are deficiencies in micronutrients (e.g. iron, vitamin A, zinc, iodine), which are measured through biomarkers, requiring blood and/or urine samples. Finally, measuring dietary intake over time provides a direct measure of nutrient intake and complementary information to the outcome indicators.

2.2 UNDERNUTRITION

2.2.1 Global status of undernutrition

Globally, in 2014, an estimated 159 million children under 5 years of age were stunted, and 50 million were wasted (Fig. 2). The highest rates of undernutrition are reported in Africa, Asia and Oceania (UNICEF/WHO/World Bank,

2015). Moreover, billions of people worldwide suffer from vitamin and mineral deficiencies, especially iron, iodine and vitamin A (WHO, 2013b). Undernutrition in all its forms is estimated to contribute to 3.1 million child deaths each year, accounting for 45% of all deaths of children under 5 years of age (Black et al., 2013). As illustrated in Fig. 2, stunting is widespread globally, and 44 countries have a significant proportion of children (at least 30%) younger than 5 years of age who are stunted.

Fig. 1. F-diagram (adapted from Perez et al., 2012)

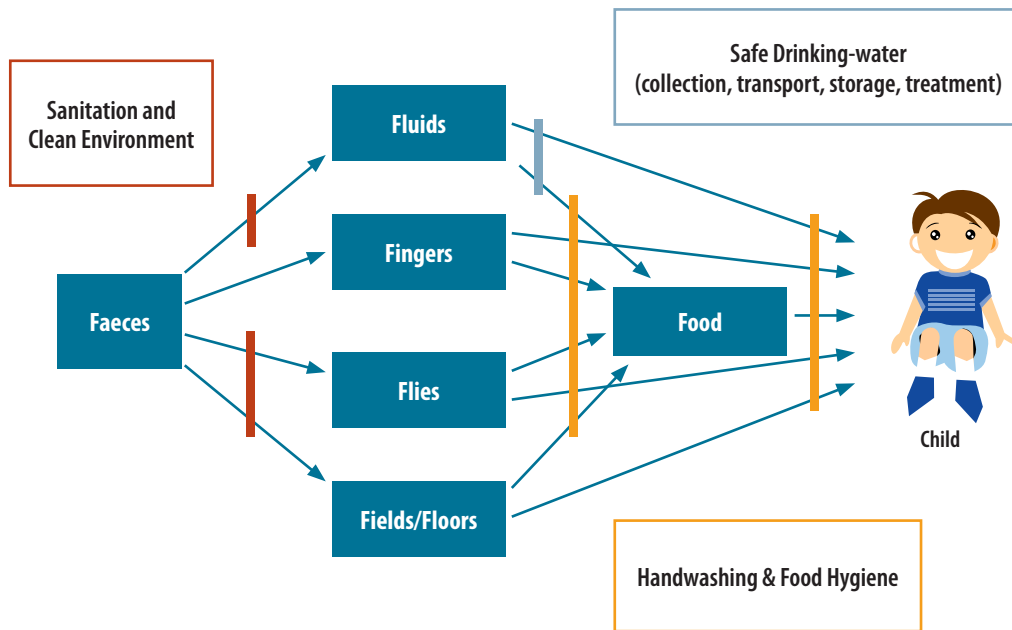
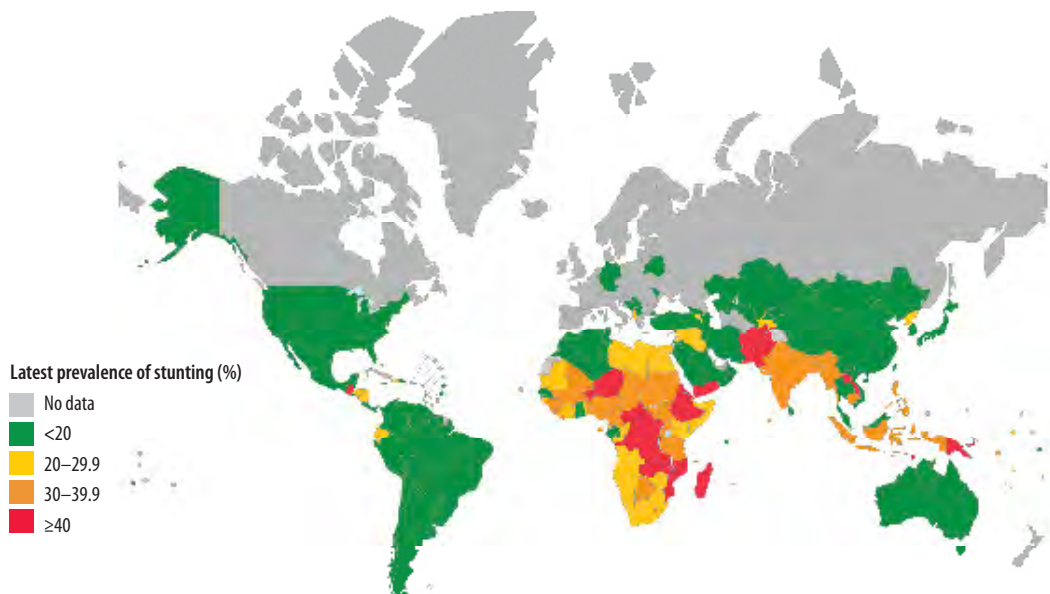


Fig. 2. Map of global prevalence of stunting of children less than 5 years of age (WHO, 2015a)



Note: The boundaries used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning delimitation of its frontiers or boundaries.

2.2.2 Causes of undernutrition

Undernutrition is directly related to inadequate dietary intake and infectious diseases and is influenced by three broad factors: food, health and care. Optimal nutritional status results when children and families have access to foods that are conducive to a healthy diet and meet dietary needs (e.g. sufficient, safe and nutritious); appropriate maternal and child care practices; adequate health services; and a healthy environment, including safe water, sanitation and good hygiene practices. The interaction between undernutrition and infection (particularly diarrhoeal diseases) creates a potentially vicious cycle of worsening illness and deteriorating nutritional status. The resources available in a society (human, financial, physical) and how they are used (social, economic, political and cultural) constitute the basic causes of undernutrition (Fig. 3).

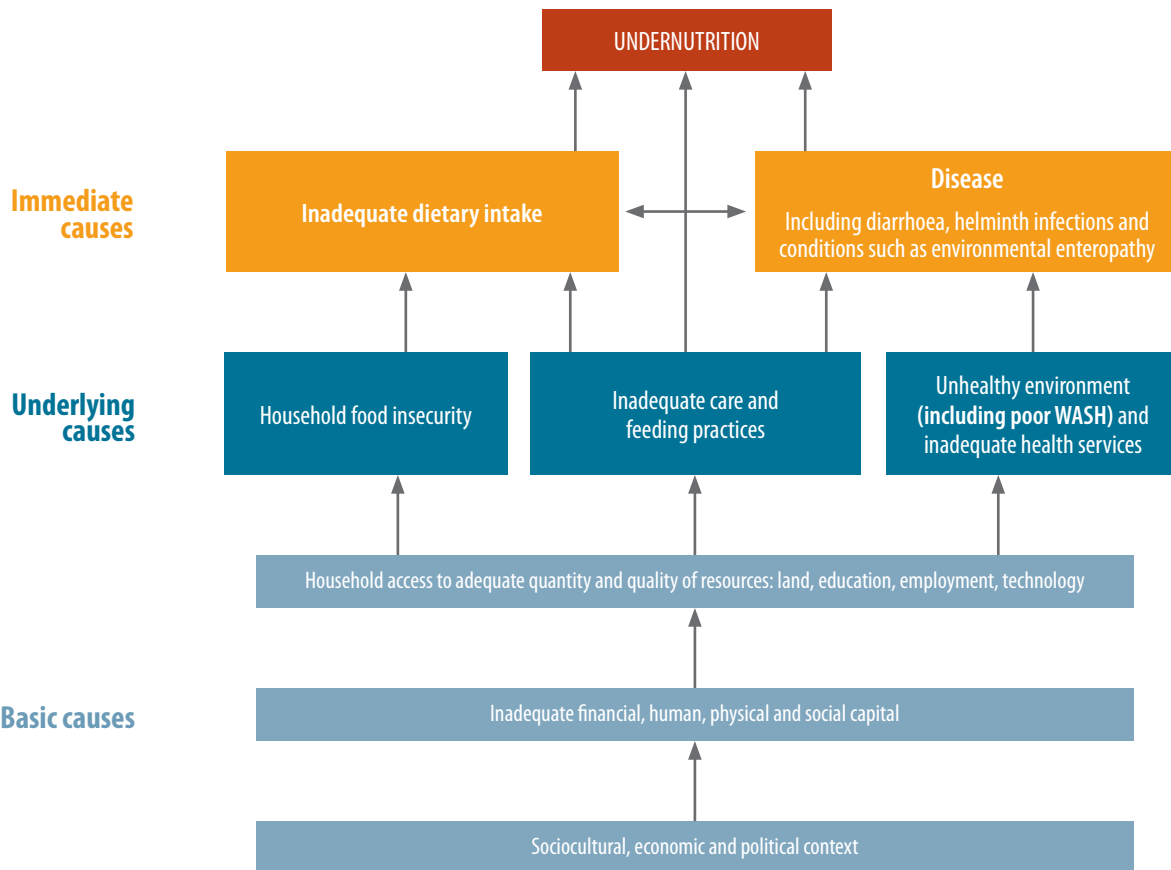
until the child’s second birthday. Adequate nutrition during this time is essential for healthy physical growth and brain development. Nutritional deficiencies during this period not only can result in disease and death, but also can have long-term consequences on cognitive and social abilities, school performance and work productivity in adulthood.

Undernutrition can span across generations and affect all stages of the life cycle. Girls suffering from undernutrition are likely to become undernourished mothers who are, in turn, more likely to give birth to low birth weight infants. For example, severe anaemia during pregnancy increases the risk of preterm delivery and low birth weight babies. Low birth weight babies are, in turn, more likely to die or become stunted. Adolescent girls are particularly vulnerable to undernutrition because they have high nutrient needs due to growth and because they are at risk for becoming pregnant (Black et al., 2013).

2.2.3 Nutrition and the life cycle

The most crucial period in a child’s growth and development is the 1000 days starting from conception

Fig. 3. Conceptual framework of the causes of undernutrition, including aspects of WASH and diarrhoea (adapted from UNICEF, 2013)



2.2.4 Links between WASH and undernutrition

Lack of access to WASH can affect a child's nutritional status in many ways. Existing evidence supports at least three direct pathways: via diarrhoeal diseases, intestinal parasite infections and environmental enteropathy. WASH may also impact nutritional status indirectly by necessitating walking long distances in search of water and sanitation facilities and diverting a mother's time away from child care (Fenn et al., 2012).

2.2.4.1 Diarrhoea

Diarrhoea is a leading cause of mortality and morbidity among children under 5 years of age. Although mortality from diarrhoea in this age group has fallen steadily over the past decades from 1.5 million deaths in 1990 to 622 000 deaths in 2012, diarrhoea morbidity has remained stable, with 1.7 billion cases occurring annually (Fischer Walker et al., 2012; Liu et al., 2012). Children under 5 years of age in low-income countries experience on average 2.9 episodes of diarrhoea per year, with the highest incidence rates in the first 2 years of life – the critical window for a child's development (Fischer Walker et al., 2012).

Diarrhoea and undernutrition form part of a vicious cycle. Diarrhoea can impair nutritional status through loss of appetite, malabsorption of nutrients and increased metabolism (Caulfield et al., 2004; Petri et al., 2008; Dewey & Mayers, 2011). Frequent episodes of diarrhoea in the first 2 years of life increase the risk of stunting and can impair cognitive development (Grantham-McGregor et al., 2007; Victora et al., 2008). At the same time, undernourished children have weakened immune systems, which make them more susceptible to enteric infections and lead to more severe and prolonged episodes of diarrhoea (Caulfield et al., 2004).

2.2.4.2 Intestinal parasitic infections

Soil-transmitted helminth infections – roundworm, whipworm and hookworm – affect millions of people worldwide (WHO, 2013c). Soil-transmitted helminth infections are directly caused by poor sanitation. Helminth eggs and larvae can survive for months in the soil and can infect humans when ingested (e.g. via contaminated water or food), by contact with fomites or by direct contact with the skin when walking barefoot on contaminated soil (hookworm larvae).

Soil-transmitted helminth infections can affect nutritional status by causing malabsorption of nutrients, loss of appetite and increased blood loss. Heavy infections with whipworm and roundworm can impair growth (O'Lorcain & Holland, 2000). Hookworm infections are a major cause of anaemia in pregnant women and children. As many as one third of pregnant women in Africa are at risk of hookworm-related anaemia (Brooker, Hotez & Bundy, 2008), which in turn increases the risk of preterm delivery and low birth

weight babies and, eventually, child undernutrition (Black et al., 2013).

2.2.4.3 Environmental enteropathy

Enteric pathogens can impair nutritional status even in the absence of symptoms such as diarrhoea. Children living in poor sanitary conditions are exposed to a high load of pathogens, especially between 6 months and 2 years of age, when they start crawling on the floor and putting objects into their mouths (Ngure et al., 2014). Chronic ingestion of pathogens can cause recurring inflammation and damage to the gut, leading to malabsorption of nutrients. This condition is often referred to as environmental enteropathy or environmental enteric dysfunction (Humphrey, 2009). Researchers suggest that environmental enteropathy may be an important cause of poor growth and may compromise the efficacy of nutritional interventions (Humphrey, 2009; Korpe & Petri, 2012). Several reviews highlighting the mounting evidence for links between unhygienic environments and gut dysfunction have recently been published (Humphrey, 2009; Korpe & Petri, 2012; Prendergast & Kelly, 2012).

2.3 EVIDENCE ON THE IMPACT OF WASH ON NUTRITIONAL STATUS

2.3.1 WASH, diarrhoea and soil-transmitted helminth infections

A large number of systematic reviews have been conducted to assess the impact of WASH interventions on diarrhoea incidence and prevalence (Esrey, Feachem & Hughes, 1985; Esrey et al., 1991; Fewtrell et al., 2005; Clasen et al., 2006, 2010; Arnold & Colford, 2007; Ejemot et al., 2008; Waddington et al., 2009; Norman, Pedley & Takkouche, 2010). The magnitude of the effect that WASH interventions have on diarrhoea mortality and morbidity varies depending on a number of factors, including the type and quality of the interventions, populations targeted, pathogens circulating in the environment, study design and methodological quality.

According to the most recent global burden of disease estimates, access to improved WASH could prevent 361 000 diarrhoeal deaths per year among children under 5 years of age, representing 58% of the total diarrhoea deaths in this age group. This analysis also suggests that the greatest reductions in diarrhoea mortality (up to 73%) can be achieved through services that provide safe and continuous piped water supply and through sewerage connections that remove excreta from both households and community environments (Pruss-Ustun et al., 2014).

Furthermore, recent meta-analyses have found that improving a range of WASH services and practices in households reduces the incidence of soil-transmitted helminth infections by, on average, one third (Ziegelbauer et al., 2012; Strunz et al., 2014).

2.3.2 WASH and nutritional outcomes

Generally less evidence and fewer rigorous trials exist on the link between WASH and improved nutritional status compared with WASH and the incidence of diarrhoea or soil-transmitted helminth infections. Nevertheless, there has been a growing interest in better understanding and measuring the effect of WASH on nutritional outcomes, and new research results provide insights into the relationship.

Observational studies have found associations between the frequency of open defecation and prevalence of stunting. An analysis of data from 140 demographic and health surveys (DHS) in 65 countries reported that over half of the variation in average child height between countries was explained by the frequency of open defecation (Spears, Ghosh & Cumming, 2013). Another analysis of 171 surveys in 70 low- and middle-income countries found that increasing access to and use of improved sanitation and improved water sources reduced the risk of stunting (Fink, Gunther & Hill, 2011). In a cluster randomized trial of 121 villages in Mali, children in communities that reduced open defecation through the community-led total sanitation (CLTS) approach suffered comparatively less stunting than comparison villages (Alzua et al., 2015).

Only a few rigorous study designs (i.e. randomized controlled trials) have been employed to measure the effect of WASH on nutritional outcomes. A Cochrane review identified five cluster randomized controlled trials to measure the effect of WASH interventions on nutritional status (Dangour et al., 2013). These five studies, conducted in low-income settings, found evidence for a small, but statistically significant, effect of WASH interventions on stunting. The interventions were limited to water quality and/or hygiene and were of short duration, and no study considered the effect of a complete package of WASH interventions (Du Preez, McGuigan & Conroy, 2010; Du Preez et al., 2011).

Whereas the Cochrane review suggests that WASH interventions can improve nutritional status, a number of large studies have recently been completed or are under way in Africa and Asia that will provide more robust evidence on how and by how much different WASH interventions influence nutritional outcomes and identify the most effective ways of linking WASH with nutrition interventions.

2.4 GLOBAL COMMITMENTS FOR WASH AND NUTRITION

As indicated above, the evidence regarding the gains associated with integrating WASH with nutrition efforts is growing. The policy basis for such common sense preventive health efforts is also strong and growing. Major global resolutions and commitments provide

further support to policy-makers and implementers for integrated efforts. Some of the major global commitments are summarized below.

2.4.1 Nutrition and WASH as related human rights

Article 24.2(c) of the Convention on the Rights of the Child – adopted by virtually all countries in the world – urges states to ensure “adequate nutritious foods and clean drinking-water” to combat disease and malnutrition (UN, 1989). In addition, the International Covenant on Economic, Social and Cultural Rights reaffirms the rights to adequate food and the highest attainable standard of health and emphasizes the role of WASH practices in achieving optimal nutrition and health (CESCR, 1999, 2000). Furthermore, in 2010, through Resolution 64/292, the United Nations (UN) General Assembly recognized the human right to water and sanitation and acknowledged that clean drinking-water and sanitation are essential to the realization of all human rights (UN, 2010).

