



June 2020

Health and Education Research Series; No. 16

A Proactive Path to Combat Malnutrition in Sri Lanka

PRIYANKA JAYAWARDENA



INSTITUTE OF POLICY STUDIES OF SRI LANKA

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ISBN 978-955-7397-19-1

National Library and Documentation Services Board -Cataloguing-In-Publication Data



The author would like to thank Dr Dushni Weerakoon, Executive Director, IPS for the support and encouragement given to undertake this research and the valuable comments provided by Dr Nisha Arunatilake, Director of Research and Dr. Ganga Tilakaratna, Research Fellow. The author wishes to acknowledge the editorial support by Gayendri Karunaratne, graphics support by Tharindu Rajakaruna and formatting by Suresh Fernando. The overall coordination and supervision of the publication process was by Ms Charmaine Wijesinghe.

The author thankfully acknowledge the Director General of the Department of Census and Statistics for giving me access to DHS 2016 micro data for this study.

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Table of Contents

1	Introduction	1
1.1	Rationale	2
1.2	Objectives of the Study	2
2	Literature Review	4
2.1	Global Nutrition Challenges	4
2.2	Consequences of Undernutrition	4
2.3	Why Invest in Nutrition ?	5
2.4	Nutrition: Concepts and Measurements	5
2.4.1	What is Malnutrition?	5
2.4.2	Definitions of Anthropometric Indicators	5
2.4.3	Intergenerational Cycle of Malnutrition	5
2.4.4	Critical Period of Child Growth	6
2.5	Theoretical Framework: Causes of Child Undernutrition	6
3	Background	8
3.1	Malnutrition in Sri Lanka	8
3.2	Policy and Programmatic Responses to Malnutrition	8
3.3	Evidence-based Nutrition Interventions	8
3.4	National Nutritional Policy (NNP)	9
3.5	Multi Sector Action Plan for Nutrition	10
3.6	Interventions to Enhance Nutrition	10
3.6.1	Nutrition Specific Interventions	10
3.6.2	Nutrition-sensitive Interventions in Sri Lanka	14
3.6.3	Summary of Nutrition Interventions in Sri Lanka	15
3.7	Public Spending for Key Nutrition Specific Interventions	19
4	Data and Methodology	21
4.1	Sources of Data	21
4.2	Scope of the Exercise	21
4.3	Methods	21
4.3.1	Measuring Malnutrition	22
4.3.2	Measurement of Inequality	22
4.3.3	Decomposition of the Concentration Index (CI)	22
4.4	Methodology Application to DHS Data	22
4.4.1	Measure of Socio-economic Status	22
4.4.2	Determinants and Drivers of Child Malnutrition	23
4.4.3	Decomposing Socio-economic Inequalities in Child Malnutrition	24

5	Results and Findings	25
5.1	Dimensions of Child Malnutrition in Sri Lanka	25
5.1.1	Nutritional Disparities by Socio-economic Characteristics	25
5.1.2	Inequality in Child Malnutrition	26
5.1.3	Life Cycle of Malnutrition	26
5.2	Determinants and Drivers of Child Malnutrition	28
5.3	Explaining Socio-economic Inequalities in Child Malnutrition	31
5.3.1	Decomposing Socio-economic Inequalities in Child Malnutrition	31
5.3.2	Decomposing Socio-economic Inequalities in Child Malnutrition 2006 vs 2016	32
5.4	Assessment of Key Nutrition Interventions in Sri Lanka	32
5.4.1	Key Factors that Contribute to Malnutrition in Sri Lanka	32
5.4.2	Are the Government Responses Addressing these Issues Adequately?	32
5.4.3	Can Resources from Other Areas of Malnutrition Policy Response be Redirected to Improve the Effectiveness of Policy Responses?	34
6	Conclusion and Policy Recommendations	35
	References	37

List of Abbreviations

BMI	Body Mass Index
CED	Chronic Energy Deficiency
CHR	Child Health Record
CI	Concentration Index
DCS	Department of Census and Statistics
DHS	Demographic and Health Survey
DNAP	District Nutrition Action Plan
FHB	Family Health Bureau
FPNP	Food Production National Programme
GDP	Gross Domestic Product
HCI	Human Capital Index
HIES	Household Income and Expenditure Survey
IMR	Infant Mortality Rate
IYCF	Infant and Young Child Feeding
LBW	Low Birth Weight
MAM	Moderate Malnutrition
MCH	Maternal and Child Health
MDGs	Millennium Development Goals
MMN	Multiple Micronutrient
MOA	Ministry of Agriculture
MOE	Ministry of Education
MOH	Ministry of Health, Nutrition, and Indigenous Medicine
MRI	Medical Research Institute
MSAPN	Multi Sector Action Plan for Nutrition
MWCA	Ministry of Women and Child Affairs
NAQDA	National Aquaculture Development Authority
NNP	National Nutritional Policy
PEM	Protein-energy Malnutrition

PHM	Public Health Midwife
RMNCAYH	Reproductive, Maternal, New-born, Child Adolescent and Youth Health
RUTF	Ready-to-Use Therapeutic Food
SAM	Severe Acute Malnutrition
SDGs	Sustainable Development Goals
SUN	Scaling Up Nutrition
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation and Hygiene
WB	World Bank
WFP	World Food Programme
WHO	World Health Organisation

Executive Summary

Reducing child malnutrition is yet to be improved. To date, successive governments have taken several measures to improve child and maternal nutrition. However, improvements accomplished during 2006-2016 are rather marginal. Improving nutrition is essential to reduce extreme poverty and achieve sustainable development in a country. It also contributes to productivity growth and economic development, as well as reducing state expenditure related to health care. Thereby, more funding can be made available for alternative welfare measures.

In this backdrop, this study investigates why child malnutrition has not improved much during 2006 – 2016. In addition, it helps to identify policy gaps which needs to be addressed to curtail child malnutrition in Sri Lanka. Thus, it is critical to identify the key nutrition issues and its underlying causes, to review the effectiveness of nutrition programmes in a more practical way.

The study findings reveal that intergenerational cycle of malnutrition is significantly present in Sri Lanka. Undernutrition among pre-conception women, where mother's poor nutritional status leads to underweight births, continue in a malnutrition cycle. This is one of the main contributors for a higher prevalence of child malnutrition among socio-economically poor people.

When addressing the malnutrition issue, national nutrition policies recognise that the crucial area is linked to the life cycle effect.

Sri Lanka currently practices most of the WHO recommended life course interventions under the Maternal and Child Health (MCH) programmes carried out by the Family Health Bureau (FHB) it is also where government should consider allocating more resources to improve the quality of supplements. Formulating nutrition-specific interventions requires due attention, especially those related to the first 1,000 days window – i.e. mother's pregnancy period and the first two years of a child's life. Some gaps can be noted regarding interventions for pre-pregnant women, in terms of quality as well as coverage. Services that are specially designed for adolescents should be initiated to improve coverage of these programmes.

Further, findings of the study reveal about possible dietary issues due to underlying causes -- food insecurity of poor people as well as lack of awareness.

Less intake of animal protein, significantly increases the prevalence of child malnutrition, especially among the poor. Possible reasons behind consuming lack of animal protein includes, food insecurity, knowledge gaps, socio-cultural practices etc. Further, child growth failures significantly increase with the child's age which is an indication of dietary issues during the weaning period. Additionally, the

study reveals that a mother's low education also contributes to a higher prevalence of child malnutrition among lower-socio economic groups. As such, nutrition interventions should be properly focussed to address the dietary issues, knowledge gaps, behavioural changes in communication etc.

Thus, effective communication on nutrition counselling – Infant and Young Child Feeding (IYCF) practices and a healthy diet; screening for acute malnutrition and follow-up of malnourished children are critical elements of nutrition interventions. Nutrition education programmes should be strengthened to inculcate better consumption habits - what foods to select; how to prepare and feed children; and the hygienic and nutritional value of food. Thus, especially the community driven programmes would have a major role to play. However, presently around 0.2% of the total nutrition-specific investments has been utilised on nutritional awareness and promoting of behavioural-change communication programmes. Awareness raising programmes, educational and promotive activities should deserve more allocation of funds and resources to proactively combat malnutrition.

Study findings point out the need to rebalance public financing towards a more targeted evidence-based interventions. Among Sri Lanka's reasonably comprehensive set

of nutrition programmes, a significant share has been utilised by a few programmes that may not be the most effective nutrition interventions. For instance, the country's annual public investment on key nutrition-specific interventions is approximately around Rs. 15 billion. Of these investments, 40% was absorbed by the school meal programme, followed by the pregnant mother's food allowance programme (37%) and Thriposha programme (16%). The FHB medicine and supplements in the MCH programme accounted for only 5%.

Resources should be redirected to improve the effectiveness of nutrition policy responses. Effectiveness issues are also identified in nutrition interventions such as the Thriposha and pregnant mother's food allowance programmes.

Government spends nearly half of the total nutrition specific interventions in these. Thus, careful considerations is mandatory in designing such programmes -- targeted vs. blanket. There is potential to gain some fiscal space by changing current blanket pro-

grammes (some are costly) such as the pregnant mother's food allowance programme, to targeted programmes. In light of the above, amidst issues like effectiveness and coverage gaps pertaining to some existing nutrition interventions, **WHO evidence based staple food fortification is much appropriate for Sri Lanka** as a preventive food-based intervention to improve micronutrient status of populations.

1 Introduction

Although Sri Lanka performs well in most health indicators, child nutrition remains a major issue. Several measures have been taken by successive governments to improve child and maternal nutrition, including a National Nutrition Policy (NNP) initiated in 2010, as well as the first Multi Sector Action Plan for Nutrition (MSAPN) 2013-2016. However a marginal improvement is evident in reducing child malnutrition during 2006-2016. For instance, according to the recent Demographic and Health Survey (DHS) 2016, more than 20% of children¹ and nearly 15.7% babies born were underweight; whereas respective figures were around 21% and 16.6% in 2006 (Department of Census and Statistics, 2007, 2016).

Overall, this persistent issue is an obstacle in order to achieve Sri Lanka's human development goals. For instance, the World Bank (WB) highlighted that education, health, and nutrition play vital and synergistic roles in the production of human capital required for sustained economic growth (World Bank, 2019). The 'Human Capital Index' (HCI) developed by the WB, is an important new tool for measuring a country's human capital. The HCI is a composite of five indicators from three components, namely child survival, education and health whereas the respective indicators are, child survival indicator - probability of survival up to age 5; education indicators - expected years of schooling and harmonised test scores; and health indicators - survival rate from the age of 15 to 60 and fraction of children under 5 not stunted. According to the HCI in 2018, Sri Lanka was ranked at 74th of 157 countries where the HCIs are avail-

“According to the World Bank (2006), repositioning nutrition as central to development, good nutrition is a basic building block of human capital which contributes to economic development. For sustaining economic growth, it is essential to achieve equity and improve the quality of life.”

able (World Bank, 2019). Sri Lanka performs well in some components of the HCI but performs less on nutrition and learning outcomes. Further, evidence suggests that all these indicators are affected by nutrition. Sri Lanka strives to achieve better in overall development outcomes. As such, improving nutritional status is important from an individual and a family perspective, as well as from a national perspective.

According to the World Bank (2006), repositioning nutrition as central to development, good nutrition is a basic building block of human capital which contributes to economic development. For sustaining economic growth, it is essential to achieve equity and improve the quality of life. Reducing malnutrition is important for good

health as well as for many other aspects in peoples' lives. These include enhancing learning, productivity, reducing health care expenditure as well as achieving the overall development objectives of the country. Moreover, direct and indirect social and economic costs can be reduced significantly by eliminating malnutrition (World Bank, 2006).

Thus, improving nutrition is increasingly recognised in setting the world development goals as an imperative for reducing poverty, promoting sustainable social and economic development and narrowing inequities (United Nations, 2019). For instance, under the Millennium Development Goals (MDGs)², one of the key target was to *have the proportion of people who suffer from hunger between 1990 and 2015*. This was measured using the indicator prevalence of underweight children below 5 years of age. Accordingly, for Sri Lanka, the MDG target was expected to reduce the prevalence of underweight children below the age of 5, from 29.7% in 1993 to 14.9% by 2015. However, Sri Lanka was unsuccessful in achieving the respective MDG target, given that 20.5% of children below the age of 5, were underweight in 2016.

Thereafter in 2015, the 'Sustainable Development Goals' (SDGs) replaced the MDGs, as an action to achieve the last mile on ending poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030 (United Nations Development Programme, n.d.). Further, SDGs are designed to uplift the world to several life-changing 'zeros', including zero poverty and zero hunger.

¹ Below the age of 5.

² MDG consists of a framework of 8 goals, 18 targets and 48 indicators.

Specifically, SDG goal 2 “zero hunger”, aims to end all forms of hunger and malnutrition by 2030, to ensure that all people – especially children – have access to sufficient and nutritious food year-round. This includes achieving the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons by 2030. However, given the current status of malnutrition, Sri Lanka encounters a challenge in order to achieve the SDG target on eradicating malnutrition by 2030.

Improving nutrition is recognised by successive governments. Additionally, several measures are taken to improve the nutritional status, including the NNP initiated in 2010, the first MSAPN 2013-2016 etc. Further, despite the existing budgetary constraints, Sri Lanka has maintained relative stability in financing nutrition over the years. During the 2014-2018 period, country's overall public investment on nutrition specific and sensitive interventions was around 5-6% of the total public expenditure (World Bank, 2020). However, reducing child malnutrition is an unfinished agenda that has not improved over the last decade. The reasons could be the mismatches between the policy needs and policy responses with regard to malnutrition that have undermined its effectiveness.

In this context, this study aims to assess the policy gaps in reducing child malnutrition in Sri Lanka. The specific research questions of this study are:

- Why child malnutrition has not improved during 2006 – 2016 ?
- To assess the adequacy and efficacy of interventions and programmes in order to address the nutrition issue of the country.

1.1 Rationale

A better understanding of the determinants of child malnutrition is a first step towards identifying the areas that needs attention in terms of reducing the causes of child malnutrition. There is a presumption that improved health care itself cannot improve overall health outcomes. The reason is that there are deep rooted socio-economic factors which affect health. For example, a severely thin child who does not access to sufficient food represents one type of malnutrition; this narrow perspective hinders comprehension of the problem at a broader level. This is not only limited to lack of food, but poor dietary practices in terms of both lack of nutritious food as well as excessive consumption of unhealthy food. It also fails to account for the many different but interrelated factors that contribute to nutritional status, such as water and sanitation facilities, health status and health care services, care and feeding practices including personal hygiene, etc. Thus, for addressing malnutrition issue at the root level, it is considerably important to examine the causes of child undernutrition.

According to the findings of previous research on the socio-economic determinants of nutritional status in the country, socio-economically³ poor are more likely to be malnourished (Jayawardena, 2012). Thus, an understanding of the causes of malnutrition among different socio-economic groups is essential in targetting specific socio-economic groups to improve their nutrition levels. Special programmes can then be designed targetting specific socio-economic groups to improve their nutrition levels. According to available information, to date no empirical studies have been conducted in Sri Lanka to investigate the determinants of child

malnutrition among different socio-economic groups. In this context, this study firstly examines the determinants of child malnutrition among different socio-economic groups.

Further, it is more useful and effective for policy purposes to unravel and quantify the contribution of determinants of malnutrition related to socio-economic inequality, including those associated with birthweight, mother's nutrition, mother's education, sanitary facilities etc. For instance, Jayawardena (2012) investigated on the determinants contribution to socio-economic inequality in malnutrition, based on DHS 2006 data. As a further step, based on those findings, it is important to investigate any changes in causes during 2006- 2016, which explain why socio-economically poor are more likely to be malnourished. Accordingly, this study examines the changes in the socio-economic related inequality in malnutrition from 2006-2016. Finally, it reviews the existing food and nutrition policies, strategies and programmes in the country with a view to assess the adequacy and efficacy of interventions and programmes. This is to address the nutrition issue in practical approach.

1.2 Objectives of the Study

As globally recognised, it is critical to identify the key nutrition issues and its underlying causes; to reach an accord with partners on which actions should be prioritised; to review the nutrition programmes in a more practical way (theory of change); to allocate resources; and to agree upon the roles and responsibilities of partners (United Nations Children's Fund, 2013).

