Fill the Nutrient Gap

Nutrition situation analysis framework and decision tool

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WFP World Food Programme

DOST-FNRI

With support from unicef

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List of Acronyms

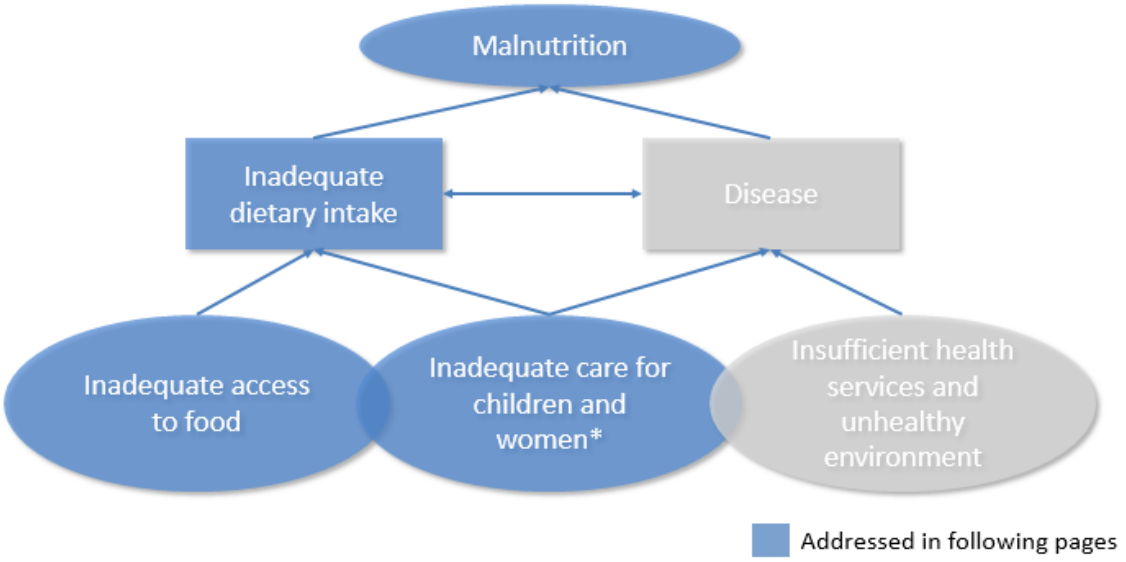
4Ps	Pantawid Pamilyang Pilipino Program (conditional cash transfer program)
ARMM	Autonomous Region in Muslim Mindanao
CotD	Cost of the Diet
DepEd	Department of Education
DBM	Department of Budget Management
DILG	Department of the Interior and Local Government
DSWD	Department of Social Welfare and Development
EAR	Estimated Average Requirement
FBDR	Food-based dietary recommendations
FAO	Food and Agriculture Organization
FNG	Fill the Nutrient Gap
FNRI	Food and Nutrition Research Institute
GDP	Gross Domestic Product
GFA	General food assistance
IFA	Iron and folic acid tablet
IFPRI	International Food Policy Research Institute
KAP	Knowledge, Attitude and Practices
LNS-SQ	Lipid nutrient supplement small quantity
LP	Linear programming
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MIMAROPA	Administrative region comprising Mindoro, Marinduque, Romblon and Palawan
MMF	Minimum Meal Frequency
MMT	Multiple micronutrient tablet
MNP	Micronutrient powder
NCR	National Capital Region
NNC	National Nutrition Council
NNS	National Nutrition Survey
OECD	Organisation for Economic Co-operation and Development
PHP	Philippine peso
PPAN	Philippines Plan of Action for Nutrition
PSA	Philippines Statistics Authority
Rimo blend	Rice and mongo blend
RNI	Recommended Nutrient Intake

SNF	Specialized nutritious foods
SOCCSKSARGEN	Administrative region comprising South Cotabato, Cotabato City, Cotabato Province, Sultan Kudarat, Sarangani and General Santos City
UN	United Nations
UNICEF	United Nations Children's Fund
WFP	World Food Programme
WHO	World Health Organization

1 - Background to the FNG

WFP, with technical input from key research institutes (University of California Davis, IFPRI, Epicentre, Harvard University and Mahidol University), Save the Children and UNICEF, developed, in 2015, a framework for strengthened nutrition situation analysis and decision-making, called "Fill the Nutrient Gap", or FNG, which aims to support identification of strategies for improving nutrition with an emphasis on increasing access to nutrients, especially during the critical period of the first 1,000 days. The FNG focuses primarily on the dietary intake side of the conceptual framework for causes of malnutrition displayed below:

Figure 1: UNICEF framework for causes of malnutrition (UNICEF 1991).



FNG Framework

The 'Fill the Nutrient Gap' (FNG) primarily uses secondary data in combination with the results from linear programming from the Cost of the Diet (CotD) tool (and others, such as Optifood, when available) to better understand the barriers to adequate nutrient intake in a country's context and model potential interventions to improve access to nutrients, particularly from nutritious foods and income support. The framework for analysis depicted in Figure 2: 'The Fill the Nutrient Gap Framework' for situation analysis and decision making helps to consolidate and analyse existing secondary data at country level based on the following categories:

i) **Malnutrition Characteristics** - review prevalence data of malnutrition characteristics (stunting, wasting, anaemia, underweight, overweight and micronutrient deficiencies) by geographic area, population group and socio-economic status. If relevant, seasonal patterns of various nutritional problems within populations can be considered. Malnutrition characteristics are reviewed in the initial stage to define priority groups for the analysis.

ii) **Enabling Policy Environment** - analyse the extent to which the policy environment adequately facilitates access and availability of nutritious foods for the population by identifying possible opportunities to strengthen national policy, and national legal or regulatory frameworks related to access and availability. Enforcement of these policies and regulations is a key part of the analysis; for example, while there may be a mandatory national fortification policy, compliance of this policy may be low. Existing partnerships (e.g. private public partnerships) and initiatives to improve availability and affordability and consumption of safe, nutritious foods are also identified and reviewed. This section is crucial in identifying current or potential entry points for nutrition interventions through different sectors.

iii) **Availability of nutritious foods in the local market** – review information on local availability of nutritious foods (natural and fortified) as well as on local production and processing capacity to assess whether the local food system can meet nutrient needs. When possible, seasonal effects on availability are also assessed.

iv) **Access to Nutritious Foods** - determine the extent to which target populations have access to nutritious foods in different urban and rural areas across lean and non-lean seasons, including home production as well as (physical) access to markets. Also understand the adequacy of nutrient intake at the household level and the ability of households to cope with shocks.

v) **Nutrient Intake** - examine likely or confirmed gaps in nutrient intake at the individual target group level, particularly related to individual dietary diversity, infant and young child feeding practices and the coverage of supplementation and/or fortification programmes.

vi) **Local Practices** - identify socioeconomic and cultural factors that influence food purchase and feeding practices and act as barriers to adequate nutrient intake. Qualitative studies are particularly useful to gain insights into local preferences and behaviours, which can inform behaviour change strategies to improve feeding practices.

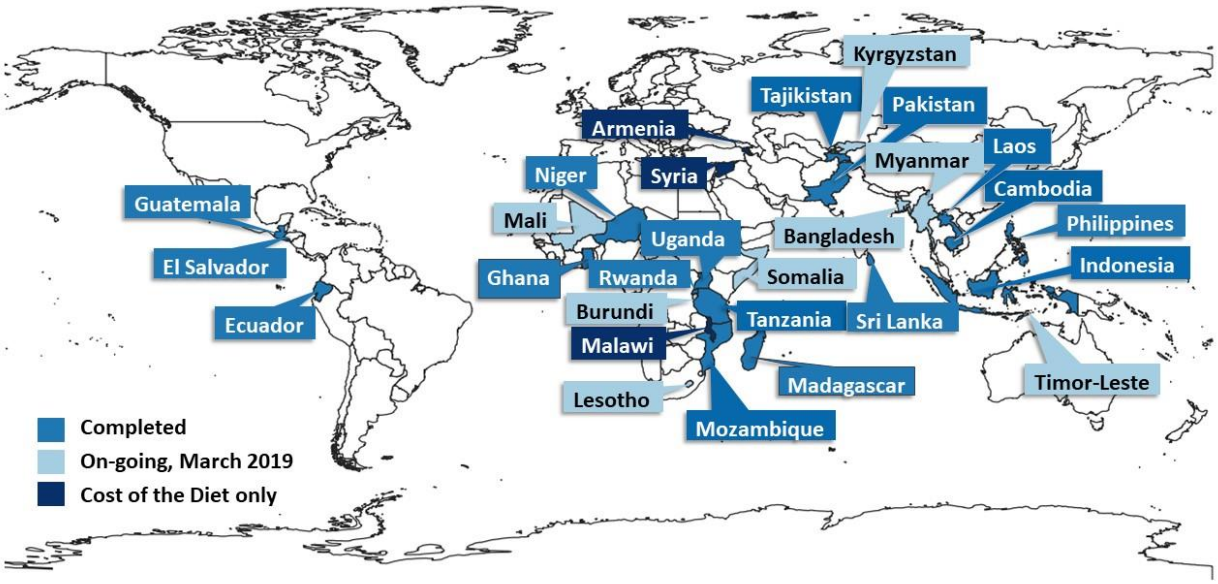
vii) **Cost Optimization** - use linear programming in the form of the Cost of the Diet (CotD) tool, to determine the (minimum) cost of meeting nutrient needs for modelled households (i.e. with specific individuals such as a breastfed child, lactating woman, adult man, school going child and adolescent girl) using local foods and what proportion of the population could afford a nutritious diet. Linear Programming is used to model the economic and nutritional impact of possible nutrition interventions identified in the secondary data analysis and by stakeholders, such as the introduction of fortified foods and/or Specialised Nutritious Foods (SNFs) through market channels or social protection programmes, improved access to nutrient-rich unfortified foods through homestead food production or vouchers, price reductions of certain nutritious foods through programmes such as subsidies and vouchers, and/or cash transfers to improve household purchasing power.

Once this information has been consolidated and analysed, context-specific optimal packages of policy and programmatic interventions can be identified, based on the relative estimated impact of different interventions to reduce cost and improve affordability of nutritious diets. Strategies for implementation

and possible entry points are collectively identified by stakeholders after the preliminary results of the analysis are available.

As of March 2019, Fill the Nutrient Gap has been completed in 17 countries and is currently underway in eight countries. In Asia Fill the Nutrient Gap was completed in the Philippines in November 2018 and previously completed in Cambodia, Lao PDR, Indonesia, Pakistan, Sri Lanka and Tajikistan. The analysis process is currently underway in Myanmar, Timor-Leste and Kyrgyzstan.