2.4.2 International Conferences on Nutrition in 1992 and 2014

The World Declaration and Plan of Action on Nutrition of the first International Conference on Nutrition (ICN) in 1992 outlined nine action-oriented strategies for countries to implement in protecting and promoting nutritional well-being for all, including two that were particularly related to water and sanitation (FAO/WHO, 1992). Countries at the second International Conference on Nutrition (ICN2) in 2014 adopted The Rome Declaration on Nutrition and the Framework for Action, which included three recommended actions on WASH, highlighted in Box 3 (FAO/WHO, 2014).

Box 3.

Recommended actions on WASH adopted by ICN2 (FAO/WHO, 2014)

- Implement policies and programmes using participatory approaches to improve water management in agriculture and food production, including by reducing water wastage in irrigation, strategies for multiple use of water (including wastewater) and better use of appropriate technology.
- Invest in and commit to achieve universal access to safe drinking-water, with the participation of civil society and the support of international partners, as appropriate.
- Implement policies and strategies using participatory approaches to ensure universal access to adequate sanitation and to promote safe hygiene practices, such as handwashing with soap, including by implementing effective risk assessment and management practices on safe wastewater use and sanitation.

2.4.3 Global nutrition targets 2025

Ministers of health at the World Health Assembly in 2012 adopted Resolution 65/6 on the Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition, which calls for combined actions in health, food and other sectors, including WASH (WHO, 2012). The targets adopted in this resolution are highlighted below in Box 4. The role of WASH in nutrition is also recognized in the Global Monitoring Framework for the Plan.¹

Box 4.

World Health Assembly global nutrition targets to be achieved by 2025

- 40% reduction in the number of children under 5 years of age who are stunted
- 50% reduction of anaemia in women of reproductive age
- 30% reduction of low birth weight
- No increase in childhood overweight
- Increase the rate of exclusive breastfeeding in the first 6 months up to at least 50%
- Reduce and maintain childhood wasting to less than 5%

2.4.4 World Food Summits

In addition to water and sanitation commitments from ministers of health, heads of state and ministers of agriculture have also committed to improved WASH. Official commitments from the World Food Summits in 1996 and 2002 include the role of water and sanitation in achieving food and nutrition security (FAO, 2002).

2.4.5 The Scaling-Up Nutrition movement

To date, more than 50 countries have joined the Scaling-Up Nutrition (SUN) movement. The SUN approach, recognizing that malnutrition has multiple causes, builds high-level support at the country level to foster collaboration and coordination across issues, sectors and stakeholders to position nutrition in all development efforts. SUN promotes scaling up both specific nutrition interventions as well as nutrition-sensitive approaches, including clean drinking-water, improved sanitation facilities and hygiene. Major donors in the SUN donor network, such as the United States Agency for International Development (USAID),

the United Kingdom Department for International Development (DFID), the Bill & Melinda Gates Foundation and the European Commission, have developed nutrition strategies that substantially address and include WASH actions to meet nutrition aims. The movement is supported by the 1,000 Days partnership, described in Box 5.

Box 5.

Supporting the SUN movement: the 1,000 Days partnership

The SUN movement is supported by the 1,000 Days partnership, which was launched by the USA and Ireland in 2010 and focuses on the critical window of opportunity between a woman's pregnancy and her child's second birthday. This is when improved maternal and child nutrition can have its greatest impact on reducing death and disease, increasing intellectual and physical work capacity and lowering the risk of undernutrition, obesity and noncommunicable diseases.

2.4.6 WHO/UNICEF Global Action Plan for the Prevention and Control of Pneumonia and Diarrhoea

The WHO/UNICEF Global Action Plan for the Prevention and Control of Pneumonia and Diarrhoea provides an integrated framework of key interventions proven to effectively prevent and treat childhood pneumonia and diarrhoea. Nutrition and WASH are both included as foundational interventions to meet the global target of eliminating preventable childhood pneumonia and diarrhoea by 2025, and work is under way in a number of pilot countries to determine effective implementation approaches and their corresponding costs and benefits (WHO/UNICEF, 2013).

2.4.7 Global WASH resolutions and commitments

In 2011, the World Health Assembly adopted Resolution 64/24 on Drinking-water, Sanitation and Health, which calls for an integrated approach to implementing safe water and adequate sanitation as primary prevention with other health efforts, including nutrition.

Several developing countries, donors and organizations made public commitments to improve nutrition as part of the 2014 High Level Meeting of Sanitation and Water for All, a global partnership of over 90 developing country

¹ A set of core indicators, including two on WASH, was approved by the Sixty-eighth World Health Assembly in 2015 (see http://apps.who.int/gb/ebwha/pdf_files/WHA68/A68_9-en.pdf and WHA68(14) in http://apps.who.int/gb/ebwha/pdf_files/WHA68/A68_DIV3-en.pdf).

governments, donors, development banks and civil society organizations that tracks commitments made towards universal access to safe water and adequate sanitation services.

2.4.8 Global strategy on WASH and neglected tropical diseases

In August 2015, WHO launched a 5-year global plan to better integrate WASH services with four other public

health interventions in order to accelerate progress against neglected tropical diseases (NTDs). The strategy includes a call for reinforcing efforts on WASH to combat diseases such as soil-transmitted infections and schistosomiasis, both of which are directly linked to poor nutritional outcomes. Greater coordination and collaboration with WASH (and nutrition) are important for combatting all of the 17 NTDs scheduled for intensified control or elimination by 2020 (WHO, 2015b).

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WASH INTERVENTIONS TO PREVENT DISEASE AND IMPROVE NUTRITIONAL STATUS

Nutrition-specific interventions address the most immediate causes of undernutrition (Box 6). These interventions are supported by evidence and are detailed in several nutrition packages, including WHO's Essential Nutrition Actions (WHO, 2013a) and UNICEF's Infant and Young Child Feeding (IYCF) Programming Guide (UNICEF, 2011). These approaches focus on the most critical period of human development – the first 1000 days from conception to a child's second birthday.

Box 6.

Nutrition-specific actions (WHO, 2013a)

- Improving nutrition of pregnant and lactating women
- Early initiation of breastfeeding within 1 hour of birth
- Exclusive breastfeeding for the first 6 months
- Counselling and support for continued breastfeeding along with appropriate complementary feeding from 6 months up to 2 years and beyond
- Micronutrient supplementation to women of reproductive age, pregnant women and children
- Fortification, when needed
- Management of moderate and severe acute malnutrition
- Nutritional care and support for children and women in difficult circumstances (e.g. emergencies, human immunodeficiency virus [HIV]/acquired immunodeficiency syndrome [AIDS]).

However, the 2013 *Lancet* series on maternal and child nutrition estimated that achieving 90% coverage with a package of 10 nutrition-specific interventions would reduce the prevalence of stunting by only 20% (Bhutta et al., 2013). Reducing and ultimately eliminating undernutrition therefore require effective implementation of nutrition-specific and complementary nutrition-sensitive interventions addressing the underlying and basic causes of undernutrition – including improving WASH. Other important actions, but not the focus of this document, are addressing agriculture and food security, girls' and women's empowerment, education, family planning and social protection.

This chapter describes nutrition-sensitive WASH interventions that can be integrated into nutrition programmes. They fall under the following categories: hygiene behaviours, including handwashing with soap, food hygiene and environmental hygiene, safe drinking-water management from collection to use in the household, sanitation (with special considerations for vulnerable groups, such as children and the disabled) and water supply.

Nutrition programme managers may not have the technical expertise or resources to implement some aspects of WASH interventions effectively. Thus, they should reach out to their WASH colleagues for technical and financial support to develop and implement complementary WASH activities, by either integrating some WASH components directly into nutrition programmes or coordinating efforts to incrementally increase access to water, sanitation and hygiene facilities and services in nutrition programme areas.

3.1 WASH PROGRAMMING FRAMEWORK

WASH programmes will have a greater and more sustainable impact when three elements are combined: an enabling policy and institutional environment, access to good-quality hardware and services, and demand creation/uptake of services. These three components (and the specific elements and inputs of each) are illustrated in the WASH improvement framework (Fig. 4).

3.2 WASH INTERVENTIONS

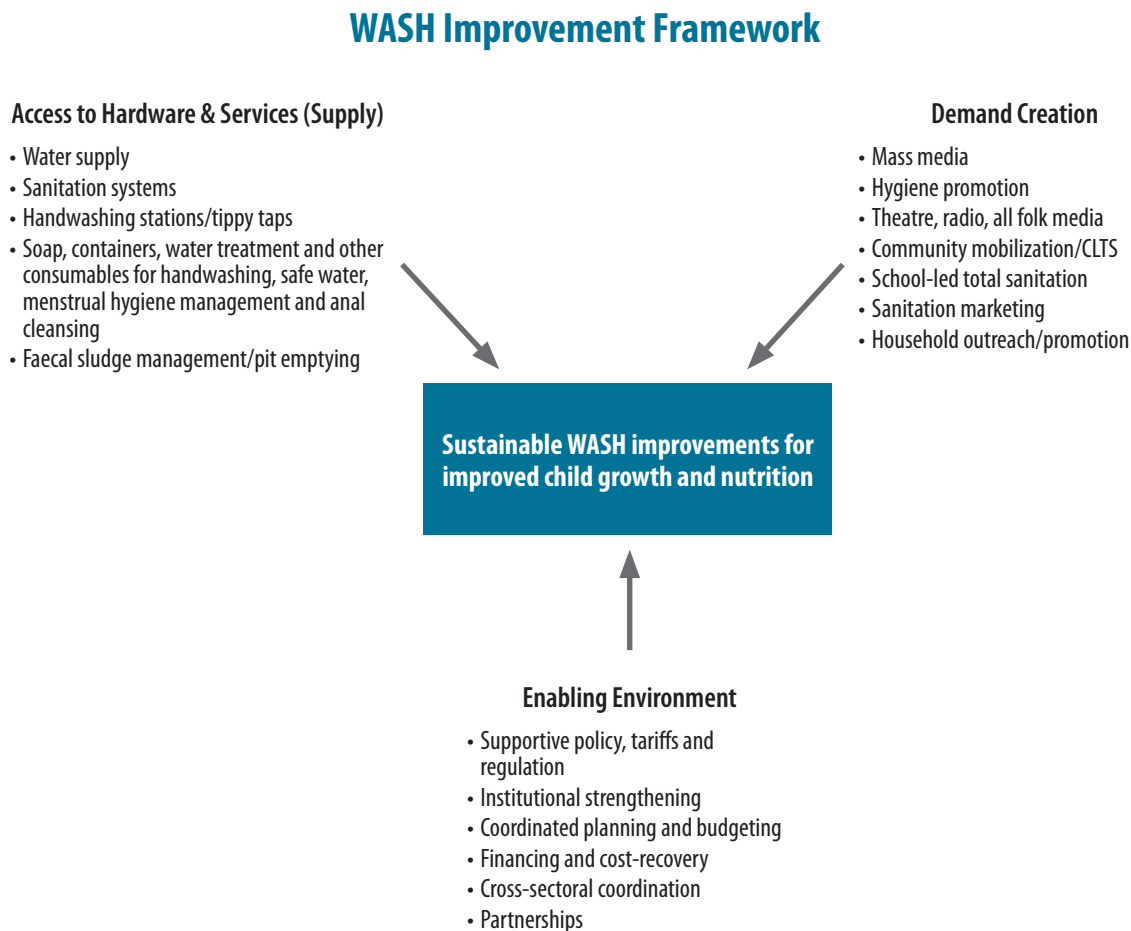
The following text describes the major WASH interventions. It begins with hygiene promotion, which may be the most feasible for nutrition programmes to integrate and implement. This is followed by sanitation, which is critical

for preventing faecal contamination of the environment, and finally water supply and water quality. Although investments in larger water and sanitation infrastructure will require resources outside the remit of nutrition, the frameworks and components of such efforts are briefly described to facilitate advocacy and planning of co-location of nutrition and WASH efforts.

3.2.1 Hygiene promotion

Hygiene interventions include promoting handwashing with soap at critical times. This document also includes food hygiene and environmental hygiene as additional hygiene interventions that support improved nutrition outcomes.

Fig. 4. WASH improvement framework (adapted from EHP et al., 2004)



3.2.1.1 Handwashing

In the household, handwashing with soap should be encouraged at critical times (see Box 7).

Box 7.

Critical handwashing periods

- Before preparing food or cooking
- Before eating or feeding a child
- After cleaning a child's bottom
- After defecation

Similar to other WASH interventions, handwashing requires the adoption of consistent and correct behaviour. Targeting the physiological factors that are responsible for the formation of habitual behaviour (e.g. risk, attitudinal, ability or maintenance beliefs) is an effective means to create and sustain such a habit (Mosler, 2012; Newson et al., 2013). Handwashing should be done correctly to effectively remove pathogens from hands. This can best be achieved by handwashing with adequate quantities of flowing water and soap or, alternatively, hand rubbing with an alcohol-based solution. To be effective, handwashing should last 40–60 seconds for water and soap or 20–30 seconds for hand rubbing with an alcohol-based solution, and the action should follow the recommended steps (WHO, 2014a).

Setting up dedicated handwashing stations with necessary supplies (soap and water or alcohol-based handrub solution) at key locations in households, schools, health care facilities and public spaces can serve as a reminder for handwashing. These handwashing stations are particularly important near food preparation sites and latrines. Simple handwashing stations or inexpensive alcohol-based handrub solutions can be manufactured locally (see the Resources section for details on constructing handwashing stations). In Viet Nam, Kenya and other settings, aspirational handwashing devices have been developed for commercial sale (Revell & Huynh, 2014).

3.2.1.2 Food hygiene

Breast milk is the most nutritious and safe food for infants and young children.¹ WHO recommends that infants should be exclusively breastfed for the first 6 months of life to achieve optimal growth, development and health. Thereafter, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe

complementary foods, while continuing to breastfeed for up to 2 years or beyond (WHO, 2013a). Care should be taken to safely prepare complementary foods, as several studies in low-resource settings have shown that food given to young children is often highly contaminated with faecal pathogens (Islam et al., 2013; Touré et al., 2013). WHO's Five Keys to Safer Food (Box 8) describe concrete actions that can be taken to prevent pathogen contamination of food (WHO, 2006).

Box 8.

Five keys to safer food

1. Keep a clean environment for handling food (including handwashing, cleaning key surfaces and utensils, protecting food preparation areas from insects, pests and other animals).
2. Separate raw and cooked food.
3. Cook food thoroughly.
4. Store food at safe temperature.
5. Use safe water and raw material.

More details on specific actions associated with each practice can be found in the Resources section. Box 9 gives an example of how an intervention can be designed to improve food hygiene practices among rural communities in Nepal, using nurture, disgust and social norm as key drivers for behavioural change.

Box 9.

Improving food hygiene in Nepal (Gautam et al., 2015)

A recent study in Nepal developed and tested innovative, evidence-based behavioural change approaches to improve food hygiene practices. The intervention was implemented by conducting group sessions and household visits. Each session focused on a specific motivational theme, including nurture, disgust, social respect and others. Activities consisted of storytelling and motivational games introducing an "Ideal Mother" figure, providing reminder materials in kitchens related to five key food hygiene behaviours, video screenings, a jingle installed on mobile phone ringtones, contamination demonstrations, public pledges of commitment to the campaign, competitions and public reward ceremonies. One of the targeted behaviours was for mothers to keep food adequately hot to reduce bacterial growth. The message communicated to mothers was that if the food is hot, it will be tastier, and the child will eat more based on the "nurture driver". Preliminary results of this campaign indicate that mothers practised the behaviours, in particular reheating food, because they found that children liked the food better and ate more.

¹ There are instances where breast milk is not available, where the mother is unable to breastfeed, where she has made an informed decision not to breastfeed or where breastfeeding is not appropriate, such as when the mother is taking certain medication that is contraindicated for breastfeeding (WHO/UNICEF, 2009). In such cases, breast milk substitutes should be prepared safely to avoid contamination, following WHO recommendations (WHO/FAO, 2007).

3.2.1.3 Environmental hygiene

Floors and ground surrounding the house can be a source of contamination for young children as they begin to explore their environments by crawling, walking, putting objects in their mouths or directly consuming dirt or soil (pica). Studies have found high levels of faecal indicator bacteria in the soil of areas where young children play and on the hands of children (Ngure et al., 2013). Animal faeces, such as chicken, dog or cow faeces, often present in the yards of houses have been found to harbour high loads of pathogens, thus presenting an additional potential source of contamination, as children have been observed directly ingesting faeces found in household compounds (Ngure et al., 2013). As a result, whereas most hygiene promotion programmes have traditionally focused on the handwashing practices of mothers, researchers have begun to develop and evaluate the impact of interventions aimed at containing animals and washing babies' hands (Ngure et al., 2014). Important environmental hygiene practices are highlighted in Box 10.

Box 10.

Important environmental hygiene practices

- Keep animals away from areas where the food is prepared and served to the child, child play areas and water sources. Regularly clear compound of any animal or child faeces, at least daily.
- Control disease vectors such as flies, mosquitoes, cockroaches and rats by covering food, improving drainage and safely disposing of garbage and non-reusable materials into a waste receptacle or protected pit.
- Clean key surfaces. This may include cleaning latrines, basins and kitchen floors and surfaces with soap and water and possibly disinfecting after cleaning with a dilute bleach solution, if available.
- Provide safe areas that can be regularly cleaned where children can play. An example is in Zimbabwe, where easily washable plastic mats have been distributed (Humphrey, 2012).

