WFP
World Food Programme

SAVING LIVES
CHANGING LIVES

Micronutrient Landscape in South Asia

Status, Strategies & Future Directions

December 2021

Contents

Acknowledgements

The landscape analysis report of the micronutrient situation in the South Asia region was developed by the World Food Programme (WFP) Regional Bureau for Asia and Pacific. The analysis and report writing was carried out by Vasundhara Bijalwan, consultant.

We thank our WFP colleagues at headquarters and country offices – Saskia DePee, Martin Ahimbisibwe, Hafizullah Elham (Afghanistan), Tuba Khan, Mohammad Mahbobor Rahman (Bangladesh), Kencho Wangmo, Manasi Shukla, Phuntsho Wangmo, Svante Helms (Bhutan), Shariqua Yunus (India), Anteneh Girma, Macharaja Maharjan, Neera Sharma (Nepal), Mahamadou Tanimoune, Rabia Zeeshan (Pakistan), Saman Kalupahana, Kalana Peiris (Sri Lanka), Joris Vanhees, and Sabah Barigou — for their contribution to the report. We are also grateful to Silke Pietzsch (independent consultant) for sharing her expertise and suggestions that further enriched the report.

The report was shared with the representatives of regional offices of the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), Global Alliance for Improved Nutrition (GAIN) and Nutrition International (NI). Special thanks to Padmini Angela De Silva (WHO), Zivai Murira (UNICEF), Ashek Mahfuz, Rudaba Khondker (GAIN), Annoek van den Wijngaart, Suvabrata Dey, and Aarati Pillai (NI) for their time and valuable inputs to the report.

Acronyms

DHS	Demographic Health Surveys
FBF	Fortified Blended Food
FNG	Fill the Nutrient Gap
GHO	Global Health Observatory
IFA	Iron and Folic Acid
LNS	Lipid-based Nutrient Supplements
MAM	Moderate Acute Malnutrition
MNDs	Micronutrient deficiencies
MNP	Multiple Micronutrient Powders
MUIC	Median Urinary Iodine Concentration
PLW	Pregnant and Lactating Women
RUSF	Ready-to-Use Supplementary Foods
RUTF	Ready-to-Use Therapeutic Foods
SAC	School-aged children
SAM	Severe Acute Malnutrition
SNF	Specialized Nutritious Foods
SNP	Supplementary Nutrition Program
SOFI	State of Food Security and Nutrition
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WHO	World Health Organization
WIFS	Weekly Iron and Folic Acid Supplementation
WRA	Women of Reproductive Age

Executive Summary

South Asia is weighed down by the triple burden of malnutrition — **high childhood stunting and wasting rates, growing prevalence of overweight and obesity, and widespread micronutrient deficiencies** (MNDs). Deficiencies of iron, folate, vitamin A and zinc disproportionately affect children and women in the region; the regional anaemia rates among children and women of reproductive age are way above the critical public health level. Evidence confirms that **MNDs can have a life-long debilitating impact on individuals**, affecting their health, education, and capacity to work and earn, impeding the countries' progress through human capital loss.

The World Health Assembly Global Nutrition Targets for 2025 and Sustainable Development Goal 2 call for accelerated global action to end hunger, achieve food security and tackle high anaemia rates amongst women of reproductive age (1,2). Even before the onset of the COVID-19 pandemic, **one in two children under 5 and one in two women of reproductive age were anaemic** in the region, and about 60 percent of South Asians could not afford a healthy diet (3,4). **The pandemic has erased the gains made over the recent past** and exposed more individuals to the risk of developing MNDs through the disruption of food, health, education, and social protection systems.

While South Asian countries have been proactively implementing a combination of recommended and evidence-based approaches to improving micronutrient status, comprehensive documentation in the region remains unavailable.

The following landscape review presents the overall burden of MNDs and the interventions and advocacy efforts to address MNDs in **Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka.** The analysis also examines MNDs in the context of COVID-19 and explores the importance of a healthy diet that is central to improving health, education, and other social and economic development indicators.

of South Asians could not afford a healthy diet even before the COVID-19 pandemic

1/2 **children under 5 and 1 in 2 women of reproductive age are anaemic in the region**

STRATEGIES AND FUTURE DIRECTIONS

REACHING VULNERABLE POPULATION GROUPS

Children under 5 years and pregnant, lactating women are the main beneficiaries of large-scale supplementation, provisioning of specialised nutritious food, nutrition counselling/awareness activities on dietary diversity and health services. Meanwhile school-age children, adolescents and women in reproductive age receive considerably less attention. Furthermore, disadvantaged individuals affected by poverty, chronic illnesses, and disabilities are more prone to MNDs as they face greater physical, financial, and social barriers in accessing nutritious diets. Prerequisite to designing effective nutrition programmes to meet the nutritional needs of the vulnerable population groups demands bridging the existing data gaps through surveys and assessments and securing them through robust social safety nets.

Despite growing recognition of **investing in the first 8,000 days** as key to building human capital, school children and adolescents (5-19 years) as a broad age group are largely neglected in nutrition programming. Low coverage of weekly iron and folic acid supplements where anaemia is of public health significance and widespread consumption of unhealthy foods in school children is a reality that demands immediate attention. Bangladesh, Bhutan, India, Nepal, and Sri Lanka have a national school meal programme that aims to improve the nutrition of school children. However, the scale of implementation varies, and programmes continue to strive for better quality, coverage, and food safety. This warrants better designing of safe, nutritious school meals by including food quality and safety aspects along the value chain and complementing actions such as nutrition education, essential health and water, sanitation, and hygiene services.

CURRENT INTERVENTIONS TO TACKLE MICRONUTRIENT DEFICIENCIES

The review found that **governments in the region are committed to tackling MNDs using numerous approaches** such as dietary diversification, micronutrient supplementation, food fortification and biofortification through food, health, agriculture, education, and social

protection systems. Nutrition interventions complemented with actions from other systems – health, water, sanitation, and hygiene – have a crucial role in addressing nutritional and non-nutritional drivers of MNDs. Implementing a context-based intervention package on an appropriate scale is needed to achieve maximum benefits.

In the micronutrient intervention landscape, conventionally, **micronutrient supplementation** has been adopted as a short-term strategy to address the severe levels of anaemia and vitamin A deficiency in children, adolescents, and women. While vitamin A supplementation programmes targeting children were largely effective in curbing severe vitamin A deficiencies in the region, iron supplementation programmes across age groups had limited success due to coverage issues. Also, the coverage of specialised nutritious foods in managing children with acute malnutrition and those at risk of malnutrition remains low. The common barriers in achieving high coverage of these nutrition interventions include supply chain bottlenecks, intermittent quality service delivery, inadequate and unskilled health staff and ineffective counselling. Actions should continue to improve the quality, reach, and utilisation of micronutrient supplements and specialised nutritious foods, emphasising vulnerable areas and populations.

More recently, **food fortification** has caught policymakers' attention as an effective intervention to improve nutrient intake of the population, especially of vulnerable population groups. Given that Asia accounts for 90 percent of global rice consumption, rice fortification emerges as a vital strategy to fill MNDs and reduce equity gaps, in addition, to iodised salt, fortified wheat flour, and fortified oil. Countries are targeting vulnerable groups by integrating fortified staples into social safety net programmes (Bangladesh, Bhutan, India, Nepal, Sri Lanka, Pakistan). Governments are also channelling fortified staples into the open market (India, Pakistan) to benefit populations in settings where anaemia is a public health problem and other MNDs are widespread. Maximising coverage calls for an enabling environment and commitment to scaling up without compromising the quality of fortification and mass awareness generation activities.

Evident from the data on diets and utilisation of nutrition services, the current awareness generation efforts are slow and fall short in modifying diets and health-seeking behaviour. This calls for evidence-based, at-scale **social behaviour change strategies** to promote recommended behaviours towards the uptake of micronutrient-rich, diverse diets and micronutrient supplements, especially in the most vulnerable groups. To further strengthen the programming, there is an urgent need to fill data gaps with comprehensive and quality data on dietary intake and utilisation of micronutrient interventions to design appropriate strategies to address MNDs.

RESHAPING FOOD SYSTEMS TO ENSURE A HEALTHY LIFE WITHOUT MICRONUTRIENT DEFICIENCIES FOR ALL

While in the short term, the governments should improve the quality and coverage of supplementation programmes to tackle the high levels of anaemia in targeted vulnerable groups. In the medium to long term, governments should aim for dietary diversification to provide the nutrients for a population to live a healthy life without MNDs. **This calls for investment and commitment to reshaping the food systems and policies to increase the production and access to local, fresh, and diverse foods.** In this whole agenda of addressing MNDs, **ensuring no one is left behind** is paramount, calling for more inclusive, interconnected systems — food, health, education, and social protection — to provide better nutrition, especially to the most vulnerable groups.

Combating the MNDs epidemic calls for commitment to establishing and harmonising policies across relevant sectors, coordination between government ministries, and partnership with private sector (economic forums, SUN Business network, private industries) to deliver diverse, micronutrient-rich diets and quality micronutrition interventions to bring South Asian countries closer to better health, better education, and better lives.

1. Introduction

Micronutrients are essential for bodily functions, growth, immunity, school performance, economic productivity and prevention of morbidity and mortality among different population groups. Widespread micronutrient deficiencies (MNDs) — also known as hidden hunger, affect almost a third of the world's population, and South Asia and sub-Saharan Africa regions bear the greatest burden (5–7). South Asia presents a paradox: on the one hand, it is the fastest-growing region globally, with economic growth, agricultural productivity, poverty and illiteracy reduction and improvement in healthcare (8). Yet, the region is home to the largest number of stunted and wasted children under 5, face growing challenges of overweight and obesity and related chronic diseases, and widespread, persistent MNDs (8).

MNDs are pervasive across age groups; **children, women, poor and marginalised communities are at the greatest risk of developing nutrient deficiencies.** Inadequate diets, disease, helminthic infections and higher physiological requirements during pregnancy and childhood are the most common causes and contributors of MNDs (6). The deficiencies of micronutrients have detrimental consequences not only on the health of individuals but also on the health of the economy. The lasting effects of **MNDs can impede a country's progress through the loss of human capital and higher health costs**. The World Bank reported that countries could lose 5 percent of the GDP to iron-deficiency anaemia, vitamin A and iodine deficiencies (9). The World Health Organization (WHO) estimated that 19 percent of child deaths globally could be attributed to zinc, vitamin A, and iron deficiencies. Iron , vitamin A and zinc deficiencies also cause 6 percent of global disability-adjusted life years (DALY) (10).

The Copenhagen Consensus of 2004 and 2008 were two major conferences that ranked **micronutrient programmes as the top development priority** (11). Sustainable Development Goal 2 commits itself to end all forms of malnutrition (1). Furthermore, the World Health Assembly (WHA) Global Nutrition Targets for 2025 call for accelerated global action to end hunger, achieve food security and reduce anaemia in women of reproductive age by 50 percent (2).

To achieve these global targets, **countries have been proactively implementing nutrition interventions at varying scales** to address the massive burden of MNDs. And even though successes and operational challenges of individual nutrition interventions addressing MNDs exist, to a certain extent, a comprehensive overview of the situation of MNDs, including micronutrient programmes in South Asian countries, remains unavailable.

This landscape review provides information on the burden of MNDs in South Asia and compiles the existing micronutrient policies and interventions by country and age group. The report identifies gaps and bottlenecks in programmes addressing MNDs/improving micronutrient intake, explores opportunities, and provides broad recommendations to guide future programmes and advocacy efforts in the South Asia region. The report also highlights the potential of relevant systems — food, health, education, social protection and Water, Sanitation, and Hygiene (WASH) — to deliver healthy diets to all, with a special focus on vulnerable age groups, in addressing MNDs along with the persistent double burden of malnutrition — undernutrition and overnutrition. The countries included in the review are **Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka.**

2. Methods

The review used two broad dimensions — epidemiological aspects and programmatic interventions — to build a comprehensive understanding of the MNDs situation.

First, the epidemiological aspects are described, examining the current prevalence, trends in MNDs among vulnerable groups, and its determinants.

Second, the programmatic interventions are reported, reviewing existing policies and programmes, their coverage, utilisation, and identifying operational constraints towards delivering critical nutrition interventions and addressing knowledge gaps. To examine these dimensions, publicly available national nutrition and health surveys, programme documents of governments, UN agencies, other development partners and academic articles related to MNDs were reviewed.

3. Situation of Micronutrient Deficiencies

Deficiencies of iron, folate, vitamin A, zinc and vitamin D affect a sizable proportion of the population, especially children and women in the South Asia region. The review found a major challenge with the micronutrient data as either the national prevalences for certain MNDs were unavailable or were from disparate data sources of varying quality, posing difficulties in estimating the real burden of hidden hunger. Furthermore, despite data paucity on MNDs, high levels of anaemia indicate other MNDs in the region. It is important to note that the data depicted in this document vary across time and type of survey.

The UNICEF State Of the World's Children (SOWC) 2019 report revealed that one in two children under 5 suffer from anaemia[1] and other MNDs, and one in two women of reproductive age (WRA) are anaemic in the region (12,3). In 2016, the prevalence of anaemia among South Asian children under 5 (55 percent) and WRA (50 percent) exceeded the global prevalence (42 percent and 33 percent, respectively) and East Asia and Pacific prevalence (26 and 27 percent, respectively) (8). In the South Asia region, anaemia emerges as a 'severe' public health problem (prevalence >40 percent) among children under 5 and WRA (13). Furthermore, anaemia levels in South Asia region show a downward trend among both children and WRA vis-à-vis the upward trend in East Asia and Pacific (figure 1 and 2).

FIGURE 1: PREVALENCE OF ANAEMIA IN CHILDREN IN ASIA AND THE WORLD

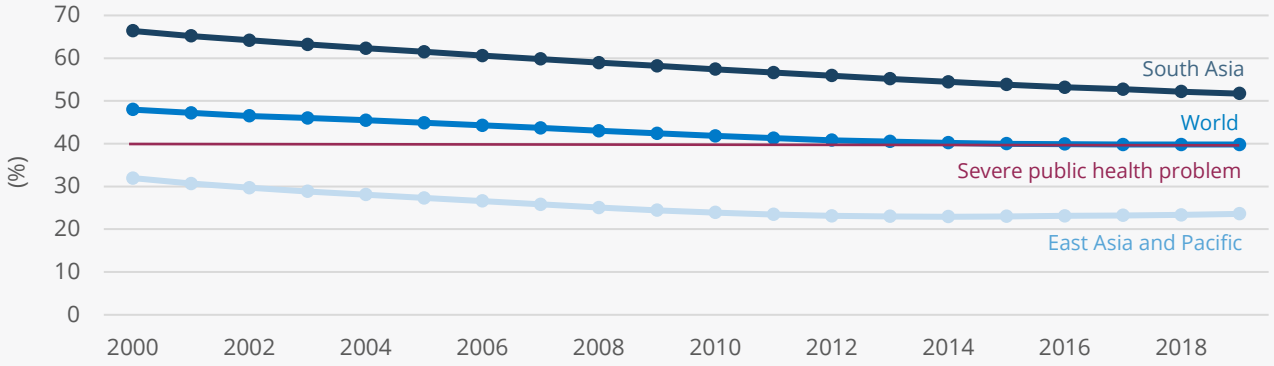
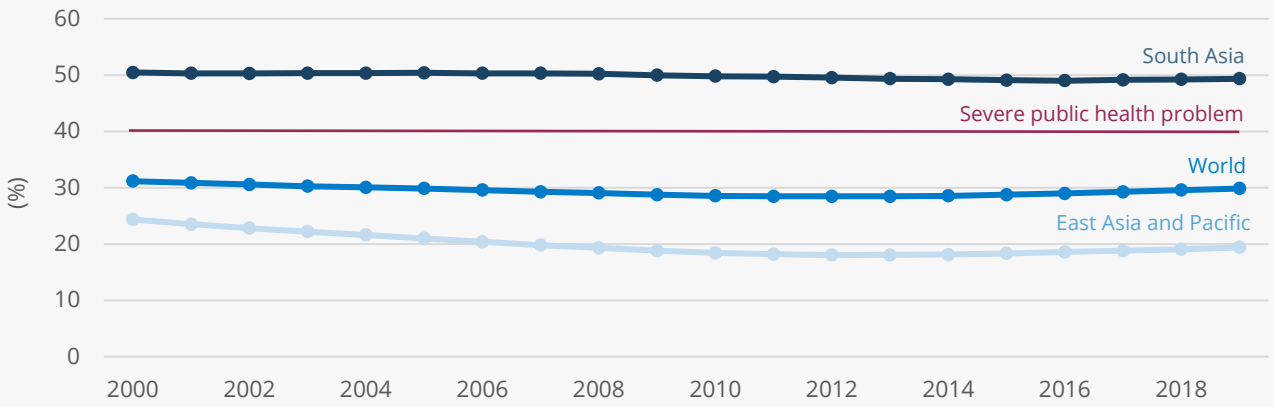


FIGURE 2: PREVALENCE OF ANAEMIA IN WOMEN OF REPRODUCTIVE AGE IN ASIA AND THE WORLD



SOURCE: World Bank, ourworldindata.org/micronutrient-deficiency

1 50 percent of anaemia in South Asians is due to low dietary intake of iron and other causes of anaemia include malaria, other nutritional deficiencies (especially folate and vitamins B12, A and C), and genetic conditions (including sickle cell disease, thalassaemia – an inherited blood disorder) and chronic inflammation.

3.1 Prevalence of micronutrient deficiencies

3.1.1 PREVALENCE OF MICRONUTRIENT DEFICIENCIES IN CHILDREN UNDER 5

In 2016, the Global Health Observatory (GHO) reported anaemia as a 'severe' public health problem among children under 5 in Afghanistan, Bangladesh, Bhutan, India, Nepal, and Pakistan, with over 40 percent prevalence (13). In Sri Lanka and the Maldives, anaemia rates classified as a 'moderate' public health problem, with over 20 percent prevalence.

The trend analyses of GHO data between 2000 and 2016 showed that all countries, except Pakistan, made some progress in reducing childhood anaemia. Bangladesh, Bhutan, and Nepal were the three countries that made consistent and significant improvements by reducing anaemia by more than 20 points. Between 2010 and 2016, a worrying trend of a gradual increase in anaemia levels was observed in Afghanistan, Maldives, and Pakistan (figure 3).

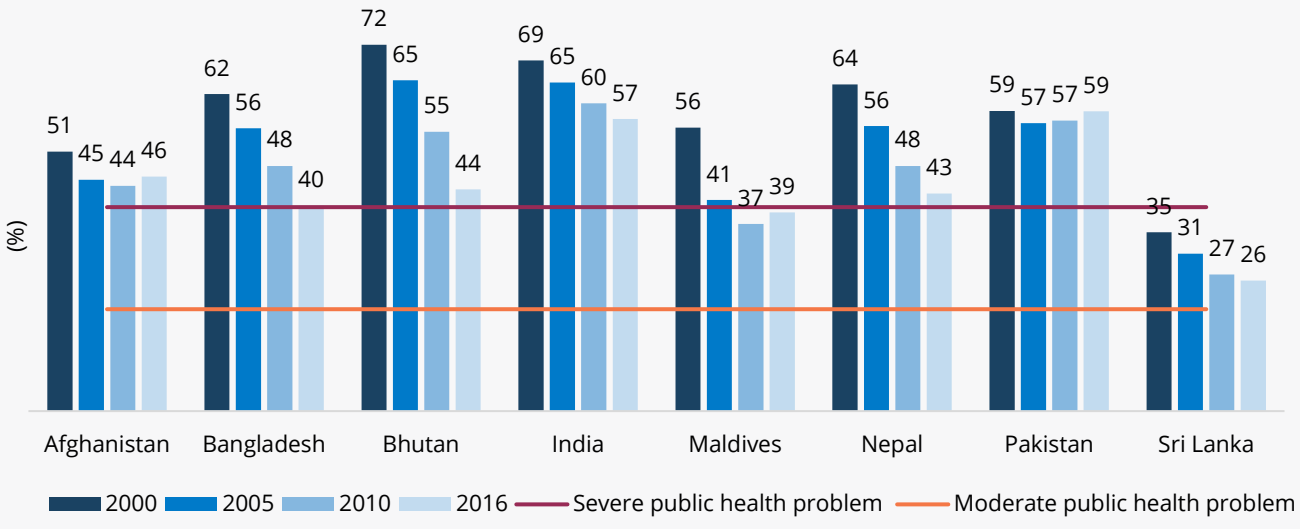
Apart from anaemia, other MNDs of public health concern include folate, vitamin A, B, D, iodine, and zinc. The data from national surveys show that deficiencies of vitamin A, iodine, vitamin D, zinc and calcium are widely prevalent among children 5 (figure 4). Vitamin A deficiency is a 'severe' public health problem in Afghanistan, Bangladesh,

Bhutan, Maldives, and Pakistan, with a prevalence of 20 percent and above. The deficiency of iodine affects 5 percent and 19 percent of children in India and the Maldives.

National nutrition surveys in four countries — Afghanistan, Bangladesh, India, and Pakistan — estimated the prevalence of vitamin D deficiency among children under 5 (14–17). However, due to lack of global consensus on the cut-off values for serum vitamin D concentration, surveys used different cut-off values to establish the burden on vitamin D. Vitamin D deficiency affects 81 percent (<50 nmol/L), 40 percent (<50 nmol/L), 14 percent (<30 nmol/L) and 63 percent (<50 nmol/L) of children in Afghanistan, Bangladesh, India, and Pakistan, respectively (figure 4).

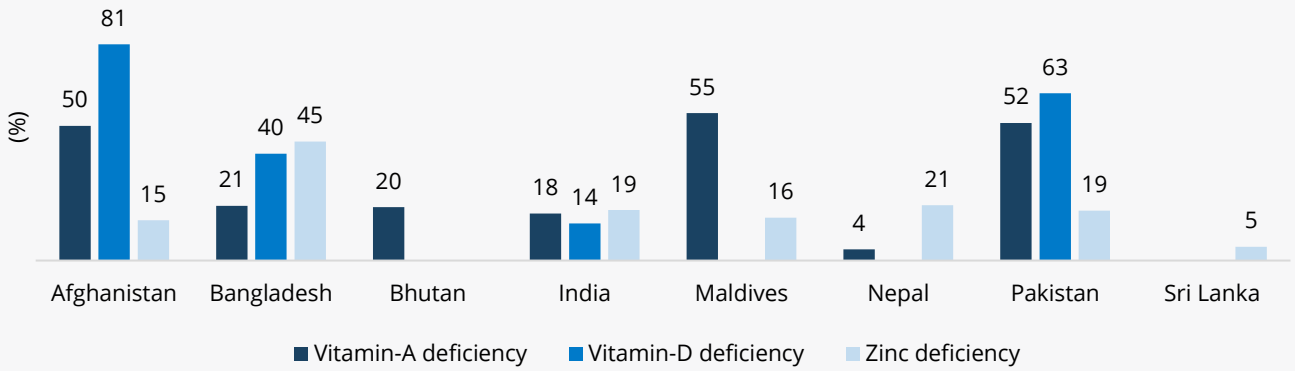
Zinc deficiency affects 5-45 percent of children in the

FIGURE 3: TRENDS IN CHILDHOOD ANAEMIA IN CHILDREN UNDER 5 YEARS



SOURCE: Global Health Observatory data repository, WHO(167)

FIGURE 4: PREVALENCE OF VITAMIN A, D, AND ZINC DEFICIENCIES IN CHILDREN UNDER 5 YEARS



SOURCE: National Nutrition Survey Afghanistan (2013), National Micronutrient Survey Bangladesh (2011)(15), National Nutrition Survey Bhutan (2015), Comprehensive National Nutrition Survey 2016-2018 India, National Micronutrient Survey Maldives (2007), National Micronutrient Status Survey Nepal (2016)(28), National Nutrition Survey Pakistan (2018), National Nutrition and Micronutrient Survey (NNMS) Sri Lanka 2012

region. About 25 percent and 48 percent of children under 5 from Bangladesh and Sri Lanka are deficient in calcium (15,18). Data from Bangladesh, the Maldives and Sri Lanka are almost a decade old and do not reveal the current situation, requiring cautious interpretation.