In this context, to assess the policy gaps in reducing child malnutrition

³ Socio-economic status measures factors such as -- education, income, type of occupation, place of residence etc.

in Sri Lanka, it is required to have a better understanding of the causes of malnutrition in severely affected populations, such as those socio-economically poor. Such analysis enables identification of policy gaps and where resources should be directed to redress the root causes of malnutrition among different socio-economic groups. Finally, this study attempts to contribute to the debate on how to make the best use of available resources. It aims to eliminate inequalities, to combat malnutrition in Sri Lanka and achieve human development goals of the country.

Under the main theme, the three sub-objectives are as follows:

1. Examine the determinants of child malnutrition among different socio-economic groups.
2. Examine the change in socio-economic related inequality in child malnutrition between 2006 and 2016.
3. To identify policy gaps in the existing nutrition interventions and programmes and propose improvements.

The rest of this report is lined up as follows. Section 2 provides the litera-

ture review and underlying theoretical background of the study. Section 3 provides background of this study which discusses current policy and programmatic responses to malnutrition in Sri Lanka. Section 4 describes data used for analysis, selection of variables and adopted methodology. Section 5 describes the main findings of this study based on the empirical analysis. Finally, the last section (Section 6) concludes the findings and discusses the relevant policy implications derived from the study.

2 Literature Review

2.1 Global Nutrition Challenges

Globally in 2016, around 14% of children below 5 years of age were underweight. Underweight prevalence is highest in South Asia (29.8%), followed by sub-Saharan Africa (18.5%)

(World Bank, 2018). Further, the WB highlights that South Asia bears the greatest share of all undernutrition records and is home to about 62 million of the world's 155 million of stunted children. More than half of the 52 million, world's wasted children live in South Asia (Pswarayi-Riddihough &

Dhushyanth, 2018). Moreover, Bangladesh, Pakistan and India have seen modest average declines in stunting of 1% per year whereas Sri Lanka has not experienced a decline (Table 1).

Table 1: Underweight Trends- Percentage of Underweight Children less than 5 Years

Country	Year of Survey	Wasting	Stunting	Underweight
Bangladesh	2007	17.5	43.2	41.3
	2014	14.4	36.2	32.8
India	2005-06	20	47.8	43.5
	2015-16	20.8	37.9	36.3
Malaysia	2006	-	17.2	12.9
	2016	11.5	20.7	13.7
Nepal	2006	12.7	49.2	38.5
	2016	9.6	36.0	27.2
Pakistan	2011	14.8	43	30.9
	2017-18	7.1	37.6	23.1
Sri Lanka	2006-07	14.7	17.3	21.1
	2016	15.1	17.3	20.5
Thailand	2005-06	4.7	15.7	7
	2015-16	5.4	10.5	6.7

Source: World Health Organisation. (2019). *Global database on child growth and malnutrition*. World Health Organisation. Retrieved January 14, 2020, from <http://www.who.int/nutgrowthdb/estimates2018/en/>

2.2 Consequences of Undernutrition

Malnutrition is closely, and directly or indirectly, linked to major causes of death and disability. About one third of child mortality (in children below five) is attributable to undernutrition (UNICEF, 2013). Malnourished children face frequent attacks of severe diarrhoea and are more susceptible to several infectious diseases, such as malaria, meningitis, and pneumonia. Further, it is clear that undernutrition early in life has major consequences for future educational, income and

productivity outcomes. For instance, recent research has recognised the harmful impact of undernutrition on brain and nervous system development, which begins early in pregnancy and is largely complete by the first two years of life. Nutritional deficiencies during this period affect brain development in different ways, depending on the brain's need for a given nutrient at a specific time (UNICEF, 2013).

Thus, early childhood development has long-term consequences in terms of educational achievements and health status, future adult productivity and earning potential. The degree

of cognitive impairments is directly related to the severity of stunting and iron deficiency anaemia. For instance, studies have shown that stunted children in the first two years of life have lower cognitive test scores, delayed enrolment, higher absenteeism and more class repetition compared with non-stunted children (World Bank, 2006). Another fact is that malnutrition raises the risk of poor physical health in the long run, and leads to more chronic illness and disability in adulthood. As such, good nutrition is an important factor for economic productivity.

2.3 Why Invest in Nutrition ?

Improving nutrition is essential to reduce extreme poverty and achieve sustainable development in a country. It also contributes to productivity growth and economic development, as well as reducing health care expenditure for the state and for households. Hence this allows state for funding of alternative welfare measures by making funds available. The economic cost of malnutrition is considerably high; it has adverse implications for the economy, through its effects on education, productivity, growth and healthcare expenditure. Therefore, in the long-run, poor nutrition and health can result in a poorly educated and an unhealthy population, which will have unfavourable impacts on the economic growth and development of the country. For instance, economists estimate that undernutrition can reduce a country's gross domestic product (GDP) by 7% and thus, is an enormous drain on economic productivity and growth (Galasso, Wagstaff, Chen, & Kramer, 2018).

As such, globally, concern to improve nutrition has increased dramatically. Investment in health and nutrition is fundamental for improving human welfare and economic growth as well as for reducing poverty. Recognising that food and nutrition security is considered as a global priority, and investing in nutrition is a key way to advance global welfare, the Group of 8 (G8) of the world's wealthiest countries has placed nutrition in high importance in its development agenda. Furthermore, according to the World Health Organisation's (WHO's) global targets for 2025, it is expected to reduce the number of stunted children by 40% and reduce the child wasting rate to less than 5% (WHO, 2017).

2.4 Nutrition: Concepts and Measurements

2.4.1 What is Malnutrition?

Malnutrition refers to deficiencies, excesses or imbalances in the intake of energy or other nutrients. Contrary to the common usage, the term malnutrition covers two broad groups of conditions. One is 'undernutrition'—which includes stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient deficiencies or insufficiencies (lack of important vitamins and minerals). The other is over-nutrition, where intake of food is in excess of dietary energy requirements, resulting in overweight or obesity (WHO, 2016).

2.4.2 Definitions of Anthropometric Indicators

The designation of a child having impaired growth implies some means of comparison with "reference" to a child of the same age and sex. Thus, in practical terms, anthropometric values need to be compared across individuals or populations in relation to an acceptable set of reference values. The WHO – 'Multicentre Growth Reference Study (MGRS) has undertaken a systematic collection and standardisation of information on the nutritional status of the world's under-5 population. Data has been collected from a pooled sample of six countries comprising of widely diverse ethnic backgrounds and cultural settings -- Brazil, Ghana, India, Norway, Oman and the USA. For analysis of nutritional surveys, Child Growth Standards were published by the WHO in 2006 (WHO, 2007). The key anthropometric measures according to the WHO growth standards are described below (UNICEF, 2013).

Underweight

Children aged 0 to 59 months whose weight for age is more than two standard deviations below (moderate or severe underweight) and more than three standard deviations below (severe underweight) from the median

of the WHO Child Growth Standards.

Stunting

Children aged 0 to 59 months whose height for age is more than two standard deviations below (moderate or severe stunting) and more than three standard deviations below (severe stunting) from the median of the WHO Child Growth Standards.

Wasting

Children aged 0 to 59 months whose weight for height is more than two standard deviations below (moderate or severe wasting) and more than three standard deviations below (severe wasting) from the median of the WHO Child Growth Standards.

Low Birth Weight

A low birth weight (LBW) child was defined as being of a birth weight of less than 2,500g.

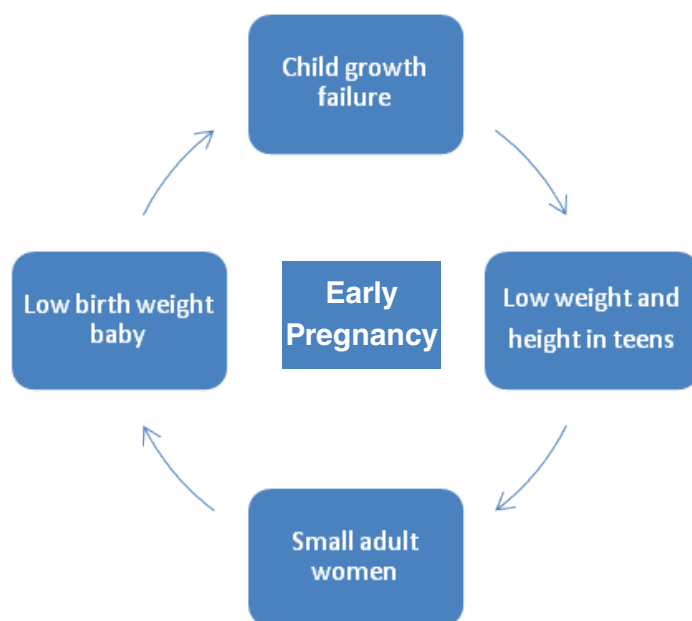
Body Mass Index (BMI)

Indicator BMI < 18.5 was used to assess Chronic Energy Deficiency (CED) malnutrition in women. This indicator is the most frequently used standardised indicator of thinness (wasting) to assess the progressive loss of body energy (WHO, 1995).

2.4.3 Intergenerational Cycle of Malnutrition

Malnutrition is not a disease; rather it is a process, with consequences that may extend not only later in one's life, but also into future generations (Gillespie & Flores, 2000). The nutritional status of individuals is interrelated to different stages of their life cycle and between generations (Figure 1). The process of becoming malnourished often starts in the utero and continues throughout the life cycle, according to Gillespie & Flores (2000). For instance, maternal malnutrition leads to underweight babies and its consequences of childhood growth retardation lead back to undernourished adults. As such, the cycle continues.

Figure 1 : Intergenerational Cycle of Malnutrition



Source: *Second report on the world nutrition situation. Volume I: Global and regional results.* ACC/SCN (1992).

2.4.4 Critical Period of Child Growth

From a life-cycle perspective, the United Nations Children's Fund (UNICEF), 2009 report on "Tracking Progress on Child and Maternal Nutrition" highlights that the most crucial time to meet a child's nutritional requirements is in the 1,000 days covering a mother's pregnancy period and the first two years of child's life. Further, comparison of child growth patterns in 54 low and middle-income countries based on WHO's standards confirms that growth faltering begins during pregnancy and continues about in the first two years of life (Van de Poel, Hosseinpoor, Jehu-Appiah, Vega, & Speybroeck, 2007). Further research has recognised that the loss in growth faltering during that period cannot be recovered, and the likelihood to catch-up growth later on in childhood is minimal (UNICEF, 2013). Furthermore, the deficits acquired by this age are rather irreversible. As such, a mother's pregnancy period and the first two years of life is recognised as a window of opportunity for growth promotion.

2.5 Theoretical Framework: Causes of Child Undernutrition

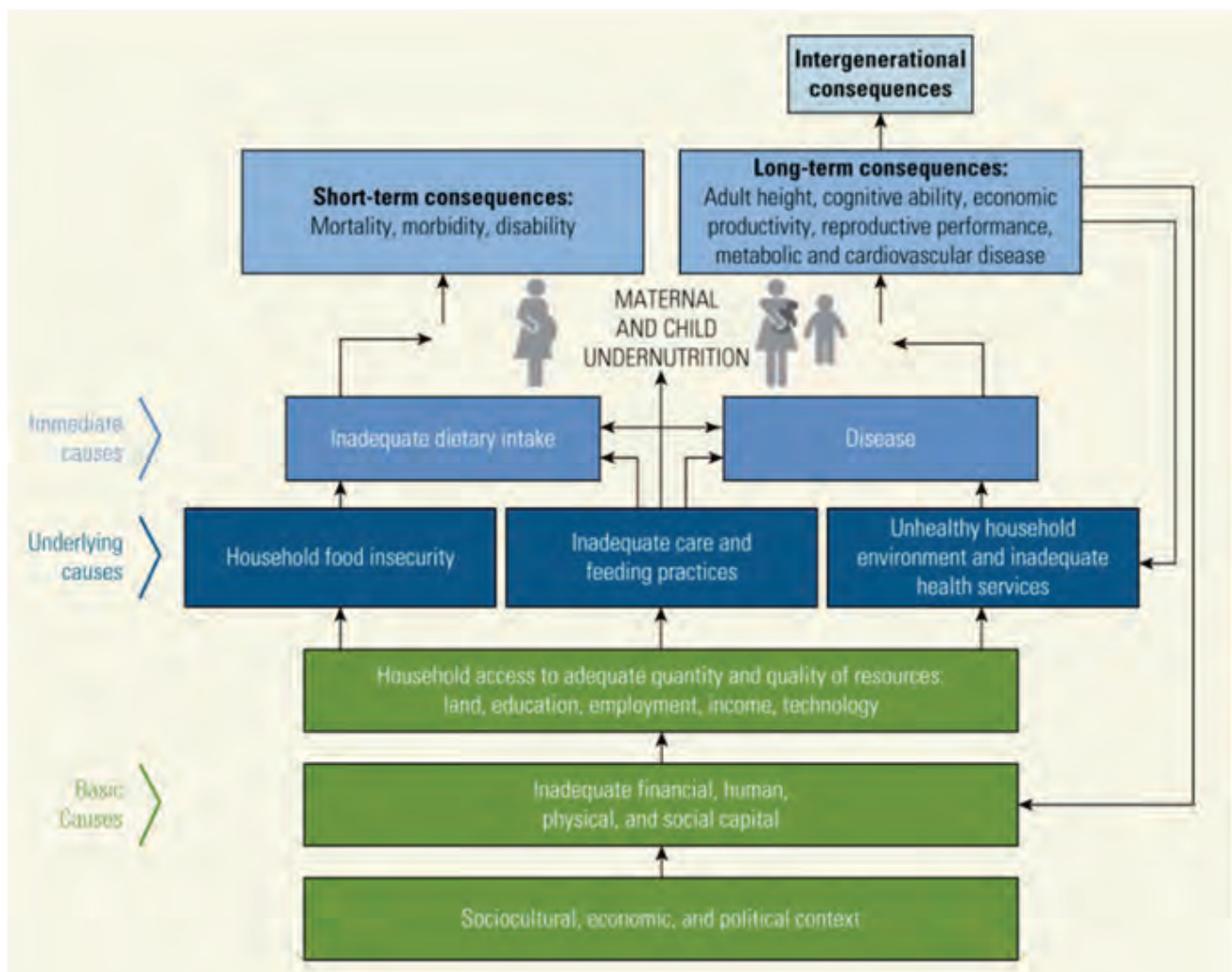
This section introduces the conceptual framework used to analyse the causes of child undernutrition. According to the UNICEF conceptual framework, child nutritional status is influenced by three levels of causality corresponding to immediate, underlying and basic causes (Figure 2). The two immediate causes of child undernutrition are inadequate dietary intake and health status. These two factors itself are interdependent. Illness reduces child's appetite and hinders the absorption of nutrients.

Subsequently, the two immediate causes of child malnutrition in turn are influenced by three underlying causes, which take place itself at the household level: food insecurity, inadequate care and feeding practices, and poor health environment and services. Food security is about having access to sufficient food which leads to an active and healthy life. Similarly, child food intake and health

are critically dependent on child care related feeding practices, such as breastfeeding, complementary feeding, and food preparation etc. As established in Smith et al (2003), women's nutritional status influences children's nutritional status in early childhood due to breastfeeding practices, a care that is vitally important for a child's health and proper growth. Further, as in the case of a mother's nutritional status, her education and knowledge can make a strong impact on the child's nutrition, through childcare practices.

Furthermore, a child's health is linked to the health environment and services which includes access to sanitary facilities, safe drinking water and access to health services -- preventive and curative health care, prenatal care and childbirth care. Household's economic resources such as education, employment, income etc., influence the underlying causes. Subsequently, these household factors are affected by social, economic and political factors.

When children have access to an affordable and balanced nutritional diet, appropriate maternal and child-care practices, adequate health services, and a healthy environment and services -- including safe water, sanitation and good hygiene practices -- it will result in an optimal nutritional status. Thus, when targeting the most vulnerable people, being aware of the immediate and underlying causes of undernutrition in a given context is critical. This is to deliver an appropriate, effective and sustainable solutions.