Figure 2: Countries that have completed Fill the Nutrient Gap analysis or have the analysis on-going as of March 2019.



2 - Methods

The FNG process in the Philippines

The FNG process followed in the Philippines is outlined in . The process started in April 2018 with a meeting between WFP FNG team and the Philippines Department of Science and Technology Food and Nutrition Research Institute (DOST-FNRI) to form a collaboration with FNRI providing data on food prices and WFP providing capacity building in the form of training to support FNRI in following-up on FNG analysis beyond 2018, in particular by conducting further updated CotD analyses. Food prices and availability were provided from the FNRI 2015 National Nutrition Survey (NNS) and FNRI suggested that the FNG team request data on food expenditure from the Philippines Statistics Authority (PSA) 2015 Family Income and Expenditure Survey.

In April, the WFP FNG team held a multi-stakeholder workshop to introduce the process and request stakeholders' input on relevant interventions and target groups to focus on in the analysis (Figure 3). Stakeholders recommended that the FNG analysis in the Philippines consider the interventions outlined in the Philippines Plan of Action for Nutrition (PPAN 2017-2022), use the regions of the Philippines as the level of analysis with disaggregation between rural and urban areas (except for National Capital Region (NCR) which is all urban) and focus on target groups related to the first 1000 days, adolescent girls and school children (Figure 4).

In October, a second mission was conducted to validate the results. Preliminary findings were presented to partners and stakeholders in bilateral meetings, a national-level workshop and four regional consultations with representatives from Regions IV-B (MIMAROPA[1]), VI (Western Visayas), NCR and ARMM[2]. Regional consultations for IV-B (MIMAROPA) and NCR were held in Manila. Regional consultations for VI Western Visayas were held in Iloilo. Regional consultations for ARMM were held in Cotabato. Stakeholders affirmed the overall content of the analysis and provided further details to strengthen analysis.

In November, a third mission was conducted to share the results among a wider group of stakeholders, in the form of a technical workshop. During the workshop, participants also developed recommendations for six identified sectors related to improving the nutrition situation in the Philippines, including health, agriculture, social welfare and development, education, governance and food processing. After the technical workshop a higher-level dissemination meeting was held to present FNG findings, including recommendations developed during the technical workshop, to government policymakers and decisionmakers from partner institutions. The higher-level dissemination included participation from Philippines cabinet secretary Karlo Nograles who gave an address stating how the Philippines can respond to the FNG findings.

[1] *Short for **Mi**ndoro, **Ma**rinduque, **Ro**mblon and **Pa**lawan provinces*

[2] Since completion of Fill the Nutrient Gap in the Philippines the name of ARMM was changed to BARMM (Bangsamoro Autonomous Region in Muslim Mindanao). This report will still refer to the region as ARMM because this was the name when the FNG was conducted.

Figure 3: The FNG process in the Philippines.

Figure 4: Level of analysis for FNG Philippines as agreed during initial stakeholder consultations.

Areas for analysis	Specific target group
Regional level analysis for 17 regions, disaggregating between urban and rural areas for all regions except for National Capital Region (NCR, all urban)	Life cycle approach focusing on the first 1000 days: • Infants and young children aged 0-23 months • Pregnant and lactating women • Adolescent girls (pre-pregnancy) • School children (school feeding)

Intervention modelling plan

In the multi-stakeholder inception meeting and in bilateral consultations stakeholders identified interventions from the PPAN with the potential to improve nutrient intake for key target groups and the corresponding entry points for these target groups across different sectors. Stakeholders subsequently provided details of interventions currently implemented by local government units (LGUs), Department of Health (DoH), Department of Agriculture (DA), Department of Education (DepEd), Department of Social Welfare and Development (DSWD), WFP, Nutrition International (NI) and Helen Keller International (HKI).

Collation and analysis of secondary data

Between April and October 2018 secondary data analysis was carried out by the FNG team. In total over 130 data sources were identified and reviewed (Appendix). Of these sources 35 are cited in this report. Data sources were identified, mapped and reviewed over three main stages:

1) Consultation with national stakeholders: During the April mission to the Philippines information about data requirements were shared with the WFP country office and national stakeholders who shared relevant datasets, reports, articles and documents with the FNG team.
2) Literature search: In addition to obtaining data through national stakeholders a literature search was conducted online to identify further articles and reports relevant to the nutrition situation in the Philippines and provide a contextual overview of the nutrition situation in the Philippines.
3) Follow up on identified data gaps: Once data provided by stakeholders and obtained through literature search had been reviewed data gaps in terms of themes, areas of the country or population groups were identified. The FNG team shared this list with in-country stakeholders to inquire whether additional, targeted, resources could be obtained.

Cost of the Diet Assessment

Cost of the Diet (CotD) is a method and software developed by Save the Children UK to better understand the extent to which poverty affects nutritional status through economic access to nutritious food. The aim of the tool is to estimate, with linear programming optimization, the amount, combination and cost of local foods that would be needed to provide individuals or households with their average needs for energy and their recommended intakes of protein, fat and 13 micronutrients. CotD analysis was conducted for 33 assessment areas in the Philippines – urban and rural areas in 16 of

the 17 regions of the Philippines and urban areas in NCR. Weighted averages based on the 2010 census were applied to urban and rural areas of each region to produce regional level results.

Food availability and price data

The 2015 NNS provided data on food prices and availability, based on household 24-hour observation surveys. The 2015 NNS was an updating survey to the 8th NNS conducted in 2013. Surveying was conducted in NCR from July to August 2015; in Luzon from August to September 2015; and in Visayas, Mindanao and BASULTA (Basilan, Sulu and Tawi-Tawi) from September to November 2015. The 2015 NNS was divided into three (3) phases. The first leg was conducted in NCR from July to August 2015. The second leg, which covered areas in Luzon, was conducted from August to September 2015. Areas in the Visayas, Mindanao, and BASULTA (Basilan, Sulu, and Tawi-Tawi) were covered in the final leg from September to November 2015.[1]

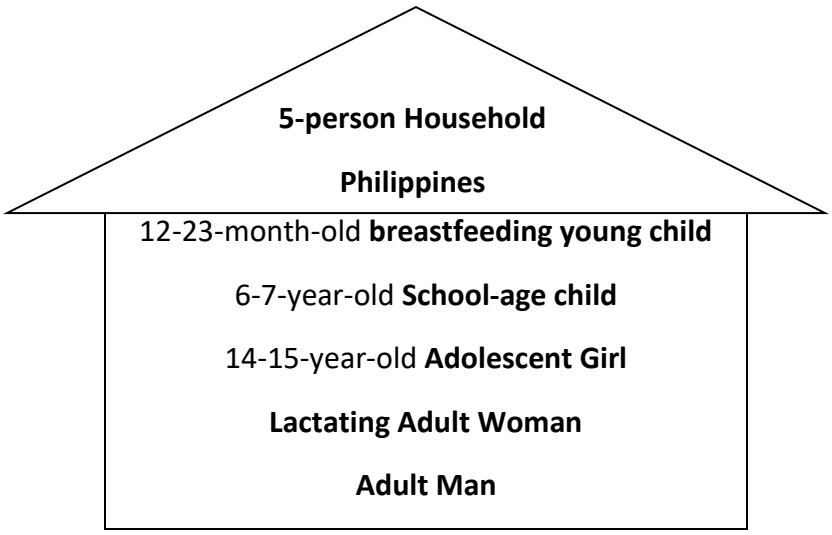
For each assessment area the top 100 most commonly consumed foods from the 2015 NNS were included as available local foods for CotD analysis. The average estimated price for each food was provided by FNRI's 2015 NNS survey. Based on this data, the foods included in CotD analysis for each assessment area represented the local situation in terms of availability (including monetized local production, market availability and household use of foods) and access to different foods. Food composition data came from the CotD database, when available food compositions came from the most geographically proximate source in the CotD database, i.e. Indonesia.

Household size and composition

The model household composition for CotD analysis was designed to incorporate the key target groups of interest for FNG Philippines as identified by stakeholders. The model household was consistent with average household size in the Philippines of five people per household. The same model household was used in all assessments to allow for comparisons between different assessment areas across the country.

For each assessment area the model household included a breastfed child 12-23 months old, a lactating adult woman 30-59 years old and an adolescent girl 14-15 years old, to represent the target groups suggested by stakeholders, along with a child 6-7 years old and an adult man 30-59 years old. For this analysis the breastfed child 12-23 months old is to be used as a proxy for 6-23-month-old breastfed children, the child 6-7 years old is a proxy for a school aged child and the lactating woman is a proxy for a pregnant and lactating women (PLW). The diet of the 12-23-month-old child was modelled to account for age-appropriate continued breastfeeding. The sex of the 12-23-month-old child and the 6-7 years old child was not specified because nutrient intake recommendations are not different for boys and girls at those ages.

Figure 5: Model household size and composition for all CotD assessments.



CotD nutritious diet

The CotD analysis for FNG uses a staple-adjusted nutritious diet (herein referred to as the nutritious diet) that estimates the lowest cost diet that meets energy requirements and recommended intakes for protein, fat and 13 micronutrients (9 vitamins, 4 minerals) with consumption of the main staple foods for a given assessment area. Staple foods are defined as foods that are generally eaten every day by all household members.

For the Philippines rice was included as the staple in all assessment areas. Two servings per day were included for all household members except for the child 12-23 months old who had one serving per day included (Figure 6).

Figure 6: Daily staple consumption of rice included in CotD models for all assessment areas.

Household member	Portion size	Number of portions daily	Total rice per day included as staple
Child 12-23 months old	68 g	1	68 g
Child 6-7 years old	113 g	2	226 g
Adolescent girl 14-15 years old	184 g	2	368 g
Lactating woman 30-59 years old	173 g	2	346 g
Adult man 30-59 years old	207 g	2	414 g

Affordability analysis

The cost of a nutritious diet becomes a more meaningful estimate when compared with the amount of money households can spend on food. This comparison allows for an estimate of the percentage of households within a population that would realistically be able to afford a minimum cost nutritious diet. To estimate the percentage of households within the 17 regions that could afford the nutritious diet percentile rank analysis was conducted in STATA with food expenditure data from the Philippines 2015 Family Income and Expenditure Survey (FIES). Food that was produced by households for own

consumption was monetized based on how much the foods would have cost if they had been purchased.

Per capita food expenditure figures were multiplied by the number of individuals in the model household (5) and the number of days in an average month (30.4) to estimate monthly household food expenditure. Survey weights were used to account for unequal selection probabilities in the dataset; adjusting for non-responses and conforming to known population distributions.[2]

Regional figures presented in this report are weighted averages across rural and urban areas based on the percentage of population living in urban/ rural areas (equation i). National figures are weighted averages based on relative distribution of population across regions and urban/rural areas (equation ii).