3.2.2 Sanitation

Safe disposal of faeces, the foundation for reducing pathogens in the environment and protecting human health, begins with household access to hygienic sanitation facilities that safely remove and treat faeces. Further, faeces must also be safely transported to a designated disposal/treatment site or returned to the environment in a way that prevents human exposure to the faeces. A holistic approach to addressing faecal risks from source to safe use or disposal is facilitated through sanitation

safety planning. Sanitation safety planning also serves as a valuable mechanism to safely use excreta as fertilizer, thereby increasing nutritious food output and supporting better nutrition. More information on this can be found in the links in the Resources section.

The relationship between sanitation options with different costs and health outcomes is described as the "sanitation ladder". As a household moves away from open defecation towards improved sanitation and ultimately safely managed sewerage systems, costs and health benefits both increase. Achieving health gains from sanitation requires both improving access to and use of appropriate sanitation facilities. Interventions to achieve these aims are summarized in Box 11.

Box 11.

Interventions to improve access to and use of sanitation facilities

- Engage communities in a process to develop and implement sanitation safety planning to safely manage, dispose of and utilize excreta.
- Support sanitation campaigns using social mobilization strategies, such as community-based or sanitation marketing approaches targeting both household- and community-level improvements. Box 12 provides an example of a community-based approach to sanitation.
- Mentor small-scale sanitation businesses to improve supply chain efficiency and marketing skills and improve product and service models for sanitation so they are more affordable and attractive to consumers.
- Leverage financial schemes such as village savings and loans and microfinance institutions to provide financing for household sanitation improvements.
- Develop communal, public and institutional sanitation services, as well as faecal sludge management systems, to ensure access for all and to protect the environment from faecal pollution.
- Integrate hygiene practices with sanitation facility improvements by locating a handwashing device with water and soap near a latrine to remind and enable users to wash hands after defecating.

Box 12.**Community-led total sanitation (Kar & Chambers, 2003)**

CLTS is one community-based approach to sanitation that concentrates on ending open defecation as an entry point to changing behaviour. It starts by enabling people to create their own sanitation profile through appraisal, observation and analysis of their open defecation practices and the effects that these practices have on the community. This approach is designed to trigger feelings of shame and disgust and often a desire to stop open defecation and clean up the neighbourhood. The process focuses on the whole community and targets change in social norms rather than change in individual behaviour. Collective benefit from stopping open defecation can lead to a more cooperative approach. People decide together how they will create a clean environment that benefits everyone. CLTS involves no individual household hardware subsidy and does not prescribe latrine models. Social solidarity, help and cooperation among the households in the community are the core elements in CLTS. Other important characteristics are the emergence of “natural leaders” as a community proceeds towards open defecation-free status; local innovations of low-cost toilet models using locally available materials; and community-led systems of reward, penalty and scaling-up.

3.2.2.1 Sanitation for infants and toddlers

In many low-income countries, faeces of young children are often disposed of unsafely (Gil et al., 2004; Majorin et al., 2014). Yet children’s faeces may present greater health risks than those of adults. This is because young children experience the highest rates of diarrhoea, thus shedding more pathogens in the environment, and tend to defecate in areas where other children could be exposed (Lanata, Huttly & Yeager, 1998). Unsafe child faeces disposal practices may occur because young children’s faeces are often perceived as less dirty than those of adults, nappies and potties may not be available or used, or toilets may not be adapted for use by young children. Interventions appropriate for this age group are highlighted in Box 13.

Box 13.**Sanitation interventions appropriate for infants and toddlers**

- Promote use and safe disposal of diapers (nappies) and safe cleaning of reusable cloth used to contain faeces.
- Improve and promote access to “enabling products” such as potties and hoes that facilitate getting faeces into latrines for safe disposal.
- Make latrines “child friendly” by partially covering the latrine hole with a small board or use a slab with a child-sized hole to prevent children from falling into the pit, improving light and ventilation, etc.

3.2.2.2 Sanitation for other vulnerable groups

Other vulnerable populations (pregnant women, older people, immunocompromised people and people with disabilities) may constitute a quarter or more of the population (representing one or more individuals in a family). These populations may also disproportionately suffer from poor nutrition, and thus solutions to enable their access to and use of sanitation are especially important. Their right to access is upheld in the UN Human Right to Water and Sanitation (UN, 2010) as well as the UN Convention on the Rights of Persons with Disabilities (UN, 2006). Specific sanitation interventions for such populations are highlighted in Box 14.

Box 14.**Sanitation interventions for vulnerable populations**

- Making latrine or toilet structural improvements such as providing poles, support stools or ropes that can support a person trying to get to the latrine and may make it easier to use.
- Clearing obstacles from the path to the latrine (Groce et al., 2011).

3.2.3 Water quantity and quality**3.2.3.1 Access to safe drinking-water**

Improving access to safe drinking-water involves constructing or improving water supply systems or services, such as providing piped water on-site, public standpipes, boreholes, protected dug wells, protected springs and rainwater. It is estimated that 15–20 L of water per person per day is needed for consumption, food preparation, cleaning, laundering and personal hygiene (WHO, 2003). Similar to sanitation safety planning, long-term approaches to address and manage risks associated with unsafe drinking-water ought to be addressed through the water safety plan framework (refer to the Resources section for details).

3.2.3.2 Household water treatment and safe storage

Although improving access to safe drinking-water remains an essential development goal, low-cost strategies to treat and safely store drinking-water at the point of consumption can provide an intermediate solution while longer-term infrastructure improvements are being planned and implemented. Household water treatment (HWT) and safe storage (HWTS) technologies, also known as point-of-use technologies, include a range of devices or methods used to treat water in the home or other settings, such as schools and health care facilities. A growing body of evidence demonstrates that the use of HWT products improves the

microbiological quality of household water and reduces the burden of diarrhoeal disease in users (Clasen et al., 2007; Waddington et al., 2009; WHO, 2014b). 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 (Wood, Foster & Kols, 2012).

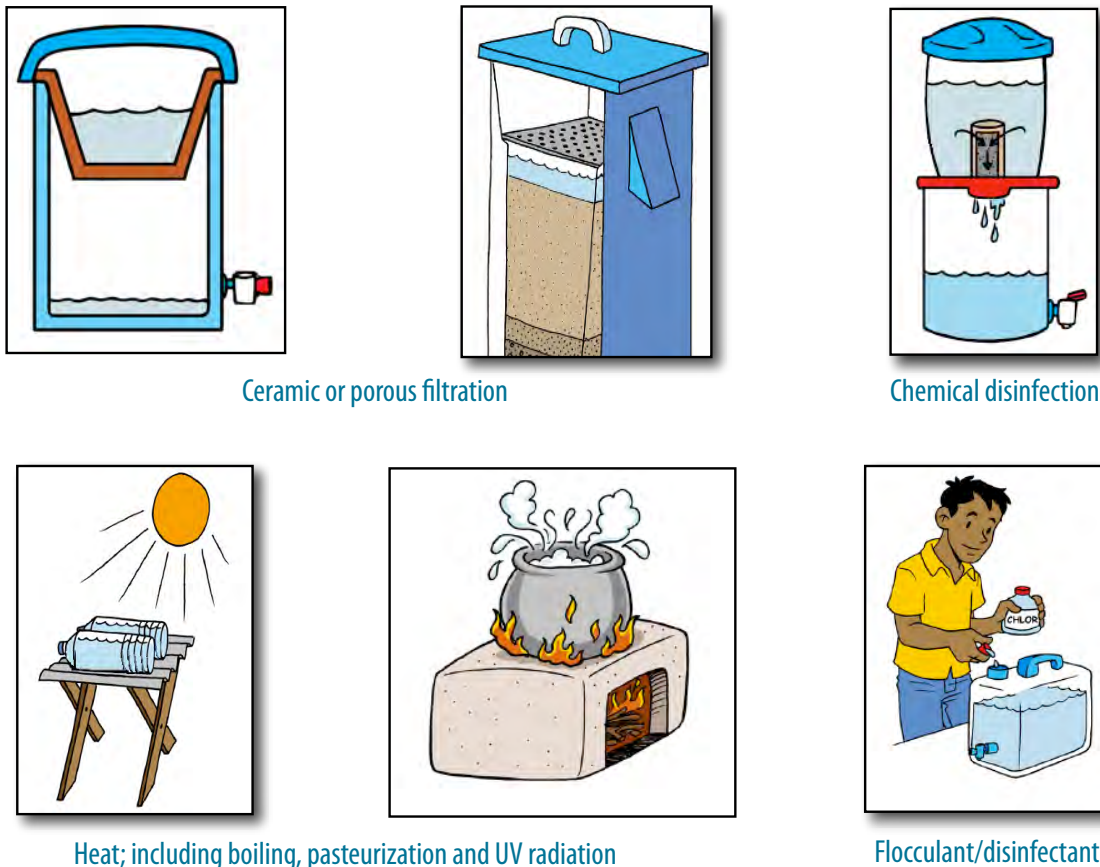
Even water safe at the source can be easily contaminated during collection, transport and storage. Ideally, water in the home should be stored in a clean container with a lid and a narrow neck or spigot to prevent contamination of the water with hands. If the container does not have a spigot, the water can be served with a ladle that is stored in a clean place (not on the floor). Water may also be stored in a bucket with a tightly fitting lid and poured from the container. The most common and proven methods of HWT include filtration, chemical disinfection (e.g. chlorination), heat, including boiling, pasteurization and ultraviolet (UV) radiation, and combined flocculant/disinfectant. These are illustrated in Fig. 5 (Sobsey, 2002; WHO/UNICEF, 2012).

In order to achieve health benefits, HWT must effectively remove the pathogens that cause diarrhoeal disease in a

particular setting and be used correctly and consistently by populations with unsafe drinking-water. To ensure that technologies sufficiently protect users, WHO has established the International Scheme to Evaluate Household Water Treatment Technologies, which coordinates the independent and rigorous evaluation of HWT technologies according to health-based performance criteria (WHO, 2011; for more information, refer to the website listed in the Resources section). In addition, selection of HWT technologies should consider pathogens that may be especially problematic for vulnerable groups. For example, those living with HIV are especially vulnerable to diarrhoeal disease and *Cryptosporidium*, in particular, and therefore the recommended method of treatment (e.g. filters) should remove this pathogen (Peletz et al., 2013).

The correct and consistent uses of technologies are equally important and depend on several factors, including ease of use, cultural preferences and motivations, and cost and availability of the product, including spare parts and consumables. Programmes aiming to implement HWTS should consider these factors and provide ongoing behavioural change and user support.

Fig. 5. Most commonly used HWTS methods (WHO/UNICEF, 2012)



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INTEGRATION INTERVENTIONS AND APPROACHES

Chapter 4 describes approaches and practices for integrating WASH into nutrition programmes, with recommendations for household/community- and health care facility-based activities. This chapter also outlines approaches for planning and implementing joint activities and suggests ways in which nutrition programmes can incorporate WASH activities that are appropriate and feasible for different contexts.

Before initiating any integration activities, it is important to consider when integration makes sense and the trade-offs of collaborative efforts compared with undertaking nutrition or WASH as single programmes. Furthermore, some nutrition efforts, such as improving nutrition of pregnant and lactating women and appropriate complementary feeding, may be more attractive for complete integration with WASH efforts in order to address the necessary food and hand hygiene, sanitation and water quality issues, whereas other nutrition interventions, such as micronutrient supplementation, may need only limited coordination. Engaging in productive conversations with both WASH and nutrition partners to outline the various advantages (e.g. health gains, longer-term cost savings) of integration as well as costs (e.g. more time spent in coordination, slower implementation) is important.

Integration may take different forms (see Box 15). It is important to build on what exists, making incremental efforts to increase integration when worthwhile, document and reflect on lessons learnt and further refine and improve joint efforts.

Box 15.

Integration elements

Integration of WASH and nutrition should not be seen as a goal in itself, but a strategic tool to enable the achievement of better nutritional outcomes. There are many types and levels of integration, and the goals, capacities and enabling environment will help determine the appropriate level of integration. The very real transaction costs of time and resources to build capacity and implement integrated activities ought to be outweighed by the anticipated benefits.

Integration could include one, some or all of these aspects:

- Geographic co-location of nutrition and WASH efforts in areas with high incidence of diarrhoea, undernutrition and inadequate water, sanitation and hygiene
- Single implementing partner or contract mechanism
- Merged budgets
- Joint design process including more than one sector/subsector
- Interdisciplinary management team/steering committee
- Consolidated reporting.

Integrated programming can happen at many levels (national, subnational, between or within agencies), and opportunities to integrate may arise as programmes evolve. The most appropriate interventions to include will be context specific. However, in many instances, promotion of hygiene practices, such as handwashing with soap, is feasible within nutrition programmes and would reinforce important preventive health behaviour.

A set of key actions for integrating WASH and nutrition activities is outlined in Box 16 and further described below:

Box 16.

Examples of key actions for integrating WASH into nutrition

- Understand the situation: review existing data, policies and strategies.
 - Leverage existing policies and strategies to advocate for greater integration and inform joint planning, objective setting and monitoring.
 - Strengthen existing nutrition policies and inform the development of new nutrition policies with an appropriate focus on WASH.
 - Identify champions and advocates for WASH and nutrition integration.
 - Engage with stakeholders in joint planning.
 - Establish and build a working relationship between nutrition and WASH actors.
 - Target WASH programmes in areas of high nutritional need.
 - Train health and nutrition staff to promote and demonstrate key WASH practices in ongoing nutrition work.
 - At the community and household levels, promote improved nutrition and WASH practices and reinforce the practices using multiple communication channels.
- **Understand the situation: review existing data, policies and strategies.** Understanding the extent and location of undernutrition, diarrhoeal diseases, access to improved water and sanitation, hygiene behaviours and food insecurity will help a manager prioritize where to implement WASH–nutrition integration activities. This information can be found in reports from health management information systems and national or localized nutrition and WASH assessments.¹
 - **Leverage existing policies and strategies to advocate for greater integration and inform joint planning, objective setting and monitoring.** Many national policies and development partners' strategies acknowledge the importance of adequate WASH practices for achieving good nutritional status and call for WASH interventions to be scaled up along with nutrition actions. Although policies alone do not ensure improved nutrition or health outcomes, having a national nutrition policy that recognizes the importance of WASH and/or national WASH policies that recognize their contribution

to nutrition outcomes pave the way to developing integrated programming at all levels.

Nutrition and WASH programme managers may use policies to identify plausible projects, collaborating partners or common goals. Policies also guide and influence budget allocations. National development plans that include WASH and nutrition could be used to advocate for the allocation of funds. As nutrition policies often do not have adequate levels of attached funding, nutrition programme managers could also identify relevant policies in other sectors to tap into resources for integrated nutrition and WASH activities. Policies are also important for monitoring and can be used to hold governments and others accountable against their commitments. Chapter 5 on M&E describes potential key indicators for integrated WASH and nutrition programmes.

Numerous countries have developed multisectoral National Plans of Action on Nutrition that include WASH components as part of their commitments after the first ICN in 1992. If the country has signed on to the SUN movement, 1,000 Days partnership or programmatic approaches such as the Renewed Efforts Against Child Hunger and undernutrition (REACH) initiative, these linkages may help to frame joint action.

- **Strengthen existing nutrition policies and inform the development of new nutrition policies with an appropriate focus on WASH.** Although policies are not revised frequently, nutrition programme managers and their WASH colleagues may get the opportunity to provide inputs and strengthen the nutrition and WASH components of those policies. Generally, nutrition policy development is an inclusive process and informed by global evidence for effective actions and local experience of best practices for implementation. Global-level evidence for nutrition actions can be found in the e-Library of Evidence for Nutrition Actions (eLENA), which features more than 100 nutrition actions that address the double burden of malnutrition and underlying causes, including guidance on water, sanitation and hygiene. Local-level evidence is best collected in country, from published and unpublished material prepared by government, partners or academia.
- **Identify champions and advocates for WASH and nutrition integration.** Champions and advocates (community leaders, health care providers, teachers, high-level government officials, celebrities) can play an important role in obtaining approvals for integrated programming or in implementing the actual programme. Their passion for preventing infant and young child undernutrition and death can encourage others to take on the cause. For example, champions may help drive leaders to review and update policies or encourage civic society to demand better WASH services and nutrition support.

¹ A number of surveys include nutrition indicators. These include the Nutrition Landscape Information System, Multiple Indicator Cluster Surveys, DHS and localized nutrition surveys. The JMP provides information on water and sanitation access in households and, as part of measuring progress towards achieving the post-2015 Sustainable Development Goals, will also report on WASH in health care facilities.

- **Engage with stakeholders in joint planning.** When integrated programming is comprehensive, the process generally starts at the national level and includes policy review and updating, stakeholder mapping, strategy development and dissemination, planning and costing, training, implementation, supervision, and monitoring and reporting. This process takes time, especially with multiple ministries and partners, and such delays should be factored into scheduling and key milestones (refer to the Resources section for specific sources of information on joint planning).
- **Establish and build a working relationship between nutrition and WASH actors.** Nutrition and WASH managers should exchange information on current programme priorities and project locations. WASH managers are often engineers focused on the water supply and sanitation and therefore may not focus on how their programmes can reduce infant and young child undernutrition. Sector coordination efforts can be helpful in establishing relationships at central and district levels, whereas cluster coordination can be effective during emergencies.