Figure 2 : Conceptual Framework of the Determinants of Child Undernutrition

Source: United Nations Children's Fund. (2013). *Improving child nutrition: The achievable imperative for global progress*. New York: United Nations Children's Fund. Retrieved March 10, 2018, from http://www.unicef.org/publications/index_68661.html

Further, it is recognised globally that maternal and child malnutrition is a complex public health issue that cannot be solved with a simple one-dimensional solution by any sector alone. The complexity of nutrition science and practice has been widely acknowledged by many specialists from academic and non-academic disciplines who collaborate, aiming to foster innovative solutions. According to the Scaling Up Nutrition (SUN) concepts, "Nutrition-specific" actions are defined as "Interventions and programmes which address the immediate determinants of fetal and child nutrition and development – adequate food and nutrient intake, feeding,

caregiving and parenting practices, and low burden of infectious diseases". 'Nutrition-sensitive' interventions refer to actions that address the underlying determinant of malnutrition as set out in the UNICEF conceptual framework (Fracassi, et al., 2017). These include actions from a range of sectors including: health; agriculture and food systems; promotion of Water, Sanitation and Hygiene (WASH); education; and social protection.

3 Background

3.1 Malnutrition in Sri Lanka

Several measures have been taken by the successive governments to improve the nutritional status, including a NNP initiated in 2010. However improvement is seen to be inconsistent in the nutritional status of children below 5-years during the 2006-2016 period. For instance, for the past 10

years, there has been no change in the prevalence of stunting among children below 5-years, while prevalence of wasting has slightly increased by 0.4 percentage points (Table 2). Yet, there was a slight decline in 2016 with regard to the prevalence of underweight children (by 0.6 percentage points), compared to 2006 figures. Furthermore, the prevalence of LBW has declined by 0.9 percentage points.

Also, it is noteworthy that although the level of severe malnutrition among the under 5-year old children remains below 5 % in all three nutritional measures, the prevalence has slightly increased over 2006-2016. However, in contrast to child malnutrition, maternal malnutrition has considerably reduced during 2006-2016.

Table 2 : Child and Maternal Nutritional Trends

	2000 ¹	2006/2007 ²	2016 ³
Percentage of Children under Age 5 who are Underweight, Stunted, or Wasted			
<i>Underweight</i>			
Moderate or Severe	23.0	21.1	20.5
Severe	4.7	3.7	4.0
<i>Stunted</i>			
Moderate or Severe	18.5	17.3	17.3
Severe	4.0	3.9	4.1
<i>Wasted</i>			
Moderate or Severe	15.5	14.7	15.1
Severe	2.5	2.8	3.0
Women with low BMI (less than 18.5)	21.8	16.2	9.1
Underweight births (less than 2,500g)	16.7	16.6	15.7

Source:

¹ Jayawardena, P. (2012). Socio-economic determinants and inequalities in childhood malnutrition in Sri Lanka. *Well-Being and Social Policy Journal*, 8 (1), 1-22.

² Department of Census and Statistics. (2007). *Sri Lanka demographic and health survey 2006-07*. Battaramulla: Department of Census and Statistics.

³ Department of Census and Statistics. (2016). *Sri Lanka demographic and health survey 2016*. Battaramulla: Department of Census and Statistics.

3.2 Policy and Programmatic Responses to Malnutrition

Determinants of malnutrition are varied and compounding. Thus the global scientific community concedes that child malnutrition is a complex public

health issue that cannot be solved with a simple one-dimensional solution by any sector alone. Various researchers, practitioners and politicians have recognised that joint partnerships across different sectors, systems and disciplines under a shared framework are crucial to address this complex issue. The complexity of malnutrition has been widely acknowledged by many

specialists from academic and non-academic disciplines who cooperate aiming to foster innovative solutions.

3.3 Evidence-based Nutrition Interventions

The WHO has developed recommendations to health and nutrition based

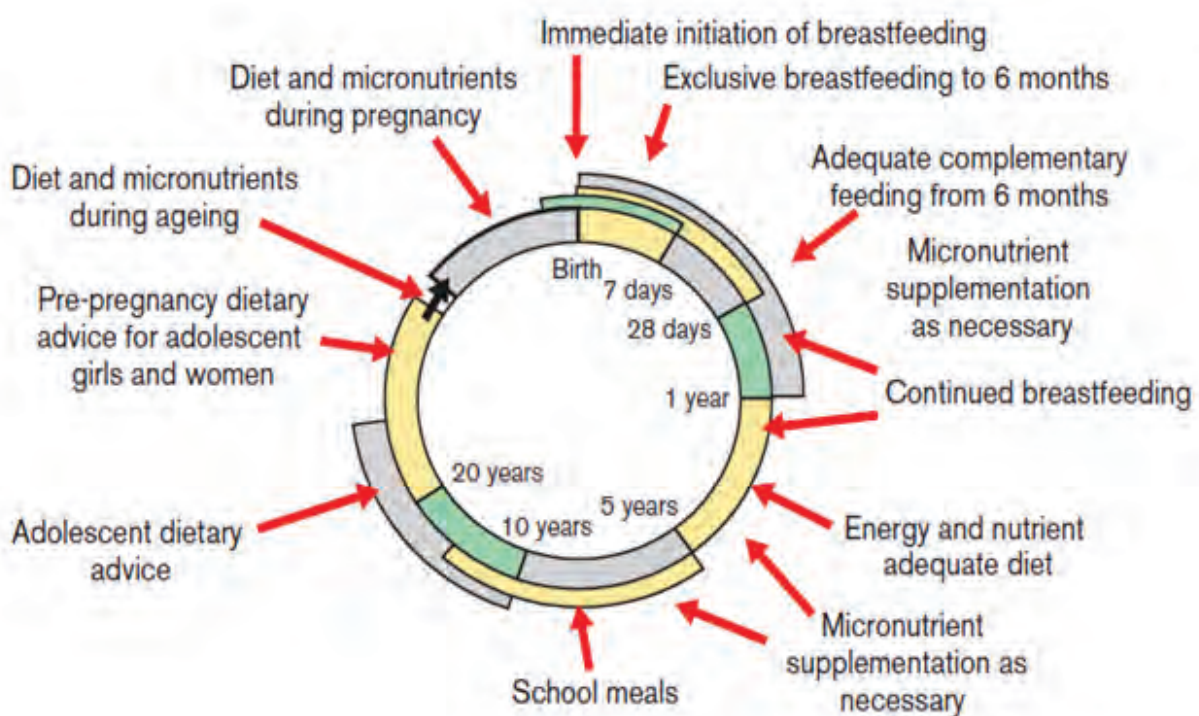
on the best available evidence. There is a growing body of evidence that the nutritional status during the first 1,000 days of life since conception, has life-long consequences on the child's development. Deficits acquired during this period are difficult to restore later in life. Therefore, this period is perceived as a critical window of opportunity for fostering growth. As such, the WHO recommends prenatal and early-life interventions for the preven-

tion of growth failure that is likely to occur during the first two years of life, including the promotion of appropriate infant feeding practices.

Accordingly, the WHO recommended strategies to improve nutritional status and growth in children include, interventions to improve nutrition of pregnant and lactating women; early initiation of breastfeeding with exclusive breastfeeding for the initial

six months; promotion, protection, and support of continued breastfeeding along with appropriate complementary feeding from the initial six months up to two years and beyond; and micronutrient supplementation, targeted fortification and food supplementation, when needed. Further, the WHO recommends evidence-based nutrition actions, relevant to nutrition of mothers and children through the life-course (Figure 3).

Figure 3 : Improving Nutrition Around the Life-Course



Source: World Health Organisation. (2013). *Essential nutrition actions*. Geneva: World Health Organisation.

3.4 National Nutritional Policy (NNP)

In line with the WHO recommended actions, a collection of evidence-based interventions has been implemented by the Ministry of Health, Nutrition, and Indigenous Medicine (MOH) to improve maternal and child health and nutrition in Sri Lanka. Despite the efforts of the government and other agencies to eliminate malnutrition, optimum

results cannot be achieved unless all interventions are carried out according to a well-designed work plan in a coordinated manner. Therefore, a NNP is a prerequisite which has to be based on the ground situation and the scope and responsibility of all relevant agencies.

The first nutritional policy for Sri Lanka was developed in 1986 and its effectiveness has diminished over the years for several reasons: limited

inter-sectoral coordination, change of government priorities, and the policies not being updated in line with socio-economic changes. Identifying this necessity, the MOH developed a NNP in 2010 and based on this document, a strategic plan and action plans have been developed. The NNP has been designed in a manner to implement future strategies and action plans, while building up on the related policies that are already in existence.

The, NNP has six key objectives -- ensure optimal nutrition throughout the life cycle; enhance capacity to deliver effective and appropriate interventions; ensure effective management of adequate nutrition to vulnerable populations; ensure food and nutrition security for all citizens; strengthen research, and monitoring and evaluation. Accordingly, the NNP has focussed its attention on optimum nutrition throughout the lifecycle by reducing the intergenerational impact of malnutrition. The NNP has recognised the importance of targetting nutritional interventions to the underserved areas, the plantation community, urban poor, and conflict affected areas. Also, it has identified the necessity to promote behavioural change among the population, enabling them to make right food choices and childcare practices. Furthermore, this policy has been prepared to obtain inter-sectoral cooperation to improve the nutritional status; including areas of work such as planning, agriculture, fisheries, livestock, health, education, social services, poverty alleviation and all other relevant sectors.

3.5 Multi Sector Action Plan for Nutrition

Successive governments have taken several measures to enhance the nutrition situation through a multi-sector approach. The first MSAPN 2013-2016 set the platform through multi sector partnerships within the government, cutting across sectors, for targetted action on the nutrition agenda to reduce maternal and child malnutrition in the country. The MSAPN was built upon the existing interventions and enhanced the synergies between institutions -- ministries, provincial offices, Divisional Secretariats together with development partners towards a common nutritional goal. This effort is aligned with the global SUN framework and a roadmap which strongly advocates the

adoption of a multisector approach. Building on the lessons learnt from implementation of the first MSAPN 2013-2016, the second MSAPN 2018-2025 further improves upon the multi sector collaboration and coordination. Especially, the MSAPN 2018-2025 increases the momentum towards improving the nutrition status of the country in line with achieving the SDGs related to nutrition.

3.6 Interventions to Enhance Nutrition

As described at the outset of this report, nutrition-specific interventions are “interventions or programmes that address the immediate determinants of fetal and child nutrition and development—adequate food and nutrient intake, feeding, caregiving and parenting practices, and low burden of infectious diseases” (Fracassi, et al., 2017). As such nutrition-sensitive interventions on food security; adequate caregiving resources at the maternal, household and community levels; and access to health services and a safe and hygienic environment—and incorporate specific nutrition goals and actions (Fracassi, et al., 2017).

3.6.1 Nutrition Specific Interventions

In line with the global frameworks for actions on nutrition, Sri Lanka's nutrition specific interventions are also designed for preventing and treating stunting and other forms of under-nutrition throughout the life cycle. In the last few decades, antenatal care, growth monitoring, supplementary feeding programmes such as the Thripasha programme and nutrition education have been established as nutrition specific interventions implemented throughout the country (Table 3). With the aim of addressing the nutrition issue of the country, several new strategies are also being implemented involving interventions such as multiple micronutrient (MMN) supplemen-

tation for infants, food supplementation (Tikiri Shakthi) for the plantation sector children aged (3-5 years) etc.

Nutrition specific interventions and programmes are provided mainly through the well-developed infrastructure of the MOH, involving a wide network of medical institutions and health service units. The presence of a good health infrastructure and the implementation of grass root level health activities, free education, free health services and food supplementation programmes have also created a favourable platform to improve the health status of the country as a whole. Such a network has resulted in a more concerted effort to strengthen the infrastructure to provide an efficient health service throughout the country. Further, the Ministry of Women and Child Affairs (MWCA) and Ministry of Education (MOE) have conducted nutrition interventions especially for pre-school children and school children.

Table 3 : Life Course of Nutrition Interventions in Sri Lanka

Target Group	Programme/Activity	Coverage and Description
Pregnant and Lactating Mothers	Micronutrient supplementation (Iron, Folic Acid, Vitamin C and calcium) Dietary supplementation - Thripsha Deworming treatment Food allowance (voucher) for pregnant mothers Rs. 2,000 x 10 months	All registered pregnant women and 6 months for lactating mothers Do All registered pregnant women All registered pregnant women
Infants	Vitamin A mega dose for children MMN supplementation Deworming treatment	6 months-5 years 2 months treatment at age 6, 12, 18 months Children at 18 months, 2, 3, 4, 5 years
Under-weight Children	Multivitamin drops, Iron, folic acid Dietary supplementation Thripsha Therapeutic food (BP100) Zinc supplementation for children with diarrhoea	Pre term and LBW children Starting soon after birth continue till completion of 2 years Undernourished children 6 months-5years Children with Severe Acute Malnutrition (SAM) Starting with onset of diarrhoea and continued for 10-14 days
Pre-school Children	Morning meal for preschool children Tikiri Shakthi – high protein nutrient bar - thrice per week	Pre-school children in vulnerable areas Plantation sector (aged 3-5 years) children
School Children	Micronutrient supplementation Iron, Folic Acid, Vitamin C Vitamin A mega dose Deworming treatment School health programme - Growth assessment and nutrition counselling for children School meal programme Glass of milk for school children	All school children (Grade 1-13) All students in small schools (< 200 students) Students in grades 1, 4, 7 and 10 in larger schools (> 200 students) Do Do All students in small schools (<100 students) Grade 1-5 students in (>100 students) schools Grade 1-5 students of selected schools
Pre-pregnant women	Folic acid	All registered pre-pregnant women

Source: Adapted using World Bank. (2020). *Assessing public financing for nutrition in Sri Lanka*. Washington, D.C.:World Bank.

Reproductive, Maternal, New-born, Child Adolescent and Youth Health programme

Reproductive, Maternal, New-born, Child Adolescent and Youth Health (RMNCAYH) programme is a collection of evidence-based interventions implemented by the MOH to improve maternal and child health and nutrition. This RMNCAYH programme provides the most widespread community based free health care services, implementing through 354 Medical Officers of Health-designated areas. In addition, the programme is comprised of maternal component which covers areas such as; preconception care, antenatal care, postnatal and maternal morbidity while child component includes new-born care, child nutrition, child development and special needs. The Family Health Bureau (FHB), is the central level institution in the MOH which is responsible for planning, implementing, monitoring and evaluating the RMNCAYH programme.

The target population for the RMNCAYH programme 'Eligible Family', is defined as a family, either married legally or living together with a female aged between 15-49 years or having a child under 5-years of age. Further, a family with a pregnant woman irrespective of marital status and age and previously married women (widowed, divorced, separated) are also considered under the eligible family. 'Eligible Family' is identified by Public Health Midwives (PHMs) at the grassroot level and registering them in eligible family registers. Further, according to the RMNCAYH eligibility criteria, it is estimated that 18.5% of the population is covered under this programme.

Under this RMNCAYH programme, Vitamin A supplementation, Zinc supplementation during diarrhoea, deworming, provision of supplementary food 'Thripasha' to undernourished children are implemented throughout the country. Based on a national com-

pliance study conducted by the Medical Research Institute (MRI) and the UNICEF the MMN supplementation programme is implemented islandwide from 2017 to combat anaemia among infants and young children. Further, special nutrition clinics have been established in the field to implement targeted interventions to malnourished mothers and children. District level trainers in selected districts and master trainers were also upskilled on the new WHO growth standards and growth monitoring, and promotion.

Infant and Young Child Feeding Programme

As discussed before, child feeding practices play a pivotal role in determining the optimal growth and development of infants. Poor breastfeeding and unfavourable complementary feeding practices have adverse consequences on the health and nutritional status of children which could hinder their growth. According to the WHO recommended infant and young child feeding (IYCF) practices, complementary feeding include timely feeding of solid and semisolid foods from the age of 6 months and increasing the amount and variety of foods and frequency of feeding as the child gets older, while maintaining breastfeeding. Following the WHO recommended IYCF breastfeeding and complementary feeding indicators, the key IYCF practices recommended in Sri Lanka are listed below (Table 4).