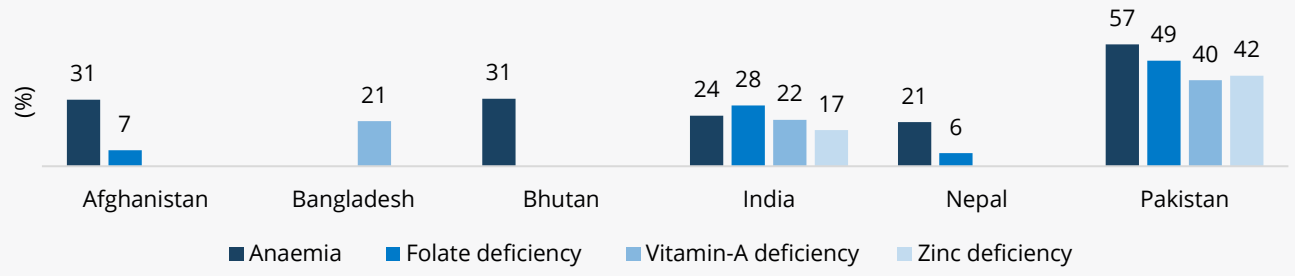
3.1.2 PREVALENCE OF MICRONUTRIENT DEFICIENCIES IN SCHOOL-AGED CHILDREN AND ADOLESCENTS

Data on nutrition and micronutrient status of School-Aged Children (SAC) (6-9 years) and adolescents (10-19 years) are scarce. The Maldives and Sri Lanka have no available data on the micronutrient levels of SAC and adolescents. The overall regional burden of MNDs is hard to determine as different national surveys assessed different sub-sets of the broad age group (5-19 years) and were focused mainly on adolescent girls.

Anaemia ranges from 21 percent in Nepal to 57 percent in Pakistan, indicating moderate to severe anaemia levels within this population's sub-groups. Data on folate deficiency was available in Afghanistan, India, Nepal, and Pakistan, where the deficiency affects 6-49 percent of SAC and adolescents. Deficiencies of vitamin A and zinc are generally thought to highly affect children under 5.

However, evidence from recent comprehensive surveys in India and Pakistan showed a substantial burden of vitamin A and zinc deficiencies among SAC and adolescents (figure 5). Studies also evidenced a high prevalence of vitamin B12 in Bhutan, Bangladesh, India, and Nepal. Independent sub-national studies found that 32 percent and 64 percent of school children in India and Bhutan are deficient in vitamin B12 (19,20). The Global Scorecard of Iodine Nutrition (2020) reported that out of eight countries in the region, seven countries had optimal[2] iodine intake based on Median Urinary Iodine Concentration (MUIC) data from surveys of SAC (21,16) (figure 6). Nepal was the only country with

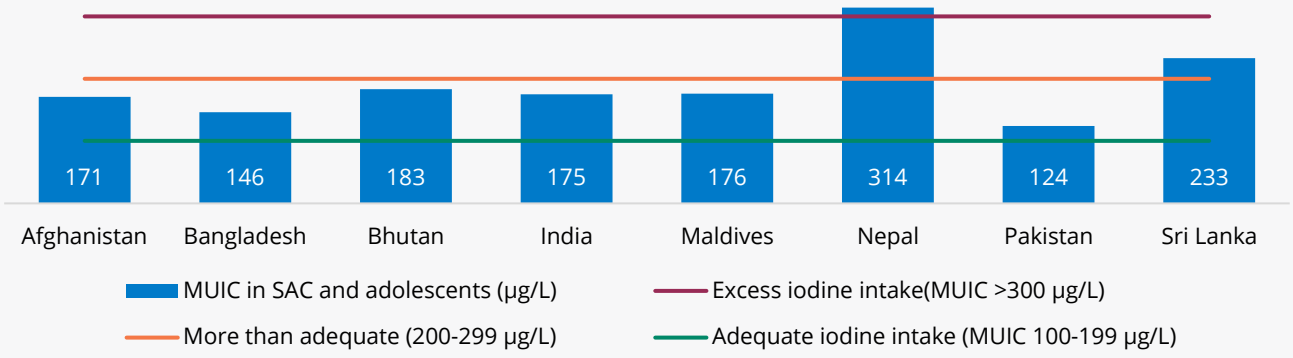
FIGURE 5: PREVALENCE OF MNDs IN SCHOOL-AGED CHILDREN (5-9 YEARS) AND ADOLESCENTS (10-19 YEARS)



SOURCE: National Nutrition Survey Afghanistan (2013), National Micronutrient Survey Bangladesh (2011), National Nutrition Survey Bhutan (2015), Comprehensive National Nutrition Survey 2016-2018 India(16), National Micronutrient Survey Maldives (2007), National Micronutrient Status Survey Nepal (2016), National Nutrition Survey Pakistan (2018)

[2] Adequate iodine intake in school-age children corresponds to median UIC values in the range 100-299 µg/L, and includes categories previously referred to as "Adequate" (100-199 µg/L) and "More than adequate" (200-299 µg/L).

FIGURE 6: MEDIAN URINARY IODINE CONCENTRATION IN SCHOOL-AGED CHILDREN AND ADOLESCENTS (µG/L)



SOURCE: Global scorecard of iodine nutrition in 2021, Comprehensive National Nutrition Survey India (2016-18)

borderline excessive iodine intake (314 µg/L) (21). However, sub-national studies have shown that iodine deficiency still exists in clusters, affecting 8 to 34 percent of children in hilly and plain regions in Eastern Nepal (22–25).

However, national surveys from Afghanistan (30 percent) and Bangladesh (40 percent) showed a significant proportion of SAC consuming insufficient iodine (MUIC<100.0 µg/L) (14). India estimated approximately 5 percent of SAC and adolescents are moderately deficient in iodine (MUIC<50 µg/L) (16). In Pakistan, it was estimated that 15 percent of SAC and adolescents are iodine deficient (17).

3.1.3 PREVALENCE OF MICRONUTRIENT DEFICIENCIES IN WOMEN OF REPRODUCTIVE AGE AND PREGNANT WOMEN

Common MNDs among women include anaemia, folate, vitamin A, vitamin D, and zinc. Anaemia[3] is either a 'severe'[4] or 'moderate'[5] public health problem among WRA and pregnant women in all the countries (13).

Trend analyses of GHO data between 2000 and 2016 showed a slow and insignificant reduction in anaemia in pregnant women and WRA in the region, except in Bhutan and Nepal, which showed substantial improvements by reducing anaemia by 15 points. In Afghanistan, and Pakistan, the prevalence of anaemia among pregnant women and WRA increased between 2000 and 2016 (figures 7 and 8). Based on the current reduction rates, all eight countries may miss the global nutrition target of 50 percent reduction of anaemia in WRA by 2025, from the baseline indicators set in 2012.

Apart from anaemia, deficiencies of vitamin A, D and zinc were also widespread among WRA. Among WRA, vitamin A deficiency ranges from 3 percent in Nepal to 44 percent in the Maldives. Old Demographic Health Surveys (DHS) data estimated night blindness linked to vitamin A deficiency among pregnant women in India (5.6 percent; DHS 2005-06), Maldives (1.7 percent; DHS 2009), Nepal (5.2 percent; DHS 2006) and Pakistan (4.6 percent; DHS 2006-07); however, no recent large-scale national surveys provided up to date information on this indicator (26).

Vitamin D deficiency emerged as a substantial problem affecting approximately 95 percent and 80 percent of WRA in Afghanistan and Pakistan, respectively (14,17). In Bangladesh and India, vitamin D deficiency affects approximately 1/5th of WRA. In these countries, it is essential to consider the impact of nutritional factors as well as the purdah 'veil' system, which is a common cultural tradition practised by women to cover the body from head to toes that restricts exposure to sunshine, limiting vitamin D metabolism (figure 9).

[3] It is estimated that 50 percent of anaemia in the South Asian population is due to low dietary intake of iron. Other causes include malaria, other nutritional deficiencies (especially folate and vitamins B12, A and C), genetic conditions (such as sickle cell disease, thalassemia – an inherited blood disorder) and chronic inflammation.

[4] Prevalence of anaemia: ≥ 40.0: Severe public health problem.

[5] Prevalence of anaemia: 20.0–39.9: Moderate public health problem.

FIGURE 7: ANAEMIA TRENDS AMONG WOMEN OF REPRODUCTIVE AGE

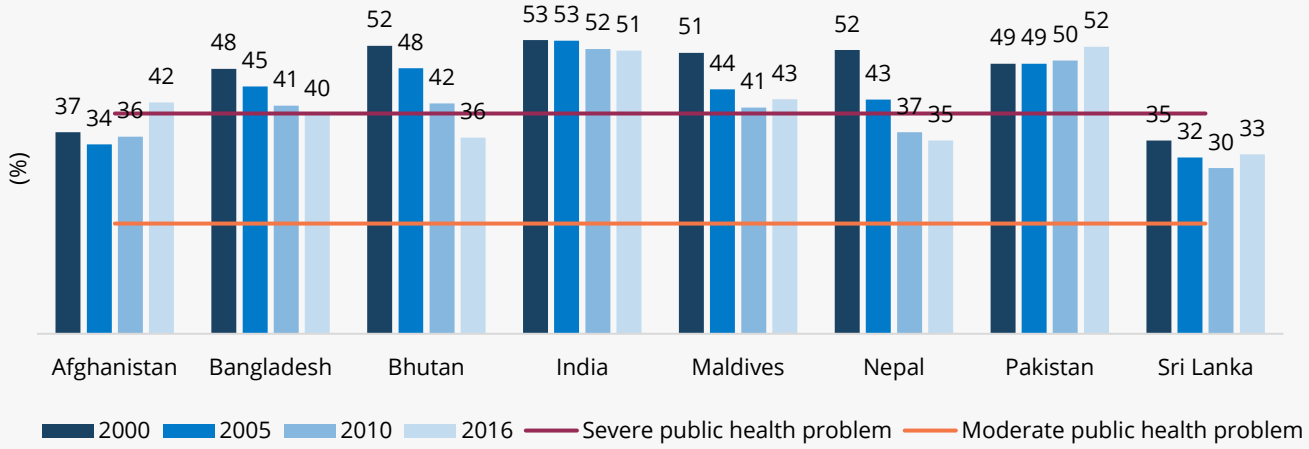


FIGURE 8: ANAEMIA TRENDS AMONG PREGNANT WOMEN

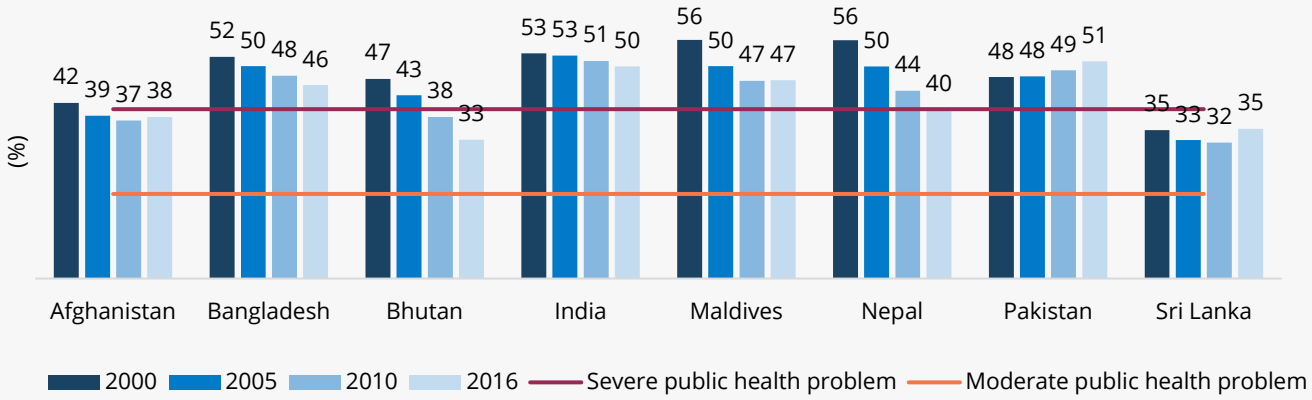
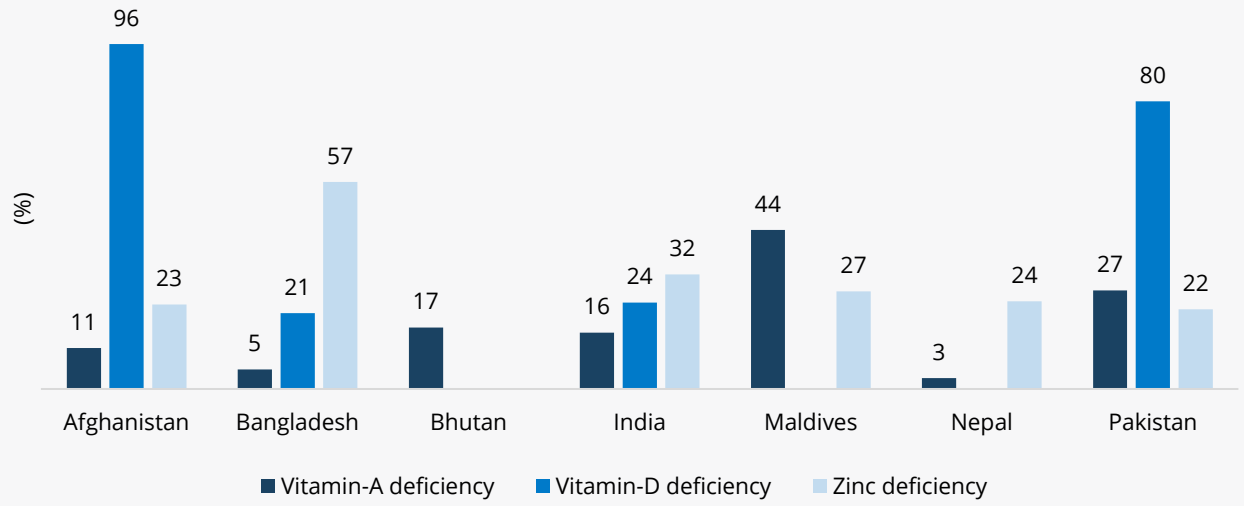


FIGURE 9: PREVALENCE OF VITAMIN A, D, AND ZINC DEFICIENCIES IN WOMEN OF REPRODUCTIVE AGE



SOURCE FIGURES 7 AND 8: Global Health Observatory data repository, WHO

SOURCE FIGURE 9: National Nutrition Survey Afghanistan (2013), National Micronutrient Survey Bangladesh (2011), National Nutrition Survey Bhutan (2015), Comprehensive National Nutrition Survey 2016-2018 India, National Micronutrient Survey Maldives (2007)(169), National Micronutrient Status Survey Nepal (2016), National Nutrition Survey Pakistan (2018), National Nutrition and Micronutrient Survey (NNMS) Sri Lanka 2012

3.1.4 DISPARITIES IN THE PREVALENCE OF MICRONUTRIENT DEFICIENCIES BASED ON GEOGRAPHIC LOCATION, AREA OF RESIDENCE, INCOME, ETHNICITY WITHIN COUNTRIES

Disparities in the prevalence of deficiencies based on region, residence (urban, rural), income and ethnicity are evident. Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka show wide inter-state/province/regional variations in children and women's anaemia rates.

Patterns by geographic location

In Bhutan, anaemia affects a higher proportion of children (50 percent) and WRA (40 percent) in the western region than children (41 percent) and WRA (29 percent) living in the eastern region (27). In India, Madhya Pradesh (54 percent), Tripura (41 percent), and West Bengal (46 percent) states have the highest proportion of anaemic children (<5 years), SAC (5-9 years) and adolescents (10-19 years), respectively. In comparison, the state of Kerala records the lowest levels of anaemia among children (13 percent), SAC (3 percent) and adolescents (9 percent) (16).

In Nepal, children (6-59 months) living in the Terai region (23 percent) are more anaemic than those living in the mountainous (17 percent) and hilly regions (15 percent). Similarly, adolescent girls (29 percent) and WRA (29 percent) living in the Terai region have approximately three times greater prevalence of anaemia than those adolescent girls (9 percent) and WRA (11 percent) living in the mountainous regions (28). In Sri Lanka, Kegalle (5 percent) and Kilinochchi (27 percent) districts have the lowest and highest childhood anaemia prevalence, respectively (29). In the Maldives, the Malé region (73 percent) have a higher proportion of anaemic WRA than other atolls. Apart from the dietary factors, a major reason for anaemia in the Maldives is the Thalassaemia trait that affects 1/3rd of the Maldivian population.

In Nepal, there is a significant difference in the prevalence of vitamin A deficiency among children (6-59 months) in Terai (7 percent), mountain (1 percent) and hill regions (1 percent). Likewise, among WRA (15-49 years), vitamin A deficiency is highest in Terai (5 percent) compared to mountain and hill regions (<1 percent) (28). Research from Afghanistan indicated data paucity on MNDs at the sub-provincial level, from remote and insecure regions (30).

Due to political conflict and fragility, displaced populations seeking asylum in host countries (Pakistan and Bangladesh) often face unique risks of developing MNDs in the host country due to limited access to adequate diets, WASH services, high infection rates, and trauma. Reports suggest that Afghan refugees in Pakistan and Rohingya refugees in Bangladesh face greater health and nutrition (including MNDs) vulnerabilities than the host communities due to displacement and shocks that impact their access to food, livelihood, basic health, nutrition, and WASH services. However, a UNHCR report (2014) indicated comparable levels of anaemia among Afghan refugee women and Pakistani women (31,32). Likewise, in Rohingya refugee camps, nutrition surveys between 2017 and 2018 highlighted no difference in anaemia rates among Rohingya and Bangladeshi children (33–35).

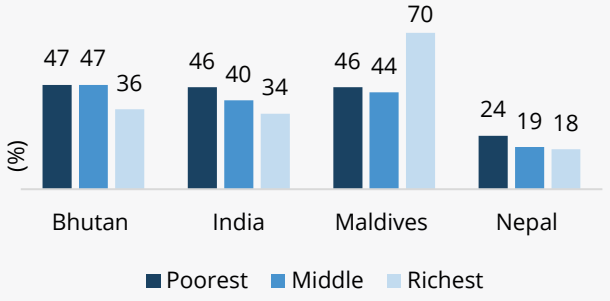
Patterns in by area of residence (urban and rural) and income

In Bangladesh, Bhutan, India and Pakistan, children and WRA living in rural areas, city slums and those belonging to low-income households are disproportionately affected by anaemia, zinc, and vitamin A deficiency compared to their counterparts living in urban areas and those from high-income families (16,17,27,36,37) (figure 10). As an exception, data from the Maldives reveal higher rates of anaemia among children and WRA in urban areas with increasing household wealth than those from the poorest households (38).

Patterns by ethnicity

In India and Nepal, national surveys unveil the impact of deep-rooted socio-cultural factors on anaemia affecting socially disadvantaged communities at most. In India, scheduled tribes bear anaemia's highest burden, followed by scheduled caste. Compared to children (38 percent) and adolescents (30 percent) in dominant castes, a greater proportion of children (53 percent) and adolescents (38 percent) from the scheduled tribes are anaemic (16). In Nepal, Muslims, Terai janjati, and other Terai castes have a higher proportion of anaemic children, adolescent girls, and women than other ethnic groups (28).

FIGURE 10: DISPARITIES IN ANAEMIA PREVALENCE IN CHILDREN UNDER 5 BASED ON WEALTH QUINTILE



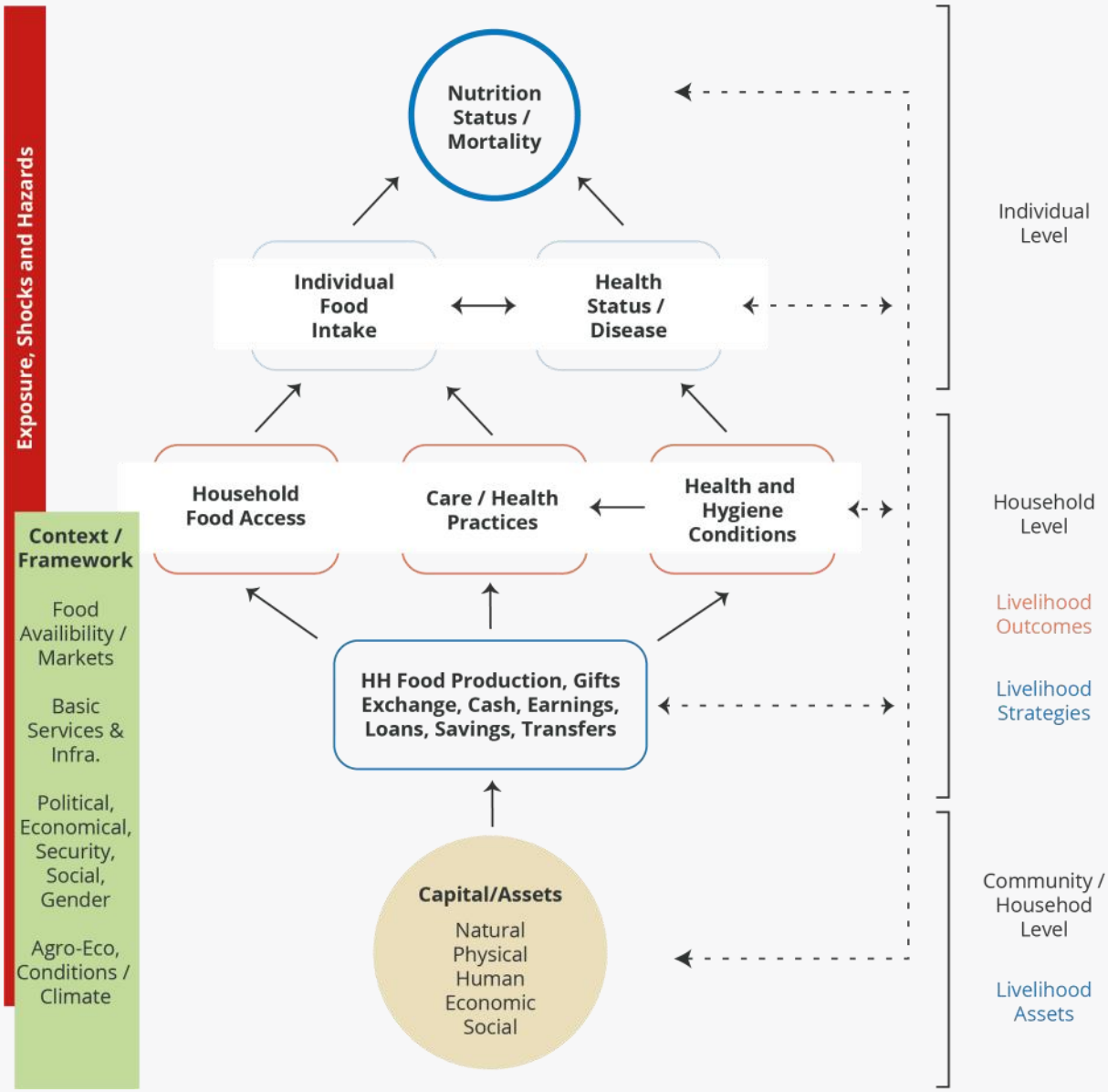
SOURCE: Bhutan National Nutrition Survey (2015), India National Family Health Survey 2016-18, Maldives DHS 2016-17, Nepal National Micronutrient Status Survey (2016)

3.2 Drivers of micronutrient deficiencies in South Asia

Identifying the potential causes of MNDs is critical for a thorough understanding of the region's MNDs situation and designing the appropriate strategies to address the problem. While several studies looked at the risk factors of anaemia in children and women in South Asia, the body of evidence on drivers of other MNDs remains limited, underscoring the need for more studies to fill the information gap. Based on global literature, this section discusses plausible drivers of MNDs in the context of South Asia.