After nutrition programme managers have established relationships with WASH colleagues, they can define how programmes can work together more formally – for example, through a memorandum of understanding or strategic work plan. Such agreements might include a WASH programme engaging in infrastructure projects and a nutrition programme introducing hygiene practices. Another example could include two programmes leading WASH improvement activities together, where each programme commits to providing some necessary components, such as technologies required, the facilitator or promotional take-home materials.

- **Target WASH programmes in areas of high nutritional need.** Knowing where WASH programmes are located and what they are doing will also facilitate discussion of opportunities for integration with nutrition programmes in relation to needs. At the national level, many countries have WASH working groups that discuss what is being done and where it is being done. In emergencies, the UN Office for the Coordination of Humanitarian Affairs supports collecting and sharing data on activities in conjunction with the WASH cluster (UNICEF, 2009). In addition, geographically disaggregated nutrition data can help in decision-making. Such information could help WASH programmes and donors target areas with high levels of stunting, food insecurity or extreme poverty, thereby addressing nutrition challenges as well as those related to inequity and human rights.
- **Train health and nutrition staff to promote and demonstrate key WASH practices in ongoing nutrition work.** Training health and nutrition staff on the key hygiene practices and how to effectively communicate and demonstrate these practices with

their nutrition clients is an important means to directly influence change. Often health staff are well respected, and therefore messaging from them can be more influential. However, care must be taken to not overload the health and nutrition staff or the clients with too many messages.

- **At the community and household levels, promote improved nutrition and WASH practices and reinforce the practices using multiple communication channels.** During community health campaigns and in door-to-door health visits, promoting both improved nutrition and WASH practices saves resources, compared with individual efforts, and allows for reinforcing areas of overlap (e.g. discussing food hygiene practices when promoting healthy and nutritious foods). Such messages require reinforcement through communication channels to which the specific population is most receptive (e.g. text messages, radio advertisements).

Fig. 6 and the accompanying table illustrate the key WASH and nutrition practices that can be promoted together, along with delivery strategies (behavioural change approaches, hardware improvements, supporting the enabling environment), platforms (nutrition interventions and health programmes) and settings (households, health care facilities and communities).

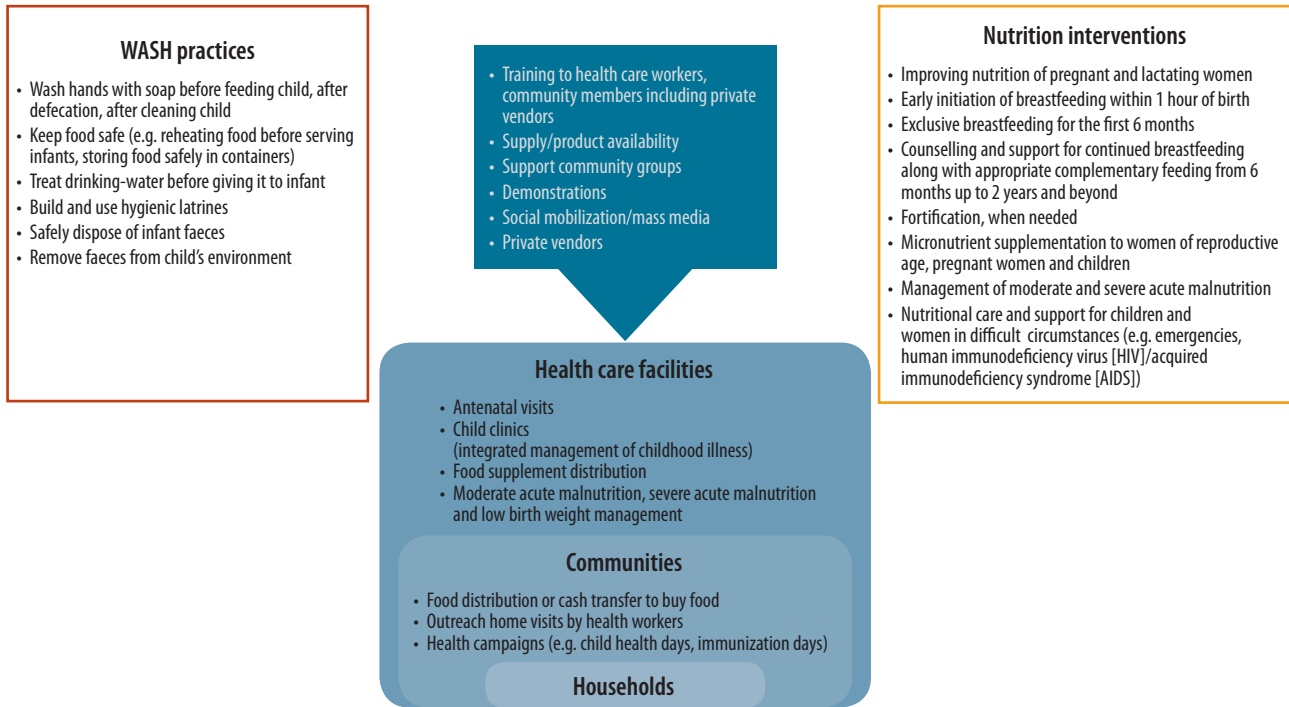
4.1 INTEGRATION ACTIVITIES AT THE COMMUNITY LEVEL

The following activities and approaches are not prescriptive or sequential, but identify opportunities for integration at the community level. One initial item to consider is the identification of key personnel in WASH–nutrition integration. Health care facility– and community-based health care staff are often the first point of contact with mothers of children under the age of 2 years. They are often influential members of the community and can model and demonstrate desired WASH practices and provide individual and group counselling. Health care staff includes doctors, nurses, midwives, trained birth attendants, and community health care workers and volunteers.

Integration activities at the community level include the following:

- **Provide counselling on improved WASH and nutrition practices.** Community health care workers can encourage healthy practices, especially in women who are pregnant or have young children. With much to do, community health care workers may need additional facilitators to help ensure that both WASH and nutrition practices are promoted effectively. Desirable WASH and nutrition practices can be demonstrated during family counselling. It allows the counsellor to

Fig. 6. WASH practices, nutrition interventions and example delivery channels for health care facilities, communities and households



Examples of WASH practices for integration	Examples of nutrition-specific actions	Illustrative activities ^a	How to integrate WASH into nutrition programmes ^b
<ul style="list-style-type: none"> • Wash hands before food preparation and feeding • Handle food safely (e.g. reheat food before serving infants) • Treat and safely store water for all individuals and especially for young children who eat complementary foods and drink water • Remove animal and human faeces from environment (e.g. dispose of infant faeces safely) • Build and use latrines, engaging with WASH actors for technical support 	<ul style="list-style-type: none"> • Counselling and support to improve nutritional status of pregnant and lactating women • Counselling and support for appropriate breastfeeding and complementary feeding practices • Micronutrient supplementation to women, including pregnant women, and children • Dietary diversification • Dietary modification • Fortification, when needed • Management of moderate and severe acute malnutrition 	<p style="text-align: center;">HEALTH CARE FACILITY LEVEL</p> <ul style="list-style-type: none"> • In-patient care for severe acute malnutrition • Counselling during <ul style="list-style-type: none"> - Sick child visit - Immunization/health days/deworming - Antenatal care - Growth monitoring and promotion 	<p style="text-align: center;">HEALTH CARE FACILITY LEVEL</p> <ul style="list-style-type: none"> • Strengthen competencies/train facility staff to negotiate improved WASH practices while also negotiating nutrition-specific practices • Assess availability of supplies at institutional levels (latrine availability, water shortages through enabling technologies/tippy tap,^c rainwater catchment) • Promote behavioural change during counselling
		<p style="text-align: center;">COMMUNITY/HOUSEHOLD LEVEL</p> <ul style="list-style-type: none"> • Community-based outreach visits through health care workers • Care Group model • Counselling during <ul style="list-style-type: none"> - Immunization days - Health days, deworming, micronutrient supplementation - Growth monitoring and promotion • Community integrated management of child illness • Treatment of moderate and severe acute malnutrition through community-based management approaches • Support groups (mothers, grandmothers) • Social mobilization (mass media, folk theatre) • General food distributions or cash transfers for at-risk groups 	<p style="text-align: center;">COMMUNITY/HOUSEHOLD LEVEL</p> <ul style="list-style-type: none"> • Conduct demonstrations on water treatment and/or handwashing • Model child-friendly latrines, potties, handwashing stations • Trigger communities to collectively eliminate open defecation • Build competencies of community outreach workers to negotiate improved WASH practices and appropriate treatment of sick children, recuperative feeding/catch-up • Assess availability of supplies (deal with water shortages through enabling technologies/tippy tap, soap, latrines) • Promote behavioural change during outreach visits • Promote use of and increase access to soap for handwashing and water treatment technologies • Support latrine construction and promote use • Provide water treatment products • Provide water supply infrastructures and establish system for operation and maintenance

^a Most are relevant to emergency and non-emergency settings.

^b Many of these suggestions will require technical and financial support from WASH actors.

^c A tippy tap is a locally made handwashing device that utilizes low-cost, easily accessible materials such as plastic jugs, rope and sticks. Refer to the Resources section for more information.

understand the current family situation, address barriers and help facilitate improved practices. One example is promoting handwashing with soap and water before food preparation, along with complementary feeding. Handwashing can be incorporated into all counselling and promotional materials as the first step before preparing food, eating or feeding a child. This involves identifying a designated place for handwashing with soap and water close to where food is prepared and children are fed. Complementary feeding and encouraging a proper diet (including diverse foods, in the right quantity and at the right frequency) can be jointly promoted with handwashing.

In addition, promotion of WASH actions can be provided during community group sessions or club meetings or in marketplaces, religious centres or schools. These sessions provide people with an opportunity to discuss with their peers and share solutions to specific behavioural or infrastructure challenges. Building or modelling how to use a handwashing station could be included in a nutrition session in the community. Group sessions could address social norms where people may be more likely to perform a desired behaviour if people that they respect do it.

- **Peer-to-peer learning.** The Care Group model described in Box 17 is a cascade training approach that includes involving a local woman as the “lead” mother responsible for assisting “peer” mothers in completing a series of results-based modules. Once the mothers complete the

modules, they (along with the lead mother) become health promoters who help build the capacity of an expanded group of caregivers in essential WASH and nutrition practices.

Shopkeepers selling food, soap, menstrual hygiene products or HWT technologies have incentives to promote WASH practices and products. In addition, religious leaders can promote WASH practices or provide informational reminder materials during or after services to reach many community members and catalyse action.

- **Offer cooking demonstrations while modelling WASH practices.** Preparing/cooking a dish offers an ideal opportunity for people to learn new recipes for dietary diversity and for the facilitator to model WASH practices, such as how to prepare and store food safely, wash hands before food preparation, and treat and store treated water. Community fairs, religious meetings or sporting events are opportunities for such integrated activities. If people can easily try a new product or technology such as a handwashing station, water treatment product or child potty, they may be more likely to adopt the practice at home.
- **Develop comprehensive communication and social mobilization campaigns with various media to support behavioural change.** Mass media can amplify messages related to WASH practices and their benefits. Messages and programmes to promote WASH can be distributed across media platforms, including

Box 17.

The Care Group model: integrating nutrition, WASH, livelihood and early child development (CORE Group, 2009)

An ongoing government programme in Malawi, which started in 2012, is supporting vulnerable communities through the Care Group approach. This approach focuses on improving knowledge and behaviours in households with pregnant and lactating women and children aged 0–59 months. Each Care Group includes 10–15 community volunteers from the same neighbourhood who meet twice a month with a programme promoter (also a volunteer) for training on high-impact interventions. Members are responsible for reaching out to 10–15 additional households.

Major programme interventions include:

- **Nutrition** – feeding children 3–5 years of age who attend community-based child care centres; providing nutrition education through Care Groups; demonstrating complementary food preparation and feeding; providing seeds, cuttings and seedlings to households and child care centres.
- **WASH** – offering hygiene and sanitation education, e.g. guidance on HWT products and how to use them; providing handwashing stations to community-based child care centres; installing and repairing boreholes.
- **Livelihood** – giving technical support for improved agricultural technologies for crop diversification and improved food security; organizing village savings and loan associations.
- **Early child development** – providing play materials and cooking utensils; offering mentoring in early child development for child care providers and management committees of community-based child care centres.

The programme includes men as both promoters and volunteers because of their decision-making roles regarding which crops to plant and how much produce to keep and to sell, as well as their potential influence on child nutrition and care practices. At present, 30% of the 1462 volunteers are men.

Regular monitoring through the Care Groups during the first programme year showed improvements in knowledge and behaviours, but also revealed several practices that require additional support and habit formation, including proper disposal of child faeces and handwashing at appropriate times.

radio, mobile phones and the Internet, and used at community events and during health care worker training. Jingles, reminder messages sent to client or health care worker phones and radio contests can be developed and employed. The use of social media and mobile health care technologies and apps are tools to assist behavioural change. Using or adapting existing materials can save time and resources.

4.2 INTEGRATION ACTIVITIES AT THE HEALTH CARE FACILITY LEVEL

Health care facilities and nutrition centres offer an opportunity to reach children, caregivers and families on a regular basis with information on WASH and nutrition. Sample activities include the following:

- **Encourage health care providers to model WASH behaviours and demonstrate WASH practices in clinic waiting rooms.** At all levels of health care services (health care facilities and posts, district hospitals, therapeutic feeding centres), establishing a handwashing station with soap and water will enable service providers to wash their hands, using the proper technique, before an examination or before handling food or drugs. If piped water is not available at a facility, handwashing stations are inexpensive to make or procure. WASH programmes or the private sector may be able to provide materials if the government budget is constrained. Do-it-yourself models such as those made from used jerry cans or other containers are also appropriate (see the Resources section for details on constructing handwashing stations). The presence of a handwashing station serves as a reminder and provides needed supplies at a convenient location.

Desired behaviours can be modelled to teach, establish or change social norms. Health care volunteers, outreach workers, peer group leaders or other auxiliary personnel can lead demonstration sessions on hygiene behaviours while mothers wait for appointments or for services and when drugs or foods are distributed. For example, hygiene talks on faecal contamination/food protection could be incorporated during mothers' visits to the facility.

- **Model WASH facilities in health care settings.** WASH facilities at hospitals and health care facilities are often insufficient, lacking reliable water supplies, adequate toilets and a designated place for handwashing with soap and water. Health care facilities and hospitals without a piped water system can facilitate handwashing and hygiene by setting up rainwater catchment systems and tippy taps that can be replicated at home, making small improvements to institutional latrines, using ash when soap is not available or pouring treated water from an appropriate container.
- **Use the clinic health care providers with status and knowledge as effective change agents.** Many routine

services, such as growth monitoring and promotion, treating severe acute malnutrition or nutrition counselling, require repeat visits; thus, health care providers can check adherence to promoted behaviours, reinforce behaviours and assist in finding ways to achieve them. Clients can be counselled individually or in groups. Frequent counselling and feedback about the child's growth and progress can help link nutrition practices to results. This is also an ideal time to discuss ways in which the family can improve WASH practices that will keep children healthy as they recover from malnutrition.

4.3 EVIDENCE-BASED, EFFECTIVE APPROACHES TO BEHAVIOURAL CHANGE

Knowledge is often not sufficient to change WASH practices. Household members also need skills, access to required supplies, social support and acceptance, and confidence that they can succeed in practising the new behaviours. The community agent or health care clinician ought to try to assess the barriers to each practice and negotiate a commitment to try a few practices that seem feasible and worth changing from the householder's point of view.

Some questions that could help the community agent identify barriers to or enablers of the desired behaviour include the following:

- What makes it hard to ... [wash your hands with soap and water (e.g.) ... before eating or preparing food]?
- What would make it easier to ... [wash your hands with soap and water (e.g.) ... before eating or preparing food]?
- Who approves or disapproves of you spending time and resources to ... [wash your hands with soap and water (e.g.) before eating or preparing food]?

Different tools are available to support the behavioural change dialogue process. Some tools are practical and simple and can be used by community workers who have good facilitation skills. See Box 18 for an example of a successful participatory approach used in Viet Nam.

Effective behavioural change approaches include the following:

- **Develop practicable messages and effective materials.** Formative research methods, such as in-depth interviews, observations and focus group discussions, can be used to gain a better understanding of existing practices, beliefs, and facilitating and constraining factors so that effective messages can be developed. Using or adapting messages that have been found effective in the target audience can save time and resources. Examples of formative research techniques, such as trials of improved practices (TIPs), are provided in the Resources section.

Box 18.

Participatory approaches to promoting safer water and food in Viet Nam (ILSI Japan CHP & National Institute of Nutrition of Vietnam, 2009)

Project SWAN (Safe Water and Nutrition) focused on both talking about and showing communities in Viet Nam that safe water and safer, more nutritious food would improve their children’s health.

SWAN1 (2005–2008) developed a model for integrating WASH and nutrition activities based on participatory approaches. The project rehabilitated existing water treatment facilities; conducted behavioural change around safe drinking-water, food hygiene and child feeding; and created community water management unions composed of commune authorities, water treatment facility operators, commune health staff and village health care workers.

SWAN2 (2010–2013) increased the ability of local authorities to ensure the programme’s sustainability. Water management unions learnt to renovate treatment facilities with a commune’s own budget and to manage water distribution. They conducted behavioural change activities through workshops, home visits, community gatherings, cooking classes, loudspeaker announcements, and drawing and poetry contests. The programme found that participatory approaches helped raise motivation and that building local capacities and using community resources were essential to sustainability. As community members came to appreciate access to safe water, they became willing to pay a water fee, leading to the financial independence of programme activities.