Table 4: Key IYCF Indicators

Indicator	Definition
Percentage (%) of new borns with breastfeeding initiation within 1 hour of life (early initiation of breast feeding)	$\frac{\text{Children born in the last 24 months who were put to the breast within one hour of birth}}{\text{Children born in the last 24 months}} \times 100$
Percentage (%) of infants under six months who are exclusively breastfed	$\frac{\text{Infants 0-5 months of age who received only breast milk during the previous day}}{\text{Infants 0-5 months of age}} \times 100$
Percentage (%) of children 12-23 months of age who are breastfed (continued breastfeeding at the age of one year)	$\frac{\text{Children 12-23 months of age who received breast milk during the previous day}}{\text{Children 12-23 months of age}} \times 100$
Percentage (%) of infants 6-8 months of age who receive solid, semisolid or soft food	$\frac{\text{Infants 6-8 months of age who received solid semisolid or soft foods during the previous day}}{\text{Infants 6-8 months of age}} \times 100$
Percentage (%) of children 6-23 months of age who receive foods from four or more food groups (minimum dietary diversity)	$\frac{\text{Children 6-23 months of age who received foods from four or more food groups during the previous day}}{\text{Children 6-23 months of age}} \times 100$ Foods groups are: ■ Grains, roots and tubers ■ Legumes and nuts ■ Dairy products (milk, yogurt, cheese) ■ Flesh foods - meat, fish ■ Eggs ■ Vitamin-A rich fruits and vegetables ■ Other fruits and vegetables
Percentage (%) of children 6-23 months of age who receive the minimum meal frequency	$\frac{\text{Children 6-23 months of age who received the minimum meal frequency* during the previous day}}{\text{Children 6-23 months of age}} \times 100$ Breastfed children – twice if 6–8 months and thrice if 9–24 months Non-breastfed children – 4 times for all children 6–24 months
Percentage (%) of children 6-23 months of age who receive a minimum acceptable diet	$\frac{\text{Children 6-23 months of age who received at least the minimum dietary diversity and the minimum meal frequency during the previous day}}{\text{Children 6-23 months of age}} \times 100$

Source: Ministry of Health, Nutrition & Indigenous Medicine. (n.d.). *National strategy for infant and young child feeding Sri Lanka (2015-2020)*. Colombo: Ministry of Health, Nutrition & Indigenous Medicine.

Treatment and management of infants and young children with severe or moderate acute malnutrition (SAM/MAM)

Children with moderate malnutrition (MAM) receive locally-produced fortified food supplement, Thripasha, at primary health care level.

Children identified as having severe acute malnutrition (SAM) receive ready-to-use (RUTF), high energy biscuits BP 100, only after confirmation of the diagnosis by a paediatrician at the district hospital level or higher.

Pre-school Meal Programme

At present, there are two pre-school meal programmes namely, pre-school meal programme administered by the MWCA and “Tikiri Shakthi”, a high protein nutrient meal for the plantation sector children aged 3-5 years, administered by the Ministry of Hill Country New Villages Infrastructure and Community Development.

School Meal Programme

Schools serve as an ideal setting to positively affect children's health as these reach young people at a critical stage of development. There are many direct as well as indirect interventions implemented at the school level to enhance health and nutritional status of school children.

At present, there are two school feeding programmes. The MOE administers the school meal national programme while the World Food Programme (WFP) assists in the ‘Food for Education’ initiative in collaboration with the Ministry of National Policies. In addition, a programme to provide a glass of fresh milk/ milk packets for schools is not covered under the school meal programme. At present, the school meal programme has been implemented in almost 80% of schools, whereby one million

school children in grades 1-5 benefit.

Food allowance for pregnant mothers

Further, nutrition food package for pregnant mothers was implemented in 2006 with the aim of enhancing the nutrition level of pregnant and lactating mothers of low-income families. The beneficiary should be a MOH registered mother living in a Samurdhi beneficiary family. Under this programme, the beneficiary received a nutrition relief card to obtain a 'Nutrition Food Package' to the value of Rs.500 for 20 months. Then, in 2015 with the change in government, this programme was amended to a universal programme where all the MOH registered pregnant mothers are entitled to receive the food allowance. Benefits were also increased to Rs. 2,000 per month for 10 months amounting to a total of Rs. 20,000 benefits per beneficiary.

Improving the nutritional status of vulnerable population

Nutrition education is provided primarily by the PHMs at the Maternal and Child Health (MCH) clinics, filed weighing posts and during home visits to pregnant and lactating mothers and infants. Additionally, the Nutrition Division (ND) of the MOH provides nutritional improvement programmes at the regional level. It conducts programmes for improvement of the nutritional status of vulnerable population. These programmes mainly consist of the District Nutrition Action Plan (DNAP) which is implemented through the FHB, MRI and Health Promotion Bureau (HPB) with the aim of improving the nutritional status of the vulnerable population. The DNAP is mainly a nutritional awareness programme.

3.6.2 Nutrition-sensitive Interventions in Sri Lanka

Adopting multisectoral approaches combining nutrition-specific and nutrition-sensitive interventions are vital for a more holistic sustainable response to improve child nutrition. Nutrition sensitive interventions include actions from a range of sectors including health; agriculture and food systems; WASH; education; and social protection.

Cash assistant programmes

In Sri Lanka, the need for protecting the most vulnerable and needy people of the society has been well recognised while successive governments have taken positive measures in relation to food subsidisation and income supplementation programmes. These government backed poverty alleviation approaches constitute the government's major strategy to offset the negative impacts for those with a low or negligible income. These are carried out with a view to enable better

food consumption and enhance the well-being of poor.

In 1978, the "Food Stamp" scheme was introduced to low income groups: this was a cash subsidy in the form of food stamps to procure a basket of nutrition-oriented food commodities (rice, flour/cereal, sugar, milk foods, dry fish, and pulses). In 1989, the food stamp scheme was replaced by the national poverty alleviation programme 'Janasaviya'. In 1995, after change of government and the political environment, the Janasaviya programme was amended as the 'Samurdhi' programme. Among the current safety net programmes, the Samurdhi transfer programme is the most extensive social welfare programme, whereas a total of 1.4 million families are benefitted. Samurdhi allowance was doubled from 2015 to a maximum of Rs. 3,500 (Table 5). As of 2018, the total financing for this programme was around Rs.39 billion, which accounted for 1.5% of the total public expenditure (World Bank, 2020).

Table 5 : Samurdhi Monthly Allowance, per Beneficiary

Beneficiary Categories	2012-2014	2015
Less than 03 Members	750	1,500
3 Members	1,200	2,500
4 or More Members	1,500	3,500
Empowered Families	210	420

Source: Institute of Policy Studies of Sri Lanka. (2015). *Sri Lanka state of the economy*. Colombo: Institute of Policy Studies of Sri Lanka.

Food security interventions

Sri Lanka is a country with an agriculture-oriented society. To date, the agriculture sector contributes about 7% to the national GDP among the key contributing sectors (Central Bank of Sri Lanka, 2018). Rice is the staple food crop and rice farming is the most important economic activity for a majority of people who live in rural areas. This fertiliser subsidy coupled with some of the longer-term policies, programmes and strategies of successive governments—such as irrigation projects, and guaranteed prices for paddy—have helped Sri Lanka to enhance paddy production.

Further, there are few other recently introduced programmes to increase domestic agriculture production to ensure food and nutrition security of the nation. The 'Food Production National Programme' (FNP) was introduced in 2015, with the main intention of making Sri Lanka a 'self-sufficient' nation, while practicing healthy food consumption among Sri Lankans. The home gardening promotion is to improve food availability while fulfilling food and nutrition requirements of the smallest institution. Establishing fruit villages to promote local, disease-free fruits is a necessity in building a healthy nation.

In recent years, many projects and programmes have been implemented to enhance the fish production. Especially, the government has taken several measures to develop the inland and aquaculture fish production. In 2016, the FNP was initiated by the National Aquaculture Development Authority (NAQDA) to enhance fish consumption through increasing access to fish. These inland fish production programmes are especially implemented in non-coastal districts where limited access exists to marine fish. The growth in inland and aquaculture fish production was mainly due to increased stocking of fingerlings into inland water bodies

and improvements in the aquaculture sector. Further, in 2016, the Ministry of Fisheries has initiated and integrated inland fishery villages under the "We-wak Sahitha Gamak Programme" (i.e. 'a village with a tank') for the development of the fisheries sector and socio-economic enhancement of the fisher community of the country.

In the livestock sector also, several programmes are carried out to enhance both the milk and meat production of the country. These include improvement of hygienic conditions for milk production in dairy farms, development of small-scale dairy farms and issuing of cows to women headed households. Furthermore, measures have been taken to enhance the collection network of milk in parallel to increase the milk production of the country.

Water and sanitation programmes

Government has taken several measures to improve the capacity, quality and distribution of water supply and sanitation facilities. At present 90.6% of the population has access to safe drinking water and safe piped water coverage is 50.5% (MCWS, 2018). There are large scale projects, such as the Water Supply and Sanitation Improvement Project (WASSIP) 2016-2020 implemented with support from the WB in seven districts around the country. In addition, the ADB dry zone urban water and sanitation project has been implemented. Also, there are special programmes implemented that aim to prevent chronic kidney diseases of unknown etiology (CKDu).

3.6.3 Summary of Nutrition Interventions in Sri Lanka

As discussed in section 3.6.1, a collection of WHO evidence-based interventions have been implemented in Sri Lanka to ensure the optimum nutrition through all stages of the life cycle. These life cycle interventions

mainly includes the nutrition interventions targetting the first 1,000 days of life – from mother's pregnancy to infants below two years of age; whereas most of these interventions are implemented under the FHB and RMNCAYH programme.

In addition to the WHO recommended nutrition interventions, other key nutrition interventions which currently practise in Sri Lanka includes provision of school meal, pre-school meal and food allowance for pregnant mothers. In addition to the above key specific nutrition interventions, Sri Lanka's multisectoral nutritional policies have focussed on integrating nutrition with other sectoral activities -including health, agriculture, education, early childhood development, social protection, and WASH. However, Sri Lanka does not have a general nutrition intervention programme, such as staple food fortification which targets improving the nutrition of the whole population.

Table 6 shows the WHO recommended nutrition interventions versus currently practising nutrition intervention in Sri Lanka.

Table 6 : WHO Recommended Essential Nutrition Actions vs Current Nutrition Practices in Sri Lanka

	Context(All Settings vs.Targetted)	Essential Nutrition Actions	Recommended Interventions	SL Nutrition Interventions
Multisectoral interventions for healthier populations	All	A. Healthy diet	Create a healthy food environment that enables people to adopt and maintain healthy dietary practices	Food security interventions
	All	B. Fortifications of condiments and staple foods with vitamins and minerals	a. Universal salt iodisation b. Fortification of rice/ wheat flour with vitamins and minerals	Existing programme Not exist
1. Infants	All	A. Protecting, promoting, and supporting breast-feeding	a. Early initiation of breastfeeding b. Enable exclusive breastfeeding for the first 6 months and continued breastfeeding	IYCF practise IYCF practise
	Targetted	B. Care of LBW and very-LBW infants	a. Optimal feeding of LBW and very LBW infants b. Enable kangaroo mother care for LBW infants	Multivitamin supplements Not exist
	Targetted	C. Assessment and management of wasting	a. Identify infants under 6months of age with SAM b. Inpatient/outpatient management of infants under 6 months of age with SAM	RMNCAYH covers Therapeutic food (BP100)
2. Children	All	A. Appropriate complementary feeding	Enable feeding of appropriate complementary foods	IYCF practise

	Context(All Settings vs.Targetted)	Essential Nutrition Actions	Recommended Interventions	SL Nutrition Interventions
	All	B. Growth monitoring and assessment	a Weight and height or length assessments for children under 5 years of age b. Nutrition counselling for children under 5 years of age	RMNCAYH covers RMNCAYH covers
	Targetted	C. Assessment and management of wasting	a. Identify infants and children aged 6–59 months with SAM b. Inpatient/outpatient management of infants and children aged 6–59 months with SAM c. Provision of supplementary foods to infants and children with moderate wasting presenting to primary health-care facilities	RMNCAYH covers Therapeutic food (BP100) Thripasha
	Targetted prevalence of anaemia in children aged 6–23 months/ 2–12 years is 20% or more	D. Iron containing micronutrient supplementation	a. Provision of iron-containing micronutrient powders for point-of-use fortification of foods for infants and young children aged 6–23 months b. Provision of iron-containing micronutrient powders for point-of-use fortification of foods for children aged 2–12 years	MMN supplementation for infants 2-18 months Micronutrient for school children
	Targetted	E. Vitamin A supplementation	High-dose vitamin A supplementation for infants and children aged 6–59 months	RMNCAYH covers
	Targetted where 20% or fewer households have access to iodised salt	F. Iodine supplementation	Iodine supplementation (or iodine-fortified complementary food) for infants and young children aged 6–23 months	Universal salt iodisation

	Context(all settings vs.targetted)	Essential Nutrition Actions	Recommended Interventions	SL Nutrition Interventions
	Targetted	G. Zinc supplementa- tion in the manage- ment of diarrhoea	Zinc supplementation with increased fluids and continued feeding for management of diarrhoea in children	RMNCAYH covers
3.Adolescents	Targetted prevalence of anaemia in non-pregnant women is 20% or higher	A.Iron containing micronutrient supplementation	Intermittent iron and folic acid supplementation for menstruating non-preg- nant adolescent girls	Only folic acid given
4.Adults	All	A.Nutritional care of women during pregnancy and postpartum	a. Nutritional counselling on healthy diet to re- duce the risk of LBW b. Energy and protein dietary supplements for pregnant women in undernourished populations c. Daily iron and folic acid supplementation for pregnant women d. Vitamin A supplemen- tation for pregnant women e. Calcium supplemen- tation for pregnant women to reduce the risk of pre-eclampsia	RMNCAYH covers Thripasha RMNCAYH covers Not exist Life course intervention
	Targetted prevalence of anaemia in non- pregnant women is 20% or higher	B.Iron-containing micronutrient supplementation	Intermittent iron and folic acid supplemen- tation for non-pregnant women (15–49 years)	Not exist
	Targetted 20% or fewer households have access to iodised salt	C.Iodine supplementation	Iodine supplementation for non-pregnant women (15–49 years) and pregnant women	Universal salt iodisation

Source:World Health Organisation. (2019). *Essential nutrition actions: mainstreaming nutrition through the life-course*. Geneva: World Health Organisation.

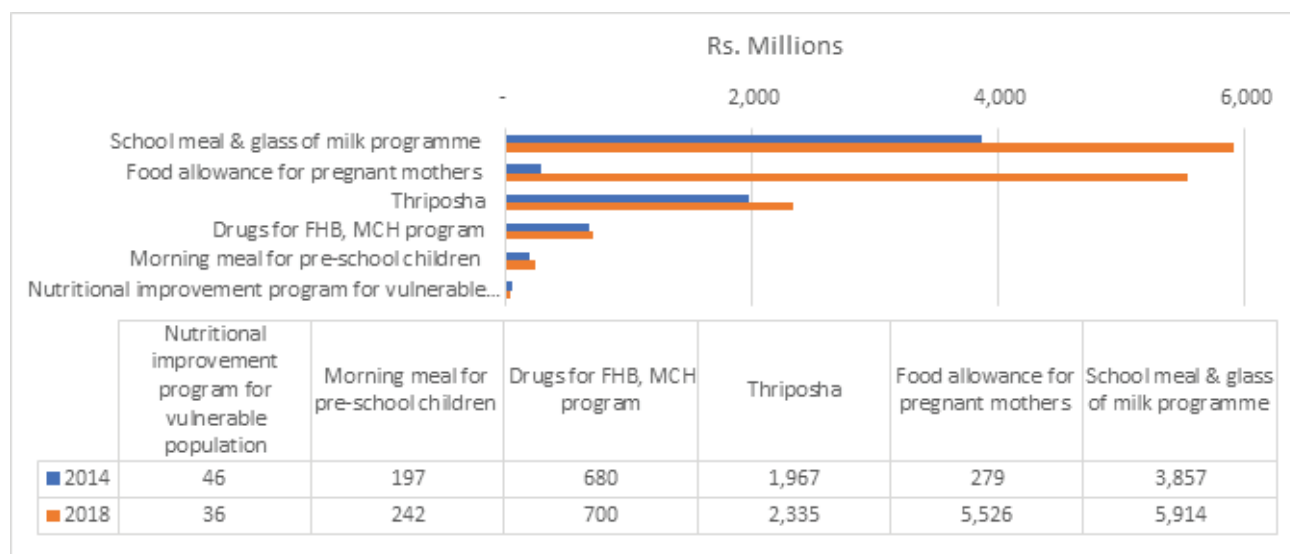
3.7 Public Spending for Key Nutrition Specific Interventions

Despite the existing budgetary constraints, Sri Lanka has maintained relatively stable level of investments in nutrition over the years. In order to realise investments on nutrition

(16%). The FHB medicine and supplements in the MCH programme accounted for only 5% of the nutrition-specific investments. Of the total nutrition-specific expenditure, only 0.2% accounted for awareness raising programmes on nutritional improvement programmes for the vulnerable population.

expansion of pregnant mother's targetted food allowance programme to universal program was a substantial expense. The government expenditure on food allowance for pregnant mothers was Rs. 5.5 billion in 2018 which indicated an increase of Rs. 5.2 billion compared to Rs. 0.3 billion in 2014. Further, around 350,000 annual beneficiary pregnant mothers were

Figure 4 : Public Spending for Key Nutrition Specific Interventions (Rs. Million)



Source: Constructed based on national budget reports.