Equation i: Regional figures are weighted averages based on the percentage of the population living in urban/rural areas.

$$regional\ average_i = \sum_{j=1}^{2} \frac{x_j}{total\ number\ of\ population} * y_j$$

Equation ii: National figures are weighted averages based on relative distribution of populations across regions and urban/rural areas.

$$national\ average = \sum_{i=1}^{17} \sum_{j=1}^{2} \frac{x_{ij}}{total\ number\ of\ population} * y_{ij}$$

With j denoting areas within a region (urban/rural); i denoting the region; x_{ij} denoting number of people living in region i and area j and y_{ij} the estimated cost of the diet/non-affordability in region i and area j.

Intervention modelling

To improve the affordability of the nutritious diet several different interventions were modelled for key target groups: children under 2, PLW and adolescent girls. Several interventions targeting school-aged children and the entire households were also modelled. Although they were not included in the model household, interventions targeting preschool-aged children 3-4 years old were also included in the analysis.

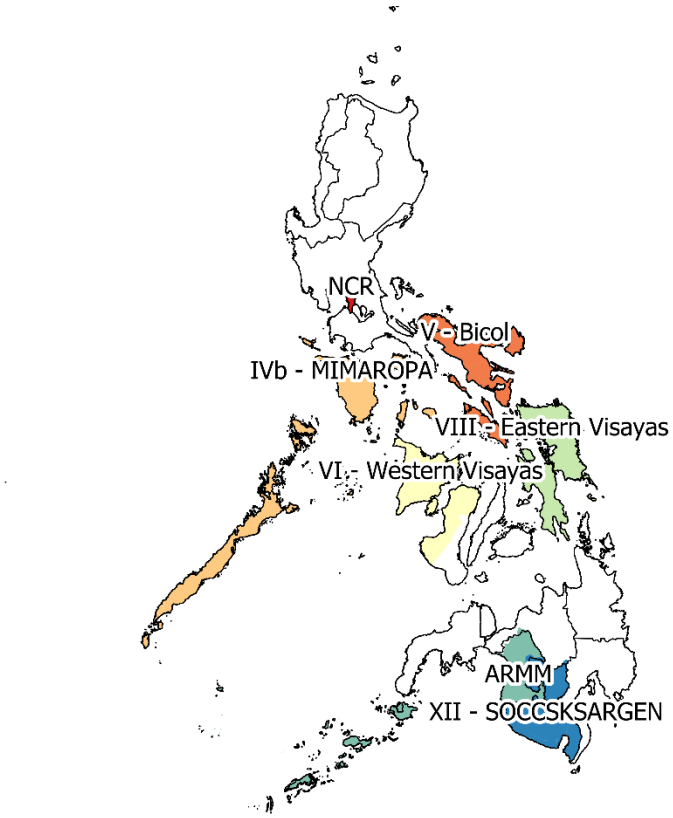
The selection of potential interventions for modelling was informed by secondary data review and stakeholder consultations. It included:

- Increased availability of local nutritious foods;
- Different types of complementary foods or specialized nutritious foods (SNF) made available through market channels and/or social safety nets;
- Micronutrient supplementation;
- Fortification of staple foods; and
- Conditional cash transfers for vulnerable households.

The modelled interventions are theoretical, assuming optimal consumer choices, and would need to be accompanied by complementary behaviour change interventions to promote nutritious choices by consumers.

Intervention modelling was conducted in seven regions suggested by FNRI: NCR, Bicol, MIMAROPA, Eastern Visayas, Western Visayas, ARMM and Soccsksargen (Figure 7). These regions were selected based on the incidence of malnutrition indicators, poverty levels and programmatic interest from national partners.

Figure 7: Regions included in intervention modelling analysis.



3 - Introduction

As stated in the Philippines Plan of Action for Nutrition (PPAN 2017-2022) the nutrition situation in the country is alarming.[3] Current indicators of malnutrition, including wasting, stunting, micronutrient deficiencies and overweight among children and women, are high. Trends show a lack of improvement, and in some cases worsening, from 2003-2015.

The lack of progress in nutrition indicators comes despite rapid growth in the national economy. The economic growth rate was 7 percent in 2017 and has averaged 5 percent annually since 2000[4]. The percentage of stunted children has not reduced in 15 years, due to several factors including persistent poverty (poverty rates based on national poverty levels decreased modestly from 25 percent in 2003 to

22 percent in 2015[4]), natural and manmade disasters, low consumer demand for nutritious foods, agriculture policies focused predominantly on rice self-sufficiency, low prioritization from government agencies to address nutrition and limited commitment and capacity of local government units to deliver nutrition interventions. Increasing overweight and obesity rates follow changes in the food environment and a concurrent shift of consumer preferences toward energy-dense (but micronutrient-poor) processed foods and an increase in sedentary lifestyles that have come with rapid urbanization.

Addressing malnutrition sustainably in the Philippines must take a lifecycle approach, targeting children under 2 years, preschool- and school-age children, adolescent girls and pregnant and lactating women, with a range of interventions adapted to the local context and coordinated across multiple levels and sectors of government. The way forward is to ensure that government and non-government bodies have access to the information and evidence that is required to inform and prioritise a range of effective interventions targeted at vulnerable populations

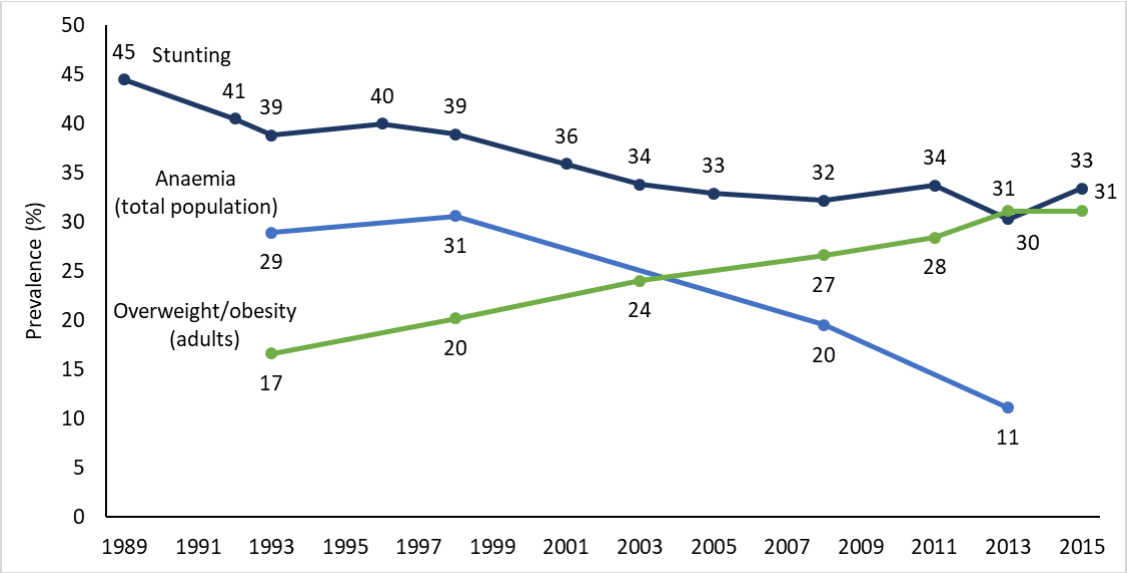
Effective coordination is needed across different sectors of local and national government, including health, agriculture, social welfare and development and education, with support from development partners and a shared responsibility from the country's extensive private sector to address constraints of food availability and physical and economic access to nutritious foods.

This report seeks to characterise the different factors contributing to the experience of poor nutrition in the Philippines by considering how food supply chains, food environments and consumer behaviour impact diets. Furthermore, this report will explore options for improving nutrient intake across different sectors and provide a basis upon which different strategies and intervention packages can be identified and tailored to local contexts for key target groups, with a focus on children 6-23 months, pregnant and lactating women (PLW) and adolescent girls.

4 – Malnutrition Overview

The malnutrition situation in the Philippines is characterized by a triple burden: very high prevalence of stunting, a decrease in the prevalence of anaemia (the most commonly measured indicator of micronutrient deficiencies) for the total population and a rapid increase in overweight and obesity for adults over age 19 during the last two decades (Figure 8).[1] Despite the reduction in overall anaemia prevalence in recent years micronutrient deficiencies should be included in the triple burden as anaemia prevalence remains high for vulnerable populations and different micronutrient deficiencies remain a concern.

Figure 8: Trends in prevalence of stunting for children under 5, anaemia for the total population and overweight and obesity for adults over age 19 in the Philippines.[1]



3.1 Stunting and wasting

After a reduction in stunting prevalence from 45 percent in 1989 to 34 percent in 2003, stunting prevalence has remained above 30% since 2003 (34% in 2003, 32% in 2008 and 33% in 2015), classified as very high by WHO using 2018 cut-offs. In all 17 regions stunting prevalence was very high (13 regions) or high (4 regions); ranging from 45 percent in ARMM to 23 percent in Central Luzon (**Error! Reference source not found.**).[1] Stunting prevalence is correlated with poverty – 50 percent of children in the poorest socio-economic strata are stunted compared to 15 percent in the richest and stunting is higher in rural areas than in urban areas (38 percent and 28 percent respectively) (Figure 10).[1] Stunting prevalence is 17 percent among children 6-11 months old and 36 percent for children 12-23 months old (Figure 11).[1] This suggests dietary inadequacies during the time when breastfeeding and complementary feeding should be frequent and diverse. Wasting prevalence has remained unchanged since 1989, fluctuating between 6 - 8 percent (Figure 9).[1]

Figure 9: Stunting prevalence in the Philippines by region.[1]