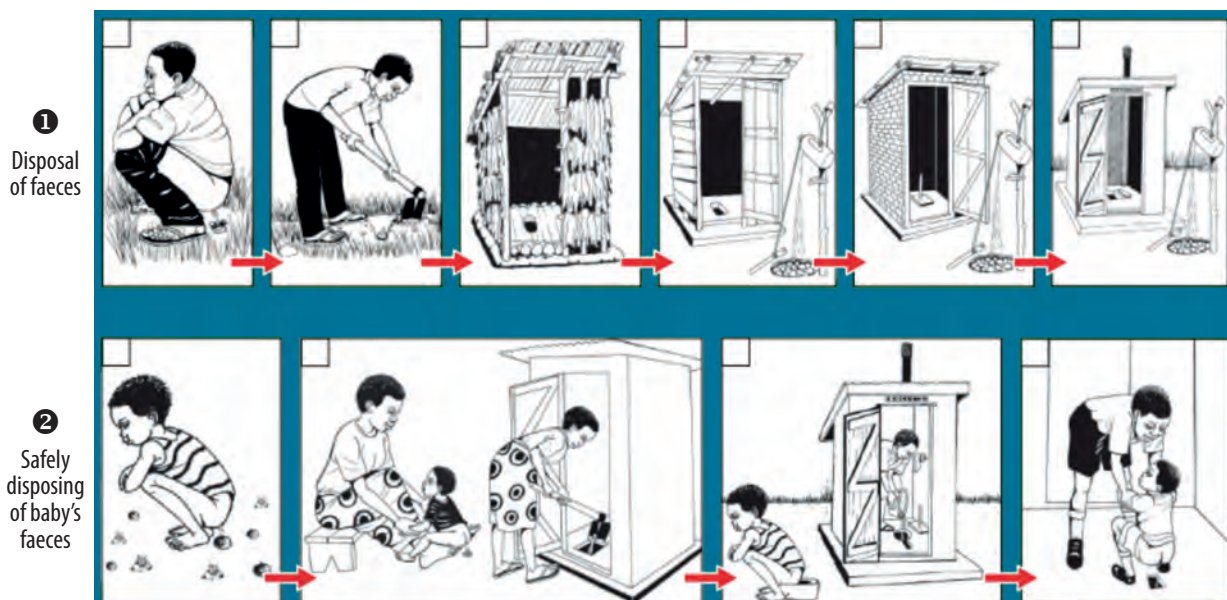
Simple, low-cost job aids, such as flip charts or flash cards, can be developed or adapted. The job aids illustrate the desired behaviour and can be used with people who have low literacy or who speak a local language only. Other options include placing posters and banners in prominent places in the community or health care facility. Health care workers can use them as a visual aid when discussing WASH practices and answering questions during one-on-one counselling. They can also use a handout or reminder card during counselling and then give it to the household member to use at home.

- **Negotiate improved practices.** Health care workers and nutrition and agricultural extension agents can engage families to assess current WASH practices in the family, reinforce existing positive actions and help identify one or two actions to be improved. Often,

people are unable to move immediately from their current practice to the ideal behaviour. Small doable actions are feasible steps that can be promoted to help people practise ideal WASH and nutrition behaviours. The extension agent “negotiates” one or two small doable actions that the mother is willing to try. These can be monitored and reinforced in subsequent visits (refer to the Resources section for links to more specific guidance). Fig. 7 is a chart that can be used with families to identify their current behaviour and the aspirational behaviour to which they are willing to commit, with the aim of ultimately achieving and maintaining the final illustrated behaviour.

Further information on integration activities at both the community/household and health care facility levels can be found in the Resources section.

Fig. 7. Example of small doable actions for safe faeces disposal



5

5
NUTRITION
HAND WASH



5

MONITORING AND EVALUATING INTEGRATED WASH AND NUTRITION PROGRAMMES

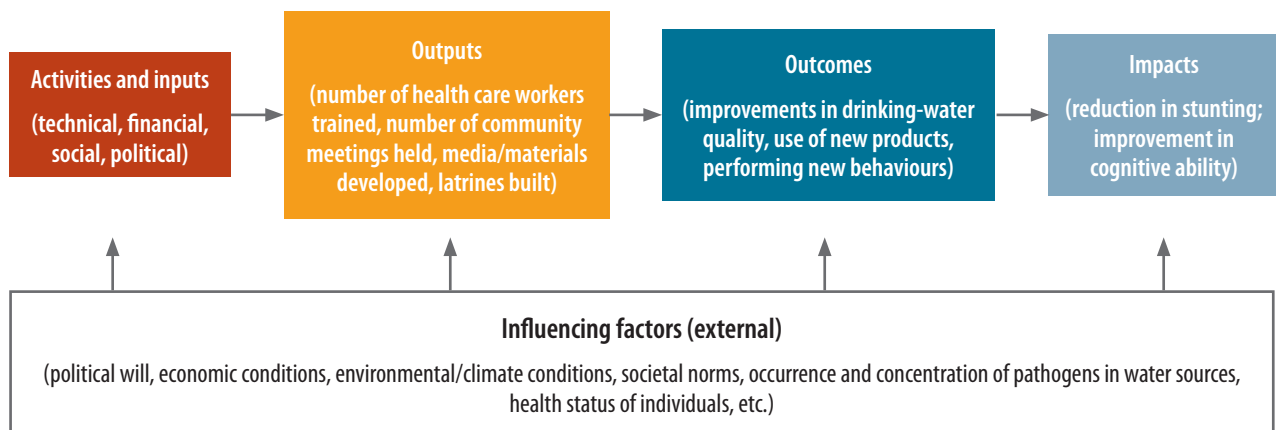
M&E is an important component of any public health effort. M&E is especially valuable for assessing progress and identifying specific areas that need improvement when new and integrated approaches are employed. This chapter provides a summary of important M&E considerations. It is not meant to provide an exhaustive overview of M&E but rather to highlight key considerations with a particular focus on useful indicators relevant to integrated WASH and nutrition efforts.

and nutrition activities and results in order to facilitate collaborative planning and action. Development of the framework ought to be done in consultation with programme stakeholders (e.g. health care workers, WASH practitioners, policy-makers, funders) to foster joint ownership and ensure that the important areas of interest are addressed. Fig. 8 provides an example of a logical framework for an integrated nutrition and WASH programme. The figure also illustrates that there are many influencing factors that can affect all elements in the framework, and these should be considered thoughtfully when assessing programme success and progress.

5.1 FRAMEWORK FOR DESIGNING M&E COMPONENT

It is important to develop an M&E framework for integrated efforts that cohesively addresses and measures both WASH

Fig. 8. Sample logical framework for WASH and nutrition programme inputs, outputs, outcomes and impacts (adapted from UNDP, 2009)



5.2 KEY WASH AND NUTRITION INDICATORS

This section describes WASH indicators relevant to nutrition programmes and highlights a few key nutrition indicators as well. Indicators of integration continue to be developed, and illustrative integration indicators are included. Actual selection of indicators to include in M&E frameworks will depend on the country context, information systems and capacity. Consideration should be given to using indicators that are already monitored by international and national efforts to allow for greater comparability and ownership of results. Tables 1–3 provide a series of illustrative indicators organized by the logical framework categories.

5.2.1 Output indicators

Output indicators measure tangible project deliverables. Examples of indicators that could be used for tracking integrated planning, targeting, human resources development and improvements in WASH software and hardware are provided in Table 1. Often, multiple data collection methods (both quantitative and qualitative) are possible, and pursuing more than one allows for triangulation of data. This is especially important in instances

where record keeping may be weak. Data collection methods may include reviewing existing documentation and programme records, interviewing key informants such as programme staff and government representatives, or conducting household surveys.

5.2.2 Outcome indicators

Outcome indicators measure intermediate results, such as changes in behavioural determinants or changes in promoted practices. Examples are summarized in Table 2. To the extent possible, observations are often preferred, as they tend to provide more objective measures. For example, one may observe a sanitation facility to determine whether it is improved or not, recognizing that reported information may be biased. For water treatment, the simplest measures are to observe a product or technology in the house and check for signs of use. More involved measures include assessing chlorine residual (if chlorine products are used) or faecal indicator bacteria. For handwashing, presence of a handwashing station with water and soap is a reliable proxy for behaviour, as self-reported responses are often unreliable, and direct observations of handwashing events are costly and tend to inflate actual practices (i.e. when one is watched, one is more likely to practise the behaviour) (Ram et al., 2010; Ram, 2013).

Table 1. Examples of output indicators

Domain	Output indicator
Increased policy and institutional support for integrating WASH into nutrition programmes	<ul style="list-style-type: none"> Country has developed a national nutrition plan that includes WASH National WASH plans include explicit targeting of areas with high rates of malnutrition and food insecurity Number of strategies, initiatives and/or partnerships/agreements advocating for integrating WASH and nutrition programmes Proportion of targeted institutions with (increased) expenditures for integrated WASH–nutrition programming
Joint planning and targeting	<ul style="list-style-type: none"> Proportion of targeted institutions reporting collaboration between nutrition and WASH programmes (e.g. joint documents, decisions/policies, work plans) Proportion or number of villages/areas where nutrition programmes that are implemented include a WASH element Proportion or number of villages/areas with high prevalence of acute malnutrition targeted by WASH activities Proportion or number of villages/areas with high prevalence of stunting targeted by WASH activities Proportion of households with children enrolled in acute malnutrition treatment programmes receiving minimum package of services that include a WASH element
Human resources development	<ul style="list-style-type: none"> Proportion of targeted organizations that have modified follow-up supervision and monitoring to include WASH elements Number of nutrition professionals trained in WASH elements per 100 000 population
Reach of joint programme activities	<ul style="list-style-type: none"> Proportion of households in target areas participating in activities where both nutrition and WASH messages were delivered Number of children under 5 years of age reached by joint nutrition and WASH programmes

Table 2. Examples of outcome indicators

Domain	Indicator
Water	<ul style="list-style-type: none"> • Proportion of households with access to an improved water source • Proportion of households consistently storing^a their drinking-water safely • Proportion of households consistently treating their drinking-water with recommended^b HWT technologies • Proportion of households with knowledge of at least one HWT method
Sanitation	<ul style="list-style-type: none"> • Proportion of households using an improved sanitation facility • Proportion of households safely disposing of children's faeces • Number of villages achieving open defecation-free status • Proportion of households with sanitation facilities that are accessible^c by children and disabled members of the household
Hygiene	<p>Handwashing</p> <ul style="list-style-type: none"> • Proportion of households with handwashing station^d in compound • Proportion of households where primary caregiver can cite critical times for handwashing with soap <p>Food hygiene</p> <ul style="list-style-type: none"> • Proportion of households keeping clean areas where children's food is prepared and served • Proportion of households safely storing children's food • Proportion of households using clean kitchen utensils (to feed children) • Proportion of households that use treated and/or safely stored drinking-water for preparing children's food • Proportion of households washing raw vegetables with treated water before feeding children • Proportion of households reheating children's food thoroughly before feeding them <p>Environmental hygiene</p> <ul style="list-style-type: none"> • Proportion of households with no visible faeces (animal or human) in the compound/yard/children's play area • Proportion of households with no domestic animals in food preparation area
Infant and young child feeding	<ul style="list-style-type: none"> • Proportion of infants 0–5 months of age who are exclusively breastfed • Proportion of children 6–23 months of age who receive minimum acceptable diet^e • Proportion of children breastfed within 1 hour of birth • Proportion of children 12–15 months of age who are fed breast milk • Proportion of children 20–23 months of age who are fed breast milk

^a For example, safe storage containers include those with a small opening at the top to help prevent children and other household members from dipping cups and possibly dirty hands into the drinking-water, covered and with a small spigot at the bottom to access the water.

^b These are technologies that meet one of WHO's three tiers of performance (highly protective, protective, limited protection).

^c For example, sanitation facilities with stools, grip pole/rope, smaller hole, chair over hole.

^d Observed dedicated place for handwashing with presence of water, soap and/or handrub solution.

^e The minimum acceptable diet indicator measures both the minimum feeding frequency and minimum dietary diversity as appropriate for various age groups. If a child meets the minimum feeding frequency and minimum dietary diversity for his or her age group and breastfeeding status, then he or she is considered to receive a minimum acceptable diet.

5.2.3 Impact indicators

Impact indicators generally show long-term changes and are typically measured at baseline and at endline once the implementation is complete. For example, an impact indicator might be the percentage of children aged 0–59 months in the target population who are stunted. Measuring impact often requires additional time, funding and expertise beyond the programme staff and budget and will often not be needed in the context of routine programme delivery. Impact indicators are useful to demonstrate the value of “new” interventions rather than those for which evidence already exists. Table 3 includes examples of impact indicators for diarrhoeal diseases and nutritional status.

Reported prevalence or incidence of diarrhoea is the most commonly used indicator for assessing the impact of WASH interventions. However, measuring the incidence of diarrhoea reliably is difficult (Schmidt et al., 2011). Reported diarrhoea incidence is subject to reporting bias, is affected by seasonality and often requires large sample sizes for an impact from the programme to be detected.

Indicators of nutritional impact include the prevalence of stunting and wasting in children under 5 years of age. These anthropometric indicators, along with an analysis on uptake of the WASH and nutrition interventions, should allow for determining the impact of joint efforts on nutrition status. Just like diarrhoea, it is important that nutritional status

Table 3. Examples of impact indicators

Domain	Impact indicator
Diarrhoea	<ul style="list-style-type: none"> • Proportion of children under 2/5 years of age who had diarrhoea^a and diarrhoea with blood in the 2 weeks preceding the survey • Proportion of children under 2/5 years of age who had diarrhoea^a in the preceding 24 hours
Undernutrition	<ul style="list-style-type: none"> • Proportion of children aged 0–59 months stunted (height-for-age z-score < –2 standard deviations of WHO Child Growth Standards median) • Proportion of children aged 0–59 months wasted (weight-for-height z-score < –2 standard deviations of WHO Child Growth Standards median) • Proportion of women underweight (body mass index < 18.5) • Proportion of children 6–59 months with anaemia (haemoglobin measurement of < 8 g/dL) • Proportion of women of reproductive age with anaemia (percentage of women aged 15–49 years screened for haemoglobin levels who have a level < 12 g/dL [pregnant women < 11 g/dL]) • Proportion of low birth weight children (< 2500 g)

^a WHO defines diarrhoea as the passage of three or more loose or liquid stools in a day (WHO, 2005).

be measured in the same season at baseline and endline. However, it is not possible to see an impact on stunting over a short time frame. Programmes of at least 2 years are required for an impact on stunting to be observed.

5.3 RESOURCES FOR DEVELOPING AND IMPLEMENTING M&E ON WASH AND NUTRITION

A number of resources exist for developing and implementing M&E efforts. Some of these are intervention

specific (i.e. for HWT or for handwashing), and others are more general in regard to how to assess nutrition efforts. The reader should refer to the Resources section for more information. M&E activities should be integrated into the countries' existing health information management systems to avoid duplication of efforts and to strengthen countries' M&E capacities.

6



NUTRITION
AND
WASH

6

CASE-STUDIES

This chapter includes country examples of ongoing efforts to better link WASH and nutrition programmes. These case-studies illustrate the diversity of contexts in which such efforts are being implemented and the wide array of government ministries, NGOs, donors and communities that have recognized the benefits of

integration and responded with innovative frameworks, approaches and tools. Further details on these case-studies are posted on the WASHplus website (see Resources section) and will be updated as results become available. A summary of the case-studies can be found in Table 4.

Table 4. Review of existing case-studies

Country/region	Integration mechanism	Key interventions	Conclusions/lessons
National nutrition programmes including a WASH component			
Bangladesh	Integration at the design stage	National campaign including messages on IYCF and handwashing with soap before food preparation and when feeding children, and building handwashing stations in kitchen areas.	Formative research is essential for identifying target behaviours on WASH and nutrition and for developing effective behavioural change strategies.
Honduras	Adding WASH component to existing nutrition programme	Food aid programme (food distribution, training of farmers and home counselling), rehabilitation of water and sanitation infrastructures and mechanism for operation and maintenance.	High degree of collaboration between local government departments, leading to increased funding, increased capacity of local volunteers.
Large-scale programmes aimed at reducing malnutrition through a cross-sectoral approach			
Bangladesh	Integration at the design stage	Multisectoral approach to improve food security and nutritional status of mothers and children from the poorest households. Included nutrition-specific approaches but also components to address the root causes of undernutrition, including WASH, empowerment of women, income generation activities and reinforcement of institutional capacity to prepare for and respond to disasters.	Better results can be achieved by targeting the poorest populations and addressing the root causes of undernutrition, including WASH.
Ethiopia	Randomized controlled trial to determine impact of single programmes versus integrated programme	WASH intervention villages received hygiene messaging, support for constructing latrines and wells; nutrition intervention villages received nutrition messaging, cash or grain transfers for food security and demonstration gardens; health intervention villages received essential medicines and micronutrients and general health messages; the fourth group of villages received all of the above.	WASH intervention villages were the only ones to demonstrate a decrease in stunting from baseline rates. However, the quality of the nutrition interventions was suboptimal, the villages receiving all interventions may have had too many messages, and WASH particularly benefited from an effective intervention lead. Thus, the quality of the delivery of intervention is very important.
Peru	Integration at the design stage	Participatory community-based programme combining nutrition with health interventions (antenatal, immunization and other health services), WASH (handwashing with soap, safe disposal of children's faeces, fencing animals outside household area) and early cognitive development stimulation activities.	Participation and support from health care staff, households and community leaders were key to the success of the programme.