Figure 11 presents a conceptual framework[6] on food and nutrition security that identifies possible causes of MNDs (39). At the individual level, inadequate dietary intake and diseases are the two immediate causes of malnutrition (including MNDs). These immediate causes, in turn, are

FIGURE 11: CONCEPTUAL FRAMEWORK ON FOOD AND NUTRITION SECURITY



SOURCE: WFP expanded version (2012) of UNICEF conceptual framework of the determinants of child undernutrition (adapted from UNICEF 1990)

[6]Expanded version of the UNICEF conceptual framework on the causes of malnutrition.

influenced by underlying household-level factors such as the household's ability to access food, healthcare and WASH services and the status of the care environment. Broad factors such as geo-politics, socio-economic, cultural, environmental scenario and institutional infrastructure impact the immediate and underlying factors. This section further elaborates on the immediate causes of malnutrition and its contributing drivers.

3.2.1 FOOD INSECURITY, INADEQUATE FOOD INTAKE AND POOR DIETS

The State of Food Security and Nutrition in the World (SOFI) report 2021 indicated that South Asia is home to 850 million (44 percent) food insecure people[7,8]. Individuals and families experiencing food insecurity due to unavailability of food or lack of resources tend to cut out the relatively expensive nutritious foods or compromise on food diversity resulting in the manifestation of MNDs (3).

A large share of South Asian families consumes monotonous diets, dominated by staples – mainly rice – and low in fruits and vegetables, eggs, meat and dairy products (Figure 12). Inadequate access to and affordability of a healthy diet[9] due to poverty or poor dietary choices resulting from limited knowledge, socio-cultural norms, preferences, or convenience can contribute to the burden of MNDs across various life stages (40,41). These diets may meet an individuals' caloric requirements but are not diverse enough to cover their micronutrient needs.

The urban nutrition scenario is slightly different from rural. Individuals living in urban areas tend to eat more diverse foods (meat, vegetables) and highly processed foods than their rural counterparts. However, their diets remain often low in micronutrients such as iron, zinc, and vitamin due to inadequate consumption of nutritious foods in the right quantities and poor food choices (42).

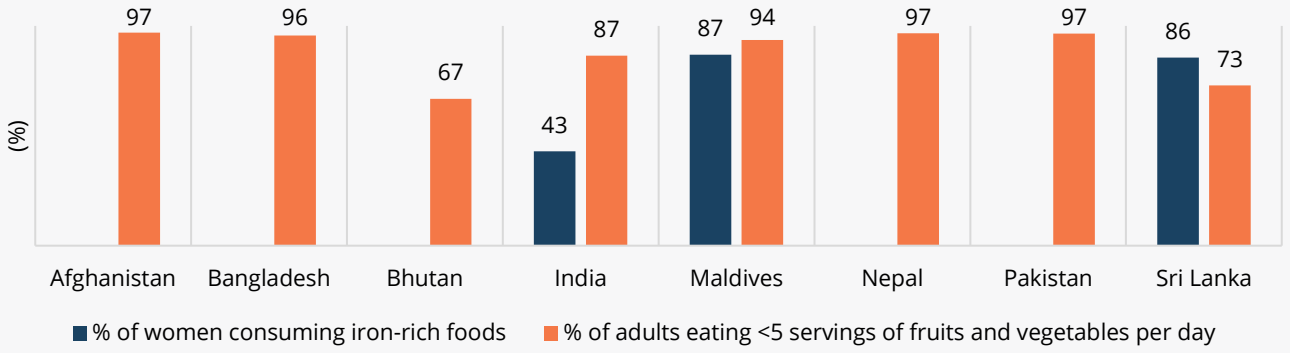
High nutritional needs of women and adolescent girls and gender inequality

Women and adolescent girls are particularly vulnerable to MNDs. This is because of the increased nutritional requirements caused by the physiological changes during puberty. Pregnant and lactating women (PLW) need additional nutrients to carry the foetus to term, for the blood loss during delivery, to produce breastmilk for infants, and to make up for the nutrient losses during menstruation. These increased nutritional requirements for women often remain unmet due to poor diet diversity. In Nepal, about 50 percent of women did not achieve minimum dietary diversity for women (MDD-W) (3). In India, 40 percent of women reported consuming iron-rich foods.

Furthermore, prevailing social norms hit women the worst. It is well-known that girls and women in Afghanistan, Bangladesh, India, Nepal, and Pakistan often eat last and least (41,43). Early marriage, multiple pregnancies, and the disproportionate burden of anaemia among South Asian adolescent girls often lead to poor nutritional and pregnancy outcomes (44).

The vulnerabilities of women further worsen by heavy and unequal workload, plus the added responsibility of childcare that sits exclusively on a woman's shoulders, depriving women of the time to take care of themselves

FIGURE 12: CONSUMPTION OF FRUITS, VEGETABLES, AND IRON-RICH FOODS IN ADULT POPULATION



SOURCE: Stop Stunting - Power of Maternal Nutrition (2018); STEPwise approach to chronic disease risk factor surveillance- Bangladesh (2010), Bhutan (2014), India (2007) Maldives (2011), Nepal (2019), Pakistan (2014-15)(170), Sri Lanka (2015)

[7] A person is food insecure when they lack regular access to enough safe and nutritious food for normal growth and development, an active and healthy life. This may be due to unavailability of food and/or lack of resources to obtain food.

[8] Based on Food insecurity experience scale.

[9] This diet provides adequate calories and nutrients (per the energy sufficient and nutrient adequate diets above), but also includes a more diverse intake of foods from several different food groups.

FIGURE 13: INFANT AND YOUNG CHILD FEEDING PRACTICES (0-23 MONTHS)

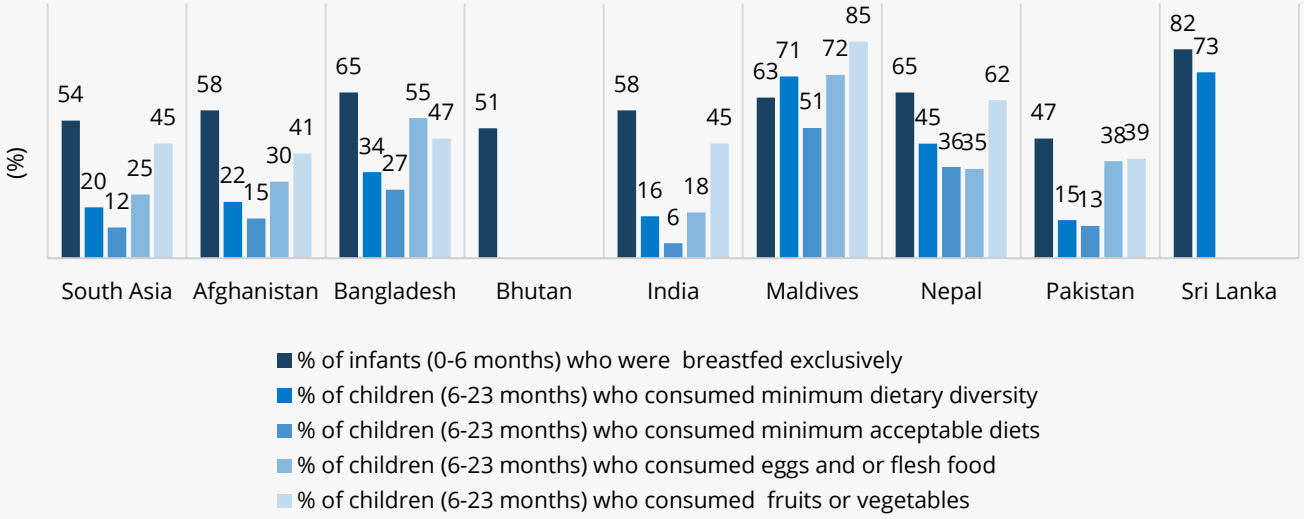
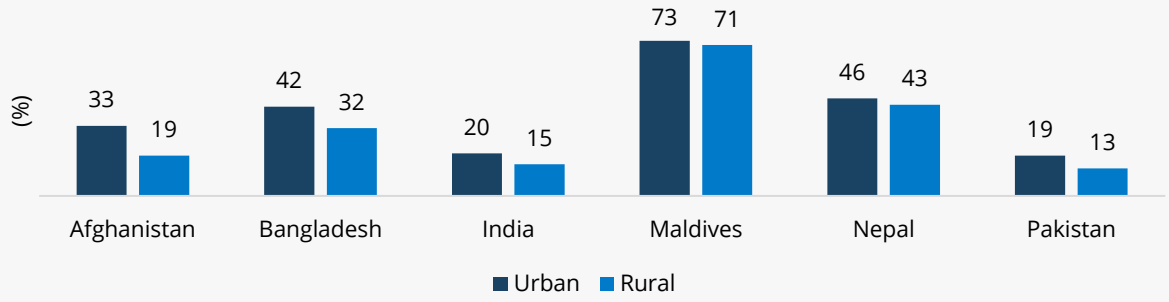


FIGURE 14: CHILDREN (6-23 MONTHS) WHO MET MINIMUM DIETARY DIVERSITY BY URBAN AND RURAL AREAS



SOURCE: UNICEF

and their young children (45,46). Furthermore, South Asian women and girls are systematically more disadvantaged due to prevalent social issues, including limited access to education and inequities in income and land ownership (43).

High nutritional needs of young children

Like women, children also have increased nutrient needs for their physiological growth and cognitive and overall development. The data show poor diet quality is a common feature across South Asian countries. It is also one of the leading causes of undernutrition and MNDs in young children, and hence their health, diets and care require special attention (47).

In the early years of life, optimal breastfeeding and appropriate complementary feeding ensure infants and young children survive and thrive. Evidence from South Asia shows strong links between poor breastfeeding and complementary feeding practices and stunting and wasting in young children (48). Yet, in South Asia, only half the infants under 6 months are breastfed exclusively. The status of complementary feeding in young children (6-23 months) is even more alarming (figure 13).

Only one in five South Asian children (6-23 months) meet minimum diet diversity[10]; except for the Maldives and Sri Lanka, less than 50 percent of children do not receive optimally diverse diets (figure 13). The consumption of diverse diets is lower among the children from poor households and rural areas than those from wealthier households and living in urban areas (figure 14 and 15).

Despite South Asia producing enough fruits and vegetables for the entire population, more than 50 percent of young children (6-23 months) do not receive fruits and vegetables

[10] Proportion of children 6–23 months of age who receive foods from 4 or more food groups (7 foods groups used for calculation of this indicator are: 1.) grains, roots and tubers, 2.) legumes and nuts, 3.) dairy products (milk, yogurt, cheese), 4.) flesh foods (meat, fish, poultry, and liver/organ meats). 5.) eggs, 6.) vitamin-A rich fruits and vegetables, 7.) other fruits and vegetables(161).

Box 1: Barriers to a healthy diet

Access to food and healthy diets is generally determined by economic access (affordability/ purchasing power, access to credit) and physical access (own production, distance to markets, availability in markets, natural resources and biodiversity that provide wild foods). In some circumstances, social access (ability to secure food through social networks, ethnicity, religion or political affiliation) may influence access to food (3).

Unaffordability to a healthy diet

Affordability is the greatest barrier to achieving healthy diets, especially for the most vulnerable. Households with low incomes predominantly live on staples and have reduced demand for diversified foods and higher value foods, including meat, legumes, vegetables, and fruits. Even before the pandemic, 1.3 billion people, corresponding to 60 percent of South Asians, could not afford a healthy diet (4).

The Cost of the Diet (CotD) and Fill the Nutrient Gap (FNG) [11] analyses found unaffordability to nutritious diet varied among South Asian countries. The affordability prevented more than 60 percent of individuals in Afghanistan, India and Pakistan and approximately 20 percent in Bangladesh and Sri Lanka from accessing nutritious diets and contributing to a chronic deficit in micronutrients (50–54). The analyses also showed that the nutrient requirements of an adolescent girl and a lactating woman are the most expensive at the household level in Sri Lanka, of pregnant and lactating women in Bangladesh and adolescent girls in Pakistan (52,54,50).

Lack of physical access to healthy diets

Women, children, people with illnesses and disabilities, and marginalised communities often have insufficient access to safe, affordable, and healthy diets due to discriminatory socio-cultural practices, lack of economic independence, weak health, market infrastructure and inadequate social safety nets. Furthermore, rural areas, harsh geographical terrains, seasonal fluctuations in food production, food prices, and financial insecurity due to political instability and climate shocks can significantly limit access to healthy diets and compromise the affordability for many households (55).

Urbanisation, rapidly changing food environment and poor food choices

The current food environment poses further challenges in improving the population's nutritional status as diets are in rapid transition with the arrival of fast food joints, convenience, 'ready to eat foods and influencing advertisements (4). High prices of healthy foods and easy availability of ultra-processed, low-cost, energy-dense foods, low in nutrients characterise the existing food environment. This has led to a significant transformation in consumption patterns and poor dietary choices resulting in increased intake of foods and beverages dense in calories and low in nutrients, which can potentially drive MNDs in the region (3,56,57).

School-age children and adolescents are mainly exposed to changing food environments and aggressive marketing of unhealthy ultra-processed snacks and beverages targeting them. A systematic review highlighted that consumption of fast foods, high in fat and sugar, and carbonated sugary drinks are high among South Asian adolescent girls living in urban areas and girls from wealthier households (56,58). Global school-based health surveys (GSHS) estimated that approximately 1 in 3 adolescents (13-17 years) are consuming one or more carbonated soft drinks daily in the South Asian countries (59–66).

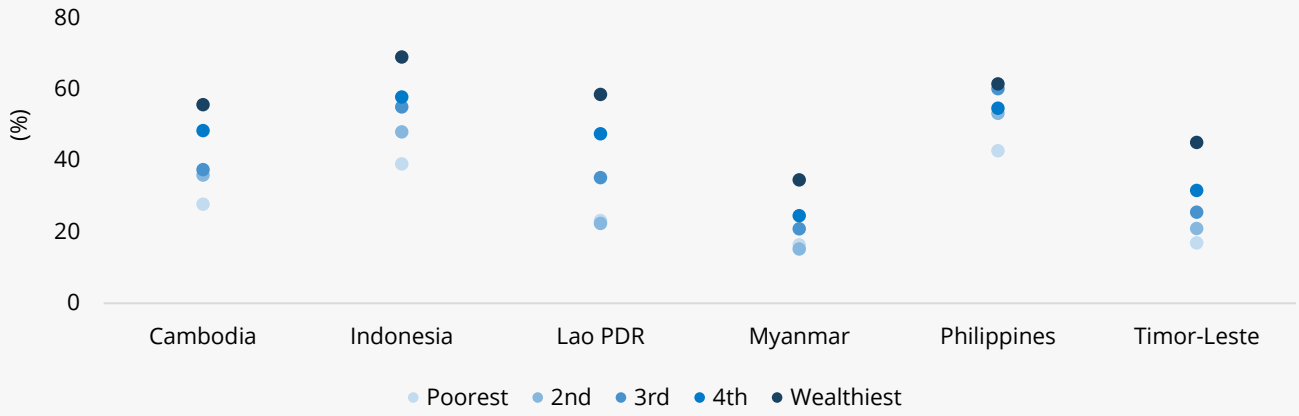
Other shocks: natural hazards and conflicts

In the past few years, South Asia witnessed extreme weather events that disrupted food production, supply chains, livelihoods, and income, which in turn exacerbated food insecurity (67,68). Political conflicts and internal unrest also resulted in mass displacement, exposing people to greater health and nutritional vulnerabilities. In the aftermath of catastrophic events and the absence of a nutritious diet and compromised WASH services, undernutrition and MNDs are bound to aggravate. Numerous studies have exhibited close linkages between climate shocks, food insecurity and nutrition. Oskorouchi H.R et al. (2018) showed that food insecurity due to floods negatively affect haemoglobin and retinol concentrations among WRA in Afghanistan (69). Poverty-stricken families, women and girls, people with disabilities, chronic illnesses and those affected by crisis and displacement are most likely to face the brunt of natural hazards.

[11] FNG- Afghanistan (2019), Bangladesh (2019), Sri Lanka (2018), Pakistan (2017).

[12] Proportion of children 6–23 months of age who receive a minimum acceptable diet (apart from breast milk).

FIGURE 15: CHILDREN (6-23 MONTHS) WHO MET MINIMUM DIETARY DIVERSITY BY WEALTH QUINTILE



SOURCE: UNICEF

in their daily diets. Flesh foods and eggs rich in haem iron, zinc, and B vitamins were missing from 75 percent of young children's diets (4). The minimum acceptable diet (MAD)[12] is alarmingly low in all the countries, ranging from 6 percent in India to 50 percent in the Maldives.

A comprehensive nutrient gap assessment (2021) during the complementary feeding period indicate that there is a significant micronutrient gap in iron, zinc, vitamin A, folate, vitamin B12, to a lesser extent, in vitamin C and almost no gap in iodine or vitamin B6 across the region (47). Furthermore, there is evidence that intake of unhealthy processed foods has increased over the years and poses a risk to growth and development in early life (49).

3.2.2 ILLNESSES, INADEQUATE ACCESS TO HEALTH, AND WASH SERVICES

Apart from poor diets, chronic and acute illnesses, worm infestation, unavailability, and inadequate utilisation of health services (including insufficient provision of micronutrient supplementation, the practice of early cord clamping) stemming from poor living conditions, sub-optimal childcare practices and genetics are potential immediate and underlying contributors to MNDs.

For example, in the region, high burden of anaemia is partly attributed to diets deficient in iron, folate, vitamin B12, and partly to non-nutritional factors (including biological drivers) such as blood loss during birth and menstruation, malaria, acute and chronic illnesses, and worm infestation and genetic haemoglobin disorders. It is estimated that 50 percent of anaemia in the South Asian population is due to low iron intake (71). Arsenic contamination has been raised in the aetiology of anaemia in Bangladesh (70). Certain ethnic groups, people with disabilities, and those living in poverty have compromised access to healthy diets, and predominance of non-nutritional factors makes them most vulnerable to anaemia and other MNDs.

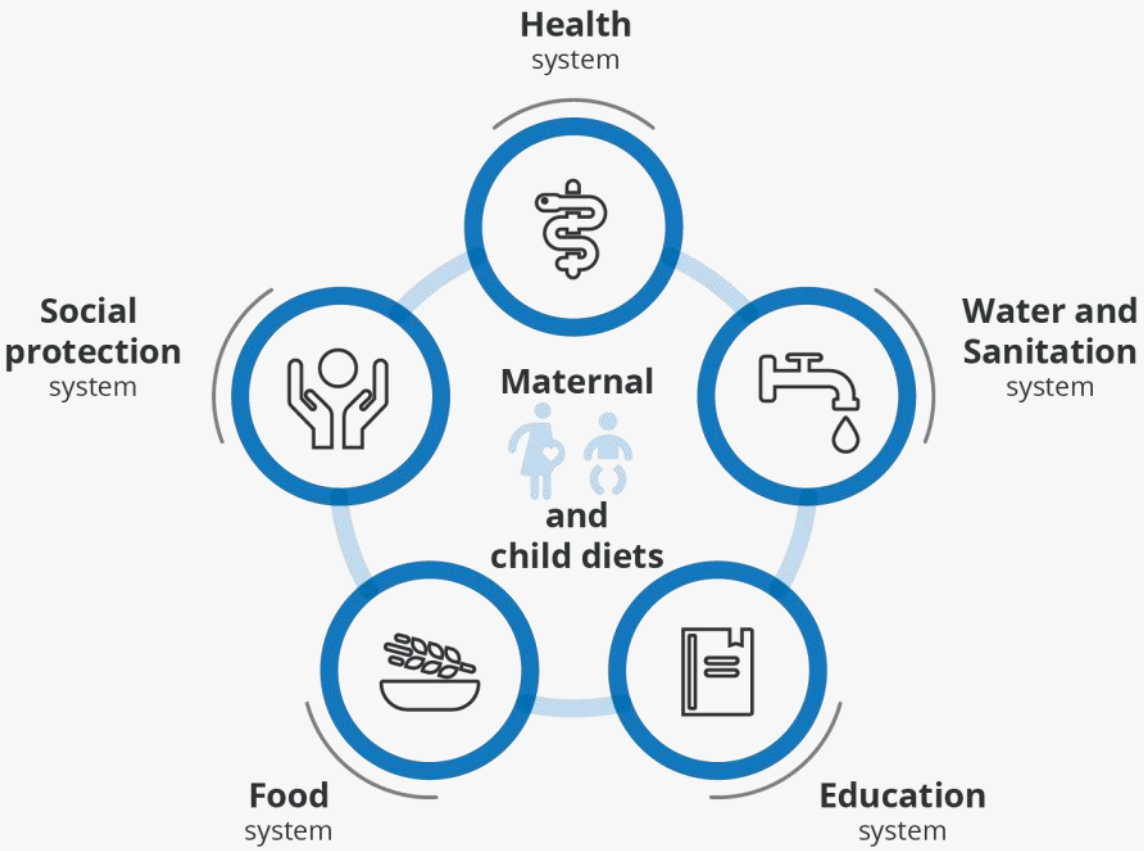
3.2.3 IMPACT OF COVID-19 PANDEMIC ON HEALTHY DIETS AND NUTRITION

Even before the pandemic, in 2019, South Asia was home to 692 million moderately or severely food insecure people; where 50 percent of children were not growing well, and approximately 60 percent of the population could not afford a healthy diet (4). The COVID-19 pandemic is likely to exacerbate this situation further and made them more nutritionally vulnerable.

South Asian countries are more likely to face challenging situations due to large populations, high poverty, low socio -economic conditions, inadequate health facilities and social safety nets, limited access to WASH and limited living space necessary to maintain social distancing (71). The COVID-19 pandemic is an added shock that undermines an already precarious food and nutrition situation for the vulnerable people by disrupting closely knitted systems – food, health, education, social protection and WASH systems that are critical in achieving healthy diets for all (4,72,73) (figure 16).

Predictions suggest that the pandemic would substantially increase global poverty, severely impacting South Asia and sub-Saharan Africa (74). During lockdowns, the loss of livelihoods resulting in shrunken household incomes has likely made healthy diets less affordable for many people. The pandemic also led to a shift in consumer demand

FIGURE 16: SYSTEMS APPROACH TO MATERNAL AND CHILD DIETS



SOURCE: UNICEF, 2019, Maternal and Child Nutrition UNICEF Strategy 2020-2030.

towards cheaper, less nutritious foods and snacks (74).

Although the economic recession at the macro level may be short-lived, the negative impact of inadequate diets on wasting and MNDs and eventually stunting will potentially be long-lasting, especially for pregnant women and young children (74). A study in Pakistan reported people in geographically isolated areas were over proportionally affected by acute food crises during the pandemic due to the disruption of the supply chain and remotely inaccessible markets (75).

Due to the COVID-19 mitigation efforts, healthcare services were disrupted, which led to a 30 percent decline in the coverage of essential health services to improve nutrition outcomes for women and children (76). For instance, reduced community healthcare worker visits led to lower nutrition counselling coverage, including promoting and supporting infant and young child feeding practices. Drop-in provisioning of essential health and nutrition services (immunisation, vitamin-A supplementation, management of illnesses and acute malnutrition) could precipitate dramatic increases in child mortality. Disruptions in imports, local production and distribution of essential preventive and therapeutic nutritional products and lags in the availability of micronutrient premix needed for staple food fortification have also been severe (77). Furthermore, communities were also hesitant to use essential health services due to fears of COVID-19 transmission (78).