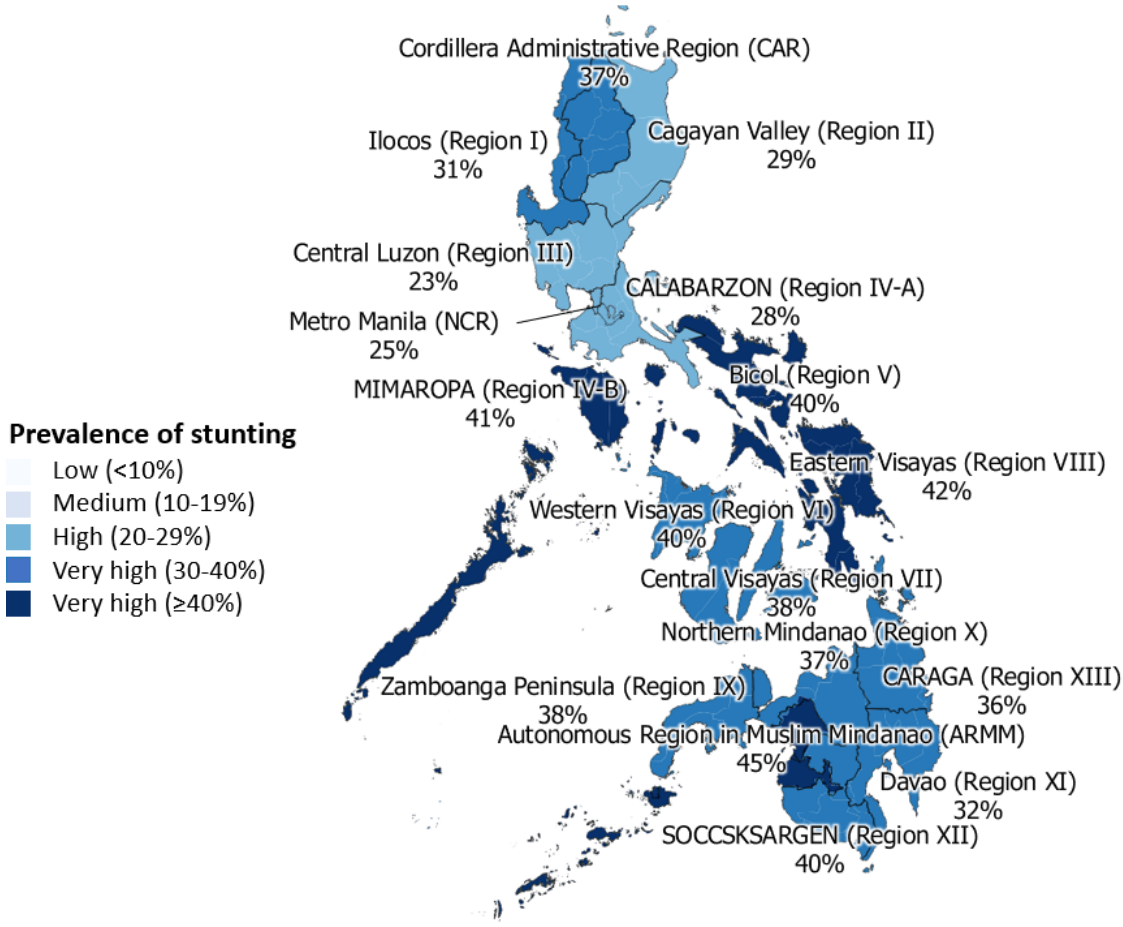


Figure 10: Stunting prevalence by socio-economic quintile and by urban and rural areas.[1]

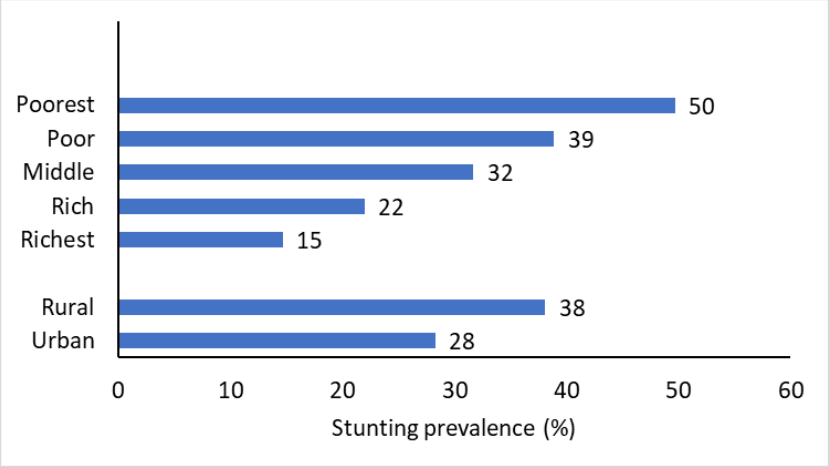


Figure 11: Stunting prevalence by age for children under 5.[1]

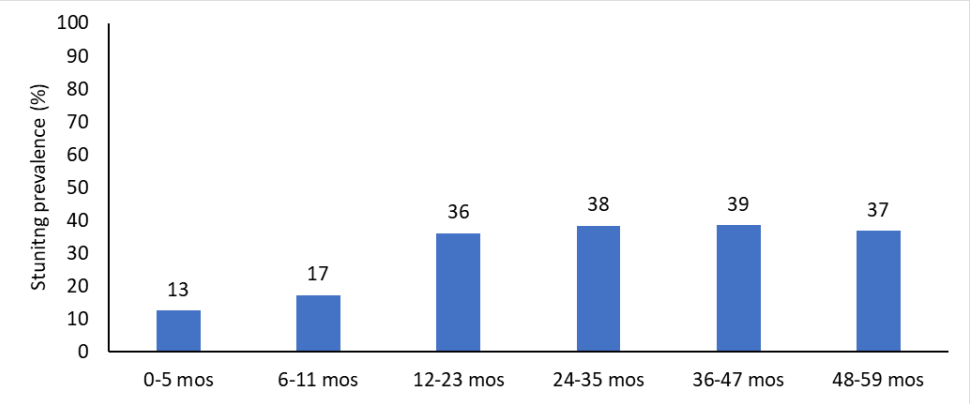
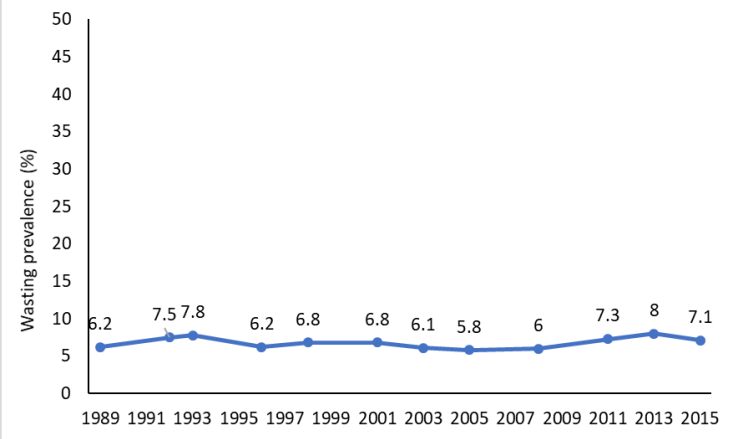


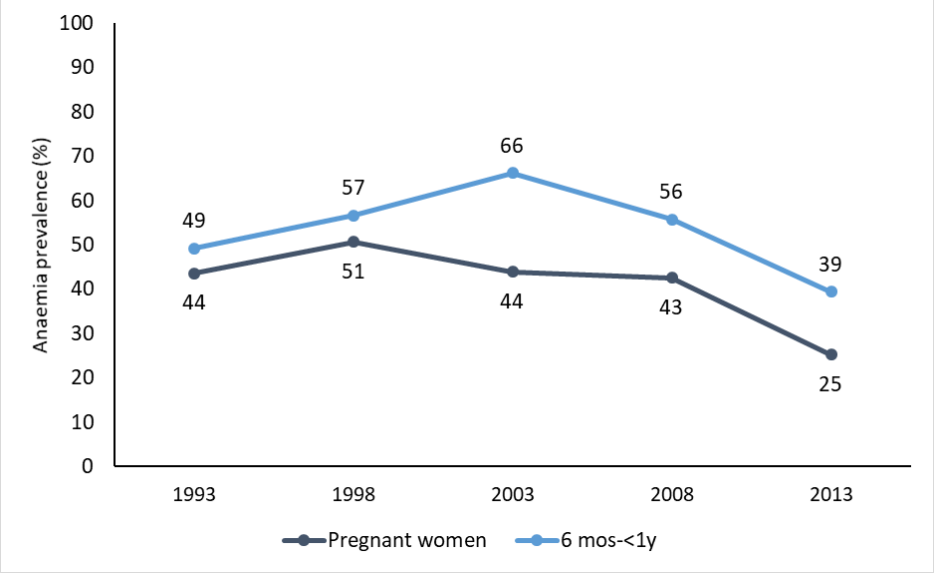
Figure 12: Trends in prevalence of wasting among children less than 5 years old (0-59 months), using WHO-CGS.[1]



3.2 Micronutrient deficiencies

Anaemia prevalence has decreased across all groups since 2003, but the prevalence is still 25 percent for pregnant women, classified as moderate by WHO, and 39 percent among children 6-11 months old, classified just below the 40 percent threshold considered severe by WHO (Figure 13).[5] For children 12-23 months anaemia prevalence decreased from 53 percent in 1998 to 25 percent in 2013 and for children 24-35 months anaemia prevalence decreased from 37 percent in 1998 to 14 percent in 2013[5], which are substantial reductions.

Figure 13: Trends in prevalence of anaemia among pregnant woman and children 6 mos.-<1y 1993-2013[5]



3.3 Overweight and Obesity

The prevalence of overweight and obesity among adults has nearly doubled from 17 percent in 1993 to 31 percent in 2015.[1] Among adults 35 percent of women and 27 percent of men are overweight or obese. Overweight and obesity is correlated with wealth – 44 percent of adults in the richest socio-economic strata are overweight or obese compared to 17 percent in the poorest socio-economic strata. 4 percent of children 0-5 years old are overweight or obese, 9 percent of children 5-10 years old and 9 percent of adolescents aged 10-19 years old are overweight or obese (
Figure 15). The prevalence among children 5-10 years and among adolescents is high, with the increase from adolescents to adults being dramatic.