Note: Drugs for the FHB includes all the costs related to micronutrient supplementation under the MCH programme other than the MMN & BP 100 related costs.

as effective, it is important to identify as to which nutrition interventions deserve further investments to maximise the nutrition outcomes to reach the country's targets. Investments in both nutrition-specific and sensitive interventions are fundamental for countries to improve food security and nutrition. This section discusses the public-finance on key nutrition specific interventions in Sri Lanka to assess the levels and appropriateness of public intervention.

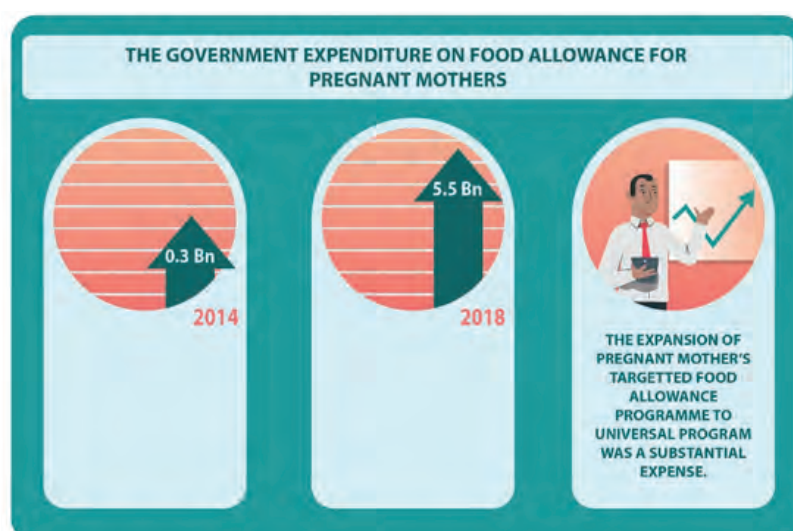
The country's annual public investment on key nutrition specific interventions is approximately around Rs. 15 billion. Of these investments 40% was absorbed by the school meal programme followed by the pregnant mother's food allowance programme (37%) and the Thripasha programme

Food allowance for pregnant mothers dominates among the current nutritional programmes.

As discussed before, in 2015, the

recorded during the 2016-2018 period (World Bank, 2020). This programme is administered by the MWCA.

The government annually spends around Rs. 5.5 billion for govern-

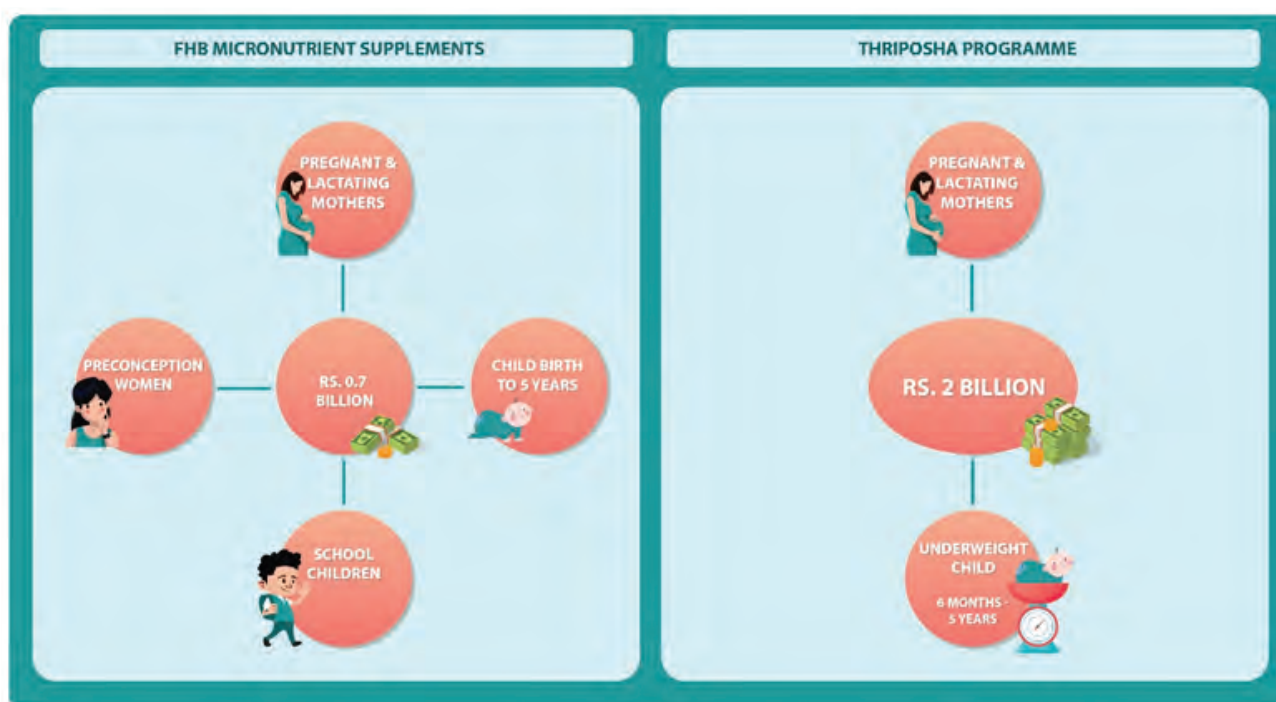


ment school meal programme as well (Figure 4). This programme has been implemented in almost 80% of schools, whereas one million grade 1-5 school children are benefitted. Further, a glass of fresh milk/milk packets programme is implemented in only around 10% of schools, which are not covered under the school meal programme.

The key nutrition programmes carried out by the MOH, are the FHB maternal and child micronutrient supplementation programme and Thripasha programme.

As discussed before, FHB medicine/supplement programme is a collection of evidence-based interventions which target nutrition of reproductive, maternal, new-born, child adolescent

and youth health. Parallely, the Thripasha programme is a supplementary feeding programme for pregnant and lactating mothers and undernourished children below 5-years. The government annually spends around Rs. 2 billion and Rs. 0.7 billion for the Thripasha programme and the FHB and MCH programmes, respectively (Figure 4).



4 Data and Methodology

4.1 Sources of Data

The study used micro data from the DHS – 2016 conducted by the Department of Census and Statistics (DCS) of Sri Lanka. The DHS collected demographic, socio-economic, and health data from married women aged 15-49 and their children under five years. Survey has covered representative samples of the three sectors: urban, rural, and the estate sector including 27,210 households and 18,302 married women aged between 15-49 years.

The DHS household survey collects information regarding a large number

of health, nutrition and health service utilisation measures, as well as data on respondents' demographic, social, and economic characteristics. Especially, this data set is useful for the proposed study, as it provides valuable information on child health and mother's background (education, prenatal care, health habits, as well as socio-economic background of the household – food consumption, sanitary facility, drinking water, etc).

4.2 Scope of the Exercise

Underweight is a composite form of

undernutrition that includes elements of stunting and wasting (United Nations Children's Fund, 2013). The scope of this study focussed on underweight children below 5-years, which relates to protein-energy malnutrition (PEM). Selection of variables is based on the UNICEF conceptual framework (discussed under the theoretical framework section) as well as on availability of data.

4.3 Methods

There are three key strands of analysis under this study, as described below.

Objective	Method
Examine the determinants of child malnutrition among different socio-economic groups	Regression model --negative of the z-score is used instead of a binary variable (indicating whether the child is underweight), as it provides information on the degree of undernourishment; facilitates the interpretation of coefficients, with positive value meaning increasing malnutrition
Examine why socio-economically poor are more likely to be malnourished	Decomposition of CI for weight-for-age z-scores of children is employed to measures the combined effect of the determinant on nutritional status as well as its distribution by socio-economic status to raise the socio-economic inequality in the malnutrition
Examine the change in socio-economic related inequality in child malnutrition between 2006 and 2016	Decomposition of change in CI, 2006 and 2016

4.3.1 Measuring Malnutrition

Underweight child

Child weight for age was constructed according to the international standards and z-scores were created using WHO growth standards.

$$\text{Z-score (or SD-score)} = \frac{\text{Observed value} - \text{Median value of the reference population}}{\text{Standard deviation value of reference population}}$$

A child was considered as "underweight" if child's weight for age z-score is more than two standard deviations below from the median of the WHO Child Growth Standards.

Underweight Birth

A LBW child was defined as being of a birth weight of less than 2,500g. The study considered the birth weight as recorded in the Child Health Record (CHR).

4.3.2 Measurement of Inequality

Concentration Index (CI) is used to illustrate the existing gaps of malnutrition level among different socio-economic groups. CI is defined as twice the area between the concentration curve and the line of equality (the 45° line).

$$C = \frac{2}{\mu} \text{cov}(h_i, r_i)$$

where h_i refers to the nutritional measure of the i^{th} individual and r_i is its respective fractional rank in terms of the index of household socio-economic status; μ is the mean of the nutritional measure and cov denotes the covariance.

The value of the CI can vary from -1 to + 1. Negative values imply that malnutrition is more concentrated among the disadvantaged children while the opposite is true for its positive values. When there is no inequality, the CI will be zero (O'Donnell, van Doorslaer, Wagstaff, & Lindelow, 2008).

4.3.3 Decomposition of the Concentration Index (CI)

Measurement and explanation of inequality in nutritional status across the entire distribution of socio-economic status would be preferable. Such inequality can be explained through decomposition of the CI which can be decomposed into the contributions of individual factors to socio-economic related inequality. Each contribution is the product of sensitivity with regard to the respective factor and the degree of income-related inequality in that particular factor (O'Donnell, van Doorslaer, Wagstaff, & Lindelow, 2008; Wagstaff, van Doorslaer, & Watanabe, 2003). For any linear additive regression, model y is used, such as

$$Y = \alpha + \sum_k \beta_k X_k + \varepsilon$$

The CI of Y can be written as;

$$C = \sum_k (\beta_k \bar{X}_k / \mu) C_k + GC_\varepsilon / \mu$$

where μ is the mean of Y, $\bar{X}_k$ is the mean of X_k , C_k is the CI for X_k , and GC_ε is the generalised CI for the error term (ε).

As shown in the second equation (of Section 4.3.3), C is equal to a weighted sum of the CIs of the k regressors, where the weight for X_k is the elasticity of y with respect to X_k .

The elasticity, CI with respect to each factor and the total contribution of each factor to the CI are derived from above equations.

In the case of non-linear, model such as ;

$$Y_i = G(\alpha^m + \sum_j \beta_j^m x_{ij}) + U_i$$

is used where y, may be binary or a count, x factor variables and G will take particular forms for the probit, logit, etc. Then, the decomposition is possible only if some linear approximation to the non-linear model is made. Using approximate using estimates of the partial effects evaluated at the means gives ;

$$Y_i = \alpha^m + \sum_j \beta_j^m x_{ij} + U_i$$

where the β_j^m are the partial effects, dy/dx_j of each variable treated as fixed parameters and evaluated at sample means; and U_i is the implied error term.

The CI for y can be written as ;

$$C = \sum_j \beta_j^m \bar{X}_{j\mu} C_j + GC_u / \mu$$

4.4 Methodology Application to DHS Data

4.4.1 Measure of Socio-economic Status

The DHS surveys do not provide consumption or income data; rather, it contains detailed information on household ownership and access to a variety of consumer goods and services. The questionnaire includes questions concerning the household's ownership of a number of consumer items, ranging from an electric fan to a television and car; dwelling characteristics such as flooring material; type of sanitary facilities, source of drinking water and toilet facilities used; and other characteristics that are related to household socio-

economic status. Recent research suggests that the asset approach is a reasonably satisfactory proxy for consumption (Filmer & Pritchett, 1998; Wagstaff, Paci, & van Doorslaer, 1991). Thus, an asset approach was used throughout this study as a proxy to measure the standard of living in a household.

4.4.2 Determinants and Drivers of Child Malnutrition

As discussed under the theoretical framework of this report, improvements in all hypothesised explanatory variables would lead to reductions in child malnutrition. Thus, the goal of this strand of analysis is to single out the independent effect of each variable, while controlling the other variables. More directly, it can be compared to the partial effects of the regressors on the probability that a child is malnourished. Thus, regression analysis is employed to examine the causes of child malnutrition, in line with the conceptual framework of this study (i.e. in relation to three levels of causality: immediate, underlying and basic causes).

This study aims to investigate on current nutritional measures such as IYCF practices, Vitamin A supplementation to children, dietary habits which are relevant to age 6 months and above children. As such, this analysis is carried out for children age 6-59 months old.

Dependent Variable

In regression models, the negative of the z-score is used as the dependent variable instead of a binary variable. The z-score conveys information in depth regarding malnutrition which facilitates the interpretation of coefficients, where a positive value means an increase in malnutrition. Therefore, child malnutrition is constructed by the negative of z-score, where a greater value indicates a high level of malnourishment. Since children with a

negative z-score represent those who are better off than the reference population, negative z-scores are changed into zero (O'Donnell, van Doorslaer, Wagstaff, & Lindelow, 2008; Van de Poel, Hosseinpoor, Jehu-Appiah, Vega, & Speybroeck, 2007).

Explanatory Variables

In line with the theoretical framework given in Section 2.5, explanatory variables are employed to identify the immediate, underlying and basic causes of malnutrition. The selection of the variables is based on the previous research findings on child malnutrition in Sri Lanka, as well as data availability.

Immediate Causes

Two immediate causes of child undernutrition, inadequate dietary intake and child's health status are measured using the following two variables -- intake of animal protein-meat, fish, or egg as recorded in the DHS survey child's food intake during 24 hour reference period Child's health status is measured using whether the child had diarrhoea, fever, or cough during the two weeks reference period of the survey.

Underlying Causes

As described in the theoretical framework following variables are employed to examine the three underlying causes - food insecurity, inadequate care and feeding practices, and poor health environment and services.

Food Insecurity

There is no direct variable to measure household food insecurity. The proximal determinants are closely associated with household food insecurity: the number of people in the household, the number of children between the age of 0 and 5 and the household members who consume alcohol regularly which may adversely affect household food security, are used as proxy measures.

Child Care and Feeding Practices

Further to explanations in the theoretical framework of the study, a child's food intake and health are critically dependent on the child care related feeding practices. These include breastfeeding, complementary feeding, and food choices etc. Thus, this study employed several variables to investigate on child care related feeding practices such as, complementary feeding related IYCF practices -- dietary diversity (four or more food groups) and minimum meal frequency (as defined in Table 4); whether the child is given Vitamin A; and to examine on food choices child's sugary food consumption was considered.

Mothers' Education and Availability

The household decisions made on food choices are influenced by women's knowledge regarding the nutritional benefits of different food and their ability to direct household resources towards food for household consumption (Engle, Menon and Hadad 1999). Thus, the effect of women's education and knowledge will partially reflect the influences of food security as well as mother and child care. To measure a mother's education and knowledge, the variable, mother's level of education is considered in this study. Whether the mother engages in an economic activity is used to measure the mother's availability for child care which is critically important for child's health.

Health Environment and Services

To represent health environment and services, access to safe water and sanitary facilities are chosen as explanatory variables. Safe water is defined as a household with reasonable access to water that is either treated surface water or water that is untreated but uncontaminated (such as from sanitary wells). Safe sanitary facility is defined as having water sealed toilet facilities.

Basic Courses

Following the previous research findings on child malnutrition in Sri Lanka, household's socio-economic status is considered, as a key basic cause for child malnutrition (Jayawardena, 2012).