The existing social net programmes often have limited coverage, insufficient amount of cash transfers, and disruptions during the pandemic (for instance, halting of school meals due to school closures), further exacerbated access to food and nutrition services among children and women and low-income households (4). Furthermore, the poor population living in crowded slums, with shared toilets and water sources, with impossibility to social distance and facing income loss during lockdowns make slum dwellers particularly vulnerable to access nutritious diets and heighten their risk of contracting COVID-19 infection (79).

4. Interventions to Address Micronutrient Deficiencies

Addressing widespread MNDs require a combination of interventions through close collaboration between nutrition, health, education, social protection, and WASH systems. The nutrition ecosystem recommends a gamut of evidence-based nutrition-specific and sensitive interventions to improve diets and reduce MNDs in children, school-aged children, adolescents, and women through a life-cycle approach (figure 17).

Table 1 summarises evidence-based guidance by WHO, the LANCET and programmatic actions endorsed by UNICEF, WFP and other relevant agencies that have shown promising results in improving overall maternal, child and adolescent nutrition by enhancing micronutrients intake and reducing the burden of infections.

Countries are implementing different interventions depending on the burden of MNDs, context, and resources. With this background, to build a complete understanding of the current micronutrient intervention landscape, it is essential to compile existing micronutrient strategies implemented by the Government at the national level; and capture their coverage, quality, utilisation status, and identify the gaps to maximise interventions' potential.

FIGURE 17: INTERVENTIONS TO ADDRESS MICRONUTRIENT DEFICIENCIES

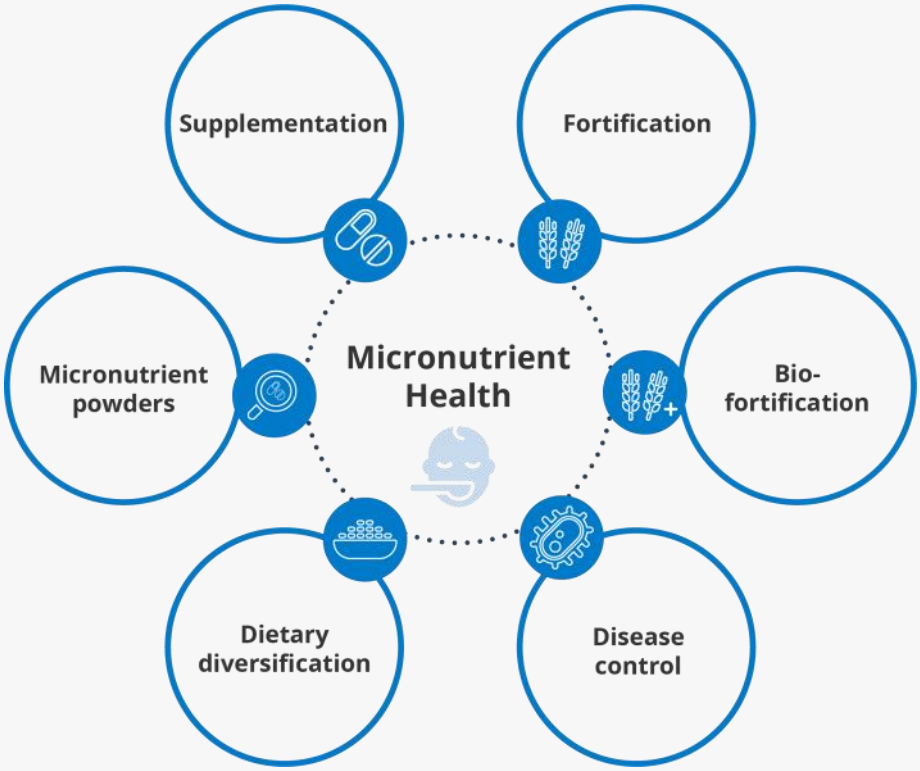


TABLE 1: PROVEN NUTRITION STRATEGIES TO IMPROVE MICRONUTRIENT LEVELS

TARGET GROUPS	INTERVENTIONS
Newborn babies	Initiation of breastfeeding within an hour of birth and promotion of colostrum feeding optimal breastfeeding practices
	Delayed cord clamping[13]
Infants and children	Promotion of infant and young child exclusive breastfeeding for first 6 months, timely introduction of complementary feeding at 6 months, promotion of safe, adequate, and diverse complementary feeding among young children 6-23 months through individual and group counselling, along with continued breastfeeding up to 2 years
	Multiple micronutrient powders for point-of-use fortification of foods consumed by children aged 6-23 months and children 2-12 years where anaemia is 20 percent or higher[14]
	Vitamin A supplementation where vitamin A deficiency is a public health problem[15]
	Iron fortification and supplementation programmes where anaemia is 40 percent or higher[16]
	Zinc supplementation
	Zinc in management of diarrhoea[17]
	Universal salt iodisation
	Treatment of severe and moderate acute malnutrition
	Provision of age-specific specialised nutritious food supplements for the prevention of wasting in settings of food insecurity or emergencies
	Deworming[18]
	Handwashing and hygiene, sanitation intervention
School-age children and adolescents	Weekly iron and folic acid supplementation where anaemia is 20 percent or higher[19]
	Provision of diverse and nutritious school meals
	Promotion of dietary diversification through health and nutrition education, school gardens
	Deworming[20]
	Handwashing and hygiene, sanitation intervention
Pregnant, lactating women and women of reproductive age	Iron folate supplementation during pregnancy where anaemia is 40 percent or higher; intermittent iron folate supplementation for WRA where anaemia is 20 percent or higher[21]
	Maternal calcium supplementation during pregnancy[22]
	Maternal iodine through iodisation of salt
	Deworming during pregnancy and for WRA[23]
	Periconceptional folic acid supplementation to prevent neural tube defects[24]
	Vitamin A supplementation during pregnancy where vitamin A deficiency is a severe public health problem[25]
	Provision of specialised nutritious food supplements to maintain nutritional requirements[26]
	Promotion of nutritious, diversified diets among PLW through nutrition counselling
General population & vulnerable groups	Promotion of dietary diversity, improving agri-value chain and sustainable agriculture
	Nutrition sensitive transfers through the social safety net, emergency assistance programmes
	Scaling up availability and enhancing consumption of fortified staples and condiments[27]
	Handwashing and hygiene, sanitation intervention

SOURCE: What works? Interventions for maternal and child undernutrition and survival(80), Lancet Maternal and Child Nutrition series 2013(81), WHO e-Library of Evidence for Nutrition Actions (eLENA) (82), Ten proven nutrition interventions(83), A chance for every schoolchild Partnering to scale up School Health and Nutrition for Human Capital(84), Scaling up proven interventions, Power of Nutrition (85)

5. Status of National Policies and Strategies in the Region to Address Micronutrient Deficiencies

All eight South Asian countries, except the Maldives[28], have an up-to-date national nutrition policy[29] that stipulates the need to address MNDs and improve the population's diets. These strategic policies and action plans emphasise multi-sectoral partnerships between critical systems — food, health, education, social protection, and WASH — to deliver quality micronutrient interventions such as supplementation, food fortification, and promotion of infant and young child feeding practices, and dietary diversification. In particular, the current policies explicitly recognise the need to invest in encouraging positive health behaviours among school children. The following section presents national programmes targeting MNDs in vulnerable age groups in the region.

5.1 Status, coverage of interventions age-wise

5.1.1 CHILDREN UNDER 5

Enhancing iron stores at birth through cord clamping

At the time of birth, healthcare systems play a crucial role in ensuring that new-borns receive the proper nutrition through delayed cord clamping and timely initiation of breastfeeding within an hour of birth. Delayed cord clamping enhances iron levels in new-born babies and infants up to 6 months post-birth (86). Delayed cord clamping was noted as part of new-born care strategies in Afghanistan, Bhutan, India, Nepal, and Sri Lanka. However, national data on proportion of cords clamped remain unknown, especially in rural and far locations where many women still deliver at home with no access to trained birth attendants.

Large scale micronutrient supplementation programmes

As a prophylaxis strategy, micronutrient supplementation is widely implemented to tackle high levels of anaemia and vitamin A deficiency among children under 5 years in the region. All eight countries have a policy of administering mega-doses of vitamin A supplementation, biannually, to all children aged 6-59 months. Coverage of vitamin A

[13] Delayed umbilical cord clamping (not earlier than 1 min after birth) is recommended for improved maternal and infant health and nutrition outcomes.
[14] In settings where anaemia is a public health problem-prevalence of anaemia is 20 percent or higher in children 6-23 months of age and 2-12 years.
[15] Where vitamin A deficiency is a public health problem-prevalence of night blindness is>= 1 percent in children (24–59 months) or prevalence of vitamin A deficiency is >=20 percent in infants and children (6–59 months).
[16] Where anaemia is a public health problem-prevalence of anaemia is 40 percent or higher.
[17] Mothers, other caregivers and health workers should provide children with 20 mg per day of zinc supplementation for 10-14 days (10 mg per day for infants <6 months).
[18] Single-dose albendazole (400 mg) or mebendazole (500 mg), for pregnant women, after the first trimester, living in areas where baseline prevalence of hookworm and/ or T. trichiura infection is 20 percent or more among pregnant women, and where anaemia is a severe public health problem, with a prevalence of 40 percent or higher among pregnant women.
[19] Where anaemia is a public health problem-prevalence of anaemia is 20 percent or higher.
[20] Annual or biannual* single-dose albendazole (400 mg) or mebendazole (500 mg) for all non-pregnant adolescent girls in areas where the baseline prevalence of any soil-transmitted helminth infection is 20 percent or more; Biannual administration is recommended where the baseline prevalence is more than 50 percent.
[21] In population where prevalence of anaemia is a severe public health problem (40 percent or higher), daily IFA recommended for both pregnant women and adolescent girls; intermittent (once a week) IFA supplementation is recommended for WRA living in settings where the prevalence of anaemia is 20 percent or higher.
[22] In populations with low dietary calcium intake, daily calcium supplementation (1.5g–2.0g oral elemental calcium) is recommended in pregnancy to reduce the risk of pre-eclampsia.
[23] Same as 13.
[24] All women, from the moment they begin trying to conceive until 12 weeks of gestation, should take a folic acid supplement (400 µg folic acid daily).
[25] ≥5 percent of women have a history of night blindness in their most recent pregnancy or if ≥20 percent of pregnant women have a serum retinol level <0.70 µmol/L.
[26] Only where thinness in women is >20 percent.
[27] Fortification of rice, wheat is recommended as a public health strategy to improve the iron and folic acid strategy to improve iron and folate status of the populations, in settings where rice/ wheat is a staple food.
[28] Maldives' National Nutrition Strategic Plan ended in 2017
[29] Afghanistan's National Public Nutrition Policy and Strategy (NPNS) 2019-2023(162), the National Nutrition Policy (NNP) Bangladesh, Food and Nutrition Security Policy of the Kingdom of Bhutan, 2014 (163), Nation Nutrition Strategy India 2017-2022 (164), National Nutrition Strategy Maldives (165), National Nutrition Strategy-Nepal 2020, Pakistan Multi-sectoral Nutrition Strategy 2018-2025 (166), National Nutrition Policy Sri Lanka 2010 (NNP).

supplementation within the last six months ranges widely across the region from 50 percent in Afghanistan to 95 percent in Sri Lanka. Data between 2000 and 2016 showed dramatic vitamin A supplementation programme scale-up — yet alarming dips in coverage occurred due to bottlenecks in the supply chain, competing health priorities, lack of planning, or the global shortage of vitamin A (87). The COVID-19 pandemic acted as a shock when mass campaigns of vitamin A supplementation were either delayed or suspended in the early months of 2020.

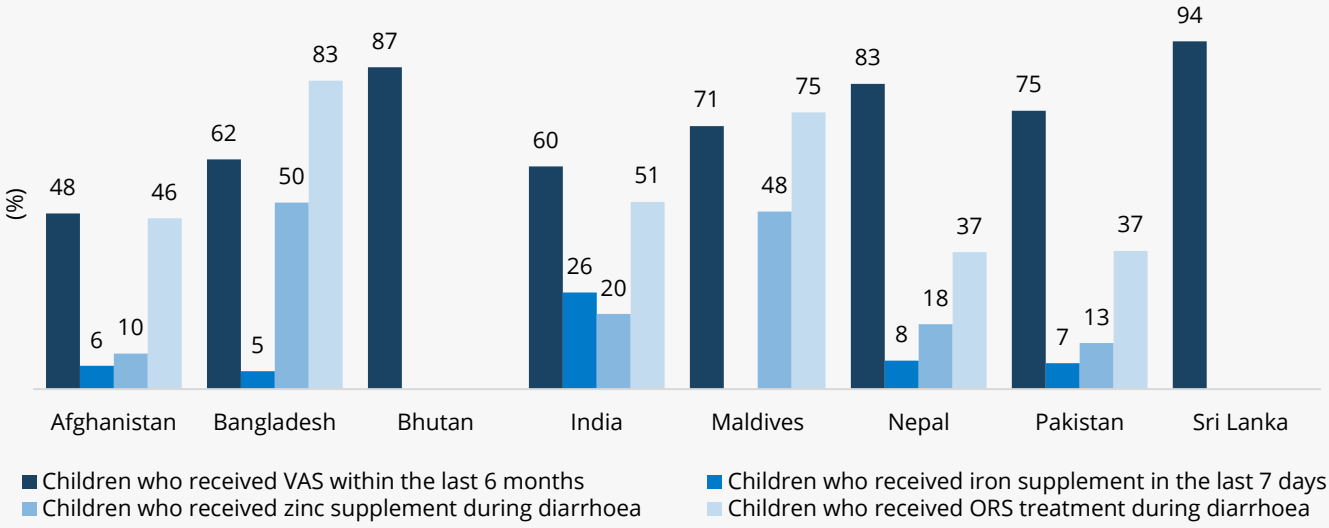
With regards to iron supplementation[30] in children under 5, Afghanistan, Bangladesh, India, Nepal, and Pakistan presented population-level coverage of iron supplements that were considerably low in all the countries. The coverage of iron supplementation was less than 10 percent in Afghanistan, Bangladesh, Nepal, and Pakistan and approximately 25 percent in India. Sri Lanka has a targeted iron supplementation programme for children (<5 years) who are born pre-term or have low birth weight. WHO recommends supplementing children with zinc along with ORS for diarrhoea management. Six countries — Afghanistan, Bangladesh, India, the Maldives, Nepal, and Pakistan — have published coverage data on ORS and zinc treatment. During diarrhoea, provisioning of zinc supplements is substantially lower than ORS treatment, ranging from 10 percent in Afghanistan to 50 percent in Bangladesh (figure 18).

Improving the nutrient density of complementary foods among young children through fortified blended foods and micronutrient powders

Fortified blended foods have multiple benefits, contributing to nutrient adequacy of both micro- and macro nutrient needs (like protein) and hence can play an important role in preventing MNDs and also growth faltering, wasting and stunting, especially in contexts where nutritious diets are poor and unaffordable. Adding micronutrient powders (MNPs) to complementary foods of young children ensures adequate micronutrient intake in young children (Refer box 2). Fill the Nutrient Gap analyses in Bangladesh and Pakistan showed that providing in-kind (or through vouchers) fortified blended food or MNPs through the health system or social safety net can reduce the daily cost of a nutritious diet for young children (50,54).

With regards to MNP programming, Nepal, Sri Lanka, and Bhutan were the only countries in the region that have provisions for MNPs to be added at home to the complementary foods of children aged 6-23 months. Nepal's government showed strong commitment by scaling up the distribution of MNP' Baal Vita' from 23 districts to 42 districts in 2016, however, its uptake remain low (2 percent) (28). In Sri Lanka, MNP is distributed to young children for a period of two months at completion of 6, 12, and 18 months of age (88). In Bhutan, the MNP strategy was only rolled out in 2019; and hence its coverage and effectiveness are not yet known (89).

FIGURE 18: COVERAGES OF MICRONUTRIENT SUPPLEMENTATION AMONG CHILDREN UNDER 5 YEARS



SOURCE: DHS Afghanistan 2015, Global Nutrition Report- Afghanistan, DHS Bangladesh 2017-18, Global Nutrition Report Bangladesh, National Nutrition Survey Bhutan (2015), National Family Health Survey India 2015-16, DHS India 2015-16, DHS Maldives 2016-17 and Global Nutrition Report Maldives, DHS Nepal 2016, National Micronutrient Status Survey Nepal (2016) and Global Nutrition Report-Nepal, DHS Pakistan 2017-18, Global Nutrition Report Pakistan, Nutrition Landscape Information System Sri Lanka

[30] Children aged 6-59 months who received iron tablets/syrup/sprinkles in the seven days preceding the survey.

India has policy provisions for distributing some type of fortified blended foods through social safety nets. Country's largest child development programme- Integrated Child Development Services (ICDS) under the Ministry of Women and Children Development. The programme delivers essential services such as supplementary nutrition, growth monitoring, early childhood education, and health services to cater to the needs of children below the age of 6 years.

As part of supplementary nutrition programmes (SNP), young children (6 months-3 years) receive fortified take-home ration, and older children (3-6 years) are provided with a morning snack followed by a hot cooked meal using fortified staples through crèches' Anganwadi centres' under ICDS (90).

A major issue emerged that age-specific requirements are not considered, as ICDS norms for take-home ration are constant throughout the age group (6 months-36 months) (91). Also, WHO and the Food and Agriculture Organization (FAO) recommendation on several micronutrients — vitamins B and D — are missing from the ICDS guidelines on micronutrient fortification (92). Nepal also provides a locally produced fortified wheat soya blend to children in highly food insecure areas, acting as a social safety net for vulnerable populations.

Improving diets of children through the provision of hot cooked meals

India is the only country in the region that targets all older children (3-6 years) with hot cooked, nutritious meals to enhance their diets (90). The Government mandated the use of fortified foods like wheat flour, rice, edible oil, and double fortified salt to enhance the nutrient density of supplementary nutrition for children under ICDS. Six states have already integrated fortified oil and double fortified salt. One state (Chandigarh) has incorporated both fortified rice and wheat flour. The inclusion of fortified rice and fortified wheat flour into the scheme is underway in additional eight and four states, respectively (90).

In 2015-2016, about 102 million children (6 months-6 years) were estimated beneficiaries of SNP (93). As per the National Family Health Survey-4 (2015-2016), only half of the children received supplementary nutrition (94). A few reasons behind this low coverage were: erratic supplies, frequent stock-outs, leakage and pilferage, insufficient monitoring, closure of Anganwadi centres, and low utilisation of services by beneficiaries (95).

Micronutrient supplementation through therapeutic feeding for children with acute malnutrition

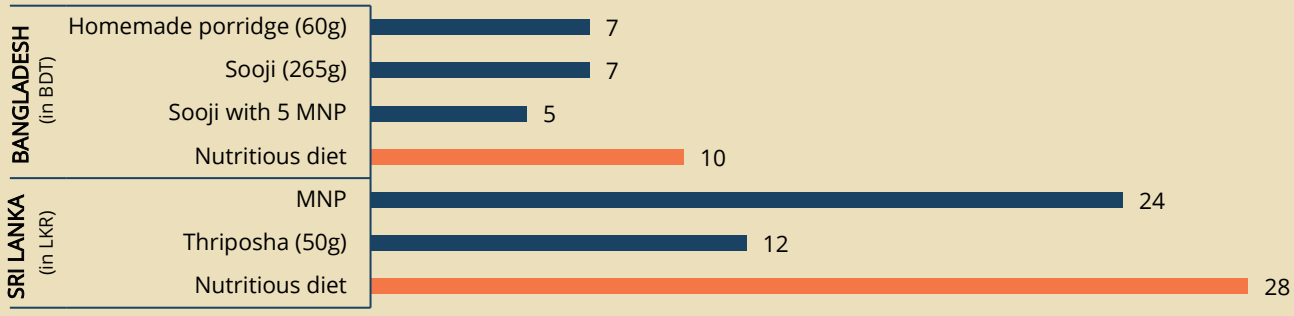
South Asia carries an enormous burden of wasting, with more than 50 percent (≈ 25 million) of the global 47 million wasted[31] children under 5 living in the region. This precarious form of undernutrition exposes children

Box 2: Findings of Fill the Nutrient Gap (FNG) analyses

The FNG analyses from Sri Lanka, Bangladesh and Pakistan concluded that the provision of fortified complementary foods and micronutrient powders could enhance the diets of young children under 2 years by reducing the overall cost of a nutritious diet.

In Sri Lanka, provision of fortified complementary food 'Thriposha' and MNP (thrice a week) for children decreased the daily cost of a nutritious diet by 57 percent (or 16 Sri Lankan rupee and 14 percent (4 Sri Lankan rupee per day), respectively. Bangladesh also showed substantial reduction (50 percent) in a nutritious diet's daily cost through provisioning of MNPs (figure 17). On the contrary, in Pakistan, providing MNPs could reduce the daily costs of nutritious diet by a small percentage (8 percent) (50,52,54).

AVERAGE DAILY COST OF DIET FOR A CHILD UNDER 2 YEARS IN SRI LANKA AND BANGLADESH



to mortality from illness, infections, and micronutrient deficiencies (95,96). Furthermore, evidence suggests that deficiencies of micronutrients, such as iron, magnesium, and zinc contribute to anorexia, resulting in growth retardation indirectly by reducing the intake of energy and protein. Also, several micronutrients, including iron, vitamin A and zinc, are associated with immune function and risk of morbidity (96). Therefore, for recovery, children with Severe Acute Malnutrition (SAM) and Moderate Acute Malnutrition (MAM) have special needs for both macro and micronutrients.

To address the special needs of children with acute malnutrition, various tailor made Specialised Nutritious Foods (SNF), which are rich in macro and micronutrients, are available that account for specific nutritional requirements for the recovery of children with SAM and MAM[31]. These include lipid-based nutrient supplements (LNS), or Ready-to-Use Therapeutic Foods (RUTF) for the treatment of SAM[32] and Ready-to-Use Supplementary Foods (RUSF) or Fortified Blended Food (FBF) such as corn or wheat soya blend for treatment of MAM[33]. Similarly, medium quantity LNS and FBF are also used in the prevention of acute malnutrition[34], particularly in food insecure or emergency context (97).

At present, not all countries in the region have a programme aligned with the WHO recommendations for the therapeutic care of children with SAM. Only three countries — Afghanistan, Nepal, and Pakistan — have national policies and guidelines that are largely in line with the 2013 WHO recommendations, including the provision of RUTF. The programmes in these three countries began as humanitarian responses and are at various stages of integrating treatment into routine health services. Still, coverage is severely constrained by a lack of funding, particularly for RUTF. The reported programme coverages by UNICEF was low in Afghanistan (50 percent) and very low (<5 percent) in Pakistan and Nepal (97).

India and Bangladesh have inpatient guidelines to treat children with SAM. However, neither country has fully adopted WHO recommendations to treat uncomplicated cases at the community level using RUTF formulations that meet WHO specifications (97). Sri Lanka has both inpatient and outpatient management of SAM, but services are only provided up to the district level, again constraining access to treatment (97).

WHO recommends the optimal use of locally available nutrient-dense foods to improve MAM children's nutritional status through dietary diversification and fortification of foods. In addition, during emergencies or displacement situations, specially formulated supplementary foods are recommended to supplement the regular diet and improve nutrient intake (98). Afghanistan and Pakistan are the only countries in the region that provide RUSF for treating children with MAM. In other countries where SNF for MAM treatment is not part of the health system, governments offer an alternative like counselling with local nutrient-dense recipes. However, when dietary intakes — MDD and MAD — are sub-optimal, programming often fails to help mothers and caretakers meet their children's macro and micronutrient intake.