Figure 14: Overweight/obesity prevalence of adults >20y using BMI by socio-economic quintile and rural and urban areas.[1]

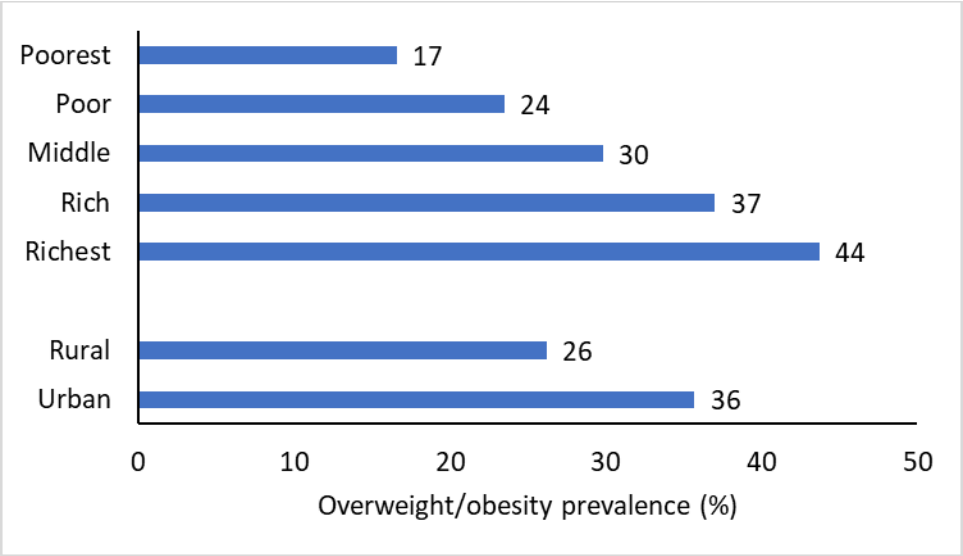
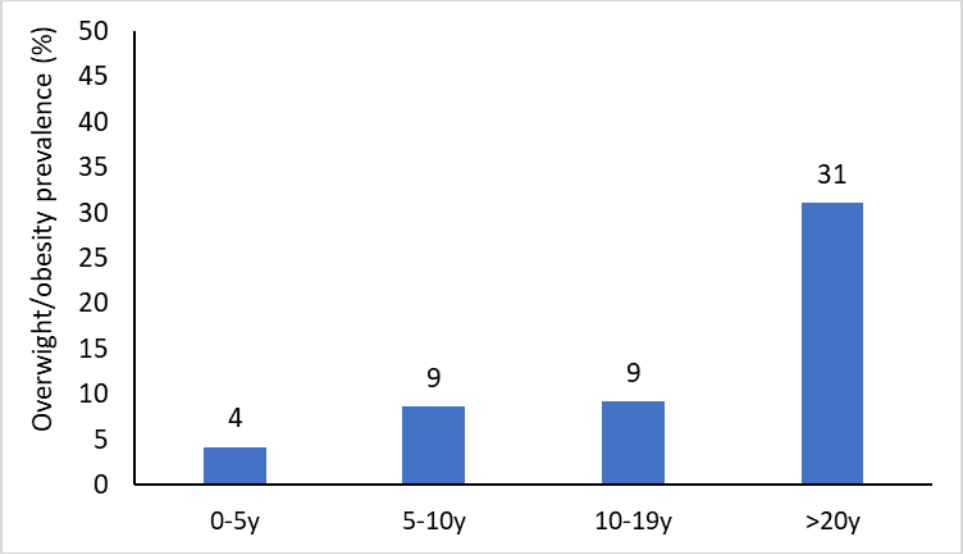


Figure 15: Prevalence of overweight/obesity using BMI by age.[1]



5 - Key Findings

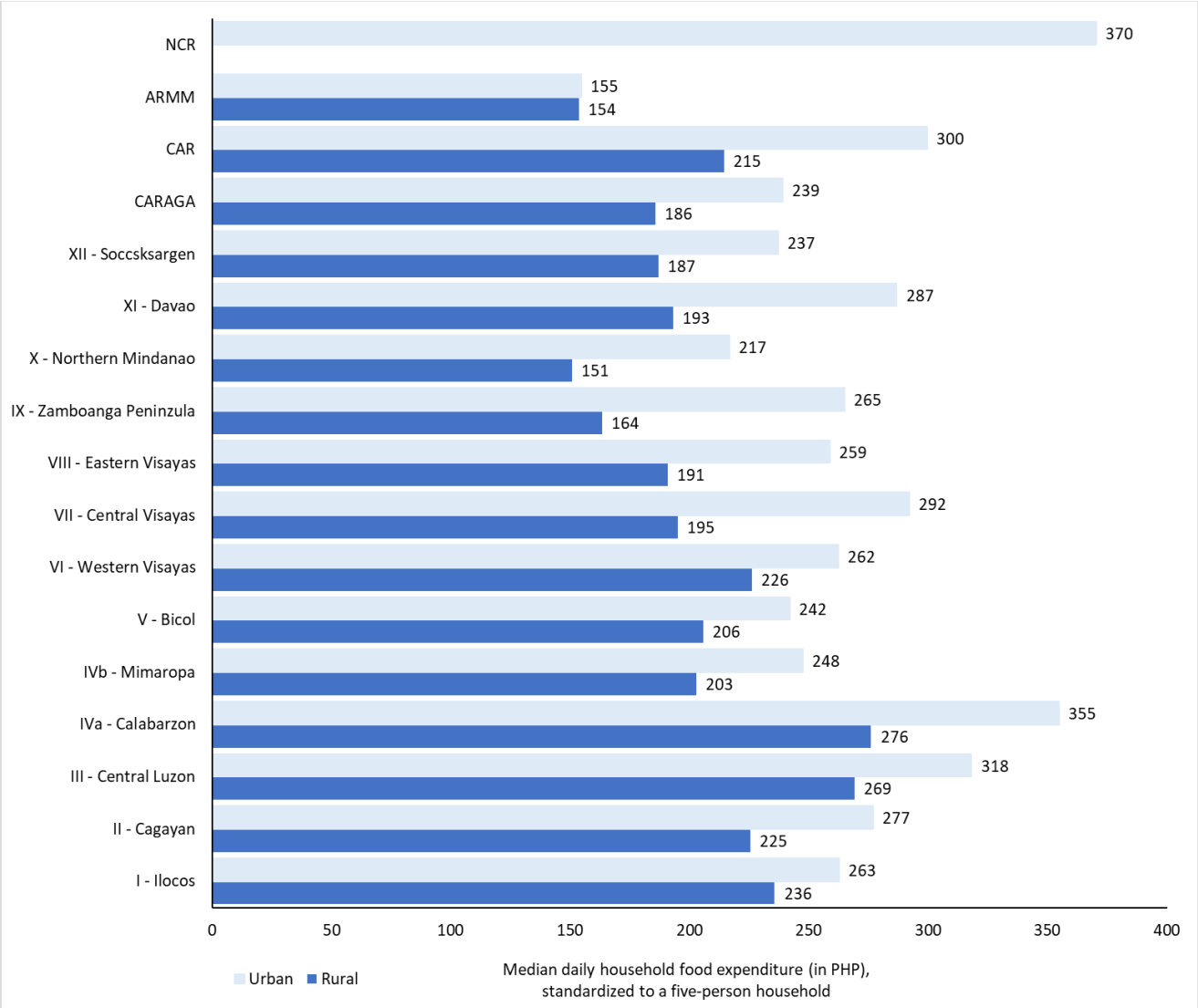
5.1 – Economic Barriers

Message 1: Cost and non-affordability

While almost all households would be able to afford a diet that meets energy needs, one third would not be able to afford a diet that meets nutritional needs. Non-affordability of a nutritious diet is associated with stunting prevalence. The minimum wage is insufficient to access a nutritious diet.

To evaluate to what extent non-affordability is a barrier to accessing a nutritious diet the lowest cost diets were calculated to meet (1) energy-only requirements and (2) staple-adjusted nutrient requirements for a model five-person household (breastfed child 12-23 months; child 6-7 years; adolescent girl 14-15 years; lactating woman; adult man). Lowest cost diets were compared with the household food expenditure curve for each region, disaggregated by urban and rural areas. Median household food expenditure standardized for a five-person household ranged between 151 PHP in rural Northern Mindanao and 370 PHP in the National Capital Region (NCR) (Figure 16).

Figure 16: Median daily household food expenditure (in PHP) standardized to a five-person household, by region and urban/rural areas.[6]



While almost all households would be able to afford a diet that meets energy needs, one third would not be able to afford a diet that meets nutritional needs. Nationwide the average cost of a diet that meet energy requirements only (energy-only diet) for the modelled five-person household was 108 PHP per day. The cost of this diet varies from 81 PHP in Northern Mindanao to 120 in ARMM and CALABARZON. Generally, energy-only diets are slightly more expensive in Luzon and less expensive in the Visayas and Mindanao (Figure 17). Almost all households would be able to afford this diet (97 percent). However, in ARMM a considerable proportion of the population (23 percent) would not be able to afford the energy-only diet (Figure 18). This value is in line with other estimates of household food insecurity in the region.

Figure 17: Cost of energy-only diet (in PHP, weighted average across urban and rural areas).

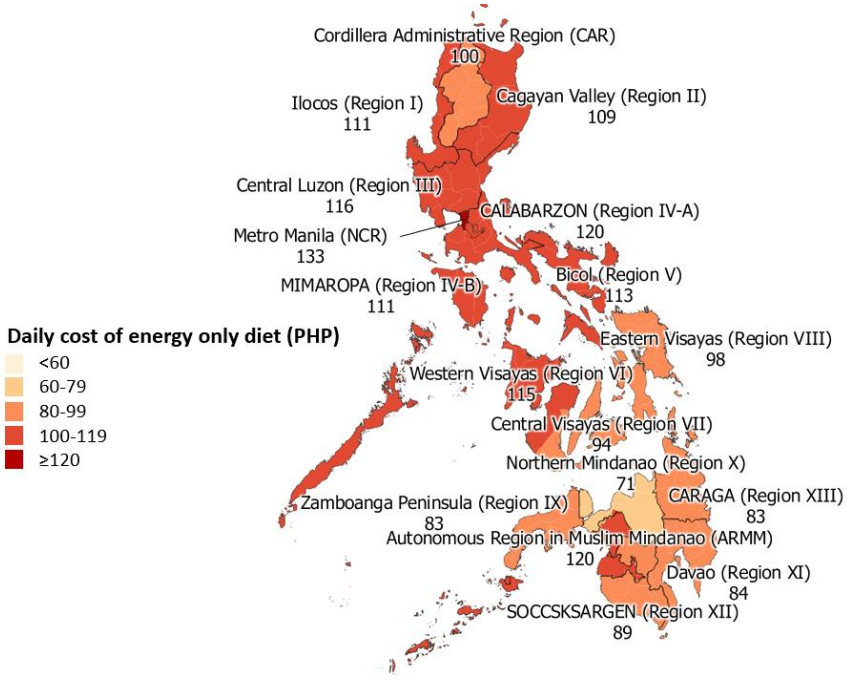
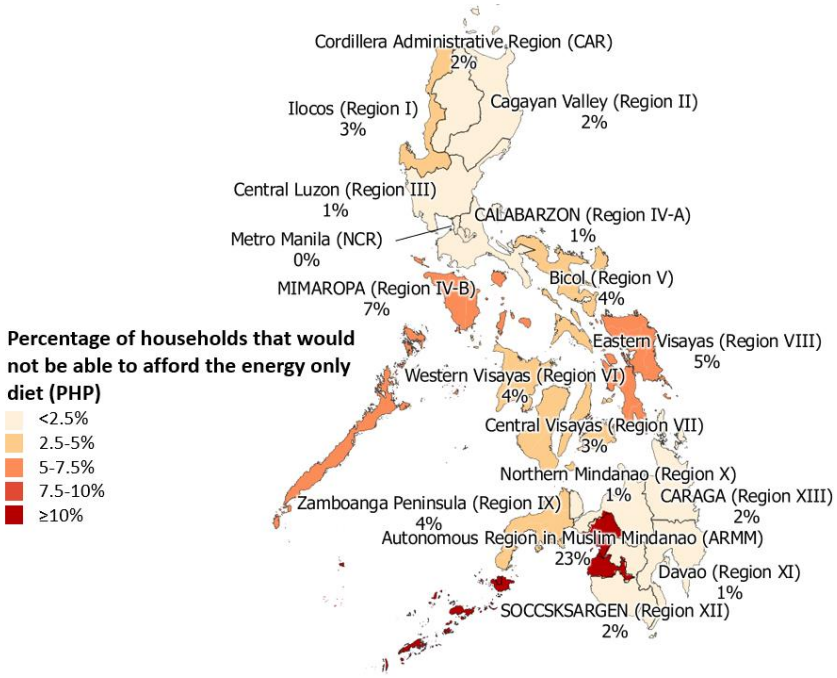


Figure 18: Non-affordability of energy-only diet (weighted average across urban and rural areas).