Intergenerational and Life Cycle Effect

According to Jayawardena (2012), previous research indicates that intergenerational transmission of malnutrition was evidenced in Sri Lanka. For instance, it revealed that being born underweight as well as mother's poor nutritional status are significant contributors to child's growth failures. In addition, a child born to an undernourished mother has a higher probability of being underweight at birth. Furthermore, this intergenerational cycle of malnutrition is more visible in some regions. For instance, it was proved that the intergenerational cycle of malnutrition is deeply embedded in the estate sector (Jayawardena, 2014).

Thus, in this study, mother's height (in cm) which represents her long-term growth failures and mother being underweight (BMI) are considered to investigate on intergenerational effect of nutrition, while whether the child had a LBW is employed to investigate the life cycle effect of malnutrition.

Other Variables

To distinguish the broader determinants of child's nutritional status, characteristics such as, the child's age, sex, and birth order of the child, were employed as independent variables in the explanatory analysis.

4.4.3 Decomposing Socio-economic Inequalities in Child Malnutrition

Household socio-economic status is employed in this study to measure the

inequalities in nutritional status between deprivation groups. The study of poor-rich inequalities in nutritional status is solely inadequate to address the malnutrition problem at a practical level. Therefore, this study attempts to decompose the inequalities of malnutrition into the determining factors of malnutrition.

The decomposition analysis of the CI measures the combined effect of the determinant on nutritional status as well as its distribution by socio-economic status to raise the socio-economic inequality in the malnutrition. For an instance, a contribution to an inequality could arise either because a determinant is more prevalent among people of lower socio-economic status. As such, it is associated with a higher probability of malnutrition. If it is more prevalent among people of higher socio-economic status then it is associated with a lower probability of malnutrition (Yiengprugsawan, Lim, Carmichael, Sidorenko & Sleight, 2007).

As described by Hosseinpoor et al. (2006), the following steps are required to carry out a decomposition analysis. Firstly, it regresses the health outcome variable against its determinants through an appropriate model which results in finding the coefficients of the explanatory variables. Secondly, the means of the health variable and each of its determinants are calculated. Thirdly, CIs are calculated for the health variable and determinants. Finally, the pure contribution of each determinant included in the model regarding the inequality in the health variable can be quantified. Thereby, the absolute contribution of each determinant can be calculated by multiplying the health variable elasticity with the respective determinant and its CI. The equations employed for these analysis are described in Section 4.3.3 of this report.

5 Results and Findings

This chapter presents the empirical findings, to answer the research questions of this study. It begins with providing the dimensions of child malnutrition in Sri Lanka; by socio-economic characteristics, inequality in malnutrition as well as the life cycle effect of malnutrition. Next, it presents the summary statistics of the variables which are analysed in detail in this study. Then the empirical analysis findings are presented emphasising on two key areas of the study. Firstly on immediate, underlying and basic causes of child malnutrition among different socio-economic groups, then towards contributing of identified cause on explaining socio-economic differences in child malnutrition. Finally, it reviews the key nutrition specific programmes to assess the adequacy and efficacy of interventions and programmes. These help to address the nutrition issue.

5.1 Dimensions of Child Malnutrition in Sri Lanka

5.1.1 Nutritional Disparities by Socio-economic Characteristics

The DHS 2016 reveals the existence of socio-economic variations as well as regional disparities in child and maternal nutritional status. The prevalence of malnutrition is much severe in terms of certain population groups, such as the estate sector. For example, 30% of children under 5-years of age and 25% of babies were underweight (Table 7). Similarly, district level variations remain where Nuwara-Eliya, Mullativu and Anuradhapura districts have recorded the higher prevalence of child malnutrition, while Ratnapura, Nuwara-Eliya and Matara districts have recorded a higher prevalence of maternal malnutrition as well as LBW babies. In such deprived regions, there are deep rooted socio-economic factors which affect health and wellbeing of communities.

Table 7 : Nutritional Disparities by Background Characteristics, 2016

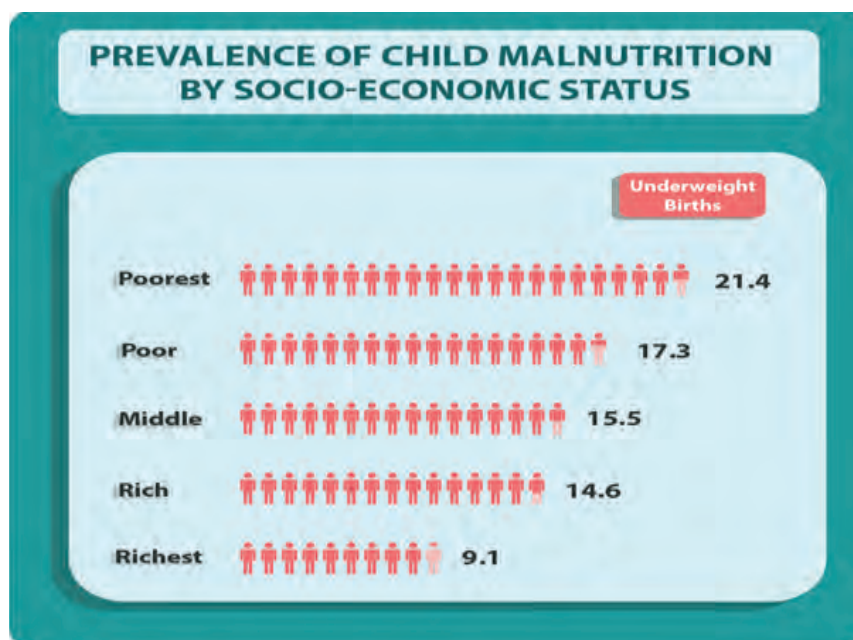
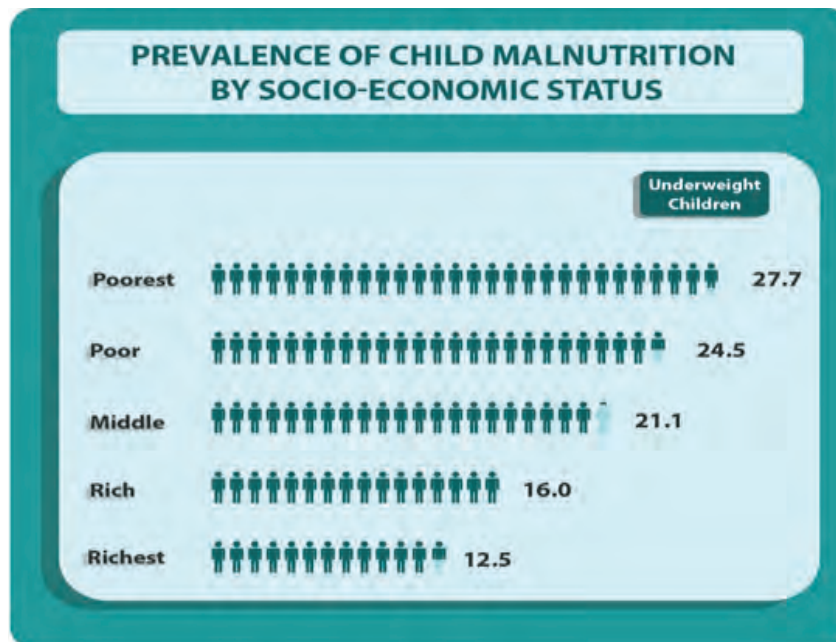
	Underweight Children <5-years Old	Underweight Births (<2,500 g)	Women with Low BMI (<18.5)
Residence			
Urban	16.4	12.7	5.6
Rural	20.8	15.7	9.1
Estate	29.7	25.4	22.0
District			
Colombo	14.6	12.4	4.6
Gampaha	19.6	15.2	6.6
Kalutara	20.1	15.3	9.0
Kandy	20.6	14.3	7.9
Matale	17.8	13.5	8.3
Nuwara-Eliya	29.6	20.7	13.4
Galle	17.8	12.6	12.3
Matara	22.3	20.5	12.3
Hambantota	22.4	10.0	10.7
Jaffna	13.7	6.2	7.4
Mannar	18.2	14.7	7.6
Vavuniya	20.3	19.4	7.9
Mullativu	25.5	9.4	8.9
Killinochchi	16.6	9.5	14.0
Batticaloa	21.4	18.9	10.7
Ampara	18.1	16.0	8.4
Trincomalee	22.7	15.0	7.4
Kurunegala	21.9	15.1	9.5
Puttalam	20.1	18.7	7.6
Anuradhapura	24.7	14.3	7.4
Polonnaruwa	18.7	17.3	12.0
Badulla	22.6	17.0	9.7
Moneragala	24.2	18.8	9.7
Ratnapura	22.9	22.4	15.2
Kegalle	19.9	18.8	8.5
Safe Drinking Water			
Yes	19.8	14.9	8.7
No	28.6	23.5	14.2
Sanitary Facility			
Yes	19.7	15.2	8.6
No	27.1	19.8	14.4

Source: Author's calculations based on DHS 2016 micro data.
Department of Census and Statistics. (2016). *Sri Lanka demographic and health survey 2016*.
Battaramulla: Department of Census and Statistics.

The estate sector households in particular are socio-economically poorer. Although in recent years poverty levels in the estate sector have reduced nearly fourfold, from 32% in 2006/2007 to 8.8% in 2016, this sector is still lagging behind compared to other regions of Sri Lanka. As reported in the Household Income and Expenditure Survey (HIES) 2016, 64.6% of the estate sector households are among the poorest 40% of households in the country. Furthermore, the HIES 2016 reveals that the mean monthly per capita income for estate sector is remarkably low at around Rs. 8,566 when compared to the national average of Rs. 16,377. It shows that, while the estate sector is exiting poverty, low income levels may be still hindered by food security.

5.1.2 Inequality in Child Malnutrition

Long-term health and nutrition problems exist among lower socio-economic groups. The CI of malnutrition is used as a measure of socio-economic inequality. The CIs for all four child nutritional outcomes are negative, indicating that poorer nutritional status is concentrated among the poor (see Table 8). These inequalities are higher for child long term growth failures--underweight and stunting, than the child short term growth failures wasting. Further, inequality in underweight births is remarkably more disadvantageous to the poor. However, absolute values of the CI of underweight and stunting in 2006 were greater than those in 2016, indicating that under-five children's underweight and stunting inequalities have reduced over the period. On one hand, even to date, according to the quintile poor/rich ratio, the prevalence of stunted children, underweight children and underweight births among the bottom socio-economic group is almost doubled to that of the highest socio-economic group. On the other hand, it is worth to note that the prevalence of



“Long-term health and nutrition problems exist among lower socio-economic groups.”

stunting, under-weight children as well as underweight births have increased among the richer group. Possibly, the causes for child undernutrition may differ by socio-economic groups.

5.1.3 Life Cycle of Malnutrition

Data shows the possible association of LBW babies with maternal malnutrition at the district level as well (Table 7). In the above circumstances, this section examines the current status of the probable intergenerational transmission of malnutrition at the different stages of the malnutrition life cycle.

Underweight births

According to the DHS 2016, 15.7% of below five-year-old children were born with LBW. Further to the discussion in Section 3.1, the prevalence of

Table 8 : Prevalence of Child Malnutrition by Socio-economic Status

		Asset quintiles (%)					Population Average	Poor/rich Ratio	CI
		Poorest	Poor	Middle	Rich	Richest			
Stunted	2016	25.4	19.0	16.2	14.0	11.9	17.4	2.1	-0.15
	2006	28.8	22.4	16.3	13.0	7.6	17.4	3.8	-0.24
	2006-2016	3.4	3.4	0.1	-1.0	-4.2	0.0	1.6	n/a
Underweight	2016	27.7	24.5	21.1	16.0	12.5	20.5	2.2	-0.16
	2006	29.2	27.0	21.1	19.0	11.4	21.4	2.6	-0.17
	2006-2016	1.5	2.5	0.0	3.0	-1.1	0.9	0.3	n/a
Wasted	2016	17.4	18.2	15.1	14.1	9.8	15.0	1.8	-0.10
	2006	17.4	14.9	16.0	16.5	10.4	15.1	1.7	-0.08
	2006-2016	0.1	-3.3	1.0	2.5	0.6	0.1	-0.1	n/a
Underweight Births	2016	21.4	17.3	15.5	14.6	9.1	15.7	2.3	-0.14
	2006	28.8	22.4	16.3	13.0	7.6	16.6	3.8	-0.13
	2006-2016	7.4	5.1	0.8	-1.5	-1.5	1.0	1.4	n/a

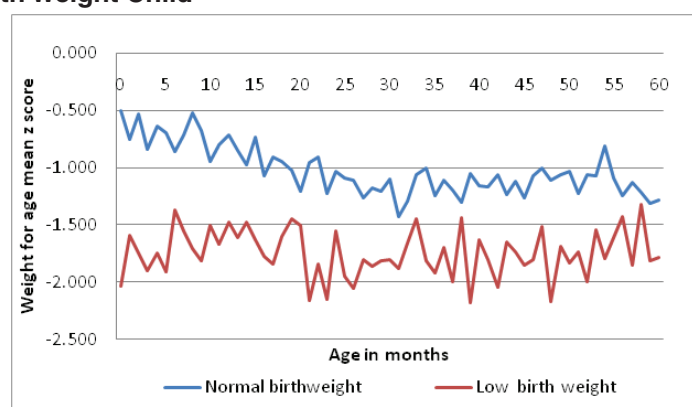
Source: Author's calculations based on DHS 2016 micro data.

“higher prevalence of malnutrition among young women before the childbearing age”

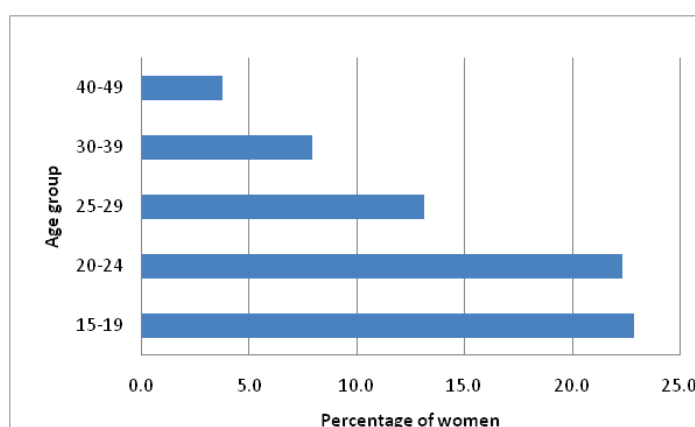
underweight births has reduced only by 1 percentage point in 2016 when compared to 2006. As established in Gillespie & Flores (2000), being born underweight causes child growth retardation significantly in the long term. The study findings support the literature, where growth patterns of children who were born underweight show continued growth retardation when compared to children born with a normal birthweight. It suggests that, underweight births has a significant yet an unfavourable effect on child malnutrition in Sri Lanka (see Figure 5).

Nutritional status of reproductive aged women

Maternal malnutrition has considerably reduced during 2006-2016.

Figure 5 :Growth Pattern of Low Birth Weight Child and Normal Birth Weight Child

Source: Author's calculations based on DHS 2016 micro data.



However, it is noteworthy the existing higher prevalence of malnutrition

among young women before the childbearing age⁴ (age 15-19 years of

⁴ Women's median age at first child birth is 26 years (Department of Census and Statistics, 2016).

22.9% and age 20-24 years of 22.4%) which affects the birth weight of a baby. These suggest that reproductive aged women should be targetted well ahead of their first pregnancy to reduce the underweight births. Unless this cycle is broken at some stage, not only does it perpetuate the vicious cycle of malnutrition, but also contributes to an enormous waste of human potential. Therefore, proactive action needs to be taken at each stage of the life cycle

to ensure that malnutrition does not perpetuate into an intergenerational problem.

5.2 Determinants and Drivers of Child Malnutrition

As explained in Section 2.5, the UNICEF conceptual framework's premise is that nutritional outcomes result from three major underlying pathways

-- household food security, caring practices and a healthy environment. Based on this framework, Section 5.2 presents regression analysis of the causes of child undernutrition in Sri Lanka.

Summary statistics

Table 9 shows the descriptive statistics of child nutritional measures and all explanatory variables with respect to DHS 2016 data.