India and Sri Lanka provision locally produced fortified blended food for malnourished children. India provides severely underweight children (6 months-6 years) a double take-home ration through 'creches' under ICDS. Sri Lanka also distributes supplementary fortified blended food 'Thriposha' to children (6-59 months) to address MAM and underweight in children through the health delivery centres and child care centres.

For infants less than 6 months of age, no survey provides information on the prevalence of wasting and MNDs even though infants under 6 months have a greater risk of mortality than older infants (>6 months) (99–101). Countries across the region have integrated the care of low -birth-weight infants into neonatal services at health facilities. However, a great concern is the continuity of care when these infants are discharged into the community (or for children born at home) and the management of infants who are or who become nutritionally vulnerable in early infancy. Six countries (Afghanistan, Bangladesh, India, Nepal, Pakistan and Sri Lanka) have national guidelines for the inpatient care of wasting in infants less than 6 months of age, but no country currently has national programmes to manage wasting and MNDs in nutritionally at-risk infants and their mothers at the community level (97).

Promotion of appropriate infant and young child feeding practices

All countries have programmes that promote optimal infant and young child feeding practices: early initiation of breastfeeding, exclusive breastfeeding for the first 6 months, timely initiation of complementary feeding after 6 months and consumption of complementary foods in age-appropriate quantity and ensuring nutrient density, and safety along with the continuation of breastfeeding up to 2 years. To ensure optimal infant and young child feeding practices, primarily pregnant and lactating mothers are targeted through counselling embedded in antenatal and

[31] Wasting is defined as low weight-for-height. It often indicates recent and severe weight loss, although it can also persist for a long time. It usually occurs when a person has not had food of adequate quality and quantity and/or they have had frequent or prolonged illnesses.

[32] Brand names- PlumpyNut, eeZee paste.

[33] Brand names: LNS-Plumpy'sup, eeZeeRUSF, Acha Mum; Fortified Blended Foods-Super Cereal Plus.

[34] Brand name-LNS-Plumpy'doz, eeZeeCup, Wawa Muml Fortified Blended Food-Super Cereal Plus, Super Cereal.

GAPS IN NUTRITION PROGRAMMING TARGETING MICRONUTRIENT DEFICIENCIES IN CHILDREN <5 YEARS

- **Data gaps** on iron supplementation (in Bhutan, Maldives, Sri Lanka), zinc supplementation for management of diarrhea (in Bhutan, Nepal, Sri Lanka) supplementation and delayed cord clamping (in all countries)
- **Provision of SNF not fully capitalized** to enhance diets of young children
- **Limited capacity to produce SNF** for prevention and management of malnutrition
- **Lack of alternatives for MAM treatment** where SNF is not part of health system, and dietary intakes (MDD, MAD) are low
- **Fathers and grandmothers are not targeted strategically** by nutrition programmes on promotion of infant and young child feeding practices and sensitisation on benefits of diverse, nutrient-dense foods, and utilisation of nutrition services
- **Low transfer amounts** and disjoints in social safety nets to reach intended beneficiaries (for example those working in informal sector) to deliver positive nutrition outcomes

postnatal services. The impact of counselling on infant and young child feeding remains limited due to low coverage, quality of counselling that often fall short to address socio-economic barriers to healthy diets and does not include grandmothers and fathers in counselling sessions who often control expenditure on foods and dictate feeding practices (102).

5.1.2 SCHOOL-AGE CHILDREN AND ADOLESCENTS

Evidence shows that early investment in school children's diets and nutrition has benefits that compound throughout their lifetime, for their future children, and society as a whole (103,104). Good nutrition in the growing years plays a significant role in nourishing children; and facilitating access to education by increasing school enrolment, attendance, completion, and improving learning outcomes and dropout rates (104).

Yet, school-aged children and adolescents (5-19 years) have been largely neglected in the large-scale nutrition surveys and nutrition programming targeting MNDs as there is no immediate risk of mortality linked to this age group. Recent comprehensive surveys from India (2016-2018) and Pakistan (2018-2019) revealed pervasive anaemia, vitamin A, B12, D and zinc deficiencies in this age group; still, micronutrient interventions in these countries have been typically geared to tackle iron deficiency (16,105).

Weekly iron and folic acid supplementation

Since 2011, WHO has recommended intermittent iron supplementation[35] for school-age children (5-12 years) and adolescent girls in settings where the prevalence of anaemia is 20 percent or higher (106). Currently, five countries (India, Sri Lanka, Bhutan, Afghanistan, and Nepal) have a national programme on Weekly Iron and Folic acid Supplementation (WIFS).

India is the only country with a national programme — 'Anaemia Mukt Bharat' (AMB)[36] — targeting anaemia and folate deficiencies holistically through the life-cycle approach. The programme targets school-aged children, adolescent boys and girls and out-of-school adolescent girls through WIFS along with other vulnerable age groups: children (<5 years), PLW and WRA. In 2019-2020, WIFS coverage in school children (6-12 grade) remained less than 50 percent. Interestingly, the coverage varied hugely within states — from less than 1 percent in states of Jammu and Kashmir and Kerala; and over 95 percent in Goa (107).

Sri Lanka also supplies WIFS to both girls and boys aged 5-19 years. The WIFS programme covers all primary school

[35] Where anaemia is a public health problem-prevalence of anaemia is 20 percent or higher.

[36] Strategies include IFA supplementation, screening and treating non-nutritional causes (malaria, haemoglobinopathies and fluorosis) of anaemia in endemic pockets and deworming.

TABLE 2: STATUS OF SCHOOL MEALS PROGRAMMES IN SOUTH ASIAN COUNTRIES

EXISTING NATIONAL PROGRAMME			NO NATIONAL PROGRAMME
National coverage	Partial coverage with plan for national coverage	Partial coverage	No coverage
Bhutan, India	Nepal, Bangladesh	Sri Lanka	Afghanistan, Pakistan

children (5-12 years) and adolescent girls studying in middle and high school in Bhutan. Afghanistan and Nepal use the WIFS strategy to counter anaemia in adolescents alone. Nepal targets adolescent boys and girls, while Afghanistan focuses only on adolescent girls through schools.

Improving diets of school children through nutritious school meals

School meal programmes are crucial safety net to build 'human capital' by improving access to education, health, and nutrition services for school children (104,108). School meal programmes are an efficient platform to provide children with nutritious meals along with health and nutrition education to encourage healthy behaviours and other complementary actions such as iron and folic acid (IFA) supplementation, deworming and improved WASH facilities.

Bangladesh, Bhutan, India, Nepal, and Sri Lanka have a national policy and programme that offers nutritious meals to school children delivered through education sector. Each country is at a different stage of implementation. Certain countries have universal coverage of school meal programmes while others with partial coverage only target areas with high food insecurity (Table 2).

School meals have the potential to directly address micronutrient gaps by improving the nutrient quality of school meals through incorporation of fresh and diverse foods from local sources. In situations where local foods may not be sufficient to meet nutrient requirements, school meals might need to incorporate fortified foods (109). For instance, Bhutan and India have integrated fortified staples into government-owned school meal programmes. Bhutan provisions fortified rice and fortified edible oil into school meals to ensure a micronutrient-rich diet for the children. India, under Mid-Day Meal (MDM)[37] programme, mandates the use of fortified staples (wheat flour, rice, salt, oil) (90).

Currently, Sri Lanka provides school meals and milk to school children from grade one to nine. However, to further advance the efforts to improve the quality of diets, the Government piloted fortified rice into school meal programmes in one district in 2019. Nepal's government has expanded its national school meal programme to increase access to nutritious meals for school children up to grade five in 70 districts (out of 77). In seven remote districts, the Government, with the support of WFP, provides hot meals of fortified rice, lentils, and oil for children up to grade eight. Bangladesh aims to provide all children up to primary school with a nutritious meal in school by 2023, through hot meals cooked at school, fortified biscuits and fresh fruits supplied by local sources.

Afghanistan, Pakistan, and the Maldives have no national school meal programme. In Afghanistan and Pakistan, the governments, with the support of WFP, provide fortified in-kind snacks and take-home rations in schools in certain provinces depending on the vulnerabilities (110,111). In the Maldives, the 100 Days' Plan of the Government, with the support of UNICEF, provides healthy breakfast for school children; however, it is not universal (112,113). Overall, out-

GAPS IN NUTRITION PROGRAMMING TARGETING MICRONUTRIENT DEFICIENCIES IN SCHOOL-AGED CHILDREN AND ADOLESCENTS

- **Extensive data gap** to estimate exact burden of MNDs in the whole age group (5-19 years) at regional and national level; no data on anaemia from Bangladesh, Maldives and Sri Lanka
- **No standardised indicators** to capture diets and dietary behaviours of school children
- **Out-of-school children and adolescents** are poorly targeted and are often left out in nutrition programming
- **No national school meal programme** in Afghanistan, Pakistan and Maldives is a missed opportunity to improve diets and healthy behaviour of school children
- **School platform not capitalised** enough to deliver comprehensive health and nutrition package

[37] Fortified oil: 6 states, Double Fortified Salt: 4 states, both fortified rice and wheat flour:1 state, Fortification of rice (11 states) and wheat flour is underway with scaling plans in 11 and 5 states, respectively.

of-school-aged children and adolescents are neglected age groups in nutrition programming. Only India targeted out-of-school adolescent girls aged 11-14 years with IFA supplements, supplementary nutrition, and health services under ICDS's SABLA scheme (114,115).

Promotion of dietary diversification and health through school health and nutrition education and social behaviour change

School health and nutrition education can promote healthy dietary behaviour from an early age through the school setting, benefitting the children themselves and their families and communities (116,117). School health and nutrition plays a critical role in generating awareness on healthy diets and behaviours to tackle persistent undernutrition and growing challenges of overweight and nutrition-related non-communicable diseases.

However, it is typically observed that education about health, nutrition, and well-being is a low priority in most countries. This is accentuated by the fact that either the school staff are not aware of their role in health promotion or are overstretched due to increasing workloads making it challenging to deliver quality school health and nutrition (118). Furthermore, due to the lack of monitoring indicators or data in national surveys (and impact evaluations), the regularity, quality, and effectiveness of school health and nutrition remain largely unknown.

5.1.3 WOMEN AND PREGNANT, LACTATING WOMEN

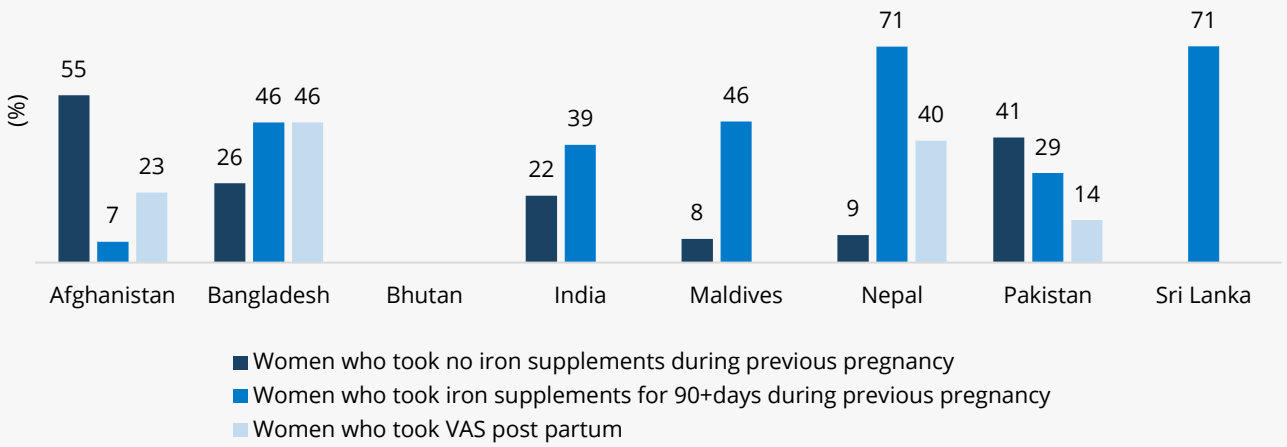
Large scale supplementation programmes

As evident in national surveys, both Pregnant and Lactating

Women (PLW) and Women of Reproductive Age (WRA) bear a similar burden of MNDs. Recommended guidance on supplementation programmes focuses on IFA and vitamin A supplementation to address high levels of anaemia and vitamin A deficiency in PLW, and anaemia in WRA. However, supplementation programmes mainly target PLW to reduce delivery-related complications and improve pregnancy outcomes, with a relatively less focus on meeting the micronutrient needs of WRA.

All eight countries have a policy/programme guidance on daily IFA supplementation during pregnancy. Dosage and initiation of IFA were consistent with WHO recommendation, but with some exceptions. In India and Sri Lanka, the recommended dose of folic acid was higher than the WHO recommendation, and Afghanistan and Sri Lanka had no mention of the timing of initiation. The

FIGURE 19: COVERAGES OF MICRONUTRIENT INTERVENTIONS AMONG WOMEN



SOURCE: Afghanistan DHS 2015, Bangladesh DHS 2014 and 2017-18, India DHS 2015-16, Maldives DHS 2016-17, Nepal DHS 2011 and 2016, Pakistan DHS 2012-13 and 2017-18, Sri Lanka UNICEF SOFI database

consumption of IFA supplement for 90+ days ranged from 7 percent in Afghanistan to 71 percent in Nepal and Sri Lanka (figure 19).

Studies show that low coverage results from a combination of both supply and/or demand-side factors. The common reasons include inaccessible health services, supply chain gaps and non-compliance issues such as distaste to supplement, change in stool colour, fear of side-effects, perceived lack of need, and forgetfulness (119). In Afghanistan, the programme also faced a severe setback due to negative media reporting or claims that the supplements cause female infertility (120).

Afghanistan, Bangladesh, Bhutan, India, and Sri Lanka also have a policy/programme guidance for daily calcium supplementation during pregnancy. In terms of daily dosage, except for Bangladesh, programmes elsewhere were not aligned with WHO recommendation (121). There is no data on population coverage in any country.

Currently, Nepal is the only country in the region with a policy on administering vitamin A supplementation during pregnancy based on vitamin A deficiency severity[38] among pregnant women in the country(121). DHS 2005-06 in India and DHS 2006-07 in Pakistan reported that 6 percent of women suffered from night blindness in both countries; however, no recent surveys validate whether the indicators have improved or not (26). In Afghanistan, Bangladesh and Nepal, vitamin A supplementation coverage was noted among 23 percent, 46 percent and 40 percent of post-partum women, respectively (figure 19).

Provision of specialised nutritious food to enhance nutrient quality of diets

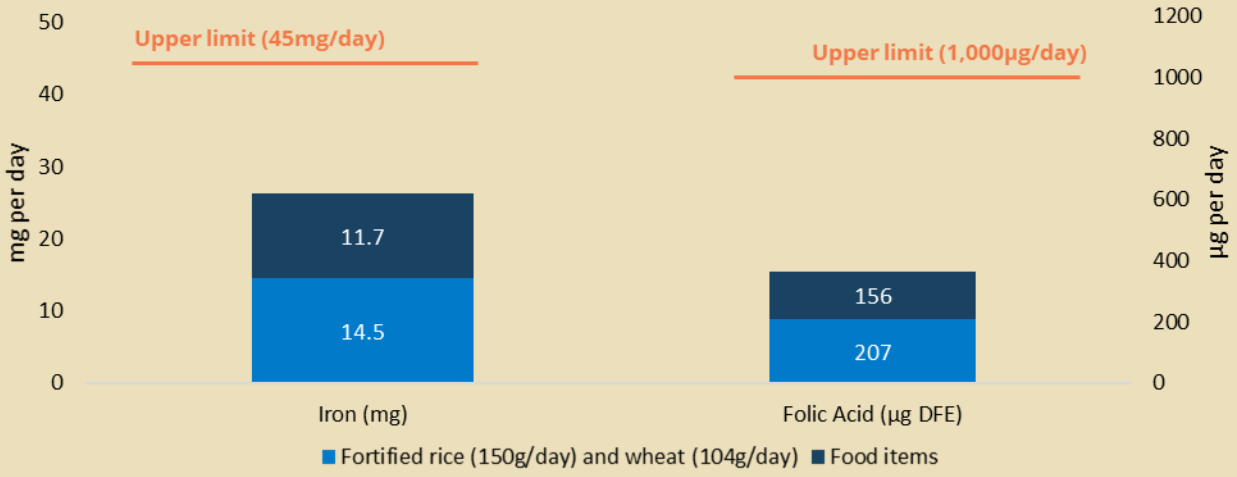
The LANCET recommends the distribution of balanced food and energy food supplements to improve maternal

Box 3: Food-based interventions contributing to micronutrient requirement in adult women in Nepal

Dietary diversification and food fortification are food-based approaches to prevent micronutrient deficiencies at the population level. Different interventions contribute nutrients in varying proportions to meet the requirement of the targeted groups. The scenario below illustrates the amount of iron and folic acid that an adult Nepalese woman can receive through commonly consumed food items in their diet and fortified staples (rice and wheat flour).

Due to increased micronutrient needs, pregnant and lactating women are recognised as special groups. Countries with a high burden of anaemia and other micronutrient deficiencies also require immediate targeted public health intervention such as micronutrient supplementation to complement food-based approaches and meet the nutrient gaps in the diets (including fortified staples).

DAILY CONTENT OF IRON AND FOLIC ACID WOMEN IN NEPAL CAN RECEIVE FROM THEIR REGULAR DIET AND FORTIFIED STAPLES



SOURCE: Government of Nepal's standards for fortified wheat flour and fortified rice and IFA supplementation, Nepal Annual Household Survey (2014-15)

[38] More than 5 percent women with birth in the past five years suffering from night blindness during pregnancy.

GAPS IN NUTRITION PROGRAMMING TARGETING MICRONUTRIENT DEFICIENCIES IN SCHOOL-AGED CHILDREN AND ADOLESCENTS

- **Extensive data gap** to estimate exact burden of MNDs in the whole age group (5-19 years) at regional and national level; no data on anaemia from Bangladesh, Maldives, and Sri Lanka
- **No standardised indicators** to capture diets and dietary behaviours of school children
- **Out-of-school children and adolescents** are poorly targeted and are often left out in nutrition programming
- **No national school meal programme** in Afghanistan, Pakistan and Maldives is a missed opportunity to improve diets and healthy behaviour of school children
- **School platform not capitalised** enough to deliver comprehensive health and nutrition package

nutrition in food insecure population or those with little access to a variety of foods (122). However, India and Sri Lanka provisions locally-produced fortified blended food to all PLW through social and health sectors, respectively, in addition to iron supplements (90,123).

In India, 50 percent of pregnant and lactating women benefitted from SNP in the form of fortified take-home ration through ICDS. The programme suffers from a limited coverage due to supply chain bottlenecks, insufficient monitoring, closure of centres and poor utilisation of services resulting from lack of knowledge and low perceived benefits of fortified blended food (94). In Sri Lanka, the National Nutrition and Micronutrient Survey revealed that 91 percent of pregnant women received fortified blended food 'Thriposha', but only 11 percent reported consuming it (124). In view of rising rates of overweight (BMI>25kg/m2) among women, blanket provisioning of fortified blended food is an issue that requires consideration.

Pakistan uses targeted approach to enrich diets of acutely malnourished PLW with specialised nutritious food named 'Maamta' through Community Management of Acute Malnutrition (CMAM) and the stunting prevention programmes (125). The FNG analysis from Pakistan (2019) found that provisioning of SNF ('Maamta' and Super Cereal Plus), in-kind or via vouchers, is the most effective intervention for reducing the cost of a daily nutritious diet by up to 36 percent in PLW. Also, the availability of SNF in the local market at full price could effectively reduce the cost of a nutritious diet of PLW (50).

Promotion of balanced diets, dietary diversification, and micronutrient supplementation

Pregnant and lactating women are the predominant population group to be targeted with counselling on balanced diets, healthy eating practices, and supplementation through antenatal care (ANC) and Post Natal Care (PNC) services. However, the high burden of MNDs and the low demand and utilisation of micronutrient interventions calls for social and behaviour change activities at scale. Furthermore, quality and continuity of awareness generation activities are often inadequate to facilitate behaviour change as they are not designed to deal with the barriers in accessing healthy and affordable diets.

5.1.4 IMPROVING DIETS OF THE GENERAL POPULATION AND VULNERABLE GROUPS

The diet of the majority of South Asians remains monotonous, lacking in diversity and limiting in essential micronutrients such as iron, folate, zinc, and iodine for adequate growth, development, and well-being. Food-based approaches such as staple fortification, biofortification and dietary diversification are used to meet the macro and micronutrient needs of the population, with targeted focus on vulnerable population sub-groups.

Improving diet quality through fortified staples

Iodisation of salt remains the leading example to showcase fortification effectively combated the severe forms of iodine deficiencies globally and in the region (126,127). As of date, six countries — Afghanistan, Bangladesh, India, Nepal, Pakistan, and Sri Lanka — have mandatory legislation on the iodisation of salt. Bhutan has no legislation, but non-iodised salt is banned, and the Maldives has no legislation. Afghanistan, Bangladesh, India, Nepal and Pakistan have committed to universal salt iodisation[39] (128).

The coverage of iodised salt at the household level was highest in the Maldives and lowest in Afghanistan (figure 20). But the challenges in ensuring and sustaining high coverage of iodised salt in households are common across the region. Some of the reasons include weak enforcement of the law, poor quality of fortificants, non-compliance of imported salt with national standards, inadequate quality

[39] Iodisation of all human and livestock salt, including salt used in the food industry.

FIGURE 20: HOUSEHOLD COVERAGE OF IODISED SALT

SOURCE: DHS Afghanistan (2015), National Micronutrient Survey Bangladesh (2011), Iodine Global Network-Bhutan, Nation Family Health Survey 2015-16, Global Nutrition Report Maldives, DHS Nepal (2016), National Nutrition Survey Pakistan (2018), Sri Lanka Global Nutrition report

control and assurance, and lack of awareness or preference at the consumer level. Bangladesh, Bhutan, and Nepal have salt iodisation standards higher than WHO standards; hence, it will be essential to regularly review urinary iodine levels to ensure iodine intake is not in excess (129).The success of salt iodisation established fortification as a proven and cost-effective solution to enhance nutrient intakes and contribute to reducing equity gaps (127). Over the last decade, fortification of regularly consumed foods has gained momentum. Countries are exploring and mainstreaming the reach of fortified staples such as wheat flour, rice, oil, and milk through different sectors — health, education, social safety nets and open markets. And in the light of the COVID-19 pandemic, food fortification is particularly important for low-income families who cannot access or afford an adequate and diverse diet.

Fortification can be either mandatory or voluntary[40], depending on the public health significance of the problem and the country's context. When supported by proper resourced enforcement, mandatory fortification is more likely to deliver a sustained source of fortified foods to a high proportion of the population and distribute health benefits more equitably than voluntary fortification (131). Mandatory mass fortification can target enriching wheat flour and rice with iron (usually together with restoration of vitamins B1, B2 and niacin), folic acid, zinc and vitamin B12 and milk and edible oil with vitamin A and D (130).