The average cost for the nutritious diet was 206 PHP for the model household (Figure 19), 96 percent higher than the cost for an energy-only diet. One third (32 percent) of households would not be able to afford a nutritious diet, ranging from 18 percent in Bicol to 59 percent in Northern Mindanao (Figure 20). Cost and non-affordability of a nutritious diet are statistically not related (r=0.17; p=0.353) (

Figure 21). This means non-affordability is driven by the cost of the diet relative to the food expenditure of the household.

Figure 19: Cost of a nutritious diet (in PHP, weighted average across urban and rural areas).

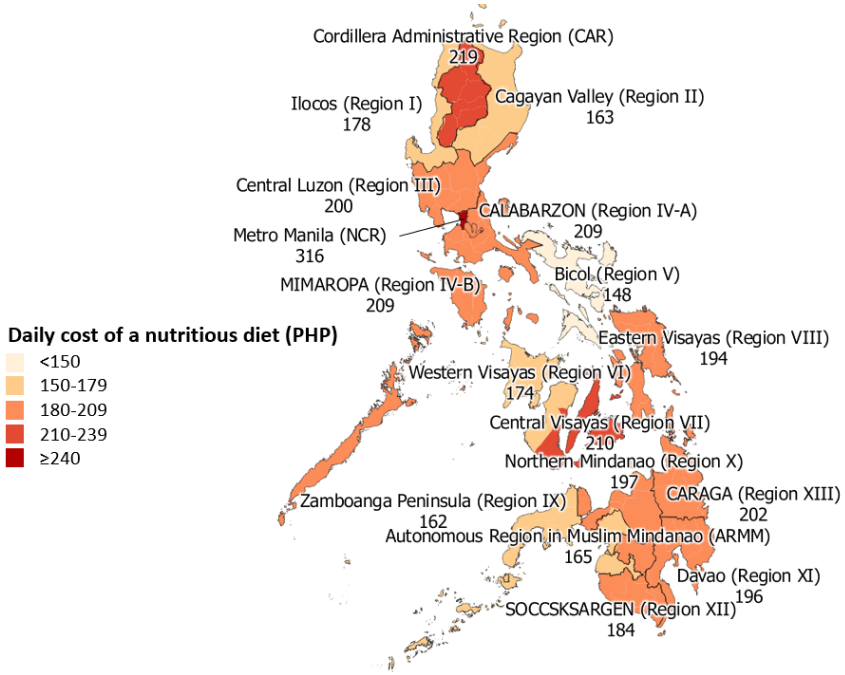


Figure 20: Non-affordability of a nutritious diet (weighted average across urban and rural areas).

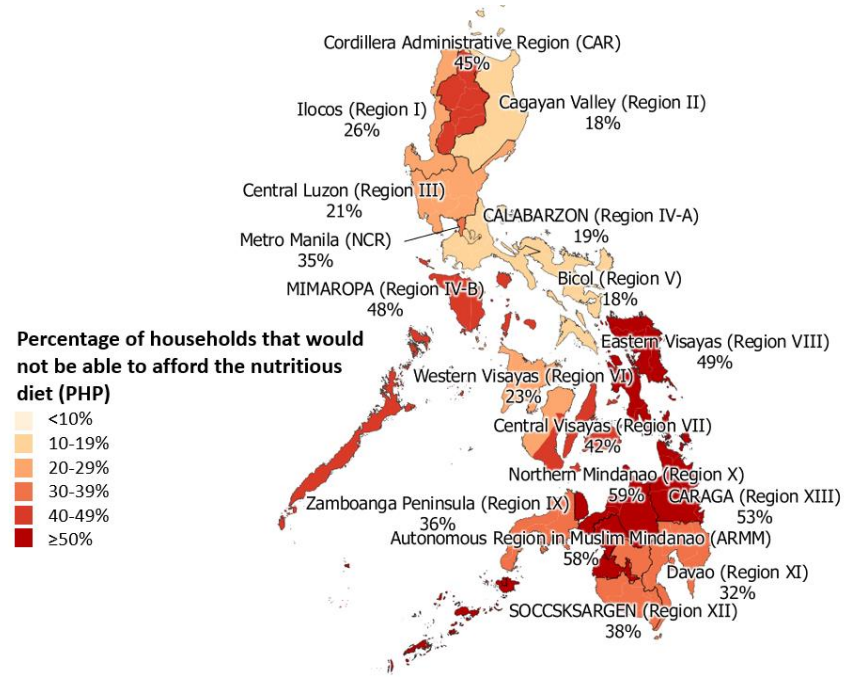
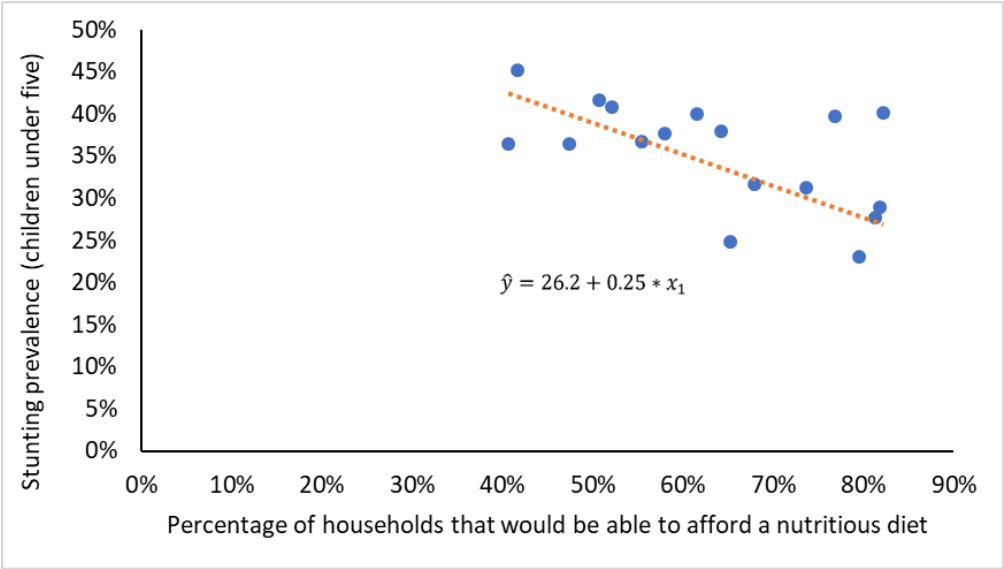


Figure 21: Relationship between daily cost and non-affordability of a nutritious diet by region.

Non-affordability of a nutritious diet is associated with stunting prevalence. However, a strong correlation (r=0.56; p=0.019) exists between stunting prevalence and the non-affordability of a nutritious diet by region, which suggests that economic access to nutritious foods might be a barrier to providing a nutritious diet for every member of the household (Figure 22).

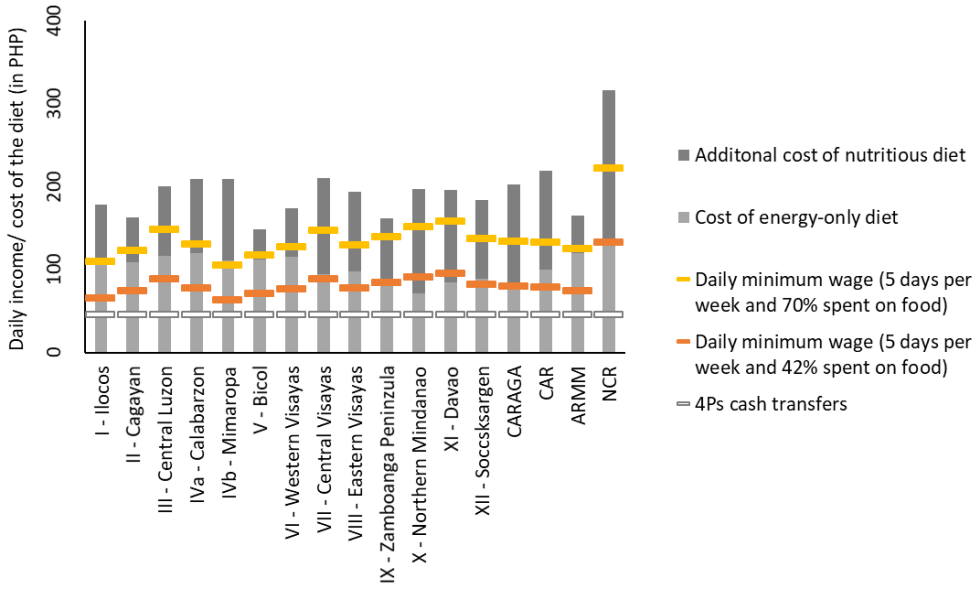
Figure 22: Relationship between non-affordability of a nutritious diet and stunting prevalence in children under 5, by region.



The minimum wage and 4Ps cash transfers are insufficient to ensure economic access to a nutritious diet. Cost of an energy-only and a nutritious diet were compared to the minimum wage level (Figure 23). The minimum wage varies by region and urban/rural and ranges between 210 PHP per day in MIMAROPA and 444 PHP per day in NCR.[7] If paid a minimum wage on five days per week and 70 percent of this wage is spent on food for a five person household, households in two of the 17 regions would be unable to afford an energy-only diet. If households spend 42 percent of their wage on food, which is the national average percentage of expenditure spent on food, households in 13 out of the 17 regions would not be able to afford an energy only diet. Five-person households in none of the regions would be able to afford a nutritious diet if paid one minimum wage only, regardless whether they spend 42 or 70 percent on food.