Country/region	Integration mechanism	Key interventions	Conclusions/lessons
Integrating WASH into nutrition programming during humanitarian emergencies			
Democratic Republic of the Congo	Integration at the design stage	A primary health care promotion programme based on community mobilization and involvement of local authorities. Key components included training of key leaders, nutrition and water committees, agricultural support to families with malnourished children, communal garden, cooking methods, etc., building latrines in schools and health care facilities and raising awareness of households to encourage them to do the same.	Programme reinforced collaboration and learning between different communities, and awareness of the linkages between WASH and nutrition was heightened among community members, leaders and educators.
Mauritania	Integration at the design stage	Integrated WASH and nutrition package of interventions for homes and health care facilities. Structure in place to coordinate activities between sectors. Components included training and supervision for treating acute malnutrition, along with distribution of hygiene kits and rehabilitation or construction and monitoring of water supply and sanitation infrastructures in health care facilities. In communities, screening for acute malnutrition, combined with information, education and communication on hygiene promotion, HWTS and CLTS.	Improved awareness of undernutrition and hygiene issues, increased awareness of and access to WASH and nutrition services.
Sahel region	Integration at the design stage	In emergency settings, minimum package of WASH interventions integrated with nutrition interventions ("WASH in Nut" strategy). Key elements included establishing a WASH in Nut focal point in each implementing organization for better integration of activities, joint targeting of priority areas and populations, and activities in health care facilities and communities with a focus on behavioural change. Structure for monitoring integrated activities established.	WASH in Nut strategy endorsed in eight countries in the Sahel region and the Democratic Republic of the Congo.
Combining WASH and nutrition to meet specific population needs or tackle a distinctive problem			
Cambodia	Integrated at the design stage	This programme focused on waste management, energy and agricultural production (including sanitation and food production). Three key components: promotion of ecological sanitation toilets, development of adapted gardens, and biogas plants for safe reuse of excreta in agriculture.	Safe reuse of excreta for food production, although some barriers remain to reuse of waste.
Democratic Republic of the Congo	Integrated after situation analysis	Programme to eradicate konzo, a neurological condition triggered by sustained dietary exposure to cyanide present in improperly processed cassava and exacerbated by protein deficiencies. Formative research to identify root causes of the problems, crop and diet diversification, training of community volunteers on nutrition, information, education and communication campaign, and rehabilitation of water points for processing cassava.	Information, education, communication and training were key to raising awareness on the importance of a better diet, adequate processing of cassava and infrastructural improvements to support changes in cassava processing.
Kenya	Integrated at design stage	Programme supported community vendors to sell health, WASH and nutrition-related products while conducting a marketing campaign using mass media and installing handwashing stations and HWTS in schools, health care facilities and religious places. The programme also included microcredit services.	Community vendors can play an important role in improving health through promotion of WASH and nutrition products.
Kenya	Integrated after situational analysis	WASH and nutrition products used as incentives for antenatal visits. Products included low-cost hygiene kits and HWT packs, as well as fortified food. Nurses were trained on safe delivery practices and on modelling safe WASH behaviours.	Low-cost incentives increase antenatal care attendance; antenatal care visits can be an important moment to promote safe behaviours, including hygiene practices.
Mali	Targeting of sanitation intervention among malnourished communities	Mobilization of communities through the CLTS framework to build and use latrines and end open defecation.	Improvements in both access to and use of latrines and health were realized in the communities with the CLTS intervention. In addition, such communities demonstrated an increase in prosocial, collective interest decision-making.

6.1 NATIONAL NUTRITION PROGRAMMES INCLUDING A WASH COMPONENT

The two large-scale programmes described in this section focused on reducing the prevalence of stunting among poor, largely rural populations through improved child nutrition. In Bangladesh, a pilot programme that is now being scaled up promoted appropriate hygiene behaviours as part of improved IYCF practices by introducing handwashing stations in the kitchen. In Honduras, activities included support for improved local water systems as well as food security.

6.1.1 Bangladesh: Community-based interventions and national media campaigns combining IYCF and improved hygiene

6.1.1.1 Context

The Alive & Thrive (A&T) project in Bangladesh, 2011–2014, aimed to reduce the incidence of child stunting and anaemia by reaching 8.5 million households with children under 2 years of age through intensive community-based interventions and national media campaigns. A&T undertook extensive formative research, developed behavioural change strategies and designed training. In addition, it created materials for multiple target audiences as a foundation for adaptation by the Bangladesh Rural Advancement Committee (BRAC, its major implementing NGO), Save the Children United Kingdom and government entities. The programme was funded by the Bill & Melinda Gates Foundation and managed by FHI 360.

The national communication campaign focused on practices that are crucial to the care of children aged 6–23 months, including adequate quantity and frequency of feeding, defined by age of the child according to WHO guidelines; food diversity, including one animal source food daily; handwashing with soap before food preparation and child feeding; and regular maintenance and use of handwashing stations near the place where the children are fed.

6.1.1.2 Activities and delivery channels

The programme initially focused on promoting improved IYCF practices. Additional formative research, in light of the high prevalence of childhood diarrhoea and poor practices regarding handwashing with soap before food preparation and child feeding, led to a stronger emphasis on hygiene. A&T and the International Centre for Diarrhoeal Disease Research, Bangladesh, collaborated in rapid field trials to examine barriers.

Because a major barrier cited by families was the lack of soap and water where food is prepared, the project began

promoting the installation and use of simple handwashing stations near the place of cooking/feeding children. TIPs examined the acceptability of 40 L plastic buckets with taps, lids and simple stands supplied by the project, as well as the feasibility of encouraging families to build their own stations with local materials.

Programme implementation in 50 BRAC *upazilas* (subdistricts) included promoting key practices through counselling during routine home visits by volunteers and IYCF promoters. Social mobilization sessions for fathers with children aged 7–10 months and for village doctors (informal health care providers) were also provided. BRAC distributed free handwashing stations to families in selected areas to jump-start use and stimulate a new social norm. It also provided a financial incentive for village volunteers based on successful promotion of handwashing stations and their maintenance in catchment area homes.

A&T partnered with DFID poverty reduction projects to introduce an IYCF-plus-hygiene module in its training. It also provided handwashing materials for distribution during immunization visits, through USAID's MaMoni integrated maternal and child health/family planning programme implemented by Save the Children. The national mass media campaign included radio and television spots showing a father supporting handwashing and installing a handwashing station in the kitchen area.

6.1.1.3 Outcomes

Results from the TIPs research informed scale-up of strategies in the BRAC programme areas. The TIPs were conducted in 2011 in 20 villages, in collaboration with the International Centre for Diarrhoeal Disease Research, Bangladesh. By the trial's end, 80% of mothers who had been given free handwashing stations and 50% of those who had built their own were observed washing their hands with soap before cooking/feeding. Among those given stations, 83% said they intended to continue the practice, in contrast to 68% of those who created their own stations. Other desirable behaviours related to child feeding were also higher at study end among the group that received free stations.

6.1.1.4 Key lessons

Barriers to handwashing before preparing food and feeding children included lack of conviction about the health benefits of the practice, lack of social pressure to change, the pressure of household chores and inconvenience. In the absence of a social norm, improving the practice of handwashing before preparing food and feeding children requires engaging influential individuals, especially men, in regard to help with installation and maintenance. Even in the absence of a social norm, mothers' reporting of practices was much higher than observed practices, making measurement difficult.

In view of the TIPs results, A&T decided to stimulate early adopters by supplying free handwashing stations in the BRAC programme area. However, during monitoring visits, the project found that many of the materials were being put to other uses. Households were using the buckets for many other purposes, such as bathing, washing clothes and fetching water for other purposes. The programme has since been weighing the different benefits of project- and home-supplied stations.

One positive innovation was the introduction of soapy water for use in the kitchen. With each handwashing station, the project distributed powdered detergent and a 1.5 L plastic bottle to make and store soapy water. Demonstrations attracted the attention of neighbours, who were also found to take up the practice.

6.1.2 Honduras: Food security and food aid programme combined with efforts to improve access to drinking-water and basic sanitation

6.1.2.1 Context

As part of the USAID-Title II development food aid programme in Honduras, 2005–2009, three international NGOs collaborated with local municipalities to improve health, nutritional status and food security among poor rural households and delivered WASH interventions as an integral component. Save the Children worked in 117 communities in south-central Honduras with assistance from USAID Food for Peace and sought additional support to improve access to drinking-water and basic sanitation. The Adventist Development and Relief Agency and World Vision worked in additional municipalities.

6.1.2.2 Activities and delivery channels

A core component of the programme was the distribution of food rations to children aged 6–23 months and to pregnant and lactating women. The programme established field schools to train model farmers to develop demonstration plots, encouraged planting of drought-resistant crops, constructed greenhouses and small-scale drip irrigation systems and encouraged appropriate storage of crops. With assistance from a municipal government liaison, the programme helped small businesses, such as those involved in food processing, to obtain legal status. It also supported the formation of small producer associations so that participants could benefit from selling in greater volumes.

The Honduran government's ongoing Atención Integral a la Ninez en la Comunidad (AIN-C) community-based growth promotion programme provided a focal point for health and nutrition activities. Volunteer monitors were identified from within the communities and received training and high-quality print materials to improve the quality of their

nutrition counselling of pregnant and lactating women and mothers of children under 2 years of age at the monthly AIN-C growth promotion sessions. The volunteer monitors also received training on how to carry out follow-up home visits to check on children with poor growth, conduct cooking demonstrations and discuss recommended feeding practices.

To rehabilitate 35 local water systems, install four new systems and construct pour/flush latrines and septic tanks in the target communities, Save the Children sought funding from other national programmes, many of which were supported by North American and European donors. It also supported communities in holding assemblies to elect or reactivate water boards, establish usage rates, chlorinate water catchment tanks and organize maintenance of the new municipal water systems.

6.1.2.3 Outcomes

In the programme communities, several improvements were noted. Among children aged 6–23 months, the prevalence of low weight-for-age was reduced from 20.5% to 10.9%. The programme achieved a reduction in the rate of stunting among children aged 24–59 months from 35.1% to 27.5%. The average number of months of adequate food supply increased from 7.4 months to 8.3 months during the project period. In addition, mothers demonstrated increased knowledge about the importance of variety in a child's diet, and the practice of introducing solid and/or semi-solid foods to children between 6 and 8 months of age rose considerably in the study population. In addition, the percentage of mothers reporting appropriate handwashing practices nearly doubled.

6.1.2.4 Key lessons

The three implementers used one common indicator (stunting) to reflect the programme outcomes; and evaluators noted a high level of collaboration with municipal government leaders. This created a strong sense of local ownership and led to increased municipal funding for food security projects. The project collaborated with municipal governments to analyse causes of food insecurity and to include proposals for interventions to address food insecurity in strategic and operational plans. Water board members gained knowledge about how to design new projects and obtain funding, and community leadership capacities increased. The improved, more accessible water systems also allowed more free time for women.

In general, the high level of skills achieved by community volunteers and their ability to serve as role models were important to the project's success. With the project ending, the evaluation noted the challenge of sustaining the community monitors' activities.

6.2 LARGE-SCALE PROGRAMMES AIMED AT REDUCING MALNUTRITION THROUGH A CROSS-SECTORAL APPROACH

To improve child nutrition, multisectoral programmes in Bangladesh, Ethiopia and Peru were designed to combine multisectoral programme arms in an integrated way. All three programmes included both WASH and health inputs in addition to nutrition interventions. Empowerment of women and girls was an important factor and was found to have a strong independent effect on the prevalence of stunting in Ethiopia. In the Peru case-study, early child development was a major programme arm.

6.2.1 Bangladesh: Multisectoral approach to reducing malnutrition

6.2.1.1 Context

In rural areas of Bangladesh, during 2006–2010, the USAID-Title II development food aid programme implemented by CARE and known as the Strengthening Household Ability to Respond to Development Opportunities (SHOUHARDO) project took a multisectoral approach to improving food security and the nutritional status of mothers and children. A target population of 400 000 was chosen from the poorest households. To reduce undernutrition, the programme aimed to both address direct determinants of undernutrition as well as tackle the underlying structural causes of undernutrition. The primary impact indicator was prevalence of stunting among children aged 6–23 months. CARE managed the programme, and 44 local NGOs carried out activities with government partners; USAID/Food for Peace provided Title II funding and food aid.

6.2.1.2 Activities and delivery channels

The SHOUHARDO project included numerous activities covering the following areas: maternal child health and nutrition, water and sanitation, empowering girls and women, alleviating poverty and food insecurity, and providing disaster mitigation and response.

CARE provided Title II food rations to children aged 6–23 months and to pregnant and lactating women. Community health care volunteers organized mothers' groups and provided education and counselling on IYCF, care for mothers during pregnancy and delivery, and hygiene practices. The project also promoted local government health care programmes that included growth monitoring and promotion; prenatal and emergency obstetric care; vitamin A supplementation for children and vitamin A (postpartum), iron and folic acid supplementation for pregnant women and mothers; immunizations; and referrals for family planning and disaster-related emergencies.

The project installed tube wells and conducted arsenic testing to help households obtain safe drinking-water and

promoted latrine use and CLTS. To foster empowerment, CARE helped women and adolescent girls build leadership and literacy skills. It also supported the government system of village development committees to alleviate poverty and food insecurity. CARE promoted improved crop production and better yields from fisheries, as well as home gardening, livestock raising and income-generating activities. A food-for-work and cash-for-work programme also resulted in infrastructure improvements. Various activities were designed to help develop local institutional capacity to prepare for and respond to disasters, especially flooding and cyclones.

6.2.1.3 Outcomes

Among the project's positive outcomes, the prevalence of stunting among children 6–23 months of age declined from 56% to 40% over 3.5 years. None of the children living in project households experienced the target area's typical substantial increase in stunting prevalence among children 0–5 months of age. Each different intervention brought positive change. The average number of months of adequate food supply rose from 5.5 to 8.9; household dietary diversity also improved. The percentage of mothers washing their hands before food preparation rose from 60.3% to 94.3%, and use of oral rehydration therapy rose from 56.7% to 92.2%. The percentage of households with access to safe water rose from 57.1% to 71.6%, and the proportion with access to a sanitary latrine rose from 13.8% to 54.6%.

6.2.1.4 Key lessons

The evaluation showed that women's empowerment interventions, including access to water and sanitation, had a strong independent impact on the prevalence of stunting. Sanitation, women's empowerment and poverty alleviation interventions had synergistic effects with direct nutrition interventions. The reduction in the prevalence of stunting was far greater for "extremely poor" than for "poor" project households, indicating that the use of pro-poor targeting also facilitated the reduction in stunting prevalence. Social mobilization to end open defecation was very effective.

Overall, the project concluded that combining direct nutrition interventions with those that address structural causes of undernutrition has the potential to accelerate reductions in child undernutrition at a rate far greater than can be expected from direct nutrition interventions alone.

6.2.2 Ethiopia: Comparison of community-based interventions to reduce stunting

6.2.2.1 Context

The Legambo Child Caring Practices project, 2004–2006, was carried out by Save the Children to measure the effectiveness of interventions to reduce stunting among children aged 6–36 months in a food-insecure area of South Wollo Zone, Amhara Region, Ethiopia. Eleven neighbouring villages were selected to receive interventions that

emphasized one of four areas: (1) health, (2) nutrition education, (3) WASH or (4) all three combined. Three neighbouring villages that did not receive any interventions were selected to serve as a control group. Funding was provided by DFID during the first year and by Irish Aid during the second through fifth years of the project.

6.2.2.2 Activities and delivery channels

All of the villages benefited from a number of ongoing or newly inaugurated government programmes. These included the Productive Safety Net Programme (PSNP) for food-insecure households, based on cash or grain transfers; a community-based health care delivery system, which was supported in rural areas by recently trained health extension workers; and emergency support during crises, including a general food ration and supplementary and therapeutic feeding for malnourished children.

Save the Children trained community animators to reach homes and deliver educational messages on all three intervention areas. Target beneficiaries included pregnant women and mothers who had children under 3 years of age and were participating in the PSNP.

In the nutrition focus villages, messages covered nutrition during pregnancy and lactation, optimal IYCF practices, such as dietary diversity and optimal feeding frequency, prevention and treatment of diarrhoea, and immunization. Save the Children also constructed demonstration community gardens in these villages. In the health focus villages, the project provided free essential drugs and micronutrients for mothers and children under 5 years of age as well as health education on various topics. In the villages with a WASH emphasis, messages emphasized both personal and environmental hygiene. The project assisted with the construction of pit latrines and improved water sources.

6.2.2.3 Outcomes

The WASH group was the only one to show a significant association between intervention activities and reduced prevalence of stunting, with a decrease of 10.1 percentage points in the prevalence of stunting compared with the baseline. The WASH group also showed improvements in mothers' knowledge and practice of correct hygiene behaviours and the largest increase in coverage of measles vaccination.

All of the groups showed improvements in knowledge of the causes of diarrhoea. The nutrition group and the group that received all three interventions had the largest improvements in breastfeeding knowledge and in complementary feeding knowledge and practices. There was an improvement in access to safe drinking-water in the group that received all three interventions, but not in the groups that emphasized health, nutrition education or WASH separately.

Evaluators urged caution in the interpretation of these results, noting the difficulty of evaluating integrated programmes. All but the WASH interventions were underpowered; sample sizes were likely too small to detect the effect on stunting prevalence. Lack of randomization may have been an issue. Operational challenges may also have influenced results; for example:

- At project start, wasting prevalence exceeded the critical cut-off (15%), suggesting that food security was an issue. The PSNP was delayed for 3 months, on average, and so was likely ineffective in addressing food insecurity. Absence of change in stunting prevalence through nutrition counselling was to be expected, as education alone has been shown to be ineffective without resources for food in food-insecure communities.
- Because the government's health extension workers were active in all areas, there was crossover between the intervention and non-intervention groups.
- The integrated group (i.e. the group that received all three interventions) received a very large number of messages. Animators may have been overburdened, and/or communities may have been overloaded with information.
- The WASH group benefited from having the same dynamic community leader throughout the project; all other groups experienced a change in leadership.