Afghanistan and Nepal have mandatory wheat flour fortification legislation, yet only 70 percent and 20 percent of wheat flour are fortified in industries, respectively. India

[40]In countries where small mills produce a large proportion of staple flour, enforcement of mandatory fortification might be challenging. Under such circumstances, a feasible option is to allow small mills to fortify their product voluntarily but following specified standards

[41]Fortified wheat flour: 3 states; fortified edible oil: 4 states; double fortified salt: 4 states, and the supply of fortified rice is underway in select districts in 9 states

GAPS IN NUTRITION PROGRAMMING TARGETING MICRONUTRIENT DEFICIENCIES IN OVERALL POPULATION AND VULNERABLE GROUPS

- Long-term social and behaviour change **strategy** at scale not implemented to improve diets through diverse foods and fortified staples
- Limited efforts on improving immediate **food environment** (quality, safety of food sold by street vendors, school, colleges, hospital and canteens) and creating awareness to read nutrition labels
- Low efforts on **generating demand for nutritious foods**, especially among low income families living in rural areas and urban slums
- **Coverage of fortified staples** remains unknown, including in those countries with mandatory legislations
- **No national data estimated burden of MNDs** among elderly population and people with disabilities

and Bangladesh have voluntary legislations on wheat flour and rice. Pakistan has national standards on wheat flour fortification and mandatory legislation on fortified wheat flour in Punjab province (132). To tackle vitamin D and A deficiencies in Pakistan, fortification of oil/ghee is mandatory under pure food laws; however, quality is an issue. Nepal also has mandatory legislation on 'vanaspati' ghee; however, the fortification and consumption status remain unknown. Recent developments include India's decision to make fortification of edible oil and milk mandatory, and Sri Lanka has also drafted standards that would make wheat flour fortification mandatory (133,134).

Governments are expanding micronutrient-rich food items to the poorest segment of the population through social safety nets. The Government of India has included fortified staples into the Public Distribution System to enrich the diets of low-income families. States have either started or are underway[41] to supply fortified wheat flour, rice, edible oil, and/or double fortified salt (90). Bangladesh has also included fortified rice into large-scale social safety nets such as the Vulnerable Group Development (VGD) programme and the Food Friendly Programme (FFP)(135). In 2020, fortified rice was introduced in the open market sale in Dhaka — a public food distribution programme that sells rice at subsidised prices to support the low-income population (136).

Pakistan and India are also targeting the general public with fortified food items through open market sales. However, the market penetration of fortified staples remains low due to lack or weak enforcement of mandatory legislation, lack of awareness and demand among consumers and affordability issues (137).

Health and social sectors play a critical role in ensuring the success of fortification initiatives and advancing efforts to improve nutrition. They serve as a platform to identify vulnerable population — individuals with chronic illnesses (HIV, Tuberculosis, Cancer), children with acute malnutrition, high-risk pregnant women, and persons with disabilities and those living in poverty.

Improving diets through biofortified staples

Countries are also adopting biofortification of staple crops to deliver crucial micronutrients such as vitamin-A, iron and zinc that are most limited in the population's diet. Biofortification is niche as it targets rural areas where large part of crop production is consumed on-farm or locally, and where the reliance on centrally processed food products is small (138).

HarvestPlus[42] research (2013) showed that investing in the biofortification of wheat, rice, and pearl millet in South Asia could generate high levels of impact by addressing MNDs (139). In the region, Bangladesh (biofortified rice with zinc), India (biofortified pearl millet in iron, biofortified wheat with zinc) and Pakistan (biofortified wheat with zinc) are a few countries that are investing in biofortification and encouraging farmers to not only grow more nutrient-rich, biofortified crops but also consume it through agricultural extension services (140–142).

Promotion of diet diversification

National nutrition policies and programmes across South Asian countries underscore the importance of a balanced diet to tackle the burden of MNDs through multi-sectoral partnerships between relevant ministries — nutrition, health, education, agriculture, horticulture. Five countries — Afghanistan, Bangladesh, India, Nepal, and Sri Lanka — have food-based dietary guidelines that provide direction on healthy diets, promote overall health, and prevent chronic diseases in the general public. India and Pakistan have national dietary guidelines that render due importance to dietary diversity.

[42] HarvestPlus, an organization that seeks to improve nutrition and public health by working with various partners to develop and promote biofortified food crops, as well as provide global leadership on biofortification evidence and technology.

Evidence shows limiting nutrients (Iron, vitamin A, B12, B5, C, calcium) in vulnerable age groups, widespread MNDs and the growing problem of overnutrition and nutrition-related chronic diseases in all age groups. Even though diet diversification is the cornerstone of addressing nutritional imbalance and diet-related chronic diseases, yet, the promotion of healthy dietary behaviours rarely goes beyond pregnant women, lactating women and, to some extent, school children (50,54,143,144).

Evidence shows that animal-source foods (eggs, liver, small fish, beef, goat, organ meat, milk, cheese) and dark green leafy vegetables are top sources of the high-priority micronutrients but likely have significant obstacles to increased consumption in the population (especially among children and PLW) due to lack of availability, affordability, physical access, knowledge, and diet-related misconceptions, taboos and cultural preferences (47,145).

India has launched a nationwide campaign 'Eat Right India' to encourage people to follow a balanced, safe and sustainable diet and reduce oil, fat, and sugar intake (146). However, there is no pre-and post-campaign data to gauge its effectiveness.

Nepal's 'Suaahara' (meaning Good Nutrition) programme garnered a lot of recognition for its at-scale, integrated approach to tackle maternal and child undernutrition through the multi-sector and multi-stakeholder lens. 'Suaahara' integrates health, nutrition, agriculture, and food security activities. An evaluation study found that indicators like the consumption of IFA tablets for 180 days during pregnancy, intake of fruits, vegetables, dairy products, and eggs in a diet, and the level of awareness were significantly higher among women living in areas targeted by the programme than in non-intervention areas. The intervention package also improved the overall dietary diversity of young children (6-23 months) compared to those who did not receive any intervention (147).

Suaahara II (2016-2021) aims to further boost the quality of maternal and child diets, mainly through enhanced homestead food production to increase access and consumption of diverse foods. In addition, households are encouraged to produce a surplus that could then be used for income generation — to address the poverty barrier in adopting optimum nutrition behaviours (148). In Bangladesh, home gardening combined with nutrition education has shown to be a successful method in improving dietary diversity and generating household income among poor households. Children in households with home gardens consumed vitamin A–rich foods (such as green leafy vegetables) and vitamin-A fruits more frequently than those children in households without a garden (149).

5.2 Bottlenecks and actions required

Table 3 presents common bottlenecks identified in implementing interventions to prevent and reduce MNDs; and actions required to improve the coverage of nutrition programmes equitably. Furthermore, these bottlenecks could have various underlying determinants depending on the country context — identifying them can improve interventions' scale and quality by taking corrective actions.

TABLE 3: BOTTLENECKS IN IMPLEMENTATION OF MICRONUTRIENT PROGRAMMES INTERVENTION-WISE

BOTTLENECKS	ACTIONS REQUIRED
Large-scale supplementation	
• Inadequate availability and stock-outs due to inaccurate forecasting and supply chain issues • Inconsistent dosage with the WHO recommendation (IFA and calcium supplements among women in India and Sri Lanka, and calcium supplements in Bhutan) • Irregular distribution of supplements to beneficiaries • Non-compliance of private doctors with national guidelines • Inadequate health staff training • Low perceived health benefits in lactating women than pregnant women • Low level of knowledge; misconceptions, fears, and poor adherence among beneficiaries • Poor counselling on supplementation regime and weak follow-up on the consumption of supplements	• Ensure coordination to intensify delivery and coverage of quality supplementation programmes, especially for the supplementation of IFA in targeted age groups and supplementation of zinc among children • Build a component of continuity into the programmes to ensure smooth provisioning of nutrient supplements based on age • Inclusion of Weekly Iron and Folic acid Supplementation (WIFS) in school-aged children; expansion of WIFS coverage among school-aged children and adolescents (5-19 years) with effective targeting of out-of-school children • Inclusion and implementation of delayed cord clamping through essential new-born care package • Engage with private-sector to ensure compliance with country-specific national guidelines • Bolster social and behaviour change activities addressing misconceptions and fears using multiple channels, innovative methods, and participation of varied stakeholders
Specialised nutritious food supplement for treatment and prevention of acute malnutrition	
• Neglected micronutrient requirements of children with acute malnutrition due to low coverage of programmes (mostly donor-dependent) • Product quality not attuned to meet the nutrient needs of malnourished children • Lack of alternatives to manage children with MAM where SNF is not provisioned through health system and MDD, MAD are low • Weak integration of management of acute malnutrition into the health systems • Intra-household sharing of specialised nutritious foods • Lack of knowledge, misconceptions, and faith in traditional practices to treat malnourished children and disregard for specialised foods	• Align in-country policies and actions on the management of children with acute malnutrition with WHO guidelines • Build institutional and technical capacity of countries to develop specialised fortified products to treat and prevent acute malnutrition, meeting the WHO standards • Strengthen health systems to detect early, manage and provide continuum care to children with acute malnutrition; with a focus on correcting MNDs • Raising awareness among families on the importance of specialised nutritious foods to manage children with acute malnutrition and MNDs
Fortification programmes	
• Absence of mandatory legislation • Weak regulation and enforcement of legislation • Industry's lack of capacity and resources to undertake fortification • Non-compliance of imported fortified staples with national standards (e.g.: Afghanistan) • Ineffective monitoring, quality assurance and quality control systems • Limited consumer awareness on the available options and benefits of fortified food	• Build institutional capacities to develop country-specific fortification standards for staples • Ensure stricter enforcements in countries with mandatory legislation on fortification and assist countries with developing mandatory legislation • Mainstream fortified staples, with high coverage, through social safety nets, hospitals, educational institutions, child development programmes • Implement pilot projects and test different modalities in countries with relatively less experience with large-scale fortification programmes and encourage cross-borders learning to build credibility • Building awareness of public on fortification and labels to identify fortified brand

BOTTLENECKS	ACTIONS REQUIRED
Improving diets through school meal, child development and other services	
• Implementation constraints of countries to implement nationally-owned school meal programmes with high coverage • Fragmented implementation of school gardens • Quality and safety issues with hot-cooked school meals • School closures disrupt school meal programmes and affect children' access to other health and nutrition services • Weak inclusion of children with disabilities, working children and children from the poorest families and remotest areas into school meal programme • Inadequate human and financial capacity to deliver quality, regular health, and nutrition education with high coverage • Integration between school and health information databases is missing • Lack of regular monitoring data on school meals, dietary behaviours, and nutritional status of school children	• Explore opportunities to design nutritious meals through the inclusion of local, seasonal, and diverse foods through agricultural linkages with local, smallholder farmers, and/or addition of fortified staples • Harness schools as a platform to promote and develop healthy behaviours among children through health, nutrition and WASH education, school kitchen gardens and other innovative methods • Inclusion of tested biofortified varieties of vegetables to improve nutritional value of school meals • Build robust infrastructure to ensure hygiene and food safety in schools • Expand access to comprehensive school meal programmes to children with disabilities, those who are working, living in harsh geographic terrains and from poorest families • Develop school-based monitoring systems to capture regular data on diets of school children and advocate for the inclusion of indicators that capture the MNDs status of school-aged children and adolescents as part of national nutrition and health surveys
Promotion of dietary diversity	
• Food and trade policies support and favour staple (rice, wheat) production • Current systems not aligned to produce affordable and climate-resilient diets • Limited knowledge in climate-smart agriculture. • Slow progress in scaling up climate-resilient agriculture and integrated homestead, aquaculture interventions improving both nutrition and incomes of vulnerable groups • Awareness raising about diet diversity primarily target pregnant women, mothers of young children; men are least targeted even though they control income and expenditure • BCC activities do not address barriers in accessing a healthy and affordable nutrient-rich diet to facilitate positive behaviour change across age-groups • Potential of agricultural developments such biofortified crops, agronomic biofortification not fully unlocked to benefit the smallholder, rural farmers	• Invest in climate-resilient food systems to deliver nutritious and sustainable foods to the most vulnerable, and protect communities in the event of extreme weather • Invest in biofortified staple crops and agronomic biofortification to deliver crucial micronutrients • Implement a combination of approaches-public awareness, social and behaviour change at scale • Align macro-policies (land right, subsidies on fruits and vegetables, mandating vegetables in institutional meals) to make healthy diets accessible and affordable, especially for vulnerable populations • Promotion of dietary diversification must not only focus on nutritious foods but also on foods with antagonistic effects on nutrient absorption. • Engage private sector in improving food value chain by building logistic infrastructure, investments in agricultural research and innovations

6. Discussion and Conclusion

South Asian countries experience the triple burden of malnutrition where **micronutrient deficiencies widely coexist with persisting under and overnutrition**. Across the population, MNDs are prevalent in varying magnitude and severity; however, the worst affected population subgroups are children, women, and individuals affected by poverty, disability, disaster, and chronic diseases. Even before the COVID-19 pandemic, one in two children under 5 years was affected by MNDs. One in two WRA had anaemia, and one in two South Asians could not afford healthy diets. With the ongoing pandemic, the situation is likely to worsen further due to the disruption of systems (such as food, health, education, social protection) critical in delivering healthy diets and improving micronutrient status.

Addressing MNDs is a priority for governments in the region, and countries have been implementing a combination of recommended, evidence-based and proven approaches. These approaches include promoting diet diversification, large-scale micronutrient supplementation, food fortification, school meal programme through various systems: food, health, education, and social protection. **Each system plays a significant role in ensuring the delivery of micronutrient interventions.** The health sector focuses on the first 1,000 days[43] and children up to 5 years. The education sector caters to school-aged children and adolescents. The social safety nets assist vulnerable groups, and food systems provide food for the whole population.

At scale, coordinated efforts of these different systems are crucial in ensuring healthy diets and addressing nutritional and non-nutritional contributors of MNDs. For instance, malaria contributes to anaemia and remains a common problem in all South Asian countries (except the Maldives); employing malaria control measures can address anaemia linked with malaria. Similarly, preventing postpartum haemorrhage through quality healthcare delivery can prevent anaemia in postpartum women and delayed umbilical cord clamping can improve iron stores in new-borns. Furthermore, food quality and safety measures while cooking at home and in institutions (schools, hospitals) can prevent infections and nutrient loss. Therefore, improving access to good nutrition coupled with quality healthcare and WASH services can break the vicious cycle of diseases, poor immunity, malnutrition, and MNDs.

In the region, most micronutrition interventions — large scale micronutrient supplementation, promotion of dietary diversification and food fortification — target children under 5 years and PLW with a relatively less strong focus on school-aged children, adolescents and WRA. Conventionally, large-scale supplementation programmes have been adopted as a short-term strategy to fill micronutrient gaps and combat severe levels of anaemia and vitamin A deficiency in children under 5 years and PLW. Except for large-scale vitamin-A supplementation in children, the coverage of supplementation programmes has had limited success due to bottlenecks in the supply chain, patchy implementation, competing priorities of the health system, ineffective counselling to garner compliance and poor utilisation.

Countries should accelerate efforts to identify and **address bottlenecks in the supplementation programmes** and identify alternate platforms to deliver services with higher coverage, continuity, intensity, and quality to ensure maximum impact in lesser targeted vulnerable groups. For example, India's SABLA scheme targeted out-of-school adolescent girls (10-18 years) in selected districts with IFA supplements, supplementary nutrition and health services through the social protection programme 'ICDS' (114). The Government of Bangladesh collaborated with the development partners to reach out to the women workforce in the readymade garments sector with iron-folic acid supplementation and more nutritious lunches prepared with fortified rice, intending to tackle anaemia, increase productivity and improve their health (150–152).

Governments have also been making efforts to enhance the diets of young children and PLW through the provisioning of micronutrient powder (in Bhutan and Nepal for young children), fortified blended foods (India, Sri Lanka) and specialised nutritious foods for malnourished children (Afghanistan, Pakistan) and women (Pakistan). Evidence from FNG analysis provides programmatic direction by demonstrating that in-kind (or vouchers) provisioning specialised nutritious foods through social safety nets or the health sector could effectively reduce the cost of nutritious diets and increase vulnerable groups' access to better nutrition.

Among **school children, school meals are a crucial social safety net** that ensures at least one nutritious meal daily — especially to children from more impoverished socio-economic communities — and promotes equitable access to education. India, Bangladesh, Bhutan, Nepal, and Sri Lanka have national school meals programmes. However, at times, these programmes struggle with coverage,

[43]From pregnancy to birth and until infant reaches 2 years of age.

continuity, and food quality issues. This warrants better designing and provisioning of safe, nutritious school meals by including food quality and safety aspects along the value chain and complementing actions — including nutrition education, essential health (iron supplementation, deworming) and WASH services (access to safe drinking water and sanitation). All countries with or without a policy on school meals should deliver continued quality nutrition education to raise awareness among children on the importance of micronutrients and healthy diets and use this platform to reach out to communities.

Apart from the school meal programme, Afghanistan, Bhutan, India, Nepal, and Sri Lanka implement a national programme on **weekly iron supplementation**; however, only India and Sri Lanka cater to all boys and girls aged 5-19 years. The Weekly Iron and Folic acid Supplementation programmes also face the aforementioned programmatic challenges of large-scale supplementation programmes, resulting in low coverage and utilisation. In addition, a major issue with school-based nutrition and health programme is that by design, it misses out-of-school children who often are most disadvantaged, neglected, and vulnerable to malnutrition, early marriage and pregnancy, and child labour. The programming should explore alternative platforms and devise strategies to reach out to school-aged children and adolescents with micronutrient interventions.

Over the past decade, **staple fortification** has gained momentum in the region. As a strategy, fortification of staples has tremendous potential to fill the limiting micronutrients in the population's diet, complement the gaps in the reach and uptake of supplementation programmes and reduce the overall cost of a nutritious diet. Iodisation of salt and wheat fortified with folic acid are

proven, cost-effective strategies to prevent severe iodine deficiency and neural tube defects during pregnancy, respectively (126,127).

In the region, governments have been adopting **different modalities to supply fortified foods** to target population sub-groups through take-home ration (India, Sri Lanka), school meals (Bhutan, India), social safety nets (Bangladesh, India), and channelling them into the open market (India, Pakistan). Leveraging the full potential of fortification initiatives call for an enabling environment, commitment to scaling up without compromising the quality of fortification, and mass awareness generation activities. One of the criticisms of fortification is that it may not be accessible and affordable for the poorest segments of societies either due to affordability issues or inequity in access (153). To effectively reach populations most in need, opportunities to link with social safety nets need to be explored and better utilized.

Given the fact Asia accounts for 90 percent of global rice consumption, **fortified rice is a powerful and safe vehicle to significantly improve micronutrient intake** of a large number of consumers, reducing equity gaps in accessing micronutrient-rich diets (154). Furthermore, **biofortification of staples** rich in iron and zinc is also a cost-effective and sustainable method to reach vulnerable populations (155). For instance, biofortified rice with zinc and pearl millet with iron can provide up to 60 percent and 80 percent of daily zinc and iron needs, respectively (140,141). In light of the COVID-19 pandemic, staple food fortification and biofortification of staple crops could be further capitalised on as more people are at risk of slipping into poverty and are facing challenges to afford a healthy diet. Moreover, providing micronutrients through staples can build the first line of defence against diseases and improve health and nutrition well-being when consumed regularly (156).

Regional and in-country policy debates have often raised **concerns over toxicity** from staple food fortification or parallel implementation of multiple micronutrient approaches targeting the same age group (153). On the one hand, food-based interventions such as staple fortification are essential to fill the micronutrients gaps in the diet at the population level. On the other, targeted public health interventions such as micronutrient supplementation are also critical to address the high levels of anaemia in vulnerable groups immediately. No evidence from research or large-scale programmes indicates that multiple micronutrient interventions can provide too many micronutrients to be deemed unsafe — as levels of micronutrients provided through fortification and supplementation remain below the upper limit[44] (157).

Ensuring the safety of fortified foods demands policy-makers to work on appropriate fortification standards depending on the food availability, population's dietary intake, fortification regulatory standards and coverage, and uptake of micronutrient supplementation (130). **The sustainability aspect is another concern with micronutrient interventions** that are not locally sourced or dependent on external funding. Any changes in available resources or systems can have a considerable impact on the programmes.

Diet diversification is a long-term, sustainable strategy to address multiple MNDs. Lack of availability, physical access, affordability, knowledge and cultural preferences lay significant obstacles in increasing consumption of micronutrient-rich, diverse foods in the population (47,145). Even at the macro-level, food policies and trade typically focus on the production of staple crops (as a source of cheap calories) rather than diet quality through the diversity of fresh foods (as a source of essential macro and micronutrients) (149). Research from Bangladesh and Nepal has shown that home gardening and homestead farming activities, combined with nutrition education targeting appropriate behaviours and women-centred approach, can empower women and communities to improve diet diversity (149,158).

Increase demand and consumption of diverse foods call for designing **evidence-based, at-scale social behaviour change strategies**. These strategies can facilitate recommended behaviours towards the uptake of micronutrient-rich, diverse diets and micronutrient supplements targeting the vulnerable population through various platforms across sectors using a life cycle approach. The ongoing pandemic has prompted people's interest in 'immunity building foods', and countries can harness this opportunity to create awareness and generate demand for micronutrient-rich foods and fortified staples.

Another prominent issue that emerged in the review is the **availability and reliability of data on MNDs**, diets and nutrition services, impeding effective programme designing and timely corrective actions. Except for anaemia, it is challenging to estimate the actual burden of MNDs in the region, as the national prevalence of MNDs are either missing or not recent and focus more on children under 5 years and PLW than school children and adolescents. In particular, there is a lack of comprehensive and regular data on micronutrient status, its drivers and diets, especially among school-aged children and adolescents and among individuals with disabilities.

Limited or no biochemical evidence on folate, thiamine, niacin, vitamin B 12, C and calcium deficiencies warrants investment in collecting biomarkers on these MNDs where recent evidence does not exist. The biochemical data

[44] 97.5 percent of the population will not observe adverse effects when this level is consumed over a prolonged period of time.

should be collected at the national level, every ten years, and ideally more frequently, to monitor programmes, track progress, and inform policies. There is a need to strengthen existing nutrition information systems to fill data gaps and advocate for integrating databases of relevant sectors to facilitate data triangulation, minimise duplication of efforts, and facilitate joint reviews for better-informed programming responses.

Furthermore, insufficient regular, comprehensive, and quality data on dietary intake, uptake of micronutrient supplementation, fortification, and their concurrent coverage at the individual level hinder programming actions. Therefore, there is an **increasing need for comprehensive, quality dietary data** or proxy data such as expenditure surveys and dietary diversity scores of target groups to design appropriate strategies to address MNDs. Furthermore, **coordination among different sectors** is required to design the most suitable package of interventions and avoid parallel micronutrient interventions targeting the same age groups.

Government policies and programmes should highlight the importance of a safe and healthy diet for all, central to improving all other development indicators. Overall, food systems actions have a significant role in making micronutrient-rich foods more available, accessible, and desirable through legislation, governance, production, supply, and demand generation. **Reshaping food systems should reduce inequality and inequities in accessing nutrient-rich foods** between rich and poor, urban and rural (73,149,159). Furthermore, investment in **climate-resilient agriculture and underutilised nutritious crops** rich in vitamins and minerals is warranted to ensure availability and access to locally available micronutrient-rich foods and build resilience in families dependent on subsistence farming and facing greater risk of climate change (160).

In this whole agenda of addressing MNDs, **ensuring no one is left behind** is of paramount importance. Policies and programmes should adopt a pro-equity lens to provide improved nutrition among the most vulnerable groups, which calls for more inclusive, responsive, and interconnected systems-food, health, education, and social safety nets. These systems have a strategic role in identifying individuals affected by poverty, disabilities and chronic illnesses who are also nutritionally at risk and linking them to social safety nets to access better nutrition. As a way forward, countries should further explore and expand the benefits of fortified staples through different macro-level platforms such as poverty eradication, welfare schemes, health systems (hospitals, hospices), and micro-level emergency programmes such as food for assets.