The Pantawid Pamilyang Pilipino Program (4Ps), the nation-wide social safety net, provides households with a cash transfer of a maximum of 1,400 PHP per month.[8] This amount is equivalent to 35 to 65 percent of the cost of an energy-only diet and between 15 and 31 percent of the cost of a nutritious diet for the modelled five-person household, depending on the region. This suggests the 4Ps alone would not be enough to ensure economic access to a nutritious diet for vulnerable households.

Figure 23: Daily cost of energy-only/nutritious diet and income from 4Ps conditional cash transfer program and minimum wage (with an assumed 5-day work week), by regions (averages across urban and rural).[7,8]



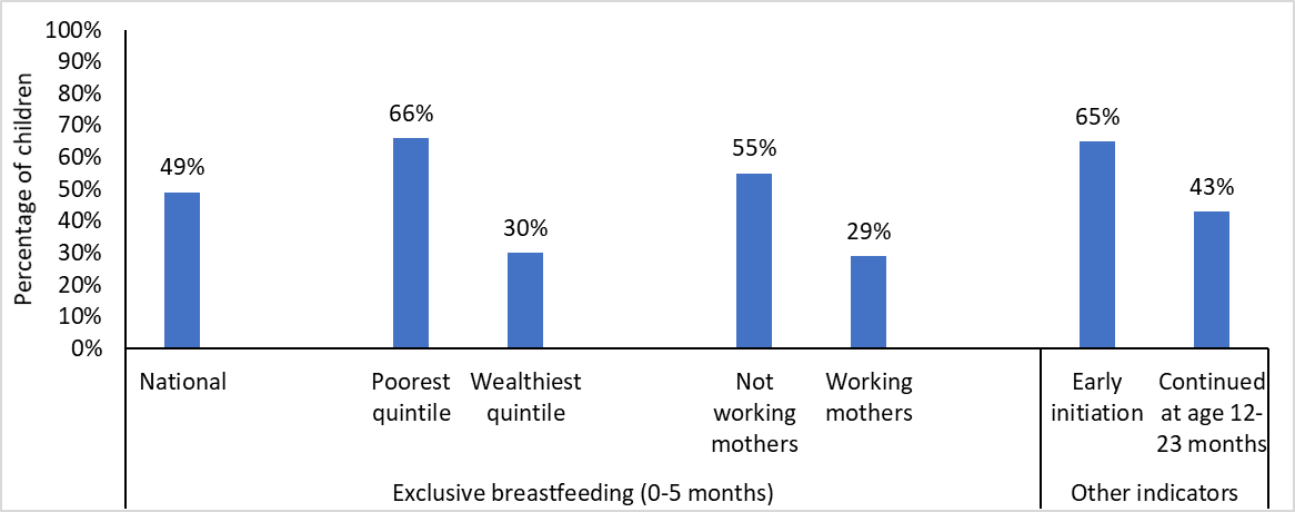
5.2 – Vulnerable Groups

Message 2: The First 1000 Days

Breastfeeding rates, dietary diversity and feeding practices for young children are suboptimal. SNF and micronutrient supplementation can support caregivers in providing nutritious diets to young children.

Breastfeeding rates are low, and progress is slow since 2011. Half (49 percent) of children 0-5 months old are exclusively breastfed and one in four children are exclusively breastfed at 5 months of age.[9] This rate has remained stagnant since 2011. Exclusive breastfeeding rates are particularly low among the richest wealth quintile (30 percent) and among working mothers (29 percent). Two thirds of all children (65 percent) receive breastmilk within their first hour of life. The percentage of children who continue to be breastfed is 58 percent for children 6-11 months and 43 percent for children 12-23 months old (Figure 24).[9]

Figure 24: Key breastfeeding indicators.[9]

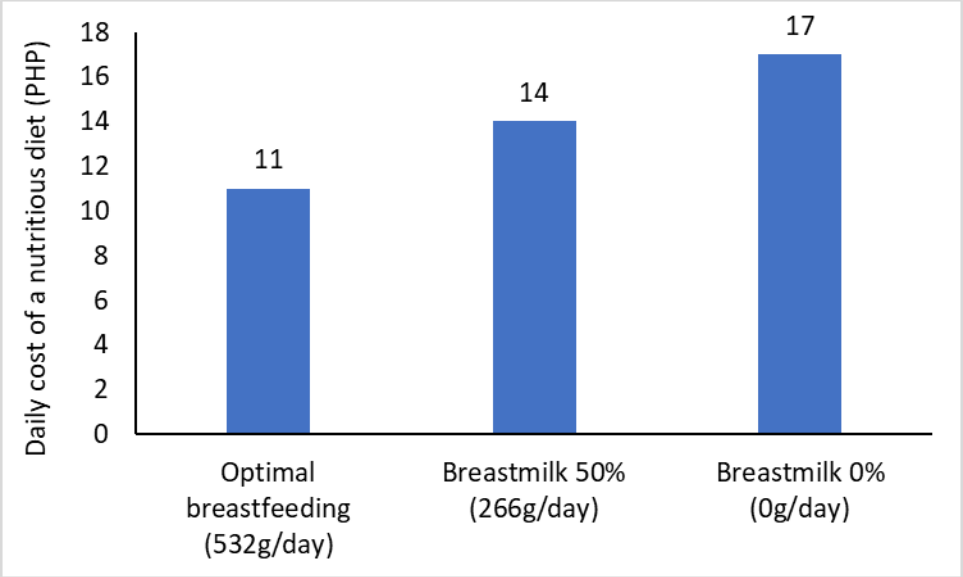


Limited data is available regarding why mothers do not breastfeed optimally. A KAP survey in five provinces of Mindanao suggests several drivers of breastfeeding behavior.[10] First, some women lack knowledge of optimal practices, including breastfeeding, care practices and basic health and nutrition knowledge. Second, the predominant reasons stated for not breastfeeding a child were an inability to do so due to a shortage of breastmilk flowing, pain when breastfeeding and/or the child refusing to drink. Third, when encountering challenges with breastfeeding most mothers reported not feeling confident seeking help. In contrast, among mothers who breastfeed, knowledge of the nutritional benefits of breastmilk and the recommendations of a physician and/or other mothers motivate mothers to breastfeed. Another factor that influences breastfeeding is ability to pay; some mothers would prefer formula but breastfeed because they cannot afford formula.

Despite maternity leave being extended recently from 60 to 105 days[11], this still falls short for enabling the WHO-recommended 6-months of exclusive breastfeeding. The private sector recognizes the market opportunity for breastmilk substitutes, concluding in market research reports that “even with better awareness on the value of breast milk, working mothers often have no choice but to rely on milk formula (…) even if the pending bill proposing that the maternity leave be extended to 120 days is approved”.[12]

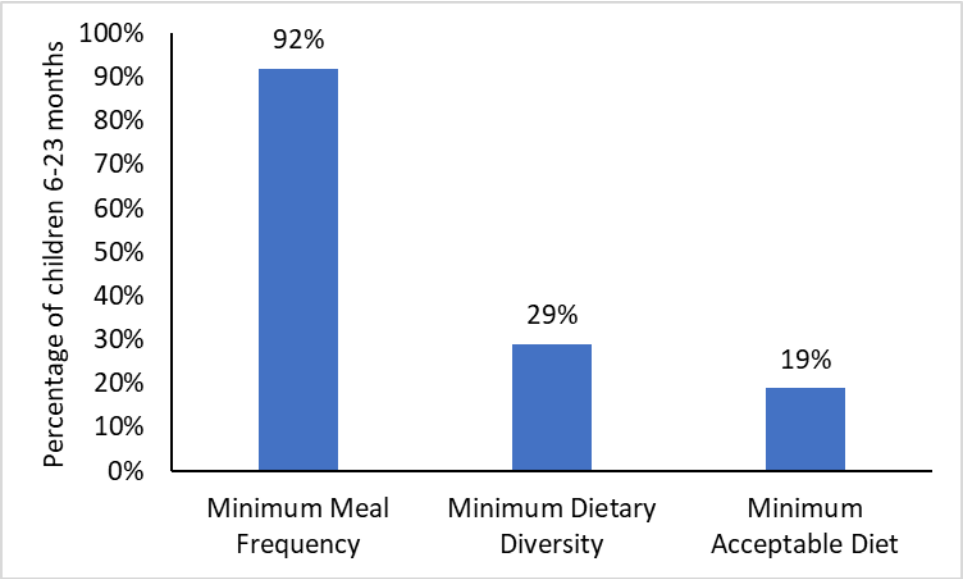
Suboptimal breastfeeding has health and economic implications for households. With optimal breastfeeding (532g per day)[13], the minimum cost of a nutritious diet is 11 PHP for a young child (12 to 23 month). If the amount of breastmilk in the child's diet is reduced, the cost of a nutritious diet increases to 14 and 17 PHP for 50 percent of the recommended amount and no breastfeeding, respectively (Figure 25).

Figure 25: Daily cost of a nutritious diet for a child (12 to 23 months) with different levels of breastfeeding.



Complementary feeding lacks diversity and hence does not meet nutrient requirements for young children. Among children 6-23 months old less than one in five (19 percent) have a Minimum Acceptable Diet (MAD). 92 percent meet Minimum Meal Frequency (MMF) but only 29 percent meet Minimum Dietary Diversity (MDD) (Figure 26). MAD is particularly low in ARMM.[9] Less than half (45 percent) of children 6 to 23 months consume iron-rich foods on a daily basis and only one in four children under 2 consume vitamin A-rich foods daily.[9]

Figure 26: Percentage of children (6-59 months) reaching MMF, MDD and MAD.[9]



Few children 6 to 59 months meet their estimated average requirement (EAR) for key micronutrients, including iron (24 percent), calcium (28 percent), vitamin A (57 percent), vitamin C (43 percent), thiamine (53 percent), riboflavin (56 percent) and niacin (67 percent).[14] The proportions that do not meet the respective EARs are considered to be deficient, i.e. their intake is lower than their estimated needs. Compliance with vitamin A supplementation and deworming is high (71 percent and 58 percent respectively among children 12 to 71 months), but only 17 percent of children 6 to 59 months took iron supplements.[9]

Figure 27: Intake of iron and vitamin A-rich food, supplements and deworming by young children.[9]