6.2.2.4 Key lessons

Both operational challenges and issues connected to the internal validity of complicated interventions can confound results; evaluations of such complicated programmes require careful analysis and sceptical weighing of implications. The evaluators speculated that strong community mobilization (not present in other areas) and promotion of handwashing practices (as opposed to hardware inputs) influenced nutrition-related results in the WASH arm. Chronic food insecurity undermined any potential benefits from improved knowledge about complementary feeding and dietary diversity in the area.

6.2.3 Peru: Participatory community-based programme integrating nutrition, WASH and early child development

6.2.3.1 Context

The Good Start (Buen Inicio) programme aimed to combat chronic undernutrition in children under 3 years of age among poor rural populations in three Andean forest regions and one Amazon forest region in Peru. The programme was conducted from 1999 to 2004 and reached an estimated 75 000 children and 35 000 pregnant and lactating women in 223 communities. Implemented by regional and local NGOs in collaboration with regional

health directorates, the programme aimed to integrate nutrition, health, hygiene and early stimulation in the family and the community. UNICEF managed the overall programme, and funding was provided by USAID.

6.2.3.2 Activities and delivery channels

UNICEF coordinated with public institutions and other programmes, including Programa Integral de Nutrición (the Integrated Nutrition Programme). Good Start directly trained health personnel to increase access to and use of improved health services. It also provided training for an average of one community health promoter for every 20 families and one peer counsellor for every 10 families. The community health promoters and peer counsellors convened regular counselling and stimulation sessions for pregnant women and for parents with children under 3 years of age.

Primary interventions included:

- maternal care, such as prenatal visits, nutrition during pregnancy and encouraging the husbands and families to support pregnant and lactating women;
- IYCF, consuming iodized salt, vitamin A supplementation (as part of immunization campaigns), and having pregnant women and children under 3 years of age consume ferrous sulfate;
- coordination with health services and promotion of immunization;
- hygiene and sanitation interventions, such as handwashing by mothers and children before meals and by mothers after changing diapers, adequate disposal of the children's excreta, and locating domestic animals outside the household area; and
- early stimulation in the home and in the community.

Growth monitoring and promotion were peripheral clinic-based activities in Good Start regions, but served as an important educational and promotional tool for parents and the community. Educational messages were also broadcast over community radio.

6.2.3.3 Outcomes

In the 19 communities from which both baseline and endline data were collected, rates of stunting were reduced from 53.5% at baseline to 37.3% at endline. Anaemia prevalence in the overall sample dropped from 76.0% to 52.3%, and low serum retinol, a measure that is used to provide information on a population's vitamin A status, dropped considerably in a subset of the communities.

Multivariate analysis did not detect a significant relationship between any of the programme activities and the nutrition indicators. However, the evaluators noted that improvements in stunting prevalence, anaemia prevalence and vitamin A status did not occur in similar regions without the programme during the same period.

6.2.3.4 Key lessons

Broad community participation – including health personnel, community leaders and family members – was a fundamental principle of the programme. Growth promotion activities in the community served as a focus for community meetings and discussion of community surveillance. The evaluators noted that sustained training for NGO staff may be necessary to ensure programme success.

6.3 INTEGRATING WASH INTO NUTRITION PROGRAMMING DURING HUMANITARIAN EMERGENCIES

WASH is a critical concern in the management of nutrition in humanitarian emergencies. People affected by the disasters are generally much more susceptible to illness and death from disease; this increased susceptibility is to a large extent related to inadequate water supplies and inability to maintain good hygiene. WASH needs for populations during humanitarian emergencies include safe access to, use and maintenance of toilets; access to water and soap or ash for handwashing at critical times; the hygienic collection and storage of water for consumption and use; and hygienic food storage and preparation. The primary effect of not meeting these WASH needs in relation to nutrition is increases in diarrhoeal illness that compromise nutritional status. Poor nutritional status further increases children's risk of contracting other illnesses, such as pneumonia, leading to a vicious cycle that can result in severe acute malnutrition.

In the Democratic Republic of the Congo, faith-based organizations joined together to empower communities, including displaced populations following a humanitarian crisis, to improve undernutrition rates through a multisectoral approach that includes WASH. In the Sahel region of Africa, UN agencies, USAID and NGOs worked together to develop a framework to define, incorporate and track a WASH minimum package at both facility and community levels as part of nutrition programming during humanitarian emergencies. The Mauritania case-study shows how this regional framework was carried out in a country context.

6.3.1 Democratic Republic of the Congo: Integrated community-based nutrition, food security and WASH programme

6.3.1.1 Context

The Programme de Promotion de Soins Santé Primaires (PPSSP) or Primary Health Care Promotion Programme is a consortium of three local faith-based groups in the eastern Democratic Republic of the Congo that joined together following interethnic conflicts, civil war and economic crises in Ituri District, near the border with Uganda. In 2002,

the groups fled towards the city of Beni and formed an emergency and relief programme to assist displaced people.

PPSSP's methodology is intensely community based and targeted to reach both internally displaced and local populations. Although early efforts complemented the supplementary feeding programmes of UNICEF and others, the consortium's approaches are primarily preventive, integrating health/nutrition interventions, WASH and trauma counselling. From 2008 to 2009, PPSSP received funding from the Jersey Overseas Aid Commission, through Tearfund, to work in the Kamango and Boga regions, with a population of 91 171. Community mobilization was also expanded into Bikima and Mugwanga in response to demands raised by successes in the initial communities.

6.3.1.2 Activities and delivery channels

PPSSP's approach combines community mobilization and education and focuses on achieving changes by gaining the involvement of local authorities and the trust of the community. As part of the process of sensitizing the whole community, PPSSP trained local religious, school and health care leaders on their roles in promoting good public health practices, including hygiene, primary health care and family planning.

In each target health area, PPSSP helped form and train nutrition committees and water committees, both of which had balanced representation between men and women. PPSSP helped form and train water committees to protect springs. Community mobilization for WASH focused on constructing latrines in schools and health care facilities and on raising awareness among families about constructing latrines, waste pits and showers.

The programme distributed improved seeds, agricultural tools and small animals to families with malnourished children. It also developed communal gardens in each village, which became the responsibility of the nutrition committees.

Committee members helped construct shelters for cattle and poultry and organized visits to the homes of malnourished children. As part of this effort, 148 severely malnourished children were referred to Mbau Therapeutic Nutritional Centre (76 km from Kamango) as a result of parents' sensitization by trained community health care workers, women leaders and the nutrition committees. The project demonstrated how to extract soya and peanut milk, along with improved cooking methods for vegetables.

6.3.1.3 Outcomes

Evaluation included baseline and endline surveys of knowledge, attitudes and practices and analysis of health data from the target communities, home visits and focus groups. Results showed a significant reduction in rates of undernutrition and waterborne disease among

children aged 6–59 months. Among children identified as malnourished, 90% returned to normal weight-for-age during the 12-month programme.

More than 60% of households constructed improved latrines during the year, and the local communities protected all water springs. After 12 months, 18.2% of families established their own vegetable gardens, and 8.9% had added more fruits to their diet within 6 months of project implementation.

6.3.1.4 Key lessons

Community involvement was considered to be the key to this project's success. Beneficiaries learnt that food is medicine if used properly. The project served as a practical learning site for students of both the nutrition and agronomy schools. Communities recognized that the project contributed to reconciliation between conflicting tribes as people worked towards the common goal of fighting undernutrition.

After funding ended, the nutrition committees restructured themselves under the leadership of the health zones; in one area, they agreed that the Anglican Church Development department (which was part of the committee) would support the groups and ensure monitoring.

6.3.2 Mauritania: Improved management of malnutrition through incorporation of an essential WASH package in nutrition programmes

6.3.2.1 Context

Guidimakha Region, in southern Mauritania, experienced high levels of acute undernutrition during the prolonged drought beginning in 2010 that affected much of the Sahel region (see also the Sahel region case-study in section 6.3.3 below). As part of a coordinated effort by the regional WASH group to reduce undernutrition in a sustainable way, especially among children under 5 years of age, Action Against Hunger | ACF International (ACF) worked with other partners to strengthen an integrated nutrition–WASH approach developed over previous years to counter the vicious cycle of undernutrition and diarrhoea. A key element of the approach was standardizing and mainstreaming a minimum essential WASH package for both homes and facilities, including nutrition rehabilitation centres.

The initial programme was conducted in Guidimakha Region during 2010–2011, in an area with a population of 186 697. It was managed by ACF-Spain in collaboration with several government entities and NGOs and supported by UNICEF, with primary funding from the European Community Humanitarian Office.

6.3.2.2 Activities and delivery channels

ACF and its partners delivered an integrated WASH and nutrition programme in the region, developed jointly by both sectors. A project manager supporting each sector ensured the link between the field teams and the coordination team based at the regional capital. At the facility level, the programme provided training according to the national protocol for treating acute malnutrition and provided supervision and technical support to health care workers in both outpatient and inpatient severe acute malnutrition rehabilitation centres and at community feeding centres.

ACF provided equipment and materials, including hygiene kits for children. It also constructed, rehabilitated and maintained wells, water networks and water storage systems; installed latrines in local health care facilities; and monitored water quality and implementation of purification systems in 26 health care facilities.

Community-level interventions focused on prevention and treatment of undernutrition and improved WASH infrastructure and behaviours. Activities included community-wide screening for acute malnutrition and monitoring of acute malnutrition cases. The programme organized cooking demonstrations and theatre performances and developed information, education and communication tools for hygiene promotion and water treatment in the home. Hygiene promotion sessions were conducted for mothers whose children were being treated for acute malnutrition at nutrition rehabilitation centres. In addition, a pilot study distributed hygiene and water treatment kits to 200 families that had a child being treated for acute malnutrition. The programme also carried out the CLTS methodology in 10 locations spread over two pilot municipalities.

6.3.2.3 Outcomes

Monthly monitoring was carried out via a system based on the programme's logical framework. A mini-survey on knowledge, attitudes and practices at the household level measured the intervention's impact. A final evaluation provided feedback to health care and nutrition facilities with recommendations for scaling up.

Overall, indicators improved during the second 6 months of the programme: awareness of undernutrition problems increased, beneficiaries were more aware of the services offered by the project, and people were more ready to access them.

At endline, sanitation and hygiene conditions were improved in 88% of the outpatient facilities, and access to safe water was available in 20 of the 26 inpatient and outpatient centres. In addition, latrines were constructed in four of the eight health posts, five connections to water networks were made, seven wells were rehabilitated and seven WASH committees were established.

In the project area, 40% of women of reproductive age (15 964 women) were reached with awareness-raising information on nutrition and hygiene. In the pilot families, 83% of beneficiaries knew three key hygiene messages at endline, compared with 68% at baseline; 79% had adopted two safe practices, up from 65%; 96% treated their water, up from 63%; and 74% of water tested in household storage systems was free of faecal coliforms, compared with 37% at baseline.

6.3.2.4 Key lessons

Among the challenges encountered during the programme, ACF sometimes found it difficult to integrate activities within government structures because of the lack of available government staff. Some of the communities were very isolated, limiting access to project beneficiaries.

6.3.3 Sahel region: A cross-sectoral, regional approach to WASH in nutrition in humanitarian programmes

6.3.3.1 Context

In 2011, the Sahel region experienced a prolonged drought that devastated crops and livestock and led to severe acute malnutrition among populations in parts of eight countries. A strong humanitarian response to the crisis, which was expected to affect at least 1 million children, was mobilized in West and Central Africa.

The regional WASH Working Group – which included the Office of the United Nations High Commissioner for Refugees, Oxfam, the Red Cross, UNICEF, USAID, other donors and NGOs – affirmed that ensuring access to safe water and sanitation and promoting improved hygiene practices should be key elements in all humanitarian responses to a nutrition crisis. In 2012, the WASH Working Group proposed aligning the WASH response to nutrition sector activities by mainstreaming a WASH minimum package in humanitarian programme efforts.

6.3.3.2 Activities and delivery channels

This major policy shift required consensus on minimum WASH hardware and software inputs and indicators, as well as processes for systematically integrating the WASH package, called "WASH in Nut", into traditionally vertical sectoral nutrition programmes. The WASH Working Group proposed establishing cross-sectoral WASH in Nut focal points within partner organizations and key groups in the nutrition and food security sector and disseminating the strategy and ensuring integration of health and nutrition goals in WASH projects of various partners at the country level. Overall objectives of the strategy are to:

- reach malnourished mothers and children at the household level with targeted community-based activities complementing hardware activities in health and nutrition centres and in homes;

- reinforce the principle of the WASH minimum package, with a choice of responses dependent on the country situation;
- give priority to behavioural change at the household level; and
- target priority regions or zones in conjunction with nutrition specialists.

The strategy also lays out a process for segmenting targets by facility type and beneficiary group and for phasing in activities over the short and medium terms. Priority targets for facilities are inpatient facilities for treating acute malnutrition with medical complications, outpatient therapeutic feeding programmes and supplementary feeding centres. Priority targets for beneficiaries are pregnant and breastfeeding mothers, children under 2 years of age at home and mothers/caregivers with children under 5 years of age.

The proposed global indicators for regional and national results monitoring are the percentage of nutritional centres delivering the WASH minimum package and the percentage of malnourished mothers/caregivers and children benefiting from the WASH minimum package in the home. Twelve proxy indicators are suggested to evaluate access and practices in the household – for example, the percentage of households where the time taken to collect water is less than 30 minutes, the percentage of households using improved and well maintained toilets, and the percentage of mothers washing hands with soap at critical times.

6.3.3.3 Outcomes

The WASH in Nut strategy is endorsed in the humanitarian action plans of eight countries in the Sahel region and by the Democratic Republic of the Congo. Monitoring data for WASH inputs at the facility level are being collected as part of the monthly UNICEF situation report process and disseminated by the Regional Office for West and Central Africa of the United Nations Office for the Coordination of Humanitarian Affairs. More than 100 organizations have picked up the approach through ministries of health and water divisions and through WASH clusters or sector groups. All relief programmes funded by the European Community Humanitarian Office are now asked to integrate a WASH in Nut component in their programmes.

6.3.3.4 Key lessons

The allocation of support and funds during a nutritional crisis is directed mainly to food aid, the most expensive input, with little funding for WASH. However, because a number of the WASH inputs in the minimum package may not be costly and focus primarily on behavioural change, these efforts can be supported as an integral component of nutrition programmes. In the participating Sahel country programmes, monitoring of hardware inputs has been systematized, but monitoring of inputs at the household level remains a challenge.

6.4 COMBINING WASH AND NUTRITION TO MEET SPECIFIC POPULATION NEEDS OR TACKLE A DISTINCTIVE PROBLEM

The five programmes described below focused on designing interventions for a specific population (the floating villages in Cambodia), for a distinctive problem (poisoning due to konzo in the Democratic Republic of the Congo) and for special programme platforms (distribution of commodities by community agents, use of incentives to improve use of antenatal care and delivery services in Kenya and community-based sanitation to improve use of latrines in Mali). They demonstrate that the role of innovation in combining WASH and nutrition to improve development impact is virtually unlimited.

6.4.1 Cambodia: Combining technologically appropriate WASH and nutrition interventions in floating and flood-affected communities

6.4.1.1 Context

On many lakes and waterways in Cambodia, entire floating communities – homes, schools and other structures – are built on top of bamboo poles, sealed plastic barrels or upturned concrete water jugs so that they can shift seasonally as water levels rise and fall. These highly vulnerable communities are typically overlooked by large-scale development programmes.

Live and Learn Environmental Education, Cambodia, has been working in partnership with Engineers Without Borders Australia and the Royal University of Agriculture to investigate appropriate agricultural practices and sanitation technologies for such areas. From 2008 to 2013, they worked in five communes (about 14 villages) around Tonle Sap Lake and in a wetland on the outskirts of Phnom Penh to introduce and demonstrate WASH and nutrition innovations before larger scale-up. The Bill & Melinda Gates Foundation and the Australian government's Department of Foreign Affairs and Trade, through Assisi Aid Projects, provided funding.

6.4.1.2 Activities and delivery channels

The project took a holistic approach to the issues of waste management, energy and agricultural production. Innovations were developed in a participatory way with the help of communities, including a small women's forum. Development and testing began in 2008, and new technologies/practices were then introduced to families through workshops and focus groups, followed by capacity building of community volunteers and demonstration sites that integrated the new sanitation and food production components. Field facilitators and farmer collaborators helped disseminate practices. Primary and secondary schools also played important roles in dissemination of

the three main components: composting toilets, floating and resilient gardens, and biodigesters.

Homes and schools in floating communities typically dump their waste directly into the water. For families, the project developed an ecological sanitation toilet, which is a toilet that safely recycles excreta resources (plant nutrients and organic matter) for use in agriculture. The ecological sanitation toilet was manufactured using locally available materials and easily installed in the limited space in floating houses. The project designed latrines for schools, taking into consideration the needs of both boys and girls, including the need for privacy and disposal of sanitary napkins.

Solid waste from an ecological sanitation toilet is collected in a bucket and treated with ash. For faeces to be safe for composting, the buckets need to be stored for approximately 6 months. To provide storage for the ecological sanitation toilet buckets, the project also constructed floating community waste management stations on barges. Waste management and fertilizer production committees were established to service and process the waste collected.