Lastly, combating the MNDs epidemic calls for **commitment to harmonising national policies across relevant sectors, concerted and collaborative efforts** of the government ministries and private sector to deliver diverse, healthy diets and quality micronutrient interventions to bring South Asian countries closer to better health, better education, and better lives. Given the context of the South Asia region and the similarities in the landscape, the following are a set of policy recommendations that can be relevant across the eight countries.

7. Recommendations

1

ADDRESS EXISTING BOTTLENECKS IN HEALTH SYSTEMS TO DELIVER HIGH-COVERAGE MICRONUTRIENT SUPPLEMENTATION PROGRAMMES.

- Prioritize and devise a context-specific strategy to address existing bottlenecks in supplementation programmes (inaccurate forecasting, stock-outs of supplements, irregular distribution, low perceived benefits) to boost delivery and coverage on ongoing interventions.
- Design and implement evidence-based behaviour change strategy to ensure intensity, continuity, and uptake of supplementation programmes.
- Identify new service delivery platforms across different sectors to target less focused groups, such as out-of-school children, adolescents, and WRA. For example, distributing IFA supplements to out-of-school adolescent girls through SABLA scheme under ICDS in India and to women workforce engaged in garments industry in Bangladesh.

2

ENHANCE MICRONUTRIENT QUALITY IN THE DIETS OF CHILDREN AND WOMEN.

- Promote local complementary feeding recipes that include animal sources of foods, green leafy vegetables and other micronutrient-rich food items in young children's diets through diverse platforms.
- Advocate, strengthen and integrate the supply of specialised nutritious foods through health systems or social safety nets and emergency assistance programmes to improve nutrient quality of diets of children under 5 and pregnant women in food insecure or in undernourished population (>=20 percent BMI among women).
- Invest in local production of safe specialised nutritious foods tailor-made to meet the nutrient demands of the targeted group. For example, locally produced fortified blended foods for children and PLW are delivered through social protection scheme (ICDS) in India and health sector in Sri Lanka.

3

IMPROVE DIETS OF SCHOOL-AGED CHILDREN AND ADOLESCENTS THROUGH SCHOOL-BASED NUTRITION INTERVENTIONS.

- Countries with national school meal programmes should aim to universalise delivery of quality nutritious school meals prepared with local, seasonal micronutrient-rich foods through the integration of small-scale farmers, fish farmers and local women groups and fortified staples, where applicable.
- Advocate and institutionalise the use of school menu planner software that optimise school meals by making them more nutritious, locally sourced, and cost-efficient. For instance, Bhutan uses PLUS School Menus software to improve and adapt food baskets.
- Formulate policies (sale of nutritious foods in canteens, levy tax on unhealthy foods and beverages, control marketing of unhealthy foods) to improve the food environment within and around schools to nudge healthy behaviours among school children.
- Develop regulations on issues relating to hygiene, sanitation and safety of school meals and build WASH infrastructure to ensure delivery of safe school meals.
- Explore opportunities to deliver nutritious meals to school-aged children in countries with no national school meal programmes. For example, either through conditional cash transfers linked to attendance or engagement of local farmers and self-help groups in selected regions with heightened nutritional vulnerabilities.
- Ensure greater synergy between different sectors to deliver a comprehensive package of nutrition (school meals), health (deworming, intermittent iron supplementation, routine check-ups) and WASH (provision of safe drinking water, promotion of hygiene) services at the school level.
- Deliver quality and continued health and nutrition education to raise awareness among children on the importance of micronutrients and healthy diets irrespective of whether the country has a policy on school meals or not.

4

MAINSTREAM STAPLE FORTIFICATION TO FILL MULTIPLE MICRONUTRIENT DEFICITS IN THE POPULATION

- Develop national standards for mandatory or voluntary fortification for all staples in countries. In countries where standards exist, ensure harmonising national standards with regional and international standards.
- Invest in infrastructure (quality control laboratories, modern equipment) and build capacity to ensure quality fortified foods production.
- Establish robust regulatory mechanisms to enforce standards (including imported food items) to ensure safety and nutritional impact.
- Target vulnerable groups by saturating the existing social safety nets with fortified staples-rice, wheat flour (with iron, folic acid, zinc, and vitamin B12) and oil, milk (with vitamin A and D).
- Maximize the reach of fortified staples through its integration in the commercial market and reaching those who benefit from cash based social safety nets.

5

ADAPT SOCIAL PROTECTION AND AGRICULTURE SECTORS TO DELIVER ADEQUATE, SAFE, AND MICRONUTRIENT-RICH DIETS FOR ALL.

- Use social safety nets to reach most vulnerable groups with nutrient adequate foods through cash/voucher and food-based approaches supported with robust social and behaviour change activities.
- Align macro-policies (land right, subsidies on fruits and vegetables, mandating vegetables in institutional meals) to make healthy diets accessible and affordable, especially for vulnerable populations.
- Gear extension services to encourage farmers to increase production of diverse, micronutrient-rich foods (fruits, vegetables, animal sources food, milk, and milk products) for improved availability and consumption.
- Agriculture extension services should target the promotion of neglected, underutilised nutritious crops (such as millets, cowpea, berries, jackfruits, drumsticks) to ensure access to local micronutrient-rich foods.
- Support and encourage subsistence farmers and local communities to adopt homestead food production, pisciculture, apiculture to diversify household's food basket and income.
- Promote agricultural advancement through the expansion of biofortified crops.
- Build infrastructure and use technology to minimise food losses and preserve and enhance the nutrient content of the food value chain.
- Expand the use of agronomic biofortification to boost the nutrient content of crops growing in regions where the soil is deficient in micronutrients.

6

COLLECT AND USE DATA ON MNDs AND DIETS FOR PROGRAMMING AND TRACKING PROGRESS.

- Invest in surveys to generate national-level estimates on folate, vitamin B12, D and calcium biomarkers for children, adolescents, and women, in countries where evidence does not exist or is not recent. Furthermore, invest in building laboratory infrastructure and technical capacity to ensure quality data collection and analyses.
- Advocate for inclusion of elderly and individuals with disabilities in nutrition surveys for designing appropriate strategies.
- Strengthen existing nutrition information systems through:
    - bridging data gaps- collect quality nutrient intake (or proxy) data for vulnerable groups (for example MDD-W), receipt and consumption of fortified foods and SNF, coverage and utilisation of concurrent multiple interventions at individual level;
    - integrating databases of relevant sectors (health, nutrition, school) to facilitate data triangulation, minimise duplication of efforts, and facilitate joint reviews.
- Develop standardised indicators to collect information on diets of school children, urban population, and expand knowledge on consumer behaviour.
- Use evidence from Cost of The Diet and Fill the Nutrient Gap for informed policy dialogue and strategic decision making to select micronutrient interventions that could deliver maximum impact in reducing the cost of nutritious diets for vulnerable age groups.
- Conduct studies to identify drivers of MNDs in the region to design an evidence-based, context-specific interventions package to address nutritional and non-nutritional causes.

7

IMPLEMENT EVIDENCE-BASED SOCIAL AND BEHAVIOUR CHANGE STRATEGIES TO PROMOTE BEHAVIOURS TOWARDS UPTAKE OF MICRONUTRIENT-RICH DIETS AND MICRONUTRIENT SUPPLEMENTS.

- Advocate for targeted micronutrient interventions for the most vulnerable population – children, adolescents, women, and people affected with disabilities, chronic diseases, and poverty.
- Promote long term social behaviour change strategy through diverse platforms across sectors using a life cycle approach targeting different age groups.
- Identify adequate channels for promoting behaviours through established platforms across relevant sectors. For instance, behaviour change strategy can target farmers to produce and consume diversified crops through the agriculture sector. Quality health and nutrition education through the education sector can nudge positive dietary behaviours among school children and adolescents.
- Advocate and allocate adequate resources to design and implement scalable social and behaviour change strategies. For example, mass campaigns on iodised salt were largely successful due to political commitment and the allocation of adequate resources.
- Emphasize evidence generation on knowledge, attitude and practices on micronutrients:
  - to understand prevailing myths and misconceptions to support the design and modification of existing/proposed interventions.
  - assess the success and failure of the intervention, thus creating an evidence base for learnings from interventions.

8

FORGE MULTI-SECTORAL COLLABORATION AND PUBLIC-PRIVATE PARTNERSHIPS.

- Strengthen collaboration and coordination mechanisms between relevant government ministries to deliver a package of micronutrient interventions effectively, with greater accountability.
- Leverage private sector engagement and investment to bring the nutrition agenda to the forefront through the SUN Business Network (SBN), economic forums and private industries. Governments should mobilise the support of the private sector in staple fortification, biofortification of staple crops, agronomic biofortification, building food value chain infrastructure, and agricultural innovations.
- Engage the private sector in improving workforce nutrition by providing healthy meals at work, IFA supplementation, and nutrition education on the benefits of micronutrients. For instance, in Bangladesh, the Government collaborated with the private sector to target the women workforce of readymade garments industry with iron folic acid supplementation and more nutritious lunches, including iron-fortified rice.

8. Annex

8.1 OVERVIEW OF NATIONAL POLICIES AND PROGRAMMES ADDRESSING MICRONUTRIENT DEFICIENCIES, BY COUNTRY

AGE GROUPS	INTERVENTIONS	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
Children <5 years	Existing nutrition policy with reduction of MNDs as a goal	■	■	■	■	■	■	■	■
	Delayed cord clamping at birth	■	■	■	■	■	■	■	■
	Promotion of infant and young child feeding among children aged 0-24 months	■	■	■	■	■	■	■	■
	Vitamin A supplementation among children aged <5 years	■	■	■	■	■	■	■	■
	Multiple MNP for point-of-use fortification of foods among children aged 6-23 months	■	■	■	■	■	■	■	■
	Iron supplementation for children <5 years	■	■	■	■	■	■	■	■
	Zinc supplementation in management of diarrhoea < 5	■	■	■	■	■	■	■	*
	Deworming among children <5 years	■	■	■	■	■	■	■	■
	Treatment of acute malnutrition <5 years with recommended LNS	■	**	■	■	■	** *	■	■
School-aged children and adolescents	Weekly iron and folic acid supplementation for school children	■	■	■	■	■	■	■	■
	Existing national school meal programme	■	■	■	■	■	■	■	■
	Deworming	■	■	■	■	■	■	■	■
	Integration of fortified staples in national school meal programme	■	■	■	■	■	■	■	■
Women and Pregnant, Lactating Women	Iron and folic acid supplementation during pregnancy	■	■	■	■	■	■	■	■
	Iron and folic acid supplementation for WRA	■	■	■	■	■	■	■	■
	Maternal calcium supplementation	■	■	■	■	■	■	■	■
	Pre and Periconceptional folic acid supplementation	■	■	■	■	■	■	■	■
	Maternal vitamin A supplementation during pregnancy	■	■	■	■	■	■	■	■
	Maternal vitamin A supplementation post-partum	■	■	■	■	■	■	■	■
	Maternal deworming in pregnancy	■	■	■	■	■	■	■	■
General population/ Vulnerable	Mandatory iodisation of salt or ban on non-iodised salt	■	■	■	■	■	■	■	■
	Integration of fortified staples in social safety nets	■	■	■	■	■	■	■	■
	Open market sale of fortified staples	■	■	■	■	■	■	■	■

■ Existing policy or programme ■ Policy or programme guidance exist but no or weak implementation ■ No programme

* Only given to underweight children, **LNS for managing children with SAM only in Cox bazaar, *** Use of LNS only for children with SAM

9. References

1. Sustainable Development Goals (SDGs). Available from: https://www.un.org/sustainabledevelopment/hunger/
2. WHO. Anaemia Policy Brief. 2012;1–7. Available from: http://www.who.int//iris/bitstream/10665/148556/1/WHO_NMH_NHD_14.4_eng.pdf
3. FAO, IFAD, UNICEF, WFP, WHO. The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets. 2020. 320 p.
4. FAO, UNICEF, WFP W. Regional Overview of food security and nutrition maternal and child diets at the hear of improving nutrition. 2020.
5. Ritchie H, Roser M. Micronutrient Deficiency. Our World Data [Internet]. 2017 [cited 2021 Apr 13]; Available from: https://ourworldindata.org/micronutrient-deficiency
6. Bhutta ZA, Salam RA. Global Nutrition Epidemiology and Trends. Ann Nutr Metab [Internet]. 2010 [cited 2021 Apr 13];375:19–27. Available from: www.karger.com/anm
7. Victora CG, Christian P, Vidaletti LP, Gatica-Domínguez G, Menon P, Black RE. Revisiting maternal and child undernutrition in low-income and middle-income countries: variable progress towards an unfinished agenda. Lancet [Internet]. Elsevier BV; 2021 [cited 2021 Apr 13];397:1388–99. Available from: http://www.thelancet.com/article/S0140673621003949/fulltext
8. Harding KL, Aguayo VM, Webb P. Hidden hunger in South Asia: A review of recent trends and persistent challenges. Public Health Nutr. 2018;21:785–95.
9. Stein AJ, Qaim M. The human and economic cost of hidden hunger. Food Nutr Bull. 2007;28:125–34.
10. Black R. Micronutrient deficiency-An underlying cause of morbidity and mortality. Available from: https://www.scielosp.org/article/bwho/2003.v81n2/79-79/
11. Consensus C. No Title. Available from: https://www.copenhagenconsensus.com/copenhagen-consensus-iii
12. UNICEF. The state of the world's children. 2019;2–9.
13. Interpretation Guide Nutrition Landscape Information System (NLIS) Country Profile indiCators.
14. National Nutrition Survey Afghanistan. 2013;
15. Ministry of Health and Family Welfare Government of the People's Republic of Bangladesh. National micronutrient survey.
16. Ministry of Health and Family Welfare (MoHFW), Government of India U, 2019 and PC. Comprehensive National Nutrition Survey. 2019; Available from: http://library1.nida.ac.th/termpaper6/sd/2554/19755.pdf
17. Ministry of National Health Services, Regulations and Coordination G of P. National Nutrition Survey. 2018; Available from: https://www.unicef.org/pakistan/media/1951/file/Final Key Findings Report 2019.pdf
18. Jayatissa R, Gunathilaka M M, Herath P FD, Maheepala P G. National Nutrition and Micronutrient Survey Part Ii: Iron, Zinc and Calcium Deficiency Among Children Aged 6-59 Months. 2014;28–32. Available from: https://www.unicef.org/srilanka/Nutrition_Survey__Iron_Zinc_Calcium_deficiency_among_children.pdf
19. Dzed L, Pokhrel HP, Zangpo L, Pelzom D, Dendup U. Vitamin B12 Deficiency among Boarding School Children from Seven Districts of Bhutan. Int J Innov Res Med Sci. 2019;4:507–11.
20. Atwood SJ, Nagpal S, Mbuya N V, Laviolette L. Nutrition in Bhutan: Situational analysis and policy recommendations discussion paper, December 20214.
21. Global scorecard of iodine nutrition [Internet]. 2020 [cited 2020 Dec 29]. Available from: https://www.ign.org/cm_data/Global-Scorecard-2020-3-June-2020.pdf
22. Tamang MK, Gelal B, Tamang B, Lamsal M, Brodie D, Baral N. Excess urinary iodine concentration and thyroid dysfunction among school age children of eastern Nepal: A matter of concern. BMC Res Notes [Internet]. BioMed Central Ltd.; 2019 [cited 2021 Jan 7];12:294. Available from: https://bmcresnotes.biomedcentral.com/articles/10.1186/s13104-019-4332-y
23. Shakya PR, Gelal B, Das BKL, Lamsal M, Pokharel PK, Nepal AK, Brodie DA, Sah GS, Baral N. Urinary iodine excretion and thyroid function status in school age children of hilly and plain regions of Eastern Nepal. BMC Res Notes [Internet]. BioMed Central Ltd.; 2015 [cited 2021 Jan 7];8. Available from: https://pubmed.ncbi.nlm.nih.gov/26306673/
24. Saroj Khatiwada, Basanta Gelal, Sharad Gautam, Madhab Lamsal NB. Iodine Status among School Children of remote Hilly regions of Nepal - PubMed [Internet]. 2015 [cited 2021 Jan 7]. Available from: https://pubmed.ncbi.nlm.nih.gov/26061936/
25. Khatiwada S, Lamsal M, Gelal B, Gautam S, Nepal AK, Brodie D, Baral N. Anemia, Iron Deficiency and Iodine Deficiency among Nepalese School Children. Indian J Pediatr [Internet]. Springer India; 2016 [cited 2021 Jan 7];83:617–21. Available from: https://link.springer.com/article/10.1007/s12098-015-1924-y
26. DHS. STATcompiler [Internet]. [cited 2021 Jan 23]. Available from: https://www.statcompiler.com/en/
27. Ministry of Health. National Nutrition Survey Nutrition Programme Department of Public Health Ministry of Health Bhutan. 2015. 1-236 (105-120) p.
28. Ministry of Health and Population, Nepal; New ERA; UNICEF, EU, USAID C. Nepal National Micronutrient Status Survey 2016. 2016;1–315. Available from: https://www.unicef.org/nepal/sites/unicef.org.nepal/files/2018-08/NNMSS Report 2016.pdf
29. Jayathissa, R., Gunathilaka, M., & Fernando D.

National Nutrition and Micronutrient Survey Part I: Anaemia Among Children Aged 6-59 Months. Minist Heal Sri-Lanka [Internet]. 2012;63. Available from: https://www.unicef.org/srilanka/Nutrition_Survey__Iron_Zinc_Calcium_deficiency_among_children.pdf%0Ahttps://www.unicef.org/srilanka/MNS_Report-28.02.2013.pdf

30. Akseer N, Bhatti Z, Mashal T, Soofi S, Moineddin R, Black RE, Bhutta ZA. Geospatial inequalities and determinants of nutritional status among women and children in Afghanistan: an observational study. Lancet Glob Heal [Internet]. Elsevier Ltd; 2018 [cited 2021 Jan 6];6:e447–59. Available from: http://www.thelancet.com/article/S2214109X18300251/fulltext

31. Badshah S, Mason L, Mckelvie K, Payne R, Lisboa PJG, Peshawar), Pakistan N. Introduction Maternal risk factors in Afghan-refugees compared to Pakistani mothers in Peshawar, NWFP Pakistan. 2011.

32. UNHCR. UNHCR Nutrition Survey among Afghan Refugees Residing in Afghan Refugee Villages of Pakistan REPORT. 2014.

33. UNHCR-WFP. UNHCR-WFP Joint Assessment Mission (JAM) Report 2019. 2019;1–68. Available from: https://data2.unhcr.org/en/documents/download/72273

34. Leidman E, Humphreys A, Cramer BG, Toroitich-Van Mil L, Wilkinson C, Narayan A, Bilukha O. Acute malnutrition and anemia among rohingya children in Kutupalong Camp, Bangladesh [Internet]. JAMA - Journal of the American Medical Association. American Medical Association; 2018 [cited 2021 Jan 6]. p. 1505–6. Available from: http://www.who.int/nutrition/publications/emergencies

35. Leidman EI, Lalan Miah M, Humphreys AI, Toroitich -van Mil LI, Wilkinson C, Chelang M, Koech at, Sebuliba H, Abu Bakr Siddique MI, Bilukha O. Malnutrition trends in Rohingya children aged 6-59 months residing in informal settlements in Cox's Bazar District, Bangladesh: An analysis of cross-sectional, population-representative surveys. [cited 2021 Jan 6]; Available from: https://doi.org/10.1371/journal.pmed.1003060

36. Jamali NH, Mahesar H, Bhutto MA. Prevalence of Iron Deficiency Anaemia in School and College Going Students of District Shaheed Benazirabad Sindh Province, Pakistan. Open J Blood Dis. 2016;06:67–78.

37. Ali SA, Abbasi Z, Shahid B, Moin G, Hambidge KM, Krebs NF, Westcott JE, McClure EM, Goldenberg RL, Saleem S. Prevalence and determinants of anemia among women of reproductive age in Thatta Pakistan: Findings from a cross-sectional study. PLoS One [Internet]. 2020;15:1–16. Available from: http://dx.doi.org/10.1371/journal.pone.0239320

38. Ministry of Health, ICF. Maldives Demographic Health Survey 2016-17. 2018;

39. WFP. Nutrition at the World Food Programme Programming for Nutrition-Specific Interventions. Programming for Nutrition-Specific Interventions. Nutr Worl Food Program [Internet]. 2012;1–38. Available from: https://documents.wfp.org/stellent/groups/public/documents/communications/wfp258650.pdf?_ga=2.92479961.556502704.1539001778-498923723.1539001778

40. Afshin A, John Sur P, Fay KA, Cornaby L, Ferrara G, Salama JS, Mullany EC, Hassen Abate K, Abbafati C, Abebe Z, et al. Health effects of dietary risks in 195 countries, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet [Internet]. 2019 [cited 2021 Jan 10];393:1958–72. Available from: http://dx.doi.org/10.1016/

41. Jayawardena R, Jeyakumar DT, Gamage M, Sooriyaarachchi P, Hills AP. Fruit and vegetable consumption among South Asians: A systematic review and meta-analysis. Diabetes Metab Syndr Clin Res Rev. 2020;14:1791–800.

42. Systems TGP on A and F, Nutrition F. Urban diets and nutrition: Trends, challenges and opportunities for policy action. 2017.

43. Bhavani R. Review of agriculture-nutrition linkages in South Asia. CAB Rev Perspect Agric Vet Sci Nutr Nat Resour. 2018;13.

44. South A. GENDER COUNTS A quantitative assessment of gender inequality and its impact on children and adolescents.

45. Cunningham K, Ruel M, Ferguson E, Uauy R. Women's empowerment and child nutritional status in South Asia: a synthesis of the literature. 2014 [cited 2021 Jan 10]; Available from: http://www.ifpri.org/sites/default/files/publications/oc33.pdf

46. Rao N, Gazdar H, Chanchani D, Ibrahim M. Women's agricultural work and nutrition in South Asia: From pathways to a cross-disciplinary, grounded analytical framework. Food Policy. Elsevier Ltd; 2019;82:50–62.

47. Beal T, White JM, Arsenault JE, Okronipa H, Hinnouho GM, Murira Z, Torlesse H, Garg A. Micronutrient gaps during the complementary feeding period in South Asia: A Comprehensive Nutrient Gap Assessment. Nutr Rev [Internet]. Oxford University Press; 2021 [cited 2021 Jun 10];79:26–34. Available from: https://academic.oup.com/nutritionreviews/article/79/Supplement_1/26/6164904

48. UNICEF. Stop stunting-Improving young children's diets in South Asia. 2019.

49. UNICEF. Stop Stunting Improving Young Children's Diets in South Asia | UNICEF South Asia [Internet]. [cited 2021 May 24]. Available from: https://www.unicef.org/rosa/stop-stunting-improving-young-childrens-diets-south-asia

50. WFP. Pakistan Fill THE Nutrient Gap. 2019;

51. Overview P, Costs D, Results A. FILL THE NUTRIENT GAP AFGHANISTAN Preliminary Overview of Diet Costs and Non - Affordability Results. 2020;1–4.