Table 9 : Summary Statistics

	Mean	Std. Dev.	Description
Child's characteristics			
Male child	0.51	0.500	Male (1) Female (0)
Child's age (in months)	31.07	15.217	Continuous variable (6-59)
Birth order	2.00	0.980	Discrete variable
Intergenerational cycle			
Under-weight birth	0.15	0.359	birth weight <2,500g (1-0)
Mother's Nutrition			
Mother underweight (BMI)	0.12	0.323	BMI <18.5 (1-0)
Mother's height (in cm)	153.33	6.396	Continuous variable
Immediate determinants			
Food intake -animal protein-meat, fish or egg	0.84	0.367	Yes (1) No(0)
Child's health	0.27	0.442	Whether child had diarrhoea, fever, or cough in the two weeks reference period
Underlying determinants			
Household food security			
Number of members in the household	4.99	1.583	Discrete variable
Number of children below 5 years	1.24	0.479	Discrete variable
Household member use alcohol regularly	0.45	0.497	Yes (1) No(0)
Child care & feeding practices			
Vitamin A given	0.53	0.499	Yes (1) No(0)
Four or more food groups	0.86	0.351	Yes (1) No(0)
Minimum meal frequency	0.84	0.369	Yes (1) No(0)
Sugary food	0.91	0.289	Yes (1) No(0)
Mother's years of schooling	10.77	2.744	
Mother engage in an economic activity	0.19	0.389	Yes (1) No(0)
Household environment			
Safe drinking water	0.90	0.306	Yes (1) No(0)
Water sealed separate toilet	0.89	0.314	Yes (1) No(0)
Basic courses			
Socio-economic status			Quintile variable (1-5)

Source: Author's calculations using the DHS 2016 data.

Table 10: Determinants of the Prevalence of Child Malnutrition

	Overall	Poorest	2nd Quintile	3rd Quintile	4th Quintile	Richest Quintile
Child's characteristics						
Male child	0.028	-0.012	0.136	-0.015	0.004	0.012
Child's age (in months)	0.005	0.01***	0.005**	0.01***	0.001	0.004*
Birth order	0.051***	0.05*	0.08***	0.005	0.06**	0.045
Intergenerational cycle						
Under-weight birth	0.576***	0.48***	0.63***	0.60***	0.56***	0.63***
Mother's Nutrition						
Mother underweight (BMI)	0.356***	0.32***	0.43***	0.32***	0.20**	0.26**
Mother's height (in cm)	-0.025***	-0.02***	-0.02***	-0.02***	-0.03***	-0.03***
Immediate determinants						
Food intake -animal protein-meat, fish or egg	-0.061	-0.21***	0.033	0.048	-0.021	-0.020
Child's health	0.005	-0.004	-0.028	0.077	0.048	-0.053
Underlying determinants						
Household food security						
Number of members in the household	-0.013	-0.005	0.008	-0.031	-0.007	-0.013
Number of children below 5 years	0.026	0.047	0.009	0.110	-0.087	0.032
Household member use alcohol regularly	0.0513**	0.12**	0.052	-0.028	0.053	0.006
Child care & feeding practices						
Vitamin A given	0.018	0.054	0.022	0.063	0.011	-0.075
Four or more food groups given	0.006	0.031	0.187	-0.049	-0.104	-0.031
Minimum meal frequency	-0.053	-0.095	-0.009	-0.055	-0.039	0.017
Sugary food consumed	0.030	0.006	0.047	0.033	0.090	-0.001
Mother's years of schooling	-0.022***	-0.004	-0.019	-0.009	0.003	-0.016
Mother engage in an economic activity	-0.057*	-0.015	-0.088	0.007	-0.111	0.006
Household environment						
Safe drinking water	-0.11**	-0.13*	-0.001	-0.017	-0.013	0.197
Water sealed separate toilet	-0.111***	-0.092	0.087	-0.015	-0.104	-0.294
Number of observations	5,956	1,476	1,231	1,148	1,155	946

Source: Author's calculations using the DHS 2016 data.

Note: Statistical significance at 1%, 5% and 10% levels are indicated by ***, **, * respectively.

LBW is a major cause of malnutrition among children below five years. Babies born with a LBW are likely to become underweight children compared to those with a normal birth weight. It is well recognised that, LBW is associated with growth retardation throughout childhood, adolescence, into adulthood and also to carry on the vicious cycle of malnutrition. It is noteworthy that the LBW is a significant determinant for child malnutrition irrespective of the socio-economic status of the household. As such, a LBW causes long-term consequences for individuals, households, communities, as well as the country.

Further, finding of this study reveals that mother's nutritional status has a strong impact on a child's nutrition. A child being born to an undernourished mother exerts a significant impact on the nutritional status of the child. Further, mother's height which indicates long term growth, is negatively associated with being an undernourished child. Similar to previously discussed child's birthweight, mother's poor nutrition is also a major cause of child malnutrition among all socio-economic groups. Thus overall measures are required to combat the vicious cycle of malnutrition in Sri Lanka.

With related to immediate determinants, study findings reveal a significant reason for child malnutrition among poor people was consuming lack of protein rich food. Children, who consumed animal protein food such as meat, fish, poultry eggs were less likely to be malnourished. However, the consumption of protein rich food, especially those containing animal protein was much lower among poor people, compared to food consumption of an average Sri Lankan. Possible reasons behind consuming lack of animal protein include, food insecurity, knowledge gaps, socio-

“ Spending on alcohol and tobacco badly affects the household's food security, especially for poor people ”

cultural practices as well as financial constraints.

As described under the theoretical model, all undelaying determinants food insecurity, child care and feeding practises as well as household environment have a significant effect on child malnutrition of the country.

Spending on alcohol and tobacco badly affects the household's food security, especially for poor people.

This study reveals that spending on alcohol and cigarettes in a household significantly increases the household's food insecurity which led to the prevalence of malnourished children. Furthermore, spending on alcohol and tobacco consumption was higher among poor people. For instance, according to the HIES 2016, the poorest quintile household average monthly expenditure on liquor and tobacco was Rs. 503 which consisted approximately 4% of their monthly food expenditure.⁵ Furthermore, the estate sector households, where the country's poorest can be identified in terms of nutrition, spend around 10% of their monthly food expenditure for alcohol and tobacco.⁶

Child growth failures significantly increase with the child's age. As discussed in Section 5.1.3 of this report, child malnutrition seems to increase after the first year of life and remain high thereafter (see Figure 5). Moreover, 22% of children are underweight among 18-59 month old children. Child

growth retardation may be an indication of either an inappropriate food intake in terms of quantity or quality during the weaning period. The low risk of malnutrition during the first six months may be due to the protective effect of breastfeeding. According to the DHS estimates, 99% of children in the country are ever breastfed, while 89% of children aged 0-23 months are breastfed appropriately for their age (i.e., exclusive breastfeeding for children aged 0-5 months and continued breastfeeding along with complementary foods for children aged 6-23 months).

The study findings also reveal that the mother's education have a strong impact on nutrition of her children, through child care practices. As explained in the research design of this study, evidence suggests that women are critical in ensuring good nutrition for the family and household food security. Although the actual amount of food taken by a child is directly related to food security, it is critically dependent on the child care practices such as breastfeeding, complementary feeding, and food preparation too. On one hand, women have the greatest potential to make decisions that positively affect child's health, such as how household income is spent, the quantity and quality of food, and indulging in health-seeking behaviour. On the other hand, poor education makes it difficult for women to take optimum advantage of the awareness raising campaigns on family health and hygiene practices offered in their localities.

Households with poor sanitary facilities -- shared toilet facility, significantly increase the risk of child growth failures. As discussed in the research design of this study, the third underlying determinant of child nutritional status is health environment and services which rely on sanitary facilities, access to safe drinking water, and access

⁵ Estimated using the HIES 2016 data.

⁶ Ibid.

to health services. Child's health is linked to the healthy environment in which the child lives, whereas hygiene practices and health services – safe drinking water, sanitary facilities, to optimise the child's health.

5.3 Explaining Socio-Economic Inequalities in Child Malnutrition

5.3.1 Decomposing Socio - Economic Inequalities in Child Malnutrition

Table 11 indicates the results of decomposition analysis where the contributions of individual determinants to the overall inequality in underweight child is reported. The decomposition analysis involves the CI and percentage contribution of each determinant. The entries in column 2 represents the CI for each factor. The percentage contribution of each factor to the CI for the dependent variable being an underweight child is given in column 4.

According to the findings, the negative CI (-0.091) shows that there is inequality in underweight children to the disadvantage of the poor. Socio-economic characteristics such as undernourished women and underweight births are more prevalent among people in the lower socio-economic status. Furthermore, these variables are positively associated with an increase in child malnutrition. Therefore, the combined effect of the above discussed determinants and their distribution by socio-economic status raise the socio-economic inequality in child malnutrition. Further, the large elasticities of determinants are also responsible for their large contribution to socio-economic inequality. For instance, although mother's height has a trivial contribution to socio-economic inequality, it is highly sensitive to child nutrition. Hence, it makes a significant

Table 11: Decomposition Results of Child Malnutrition

	Elasticity	CI	Contribution	%
Child's characteristics				
Male child	0.011	-0.003	0.000	0.0%
Child's age (in months)	0.122	-0.011	-0.001	1.5%
Birth order	0.077	-0.030	-0.002	2.5%
Intergenerational cycle				
Under-weight birth	0.070	-0.139	-0.010	10.7%
Mother's Nutrition				
Mother underweight (BMI)	0.033	-0.230	-0.007	8.2%
Mother's height (in cm)	-2.983	0.003	-0.009	10.3%
Immediate determinants				
Food intake-animal protein-meat, fish or egg	-0.039	0.027	-0.001	1.2%
Child's health	0.003	-0.006	0.000	0.0%
Underlying determinants				
Household food security				
Number of members in the household	-0.044	0.016	-0.001	0.8%
Number of children below 5 years	0.026	0.005	0.000	-0.1%
Household member use alcohol regularly	0.018	-0.057	-0.001	1.1%
Child care & feeding practices				
Mother's years of schooling	-0.190	0.069	-0.013	14.5%
Mother engage in an economic activity	-0.007	0.215	-0.002	1.8%
Household environment				
Safe drinking water	-0.057	0.045	-0.003	2.8%
Water sealed separate toilet	-0.078	0.070	-0.005	6.0%
Fixed effects				
Residual			-0.006	6.3%
Total			-0.030	32.4%
			-0.091	100.0%

Source: Author's calculations using the DHS 2016 data.

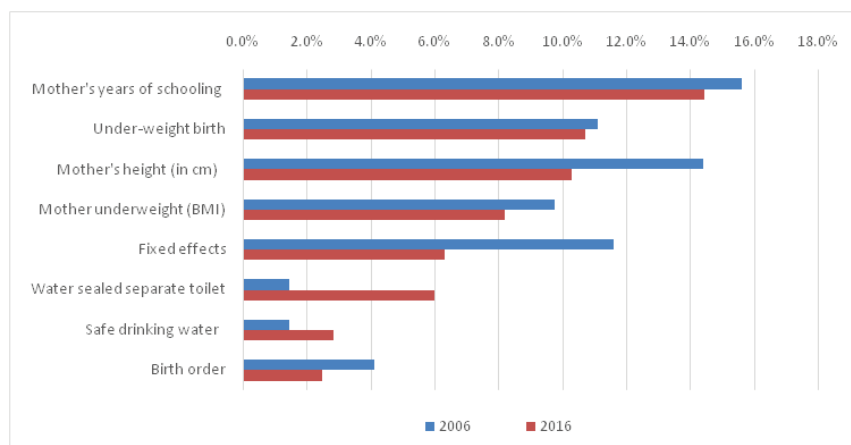
contribution to the socio-economic inequality in child malnutrition.

Apart from these direct contributions, another significant contributor for inequality in child malnutrition is less educated mothers, which has the highest single variable contribution (14.5%) to socio-economic inequality in child malnutrition. As discussed in the section 5.2, safe drinking water and sanitary facilities reduce the prevalence of child malnutrition; due to socio-economic inequalities, having less access to these facilities exert higher prevalence of child malnutrition among lower socio-economic groups. Further,

commune fixed effects contributes around 6% contribution, where districts are employed to pick commune-level determinants of nutritional status.

Finally, a major part of socio-economic inequality in child malnutrition is explained by intergenerational transmission. For instance, life cycle components of malnutrition, underweight birth as well as mother's nutritional status which are measured by both the mother's height and BMI, make a combined effect of 29% of total inequality in child malnutrition.

Figure6 :Decomposition of change in the CI, 2006-2016



Source: Author's calculations using DHS 2016 data.

5.3.2 Decomposing Socio-Economic Inequalities in Child Malnutrition 2006 vs 2016

Figure 6 presents the comparison of percentage contribution of each determinant to socio-economic related inequality in child malnutrition between 2006 and 2016 period. The percentage contribution of each determinant to the total change in CI are broadly similar across the two periods, with some important discrepancies. For instance, it can be seen that contribution of a mother's nutritional issues on inequality in child malnutrition has reduced over the period, especially mother's long-term growth indicator (i.e. mother's height). Also, contribution of commune fixed effects, i.e. district level contribution has considerably reduced in 2016. It can also be highlighted that, sanitary facilities and safe drinking water have more contribution for socio-economic related inequality in child malnutrition in 2016 when compared to those in 2006.

5.4 Assessment of Key Nutrition Interventions in Sri Lanka

Further to the discussion in the previous sections (5.2 and 5.3) of the study

“life cycle effect – mother's poor nutrition and LBW have contributed most to a higher prevalence of child malnutrition among lower socio-economic groups.”

found that the life cycle effect of malnutrition is a highly significant cause for the prevalence of child malnutrition in Sri Lanka. Furthermore, other significant causes include -- immediate causes – inadequate food intake; underlying causes - household food insecurity, inadequate maternal and child care practices and poor health environment as well as basic causes – socio-economic status.

5.4.1 Key Factors that Contribute to Malnutrition in Sri Lanka

The life cycle effect has contributed the most to higher prevalence of child malnutrition. As discussed in Section 5.3 on 'socio-economic inequalities in child malnutrition', life cycle effect – mother's poor nutrition and LBW have contributed the most to

higher prevalence of child malnutrition among lower socio-economic groups. Further, as described in Section 5.1.3, a higher prevalence of malnutrition was observed among pre-conception women, whereas more than 22% of 15-24 aged women were underweight. As discussed in the intergeneration cycle of malnutrition, a mother's poor nutrition leads to underweight babies. Therefore, a higher prevalence of undernutrition, among pre-conception women could be a leading cause of lack of progress in reducing underweight births in Sri Lanka. Thus, to break the vicious cycle of malnutrition in Sri Lanka, essential nutrition interventions are required to target pre-conception women.

Further, study findings revealed possible dietary issues and knowledge gaps. For instance, the study revealed the lesser intake of animal protein as a significant reason for child malnutrition among lower socio-economic groups. Further, the study reveals that a child's

“lesser intake of animal protein is a significant reason for child malnutrition among lower socio-economic groups.”

growth retardation accelerates with age. Childhood growth retardation may be an indication of either inappropriate food intake in quantity or quality during the weaning period. Thus, the underlying reasons could be either the food insecurity of poor people or lack of awareness. Additionally, the study reveals that a mother's less education also highly contributes to a higher prevalence of child malnutrition among lower-socio economic groups. As such, nutrition interventions should be prop-

erly focussed to address the above root causes of malnutrition.

5.4.2 Are the Government Responses Addressing these Issues Adequately?

As described in Section 3, successive governments have taken several measures to improve the nutritional status of Sri Lankans. However, there is a need to strengthen the focus and coverage of nutrition intervention programmes. In this context, this section discusses gaps in nutrition policies, when addressing the identified causes of child malnutrition.

As discussed in the previous sections, an important area of addressing malnutrition issue is addressing the life cycle effect. Sri Lanka currently practices most of the WHO recommended life course interventions (Table 6). However, some gaps can be noted regarding interventions for pre-pregnant women, in terms of quality as well as coverage. For instance, under the pre-conception programme, only folic acid is given for all registered women while iron is given only for the anaemic women. Further, coverage of the current pre-conception care programme is low due to poor participation, whereas coverage for the initiative is currently at 50% across the country (FHB, 2017). As such, due to coverage gaps as well as the nature of the pre-conception programme, most of the undernourished pre-conception women, who needs micronutrient supplementation may not receive the required supplements under this programme.

Further, another area which needs ample attention is addressing the growth retardation with age, dietary issues and knowledge gaps. In line with the WHO recommended nutrition actions, recommended nutrition interventions to address such issues these issues include -- nutrition counselling; complementary feeding practices; management of infants and aged 6–59

months children with SAM as well as the provision of supplementary foods to infants and children with moderate malnutrition (Table 6).