The project provided fertilizer, seeds and improved farming techniques to extend the growing season for nutritious foods and allowed for more resilient and varied agriculture. It also worked with farmers' collectives to create trial gardens and demonstration sites and to improve market access. Solutions such as floating, mobile and raised gardens were identified and developed for a range of circumstances, from floating houses to houses that are seasonally or occasionally flooded. This allowed improved access to vegetables and thus a more diverse and nutritious diet in fishing communities accustomed to buying fresh produce, as well as in flood-affected communities facing the dry season. Integration of food production and sanitation activities was encouraged to improve yields and to provide an added incentive for collecting and managing waste.

To treat both human and animal waste so that it can be safely disposed of or used as fertilizer or fish feed, the project developed a home biodigester. It is smaller, cheaper and more adaptable than existing biodigesters, is capable of floating and is suitable for households with fewer animals. The floating technology also produces gas for energy, and one household with a couple of pigs can produce enough gas for cooking. A major benefit of the biodigesters is better control of waste from the increasing number of floating pig farms, which has affected water quality in these areas.

6.4.1.3 Outcomes

Although evaluation results are currently pending, monitoring data show that the communities were receptive to multiple technologies that provide a holistic approach to waste management and are actively using new techniques.

6.4.1.4 Key lessons

Attempts to introduce the ecological sanitation toilet as a stand-alone intervention met with little enthusiasm, because families were used to dumping waste in their waterways and enduring the health consequences. With support for compost and fertilizer production and the simultaneous introduction of biodigesters, families had added incentive for capturing waste.

In addition to improving sanitary conditions and motivating better school attendance, particularly by girls, the early focus on schools provided several benefits. Children learnt about the new technologies from their teachers, had the opportunity to adopt them along with their peers and became promoters of the new devices in their homes. Addressing menstruation needs within the sanitation design of both home and school latrines, however, was new to some Cambodian and Australian practitioners. The project initially faced some reticence among its own staff to discuss this subject and to include menstruation services as a key component.

6.4.2 Democratic Republic of the Congo: Improving diet and eradicating konzo by combining nutrition, food security and WASH

6.4.2.1 Context

Konzo is a neurological ailment triggered by sustained dietary exposure to the cyanide that is present in improperly processed cassava and exacerbated by protein deficiency. It comes on suddenly and leads to a permanent paralysis of the lower limbs. Konzo also accelerates and worsens undernutrition. It usually appears in clusters within households, because members are exposed through the common family meal. Although cyanide is naturally present in all kinds of cassava, bitter varieties contain much higher levels, and cassavas grown during drought contain particularly high levels of cyanide. These varieties must be peeled, grated and soaked in warm water for several days to disperse the chemical.

In the Democratic Republic of the Congo, Action Against Hunger (ACF-USA) conducted a programme, from 2009 to 2011, in 395 villages in Kwango District, Bandundu Province, to eradicate the disease, which had reached epidemic proportions. With funding provided by the European Union Food Facility, the programme reached 22 000 households.

6.4.2.2 Activities and delivery channels

Formative research showed that vulnerability to konzo in the target area was heightened by the combination of low protein intake, poor soil conditions that favour the cultivation of bitter cassava varieties and insufficient water for processing. Women in rural areas preferred to directly soak the cassava on riverbanks, in ponds or in swampy areas.

In the dry season, they used less water to process, or ret, their cassavas and often used the same water repeatedly. During the lean season, when there is relatively little food available, families often consumed their cassavas without giving them a chance to be detoxified. Families recognized konzo, but thought it was caused by so-called black magic.

Over two agricultural seasons, ACF-USA promoted crop and diet diversification by introducing improved varieties of cowpeas and sweet cassava. The project provided training in agricultural techniques and distributed cuttings and seeds. ACF-USA also worked with women's groups to establish 13 mills to increase access to maize and cassava milling services and improve the quality of the flour. Water points – including boreholes, springs, rainwater harvesting systems and piped distribution networks – were rehabilitated or constructed, and public retting containers were installed to ensure that villages had access to sufficient water, of sufficient quality, for processing the cassava.

The project trained 1520 volunteer communicators to conduct educational sessions to raise awareness of the causes of konzo, carry out cooking demonstrations around balanced diets and promote kitchen gardens. Improved *fufu* recipes based on mixed cassava and maize flour were introduced. Other communication activities included posters, broadcasting of songs and stories on two local radio stations and 154 mass educational sessions in religious centres and schools.

6.4.2.3 Outcomes

An impact evaluation showed that new varieties of cassava were largely accepted, with an increase in intercropping of both bitter and sweet varieties. Overall food stocks and diversity of food (including pulses) in households increased between baseline and endline. Knowledge about konzo increased significantly: after 2 years, 95% of those surveyed associated konzo with nutritional causes and knew how to prevent it; only 7% thought the disease had a metaphysical origin, in contrast to 74% at baseline. Knowledge of the optimal length of time to ret and dry cassava was up from 60% to 99%, and the amount of time households actually soaked cassava increased from an average of 2 days to 3.4 days.

A strong inverse correlation existed between “participation” and “lack of knowledge”, indicating the overall impact of the outreach activities. According to local health screening, the prevalence of konzo decreased by 84%, with the greatest reduction among children under 5 years of age.

6.4.2.4 Key lessons

The project used a community cell approach to sensitization and promotion and put community members in leadership positions, which allowed for open discussion and mitigation of local taboos. The community cell approach also encouraged affected populations to create

messages, resulting in better communication. The impact of community education was reinforced by improved access to water, agricultural processing infrastructure and opportunities to diversify diets.

6.4.3 Kenya: Social marketing of multiple health products in rural communities

6.4.3.1 Context

The Safe Water and AIDS Project (SWAP), a Kenyan self-help NGO, has been delivering health products through a community-based programme since 2005. The SWAP approach mobilizes formal and informal community institutions to support community vendor groups that sell items from a basket of different health products to their neighbours. As of 2008, about 878 active SWAP chapters operated in Nyanza Province in rural western Kenya, with roughly 6000 vendors.

Access to standard health services in this area is difficult. From 2007 to 2009, the United States Centers for Disease Control and Prevention (CDC) partnered with local groups to carry out an effectiveness study of the promotion and distribution of health, WASH and nutrition-related products, including the introduction of micronutrient powder in single-dose packets that can be added to complementary foods. CDC, the Global Alliance for Improved Nutrition and USAID provided funding.

6.4.3.2 Activities and delivery channels

SWAP vendors receive basic health education and training on the proper use of health products, business practices and microcredit. The vendors visit homes and also sell products at market kiosks, religious centres and other community settings. Vendors regularly promote a chlorine-based water treatment product and insecticide-treated mosquito nets.

The 2-year effectiveness study was conducted following an intervention that included a marketing campaign for micronutrient sachets that provided special training for SWAP vendors, product launches, with promotional materials, educational leaflets and loudspeaker trucks, and various incentives for both vendors and consumers. To model HWTS during the intervention, water stations with drinking-water and handwashing supplies were installed in health care facilities, primary schools, religious centres and chiefs' homes. Each station consisted of a 60 L plastic bucket with a tap and lid and starter supplies of chlorine and soap.

Sixty villages, with about 80 000 people, in Nyando Division of Nyanza Province participated in the study: 30 villages participated in the intervention for 2 years, and 30 villages served as a comparison group for 1 year and then were included in activities the second year. All products sold by SWAP, except the micronutrients, were available in local village markets throughout the study area.

6.4.3.3 Outcomes

Baseline and follow-up surveys were carried out in households with children aged 6–35 months. After 1 year, 39% of intervention households and 9% of comparison households had received home visits from a vendor, in contrast to fewer than 3% of households in either area at baseline. Intervention households were more likely to have purchased the chlorine HWT (15% versus 2%) and the micronutrients (36% versus 6%).

After 2 years, 47% and 41% of original intervention and comparison households, respectively, reported receiving a home visit. More than 90% of all households receiving visits reported purchasing a health product, and sales of the three products were similar in the two areas. Both the chlorine HWT and insecticide-treated nets were purchased less frequently by households with lower socioeconomic status compared with households with higher socioeconomic status, but micronutrient sachets were purchased equally across all quintiles. On average, 33% of households in intervention villages purchased the micronutrient sachets, with an average weekly intake per child of 0.9 sachet.

Intervention children had greater improvements in haemoglobin concentration (a blood measure of anaemia) and iron and vitamin A status than comparison subjects. Results adjusted for age, sex, socioeconomic status and maternal education showed a positive association between children's haemoglobin, iron and vitamin A status and the number of micronutrient sachets the children consumed. However, the prevalence of malaria, wasting and stunting did not change significantly in either group.

6.4.3.4 Key lessons

Community vendors who visit homes in resource-poor areas can play an important role in promoting the purchase of affordable WASH and nutrition products through an integrated approach. In these villages, the high level of community engagement likely contributed to exposure to products and increased sales. Home visits were well accepted by this population. Even with relatively low and infrequent use, sales of micronutrient sachets were associated with decreased rates of anaemia and iron and vitamin A deficiency. With the exception of the micronutrient sachets, however, the uptake of health products, including those for water treatment by the poorest households, remained a challenge for these vendors.

6.4.4 Kenya: Improving antenatal care attendance through enhanced services and targeted incentives

6.4.4.1 Context

Antenatal care visits provide important opportunities for pregnant women to access a range of services and health messages that benefit both mothers and their young children. However, according to the 2008–2009 Kenya

DHS, less than half of pregnant women had four or more antenatal care visits, and very few received care during their first trimester. To increase attendance and enhance services in rural western Kenya, CDC partnered with SWAP, the Kenya Medical Research Institute and the health authorities in the districts of Suba and Mbita to test a strategy of providing incentives for each of the four recommended visits and for delivery of babies at a health care facility.

In light of high rates of childhood diarrhoea, a secondary goal was to increase the use of HWT and improve personal hygiene. Incentives included WASH as well as nutrition-related products. The intervention was carried out in 25 health care facilities, with incentives given to 2000 pregnant women. CDC and Procter & Gamble provided funding for the 2011–2012 pilot study.

6.4.4.2 Activities and delivery channels

Incentives for attendance were low-cost and locally available products. For the first and third antenatal care visits, a hygiene kit consisting of soap and a chlorine-based water treatment was provided, and for the second and fourth visits, a 1 kg bag of protein-fortified flour used to make *ugali*, a dietary staple, was provided. The incentive for delivery in a health care facility included a safe water storage bucket with lid and tap, clean delivery supplies and an additional hygiene kit containing coagulant/flocculant water treatment packets.

To enhance services, the project provided training for facility nurses in the active management of the third stage of labour, obstetric emergencies, neonatal resuscitation and improved communication. The project also supplied self-inflating bags for neonatal resuscitation as well as simple handwashing and drinking-water stations. It was important for the facilities to be able to model the same behaviours they were promoting; some had no facilities for handwashing or drinking-water. Nurses and community health care workers disseminated messages about the incentives.

6.4.4.3 Outcomes

The 1-year study followed 302 women who initially visited a programme health care facility in their first or second trimester of pregnancy. The survey included data from maternal registries and women's self-reported antenatal care, delivery and postnatal practices, as well as observations in the home related to their WASH practices. Evaluators observed an increase in the percentage of mothers who could demonstrate proper handwashing techniques, up from 47% to 62%. During the home visits at endline, 18% of families were observed using the buckets and tap for clean drinking-water storage, as opposed to none at baseline.

Overall, HWT rose from 82% to 94%, and use of filters rose from 31% to 43%. At programme start, reported use of chlorine HWT was already high, at 85%, and remained the same at follow-up. Use of the coagulant/flocculant, which

was not a familiar product in this area, remained low. Evaluators speculated that promotion of filters in the same area by another programme contributed to the increase in use of HWT.

To evaluate the use of maternal health services, practices of mothers who reported at baseline on previous pregnancies were compared with practices during the study period: the percentage of mothers with four or more antenatal care visits rose from 55% to 76%, health care facility deliveries increased from 41% to 73% and postnatal check-ups rose from 38% to 61%.

6.4.4.4 Key lessons

The programme demonstrated that low-cost incentives related to health and nutrition can help improve antenatal care attendance and that antenatal care visits can be important for promoting changes in multiple practices, including handwashing.

The evaluators recommended that future programmes assess water treatment using microbiological methods. Tests for residual chlorine in home drinking-water suggested low rates of water treatment at both baseline and follow-up. However, more than 75% of women who used the chlorine-based water treatment said they had last treated their drinking-water more than 24 hours previously. For budgetary reasons, water quality testing was limited to residual chlorine, which is a useful marker for up to 24 hours only.

6.4.5 Mali: Impact evaluation of rural sanitation programme

6.4.5.1 Context

CLTS has been adopted in Mali to scale-up sanitation in rural areas and accelerate progress towards the MDG target on sustainable access to basic sanitation. However, few impact evaluations of community-based sanitation interventions have been conducted so far. This study presents the results of a randomized controlled trial for studying the effect of CLTS in rural Mali.

It is important to keep in mind that when this study took place, Mali was facing an unprecedented large-scale humanitarian crisis. First, a nutrition and food scarcity crisis started at the end of 2011, affecting hundreds of thousands of children with moderate and severe acute malnutrition. Second, a coup d'état in March 2012, combined with rebel groups taking control of the northern half of the country, led to significant internal displacements, with communities in the southern part of the country hosting those displaced. The region of Koulikoro, where the evaluation took place, was also hit by the crisis. Communities in this region faced all the related extreme conditions, and this is reflected in a general trend of increased stunting rates and diarrhoea prevalence.

6.4.5.2 Activities and delivery channels

The intervention (CLTS) was implemented in Koulikoro Region by the Regional Directorate of Sanitation with the support of UNICEF. The trial was implemented by researchers¹ funded by the Bill & Melinda Gates Foundation.

One hundred and twenty-one communities were randomly selected out of a sample of 402 villages identified as fit for the CLTS intervention based on high rates of open defecation and an expressed interest in improving the situation. Half of the 121 selected communities were randomly assigned to receive CLTS, whereas the other half were control villages. Baseline information was collected in all the communities prior to the intervention (March to April 2011). The data collected covered household demographic characteristics, health information, anthropometrics, and sanitation and water quality samples. Follow-up information was collected between April and June 2013, 6–19 months after the intervention finished (depending on the villages).

6.4.5.3 Outcomes

The study found a very significant increase in access to private latrines (which almost doubled among households in CLTS villages), improved quality of latrines and reduction in open defecation practices (self-reported open defecation rates fell by 70% among adults and by 50% among children under 5 years of age). CLTS households were 3 times more likely to have soap present and 5 times more likely to have water present at a handwashing facility. However, no improvement in water quality was found.

Other notable findings for children under 5 years of age in CLTS villages were as follows:

- positive and significant impact on growth outcomes: they were taller (+0.18 height-for-age z-score);
- comparatively, 14% and 26% less stunting and severe stunting, respectively, in CLTS villages;
- comparatively, 16% less underweight and 35% less severe underweight children in CLTS villages; and
- 54% reduction in diarrhoea-related mortality in children under 5 years of age in CLTS villages.

Moreover, from a social perspective, the study demonstrated:

- a positive and statistically significant impact of the CLTS programme on prosocial behaviours. Based on game theory, experimental simulations showed a significant increase in decisions motivated by collective interest as opposed to individual interest; and
- increased feelings of privacy and safety reported by women.

Finally, there was no evidence that the impacts of the intervention on access to sanitation declined over time (6–19 months after the interventions), even in areas with light-touch reinforcement of positive behaviours following verification of open defecation-free status.

¹ From the Universidad Nacional de La Plata, Argentina; Université Laval, Canada; Stanford University, USA; and University of the Andes, Colombia.

6.4.5.4 Key lessons

Globally, there is still little evidence on the impact of sanitation interventions. This study produces sound evidence that can be used to evaluate the extent to which CLTS improves health outcomes and help determine what drives collective action, in order to increase sanitation coverage.

The study provides important and timely evidence that good-quality CLTS implementation achieves (1) improved access to improved sanitation and handwashing facilities and decreased open defecation, (2) health impacts, (3)

empowerment of the most vulnerable communities, and (4) the medium-term sustainability of outcomes.

With some important prerequisites, including appropriate capacity development of government and partners and a rigorous planning, monitoring and reporting framework, low-cost/high-impact community-based approaches can be developed and scaled-up in difficult contexts, such as rural Mali, to benefit health and nutrition. In addition, integration with nutrition interventions may have provided even greater health gains to better address the underlying trend of malnutrition.



CONCLUSION

Integrating WASH into nutrition policies and programmes provides a means to achieve greater health gains and reinforce the benefits of primary prevention. As detailed in this document, there is a substantial evidence base to support existing, proven WASH interventions and a growing body of knowledge on the additional benefits that are achieved when WASH is integrated into nutrition actions. Building upon existing global and national nutrition commitments, policies and databases provides a strong basis for advocating for and establishing integrated

activities. A number of emerging implementation approaches and tools from the field provide the means for actually “doing” integration at both the community and health care facility levels. Learning from and improving implementation efforts require smart and joint monitoring and continuous sharing, not only of successes, but also of challenges. In short, integrating WASH into nutrition is not the end-point, but rather an evolving and iterative process – one that will ultimately bring us closer towards realizing better health for all.

AFTERWORD

The work on integrating nutrition and WASH is evolving rapidly. New evidence from research coupled with new insights from implementation will serve to better inform not only how integration is done, but when and where it is most valuable. This information is important as feedback not only to programme managers, but also to decision-makers and funders. In the spirit of collaboration and the

evolution of this work, readers are encouraged to share their comments on the usefulness of this document, gaps in information and lessons from the field. Please write to WASHinHCF@who.int. These comments will be periodically and systematically reviewed to inform further companion pieces and actions on the ground.

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NUTRITION AND WASH

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