52. WFP. Srilanka Fill the Nutrient Gap. 2018;2.

53. WFP. Bangladesh Fill THE Nutrient Gap. 2019.

54. Fill the Nutrient Gap Bangladesh Concise Report. 2019.

55. Poole N, Amiri H, Amiri SM, Farhank I, Zanello G. Food production and consumption in Bamyan Province, Afghanistan: the challenges of sustainability and seasonality for dietary diversity. Int J Agric Sustain [Internet]. Taylor and Francis Ltd.; 2019 [cited 2020 Dec 31];17:413–30. Available from: https://www.tandfonline.com/doi/full/10.1080/14735903.2019.1680229

56. Aguayo VM, Paintal K. Nutrition in adolescent girls in South Asia. BMJ. 2017;357:1–4.

57. Harding KL, Aguayo VM, Webb P. Trends and Correlates of Overweight among Pre-School Age Children, Adolescent Girls, and Adult Women in

South Asia: An Analysis of Data from Twelve National Surveys in Six Countries over Twenty Years. [cited 2021 Jan 10]; Available from: www.mdpi.com/journal/nutrients

58. Mistry SK, Puthussery S. Risk factors of overweight and obesity in childhood and adolescence in South Asian countries: A systematic review of the evidence [Internet]. Public Health. Elsevier; 2015 [cited 2021 Jan 10]. p. 200–9. Available from: https://pubmed.ncbi.nlm.nih.gov/25746156/

59. Global School-based Student Health Survey Afghanistan 2014 Fact Sheet.

60. Global Nutrition Report-Bangladesh. 2016;1–168.

61. World Health Organization. Bhutan - Global School-based Student Health Survey 2016. 2016;7:11–6. Available from: https://nada.searo.who.int/index.php/catalog/10

62. Sheet F. Maldives Global School-based Student Health Survey Maldives. 2014;13–6.

63. Global school based Student Health survey Pakistan. Ecum Rev. 2012;64:147–59.

64. World Health Organization Department of Prevention of Noncommunicable Diseases. Global School-based Student Health Survey Sri Lanka Fact Sheet. 2016;5:1–5.

65. Sheet F. Global School-based Nepal. 2015;5:11–6.

66. World Health Organization. India Global School-based Student Health Survey. 2007;1–2. Available from: http://www.who.int/chp/gshs/2007_India_CBSE_fact_sheet.pdf

67. South Asia Monitor [Internet]. [cited 2021 Jun 14]. Available from: https://www.southasiamonitor.org/search/node?keys=extreme weather

68. Sivakumar MVK, Stefanski R. Climate Change in South Asia. Climate Change and Food Security in South Asia. Springer Netherlands; 2010. p. 13–30.

69. Oskorouchi HR, Nie P, Sousa-Poza A. The effect of floods on anemia among reproductive age women in Afghanistan. PLoS One. 2018;13:1–15.

70. Chaparro C, Oot L, Sethuraman K, India Nepal Tajikistan B. Overview of the Nutrition Situation in Four Countries in South and Central Asia. 2014.

71. Rasul G. Twin challenges of COVID-19 pandemic and climate change for agriculture and food security in South Asia. Environ Challenges. Elsevier BV; 2021;2:100027.

72. Food Security and COVID-19 [Internet]. [cited 2021 Jan 24]. Available from: https://www.worldbank.org/en/topic/agriculture/brief/food-security-and-covid-19

73. Webb P, Flynn DJ, Kelly NM, Thomas SM. The Transistion Seps Needed to Transform Our Food Systems. 2021 [cited 2021 Aug 3]; Available from: https://sc-fss2021.org/

74. Laborde D, Martin W, Swinnen J, Vos R. COVID-19 risks to global food security [Internet]. Science. American Association for the Advancement of Science; 2020 [cited 2021 Jan 25]. p. 500–2. Available from: https://pubmed.ncbi.nlm.nih.gov/32732407/

75. Ali A, Ahmed M, Hassan N. Socioeconomic impact of COVID-19 pandemic: Evidence from rural mountain community in Pakistan. J Public Aff [Internet]. John Wiley and Sons Ltd; 2020 [cited 2021 Jan 25]; Available from: /pmc/articles/PMC7460993/?report=abstract

76. UNICEF. Child nutrition and COVID-19 - UNICEF DATA [Internet]. [cited 2021 Jan 25]. Available from: https://data.unicef.org/topic/nutrition/child-nutrition-and-covid-19/

77. Carducci B, Keats EC, Ruel M, Haddad L, Osendarp SJM, Bhutta ZA. Food systems, diets and nutrition in the wake of COVID-19. Nat Food [Internet]. Nature Publishing Group; 2021 [cited 2021 Feb 25];2:68–70. Available from: http://www.nature.com/articles/s43016-021-00233-9

78. Khetrapal Singh P, Jhalani M. Safeguarding essential health services during emergencies: lessons learnt from the COVID-19 pandemic. WHO South-East Asia J public Heal. NLM (Medline); 2020;

79. Global Wash Cluster (GWC), Sanitation and Water for All (SWA), UNICEF I. COVID-19 and WASH: Mitigating the socio-economic impacts on the Water, Sanitation and Hygiene (WASH) Sector [Internet]. Available from: https://www.un.org/sustainabledevelopment/development-agenda/

80. Bhutta ZA, Ahmed T, Black RE, Cousens S, Dewey K, Giugliani E, Haider BA, Kirkwood B, Morris SS, Sachdev H, et al. What works? Interventions for maternal and child undernutrition and survival. Lancet. 2008;371:417–40.

81. The Lancet. Maternal and Child Nutrition-Executive Summary of The Lancet Maternal and Child Nutrition Series. Lancet. 2013;5:1–11.

82. WHO. Nutrition interventions. Available from: https://www.who.int/elena/intervention/en/

83. UNICEF. 10 proven nutrition interventions. Available from: https://www.unicef.org/rosa/stories/10-proven-nutrition-interventions

84. WFP. A chance for every schoolchild. Partnering to scale up School Health and Nutrition for Human Capital. WFP School Feeding Strategy 2020-2030. World Food Program WFP Sch Feed Strateg [Internet]. 2020; Available from: https://docs.wfp.org/api/documents/WFP-0000112101/download/?_ga=2.117934027.376835949.1580789897-391419386.1580789897

85. Nutrition P of. Scaling up proven interventions. Available from: https://www.powerofnutrition.org/interventions/

86. McDonald SJ, Middleton P, Dowswell T, Morris PS. Effect of timing of umbilical cord clamping of term infants on maternal and neonatal outcomes. Cochrane Database Syst Rev. 2013;

87. UNICEF. Coverage At A Crossroads: New directions for vitamin A supplementation programmes. 2018.

88. Services O of the DG of H, Ministry of Health N and IM. Iron and other vitamins supplementation for infants and young children. 2016.

89. Addressing micronutrient gaps to reduce anaemia in Bhutan's young children: Early experiences in home fortification | ENN [Internet]. [cited 2021 Apr 11]. Available from: https://www.ennonline.net/nex/southasia/2/bhutan

90. SAFETY NET PROGRAMS□: Food Fortification Resource Centre [Internet]. [cited 2021 Jan 20]. Available from: https://ffrc.fssai.gov.in/snp

91. Supplementary Nutrition Programme [Internet]. [cited 2021 Feb 16]. Available from: https://pib.gov.in/newsite/PrintRelease.aspx?relid=104046

92. WFP. Review of Take-Home Rations under the Integrated Child Development Services in India SAVING LIVES CHANGING LIVES.

93. Integrated Child Development Scheme- Annual report 2017-18 [Internet]. 2018 [cited 2021 Jun 9]. Available from: https://wcd.nic.in/sites/default/files/AR 2017-18 Chapter 3.pdf

94. International Institute for Population Sciences. National Family Health Survey (NFHS-4) 2015-16 India. Int Inst Popul Sci ICF [Internet]. 2017;1–192. Available from: http://rchiips.org/NFHS/NFHS-4Reports/India.pdf

95. Review of Take-Home Rations under the Integrated Child Development Services in India SAVING LIVES CHANGING LIVES.

96. Rivera JA, Hotz C, González-Cossío T, Neufeld L, García-Guerra A. The Effect of Micronutrient Deficiencies on Child Growth: A Review of Results from Community-Based Supplementation Trials. Journal of Nutrition [Internet]. American Institute of Nutrition; 2003 [cited 2021 Jun 14]. p. 4010–20. Available from: https://academic.oup.com/jn/article/133/11/4010S/4818063

97. South Asia and child wasting – unravelling the conundrum | ENN [Internet]. [cited 2021 Jan 22]. Available from: https://www.ennonline.net/fex/63/southasiachildwasting

98. WHO. Technical note Supplementary foods for the management of moderate acute malnutrition in infants and children 6–59 months of age [Internet]. 2012 [cited 2021 Jun 8]. Available from: http://apps.who.int/iris/bitstream/handle/10665/75836/9789241504423_eng.pdf?sequence=1

99. Grijalva-Eternod CS, Kerac M, McGrath M, Wilkinson C, Hirsch JC, Delchevalerie P, Seal AJ. Admission profile and discharge outcomes for infants aged less than 6 months admitted to inpatient therapeutic care in 10 countries. A secondary data analysis. Matern Child Nutr [Internet]. Blackwell Publishing Ltd; 2017 [cited 2021 Feb 16];13. Available from: https://pubmed.ncbi.nlm.nih.gov/27453170/

100. Kerac M, Blencowe H, Grijalva-Eternod C, McGrath M, Shoham J, Cole TJ, Seal A. Prevalence of wasting among under 6-month-old infants in developing countries and implications of new case definitions using WHO growth standards: A secondary data analysis. Arch Dis Child [Internet]. Arch Dis Child; 2011 [cited 2021 Feb 16];96:1008–13. Available from: https://pubmed.ncbi.nlm.nih.gov/21288999/

101. Kerac M, Mcgrath M. Management of Acute Malnutrition in Infants under 6 Months of Age.

102. Aubel J. The role and influence of grandmothers on child nutrition: Culturally designated advisors and caregivers. Maternal and Child Nutrition. 2012. p. 19–35.

103. Clark H, Marie Coll-Seck A, Banerjee A, Peterson S, Dalglish SL, Ameratunga S, Balabanova D, Kishan Bhan M, Bhutta ZA, Borrazzo J, et al. The Lancet Commissions A future for the world's children? A WHO-UNICEF-Lancet Commission Executive summary. www.thelancet.com [Internet]. 2020 [cited 2021 Jan 23];395:605. Available from: https://doi.org/10.1016/

104. Bundy DAP, De Silva N, Horton S, Jamison DT, Patton GC. Re-Imagining School Feeding: A High-Return Investment in Human Capital and Local Economies [Internet]. 2018. Available from: www.worldbank.org

105. GAIN. The malnutrition challenge Programmes in Pakistan [Internet]. [cited 2021 Jan 16]. Available from: https://www.gainhealth.org/impact/countries/pakistan

106. Organization WH. ESSENTIAL NUTRITION nutrition through mainstreaming ACTIONS the life-course. 2019.

107. AMB Ranking - Anemia Mukt Bharat Dashboard [Internet]. [cited 2021 Feb 16]. Available from: https://anemiamuktbharat.info/amb-ranking/

108. Bundy D, Burbano C, Grosh M, Gelli A, Jukes M, Drake L. Rethinking School Feeding Social Safety Nets, Child Development, and the Education Sector.

109. World Food Programme. State of School Feeding Worldwide 2020 SAVING LIVES CHANGING LIVES State of School Feeding Worldwide 2020. 2020;

110. WFP. Afghanistan country strategic plan 2018-2022 [Internet]. 2018. Available from: http://gender.manuals.wfp.org/en/gender-toolkit/gender-in-programming/gender-and-age-marker/.

111. Pakistan Annual Country Report 2019 Country Strategic Plan SAVING LIVES CHANGING LIVES. 2018.

112. UNICEF. Maldives Country Office Annual Report 2018.

113. Education Ministry halts school breakfast programme | South Asia Monitor [Internet]. [cited 2021 May 6]. Available from: https://www.southasiamonitor.org/uat/maldives/education-ministry-halts-school-breakfast-programme

114. RAJIV GANDHI SCHEME FOR EMPOWERMENT OF ADOLESCENT GIRLS(RGSEAG)-'SABLA'-The scheme INTRODUCTION.

115. SAG-RRS : Scheme For Adolescent Girls-Rapid Reporting System [Internet]. [cited 2021 Oct 15]. Available from: https://www.sag-rrs.nic.in/

116. UNSCN. Stepping up effective school health and nutrition: a partnership for healthy learners and brighter futures [Internet]. [cited 2021 Jun 9]. Available from: https://www.unscn.org/en/news-events/recent-news?idnews=2059

117. WHO U. Global Standards for Health Promoting Schools [Internet]. [cited 2021 Jun 9]. Available from: https://www.who.int/maternal_child_adolescent/adolescence/global-standards-for-health-promoting-schools-who-unesco.pdf

118. FAO. School-based food and nutrition education Creating healthy and sustainable foodways for the next generation A white paper on the current state, principles, challenges and recommendations for low-and middle-income countries. [cited 2021 Jun 9]; Available from: https://doi.org/10.4060/cb2064en

119. Warvadekar K, Reddy JC, Sharma S, Dearden KA, Raut MK. Socio-demographic and economic determinants of adherence to iron intake among pregnant women in selected low and lower middle income countries in Asia: insights from a cross-country analyses of global demographic and health surveys. Int J Community Med Public Heal. 2018;5:1552.

120. Dr Zakia Maroof DMHL and SF. Addressing

adolescent anaemia in Afghanistan through a school-based programmeNutrition Exchange 12, -. Nutr Exch 12 [Internet]. Emergency Nutrition Network (ENN); 2019 [cited 2021 Jan 12];22. Available from: www.ennonline.net/nex/12/adolescentanaemiaafghanistan

121. UNICEF. Nutritional care of pregnant women in South Asia: Policy environment and programme action.

122. Bhutta ZA, Das JK, Rizvi A, Gaffey MF, Walker N, Horton S, Webb P, Lartey A, Black RE. Evidence-based interventions for improvement of maternal and child nutrition: What can be done and at what cost? [Internet]. The Lancet. Elsevier B.V.; 2013 [cited 2021 Jun 9]. p. 452–77. Available from: http://dx.doi.org/10.1016/

123. Beneficiaries – Sri Lanka Thriposha Ltd [Internet]. [cited 2021 Jan 23]. Available from: http://www.thriposha.lk/thriposha-production/beneficiaries/

124. A Proactive Path to Combat Malnutrition in Sri Lanka. 2020.

125. World Food Programme. Transition: Towards Resilience and Zero Hunger in Pakistan World Food Programme in Pakistan, Islamic Republic of (PK). [cited 2021 Oct 16]; Available from: http://www.wfp.org/countries

126. Allen L, De Benoist B, Dary O, Hurrell R. Guidelines on food fortification with micronutrients Food and Agricultural Organization of the United Nations Guidelines on food fortification with micronutrients.

127. Andersson M, de Benoist B, Rogers L. Epidemiology of iodine deficiency: Salt iodisation and iodine status. Best Practice and Research: Clinical Endocrinology and Metabolism. Baillière Tindall; 2010. p. 1–11.

128. Codling K, Rudert C, Bégin F, Peña-Rosas JP. The legislative framework for salt iodization in Asia and the Pacific and its impact on programme implementation. Public Health Nutr. 2017;3008–18.

129. United Nations Children´s Fund (UNICEF). Review of National Legislation for Universal Salt Iodization: South Asia and East Asia and the Pacific. 2015.

130. Lindsay Allen B de B, Hurrell OD and R. Guidelines on food fortification with micronutrients [Internet]. Food and Agriculture Organisation, World Health Organization. 2006. Available from: http://www.unscn.org/layout/modules/resources/files/fortification_eng.pdf

131. Zimmerman S, Baldwin R, Codling K, Hindle P, Montgomery S, Pachón H, Maberly G. Mandatory policy: Most successful way to maximize fortification's effect on vitamin and mineral deficiency. Indian J Community Heal. 2015;26:369–74.

132. Pakistan's state of Punjab makes fortification mandatory - Pakistan | ReliefWeb [Internet]. [cited 2021 Feb 21]. Available from: https://reliefweb.int/report/pakistan/pakistan-s-state-punjab-makes-fortification-mandatory

133. Initiative FF. Country Profiles — Food Fortification Initiative [Internet]. [cited 2021 Jan 23]. Available from: https://www.ffinetwork.org/country-profiles

134. FSSAI. FSSAI issues draft for mandatory fortification of edible oil & packaged milk. 2021;2021.

135. WFP. How WFP supported the Government of Bangladesh to Introduce and Scale up Rice Fortification A Case Study on Reducing Micronutrient Malnutrition. 2019.

136. Fortified rice to be available in open market sale in Dhaka North and Dhaka South city corporations - Bangladesh | ReliefWeb [Internet]. [cited 2021 Jan 23]. Available from: https://reliefweb.int/report/bangladesh/fortified-rice-be-available-open-market-sale-dhaka-north-and-dhaka-south-city

137. Lalani B, Bechoff A, Bennett B. Which choice of delivery model(s)works best to deliver fortified foods? [Internet]. Nutrients. MDPI AG; 2019 [cited 2021 Jun 9]. p. 1594. Available from: www.mdpi.com/journal/nutrients

138. Meenakshi J V. BIOFORTIFICATION.

139. Asare-Marfo D, Birol E, Gonzalez C, Moursi M, Perez S, Schwarz J, Zeller M. Prioritizing Countries for Biofortification Interventions Using Country-Level Data. 2013;

140. Bangladesh | HarvestPlus [Internet]. [cited 2021 Aug 2]. Available from: https://www.harvestplus.org/node/1652

141. India | HarvestPlus [Internet]. [cited 2021 Aug 2]. Available from: https://www.harvestplus.org/node/1645

142. Pakistan | HarvestPlus [Internet]. [cited 2021 Aug 2]. Available from: https://www.harvestplus.org/node/1647

143. (ENN) ENN. The link between foetal and childhood nutrition and adult non-communicable disease: lessons from birth cohort studies in IndiaField Exchange 63, -. F Exch 63 [Internet]. Emergency Nutrition Network (ENN); 2020 [cited 2021 Jun 9];86. Available from: www.ennonline.net/fex/63/lessonsfrombirthcohortstudiesindia

144. Nutrition-Related Noncommunicable Disease Regional Profile: South and Southeast Asia | SPRING [Internet]. [cited 2021 Jun 9]. Available from: https://www.spring-nutrition.org/publications/briefs/nutrition-related-non-communicable-disease/regional-profile-south-and-southeast

145. Beal T. Priority micronutrient density in foods. :1–8.

146. Eat Right India [Internet]. [cited 2021 Jan 24]. Available from: https://eatrightindia.gov.in/eatrightindia.jsp

147. Cunningham K, Singh A, Pandey Rana P, Brye L, Alayon S, Lapping K, Gautam B, Underwood C, W Klemm RD. Suaahara in Nepal: An at-scale, multi-sectoral nutrition program influences knowledge and practices while enhancing equity. 2017 [cited 2021 Feb 17]; Available from: https://doi.org/10.1111/mcn.12415

148. The role of nutrition-sensitive agriculture in improving diets of young children: Homestead food production in Nepal | ENN [Internet]. [cited 2021 Jan 21]. Available from: https://www.ennonline.net/nex/southasia/2/nepalagriculture

149. Harris J, De B, Piters S, Mcmullin S, Bajwa B, De Jager I, Brouwer ID. Fruits and vegetables for healthy diets: Priorities for food system research and action.

150. Garment Sector Study MAKING THE BUSINESS CASE: GARMENT WORKER NUTRITION PROGRAMMES. 2019;

151. Nutrition of Working Women - Nutrition International [Internet]. [cited 2021 Jul 8]. Available from: https://nutritionintl.org/project/nutrition-of-working-women/

152. Partnering to Improve Women's Nutrition in the Bangladesh Garment Sector | SDG2 Advocacy Hub [Internet]. [cited 2021 Jul 8]. Available from: https://www.sdg2advocacyhub.org/index.php/news/partnering-improve-womens-nutrition-bangladesh

153. Osendarp SJM, Martinez H, Garrett GS, Neufeld LM, De-Regil LM, Vossenaar M, Darnton-Hill I. Large-Scale Food Fortification and Biofortification in Low- and Middle-Income Countries: A Review of Programs, Trends, Challenges, and Evidence Gaps [Internet]. Food and Nutrition Bulletin. SAGE Publications Inc.; 2018 [cited 2021 Jun 15]. p. 315–31. Available from: www.gainhealth.org/wp-content/uploads/2015/

154. Sight and Life W. Scaling up Rice Fortification in Asia .

155. Biofortification: The Nutrition Revolution Is Now | HarvestPlus [Internet]. [cited 2021 Aug 2]. Available from: https://www.harvestplus.org/biofortification-nutrition-revolution-now

156. HarvestPlus [Internet]. [cited 2021 Aug 2]. Available from: https://www.harvestplus.org/content/integrated-food-systems-approach-build-nutrition-security

157. Pee S De, Moretti D, Scientist S. Evidence for Impact of Rice Fortification.

158. Venkatasubramanian P, Alam MJ, Rojas-Rueda D, Nair MK, Konapur A. Food-Based interventions to Modify Diet Quality and Diversity to Address Multiple Micronutrient Deficiency. 2016 [cited 2021 Aug 2];3:1. Available from: www.frontiersin.org

159. Von Braun J, Sorondo MS, Steiner R. Reduction of Food Loss and Waste-The Challenges and Conclusions for Actions Findings and Recommendations for Actions of an international Conference by the Pontifical Academy of Sciences with the Rockefeller Foundation. 2021 [cited 2021 Aug 3]; Available from: http://www.fao.org/sustainable-de-

160. Azam-Ali S, Ahmadzai H, Choudhury D, Goh V, Jahanshiri E, Mabhaudhi T, Meschinelli A, Modi AT, Nhamo N, Olutayo A. Marginal areas and indigenous people Priorities for research and action.

161. WHO U. Indicators for assessing infant and young child feeding practices Part 2 MeasureMent.

162. MoPH. Islamic Republic of Afghanistan Ministry of Public Health National Health Strategy 2019 □ 2023. 2016;1401. Available from: www.moph.af

163. Food and Nutrition Security Policy of the Kingdom of Bhutan, 2014.

164. NITI Ayog G of I. National Nutrition Strategy-Nouishing India. 2017.

165. INTEGRATED NATIONAL NUTRITION STRATEGIC PLAN. 2013;

166. Ministry of Planning D and R and W (2018). Pakistan Multi-sectoral Nutrition Strategy (PMNS 2018-2025) [Internet]. 2018 [cited 2021 Jan 16]. Available from: https://extranet.who.int/nutrition/gina/sites/default/filesstore/PAK_2018_Pakistan-Multi-sectoral-Nutrition-Strategy.pdf

167. GHO | By category | Anaemia in children < 5 years - Estimates by WHO region [Internet]. [cited 2020 Dec 26]. Available from: https://apps.who.int/gho/data/view.main.ANEMIACHILDRENREGv

168. GHO | By category | Prevalence of anaemia in women of reproductive age - Estimates by WHO region [Internet]. [cited 2020 Dec 26]. Available from: https://apps.who.int/gho/data/view.main.ANAEMIAWOMENPREVANEMIAREG

169. DIVISION PAI. MALDIVES HEALTH PROFILE. 2016; Available from: http://202.1.196.69/jspui/bitstream/123456789/5529/1/Maldives Health Profile 2016.pdf

170. WHO. Pakistan STEPS FactSheet.pdf. 2014.

Photo Credits

Cover Photo : WFP/Kauser Haider

Photo page 7: WFP/Srawan Shrestha

Photo page 10: WFP Archives

Photo page 12: WFP/Angeli Mendoza

Photo page 21: WFP/Sayed Asif Mahmud

Photo page 23: WFP/Wahid Adnan

Photo page 27: WFP/Sayed Asif Mahmud

Photo page 29: WFP/Santosh Shahi

Photo page 32: WFP/Lilu KC

Photo page 34: WFP/Sayed Asif Mahmud

Photo page 38: WFP/Sayed Asif Mahmud

Photo page 40: WFP/Sayed Asif Mahmud

Photo page 43: WFP/Sayed Asif Mahmud

World Food Programme
Regional Bureau for Asia and the Pacific
Wave Place Building 7th Floor
55 Wireless Road Lumpini Pathumwan
10330 - Bangkok, Thailand
T +66 2 6554413
wfp.bangkok@wfp.org
wfp.org