In this context, effective communication on nutrition counselling -- IYCF practices and healthy diet; are critical elements of nutrition interventions. Further, considering the study findings that a less educated mother highly contributes for child malnutrition among lower socio-economic groups. Especially in community-driven programmes, this issue would have a major role to play in addressing the malnutrition problem among vulnerable regions. However, as discussed in Section 3.7, presently around 0.2% of the total nutrition-specific investments have been used for nutritional awareness and promoting of behavioural-change communication programmes of vulnerable people.

Timely access to quality health services is a key factor for the successful management and treatment of severe and moderate malnutrition. On one hand access issues of SAM treatment. Although therapeutic food BP-100 is RUTF in the form of a compressed biscuit/bar to be used in the community settings, in Sri Lanka, it is prescribed by a paediatrician at the district hospital level or higher (World Bank, 2020). Thus, service coverage is limited for SAM treatment due to low demand for services from people, lack of active case identification, and limited access to services in some provinces. Also there is no data available on the performance of existing services to treat SAM/MAM (e.g. coverage, treatment outcomes, etc.), thus, making it difficult to assess its outreach to children and assess whether they are successfully treated.

On the other hand, regardless of potential benefits of Thriplosa, it has not led to positive changes in the prevalence of acute malnutrition. Children identified as having moder-

ate malnutrition receive the locally-produced food supplement - Thriplosa, at primary health care level. However, certain issues are identified regarding the effectiveness of this Thriplosa intervention. This was affirmed by a WFP technical mission in 2016 and 2017, which cited several reasons. These included sharing of the product at the household level indicating a need for an effective in the behavioural change communication strategy and issues concerning supply management (World Food Programme, n.d.). Further, the National Nutrition and Micronutrient Survey of Pregnant Women in Sri Lanka, reveals that 91% of pregnant mothers had received Thriplosa but only 11% of them had consumed it as prescribed (Jayatissa, Ferrnando, & De Silva, 2015).

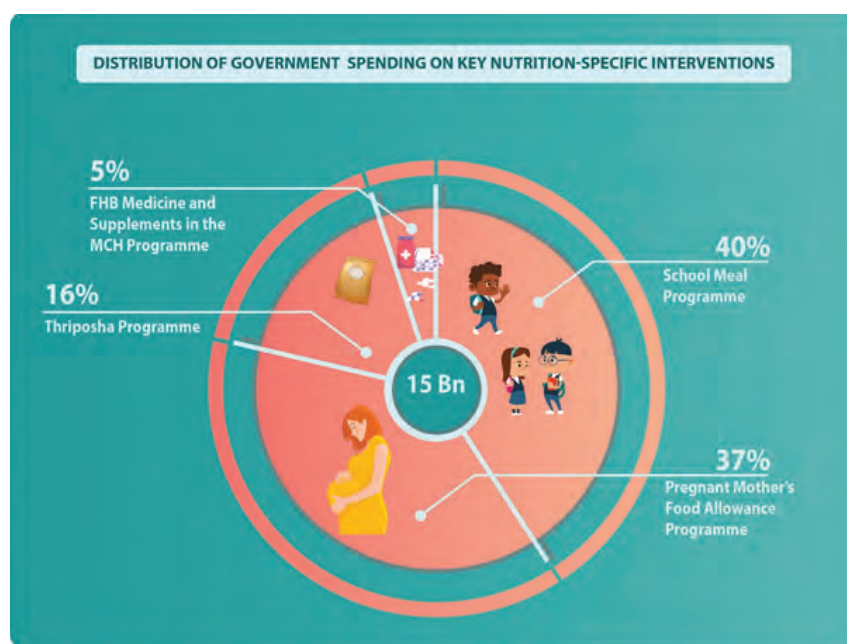
In light of the above, effectiveness issues as well as coverage gaps of some existing nutrition interventions, more holistic nutrition interventions are much appropriate for Sri Lanka. As recommended under the WHO essential nutrition actions, fortification of staple food (rice or wheat flour) would be a more appropriate nutrition intervention to address the dietary issues of people at the general level. However, currently, Sri Lanka does not practise an overall nutrition intervention programme.

5.4.3 Can Resources from Other Areas of Malnutrition Policy Response be Redirected to Improve the Effectiveness of Policy Responses? To improve the effectiveness of policy responses, the government should consider redirecting funds and resources for more effective programmes. Some possible options for fiscal space are discussed below.

The relatively imbalanced composition of current nutrition expenditure suggests a potential space to improve the effectiveness of policy

responses. For instance, as discussed in Section 3.7, the country's annual public investment on key nutrition-specific interventions is approximately around Rs.15 billion. Of these investments, 40% was absorbed by the school meal programme, followed by the pregnant mother's food allowance programme (37%) and the Thriposha programme (16%). The FHB medicine and supplements in the MCH programme accounted for only 5%. However, the MCH programme is a collection of evidence-based interventions which covers most of the maternal and child nutrition interventions. Also it especially focusses on the first 1,000-days when nutrition interventions are most effective. As such, the government should consider allocating more resources for this MCH programme to improve the quality of supplements.

Further, some of the universal nutrition interventions are an unnecessary burden for the government. For instance, the expansion of pregnant mother's targetted food assistance to one that is universal in 2015, costs significantly, which increased by Rs. 5.2 billion. The government annually spend around Rs. 5.5 billion for pregnant mother's food allowance programme; however, its effectiveness is also questionable. Although some specifications on purchasable food items are mentioned in this food allowance voucher, there remains a possibility and thus a loophole, to purchase other items which are not nutritional food. Also, it causes practical issues to target pregnant women through this programme, as even the food items purchased from this voucher are not solely consumed by these women. As such, the government should consider redirecting the funding for this programme for a relatively more effective nutrition programme, by changing the current universal pregnant mother's food allowance programme to a targetted programme in the deprived regions. Further, annual spending for supplementary feeding programme



(Thriposha) programme, which targets all pregnant mothers and lactating women for the first six months, is around Rs 2.3 billion. However, certain issues are identified concerning the effectiveness of this programme. According to the WHO recommended interventions, energy and protein

dietary supplements for pregnant women are recommended only for the undernourished populations (Table 6). In this context, there is potential to gain some fiscal space by changing the universal Thriposha programme, for pregnant and lactating women, to target pregnant women at-risk.

Wheat and Maize Flour Fortification

Wheat and maize flour fortification is a preventive food-based global intervention to improve the micronutrient status of populations. This can be integrated with other interventions in efforts to reduce vitamin and mineral deficiencies. Wheat and maize flour fortification should be considered when industrially-produced flour is regularly consumed by large population groups in a country. Therefore, such programmes are expected to be most effective in achieving a public health impact directed at the national level.

Decisions about which nutrients and the appropriate amounts to add to fortify flour should be based on a series of factors, including the nutritional needs and deficiencies of the population; the usual consumption profile of 'fortifiable' flour (i.e. produced domestically or imported, which could in principle be fortified); sensory and physical effects of the fortified nutrients on flour and flour products; fortification of other food channels; population consumption of vitamin and mineral supplements; and costs. Flour fortification programmes should also include appropriate quality assurance and quality control programmes offlour production, as well as regulatory and public health monitoring of the nutrient content of fortified foods. Further, assessment of nutritional and health impacts of the fortification strategies is recommended. Though wheat and maize flours can be fortified with several micronutrients, iron, folic acid, vitamin B12, vitamin A and zinc, are the five micronutrients recognised to be of public health significance in developing countries.

Source: World Health Organisation. (2013). *Essential nutrition actions*. Geneva: World Health Organisation.

6 Conclusion and Policy Recommendations

The study findings support the literature, that intergenerational cycle of malnutrition is significantly evidenced in Sri Lanka. A mother's poor nutritional status is a significant contributor to the child's growth failures and also being born underweight child is more likely to be growth retarded in childhood. Further, this study findings revealed that, around 30% of socio-economic inequality in child malnutrition is explained by intergenerational transmission – underweight birth as well as mother's nutritional status. Furthermore, it is noteworthy that even in richer socio-economic groups, mother's poor nutritional status is closely associated with child malnutrition. Thus, to proactively combat malnutrition, measures need to be taken at each stage of the life cycle to ensure that malnutrition does not prolong in one's life, but also into future generations.

In the above circumstances, the current nutrition programmes need to be reviewed, both in terms of design and beneficiaries. Given the strong evidence of evidenced-based nutrition-specific interventions and their role in addressing the immediate determinants of nutrition requires due attention, especially for those that are related to the first 1,000 days window. Government should consider on improving the quality of the MCH supplementation programme by the FHB, as it covers the entire life course interventions (as recommended in the evidenced based interventions). More emphasis should be given on improving the nutrition of children below two years, pregnant and lactating mothers. Section 5.4 policy assessment of this study revealed that existing gaps of the current nutrition intervention for pre-conception women. To improve the coverage of this programme, separate services for adolescents

may be more appropriate as they may not like to use general MCH services rather prefer facilities that are especially designed to offer young people. Following strategies are recommended for better targeting pre-conception women -- implementation of nutrition intervention programmes and regular screening tests at work places as well as higher education and TEVT institutes that provide services to adolescents and youth.

Further, study findings revealed about possible dietary issues and knowledge gaps due to underlying causes - either food insecurity of poor people or lack of awareness. For instance, the study revealed, significantly child's growth retardation accelerates with age. Childhood growth retardation may either be an indication of inappropriate food intake in quantity or quality during the weaning period as well as poor health status. Further, a significant reason for child malnutrition among lower socio-economic groups is less intake of animal protein. The reasons could be either food insecurity of poor people or lack of awareness. As discussed under Section 5.4, possible gaps in nutrition interventions related to this particular area could be, issues of nutrition counselling; complementary feeding practices; management of infants and aged 6–59 months children with SAM as well as provision of supplementary foods to infants and children with moderate malnutrition.

In this context, effective communication on nutrition counselling -- IYCF practices and healthy diet; screening for acute malnutrition and follow-up of malnourished children are critical elements of a nutrition interventions (UNICEF, 2013). Nutrition education programmes should be strengthened to inculcate

better consumption habits - what foods to select; how to prepare and feed children; and the hygienic and nutritional value of food. Programmes are vital to raise awareness on healthy behaviours.

Further, community-based management has proven to be successful in treating acute malnutrition. Community support can include providing services such as counselling, support and communication on IYCF; screening for acute malnutrition and follow-up of malnourished children; deworming; and delivering vitamin A and micro-nutrient supplements. It decentralises the management of SAM, eases outreach and assists to treat children in their communities. For instance, Rwanda initiated a National Emergency Plan to Eliminate Malnutrition (EPEM). The EPEM addressed both, the acute and chronic undernutrition, focussing first on the most vulnerable. Village-level identification and treatment of SAM in facilities was scaled up. Around 30,000 community health workers received refresher training on how to screen, identify and refer cases for treatment. At the same time, additional preventive measures were initiated in communities to improve household food security and care practices nationwide (UNICEF, 2013).

According to findings women's education significantly contributes to child's nutrition. Less educated mothers have contributed significantly to the higher prevalence of child malnutrition among lower socio-economic groups, where less educated women are more prevalent among these groups. Further, this study revealed that household spending on tobacco or alcohol, negatively affect household food security, hence, significantly increases the prevalence of child malnutrition, especially among the poor.

Evidence suggests that women are critical in ensuring good nutrition for the family and household food security. Women have the greatest potential to make decisions that positively affect child's health, how household income is spent, the quantity and quality of food, and in health-seeking behaviour (Haddad, 1999). Poor education acts as a constraint for women to realise the full potential of awareness raising campaigns on family health and hygiene practices which are offered in their localities.

As such, communication for behaviour and social change can promote behaviour change in communities, raise awareness about nutrition services and stimulate shifts in social norms in order to improve the enabling environment for good nutrition in communities (United Nations Children's Fund, 2013). Thus, especially the community driven programmes would have a major role to play in addressing the malnutrition problem in vulnerable regions. However, presently around 0.2% of the total nutrition-specific investments has been utilised on nutritional awareness and promoting of behavioural-change communication programmes for vulnerable people. To proactively combat malnutrition, awareness raising programmes, educational and promotive activities should deserve more allocation.

Potential exists for efficiency gains by optimising resource allocation for more targeted interventions. Sri Lanka has been providing a reasonably comprehensive set of programmes for nutrition. However, as discussed in Section 3.7, a significant share of resources has been used by a few programmes that may not be the most effective interventions in reducing malnutrition. For instance, there are identified effectiveness issues in nutrition interventions such as the Thripasha programme and pregnant mother's food allowance

programme on which the government spends nearly half of the total nutrition specific interventions. Further, a blanket provision for some nutrition programmes appears to be costly. Another emphasis is on building strong monitoring and evaluation frameworks to measure programme performance. Study findings point out the need to rebalance public financing towards more targeted evidence-based interventions. A rigorous prioritisation exercise is recommended to investigate the effectiveness, cost-effectiveness and good practices of nutrition interventions. Further, careful considerations need to be taken in designing the programmes -- targeted vs. blanket. There is potential to gain some fiscal space by changing the supplementary feeding programme (Thripasha), for pregnant and lactating women, to target pregnant women at risk rather than all. Likewise, pregnant mother's food allowance programme should be targeted in deprived regions.

In light of the above, effectiveness issues as well as coverage gaps of the some existing nutrition interventions, **WHO recommended, that staple food fortification is much appropriate for Sri Lanka.** It is a preventive food-based global intervention to improve micronutrient status of populations. Large scale food fortification -- adding micronutrients to staple foods and complementary foods in factories and other production sites is a cost-effective way to improve the micronutrient status of populations. For example, flour is commonly fortified with iron, zinc, folic acid and other B vitamins. The amount of flour currently fortified represents about 30% of the global production of wheat flour from industrial mills. Further, as of 2012, wheat flour fortification is mandated by law in 75 countries (United Nations Children's Fund, 2013). Given that, rice is a staple food in Sri Lanka; WFP assess the possibilities

of rice fortification and the benefits it would bring in to Sri Lanka. In the meantime, Sri Lanka can consider introducing fortified wheat flour in regions where wheat flour consumption is high.

Further household environment substantially contribute to child malnutrition. For instance, poor quality drinking water and sanitary facilities bear an impact on child nutrition. The availability of safe drinking water supply, hygienic sanitary facilities etc., are basic needs for maintaining health and nutrition of people. Thus, it has to be emphasised that policies relating to the improvement of household socioeconomic status and safe environment in the under privileged areas would have a major role to play in the wellbeing of child.

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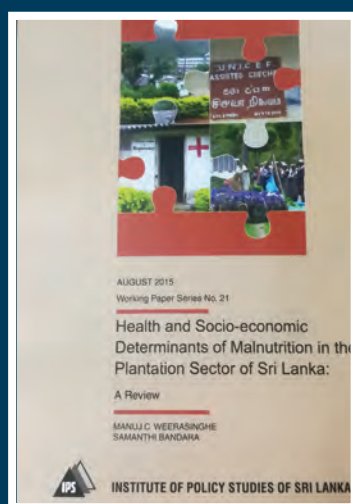
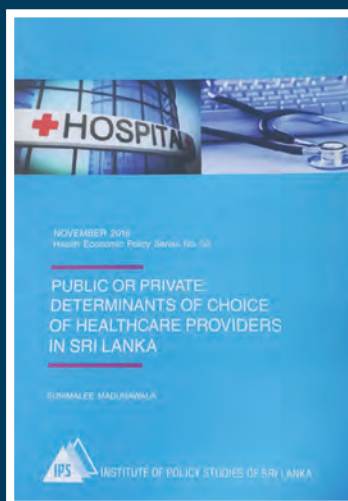
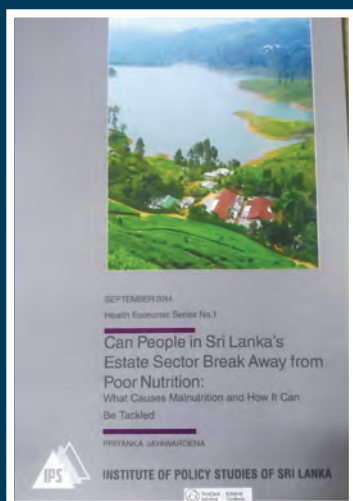
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ISBN 978-955-7397-19-1