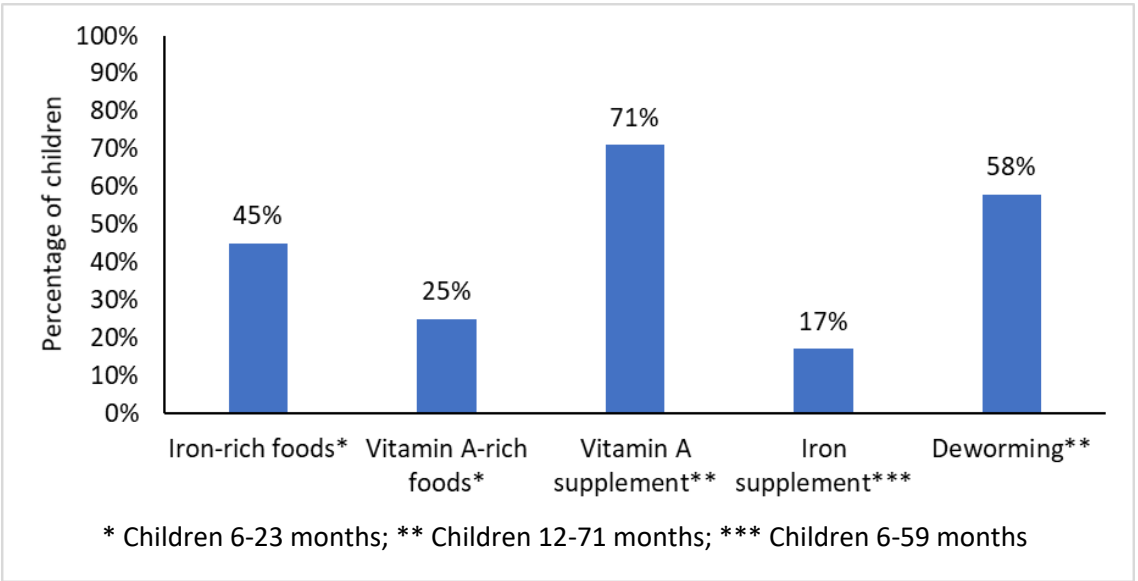
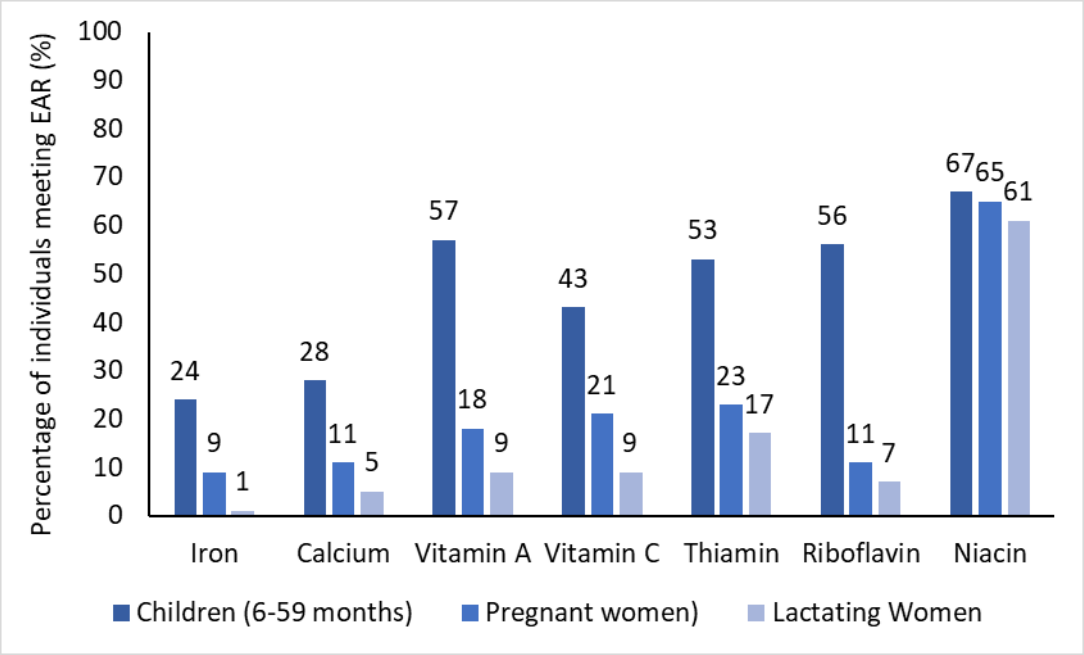
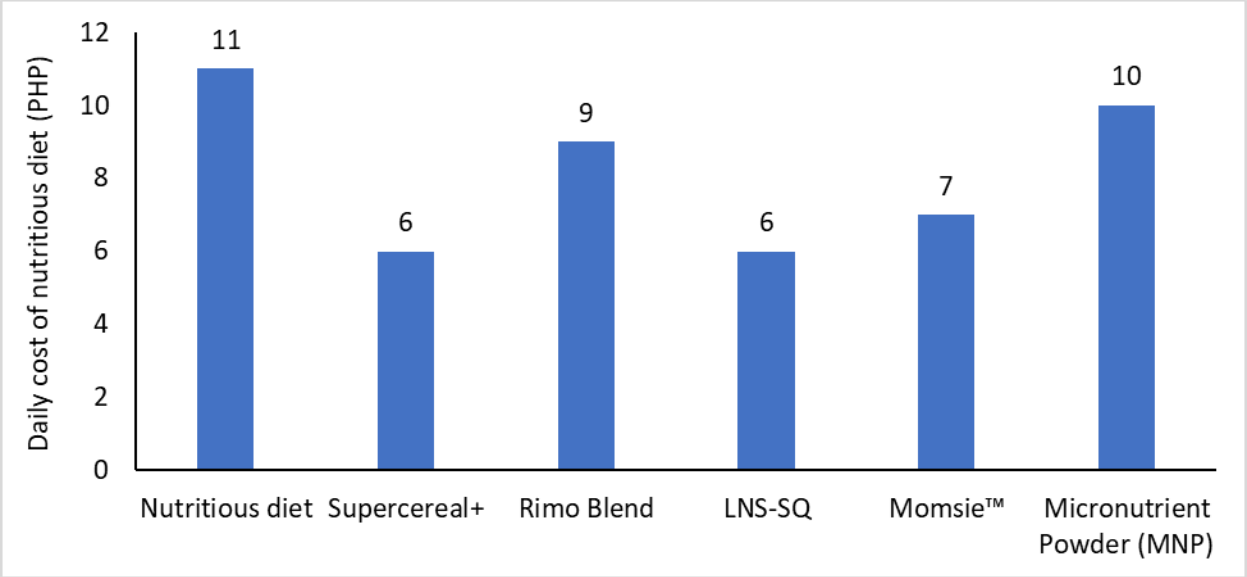


Figure 28: Percentage of children (6-59 months), pregnant and lactating women meeting their EAR for key nutrients.[5]



Specialized Nutritious Foods (SNF) and micronutrient supplementation can support caregivers in meeting nutrient requirements for young children. To estimate the impact on the cost of a nutritious diet for the 12-23-month-old child when supplements or specialized nutritious foods (SNFs) would be provided, CotD analyses were conducted for in-kind provision of Supercereal+, a similar Filipino product called Rimo (Rice-Monggo) blend, Lipid-based Nutrient Supplement Small Quantity (LNS-SQ), a similar Filipino product called Momsie™ and Micronutrient Powder (MNP) (nutrient composition for supplements and SNFs can be found in the Appendix). It was found that each of the five products could reduce the daily cost of the nutritious diet (Figure 29). Supercereal+ and LNS-SQ could reduce cost the most, from an average of 11 PHP per day to 6 PHP per day. Momsie™ could reduce the daily cost to 7 PHP per day. For the less effective products, MNP does not contain energy, protein and calcium and Rimo blend does not contain calcium; therefore, these products were less effective in the models than SNFs that also contained these key nutrients.

Figure 29: Daily cost of a nutritious diet for children (12 to 23 months) if different supplementary foods are provided in kind.



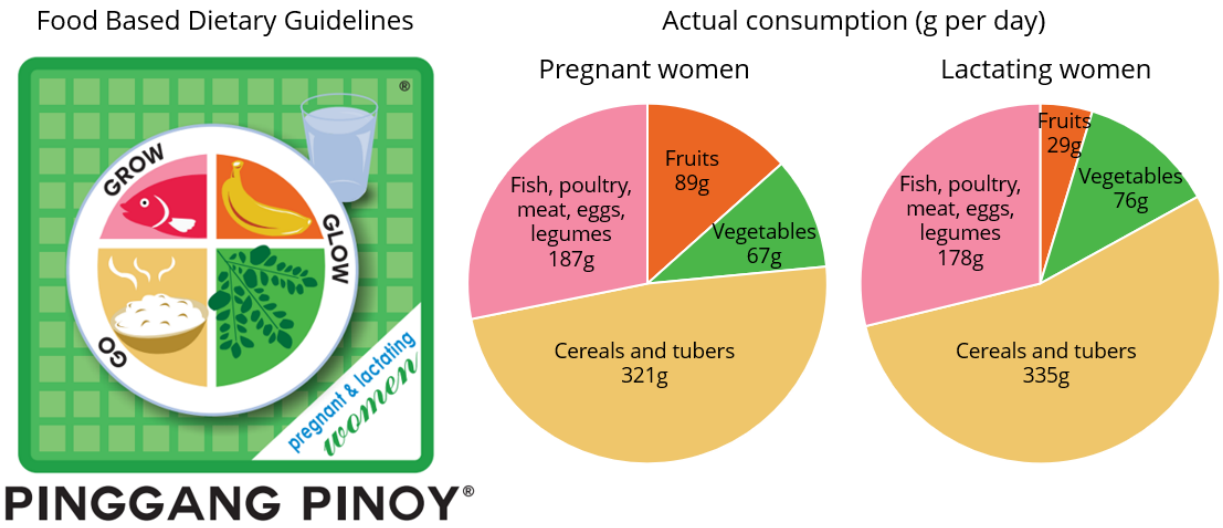
Model Specifications - Portion sizes: Supercereal+ and Rimo Blend: 30g; LNS-SQ: 20g; Momsie™: 25g; MNP: 1g; Frequency: Up to once daily (except for MNP 3x per week); provided in-kind

Message 3: Adolescent Girls and Lactating Women

Meeting the nutritional needs of adolescent girls and pregnant and breastfeeding women would cost the household the most. Their micronutrient needs are higher, which means they require the largest share of the more expensive nutritious foods. This is generally not considered in household food allocation, putting them and their children at greater risk of micronutrient deficiencies. Dietary supplementation can reduce the cost of accessing a nutritious diet for adolescent girls and pregnant/lactating women.

Pregnant and lactating women consume poor diets which most likely contribute to poor child nutrition. Anaemia rates are highest among children 6 to 11 months (40 percent), due to a combination of suboptimal stores laid down in pregnancy, related to maternal malnutrition, insufficient micronutrient intake from breastmilk and complementary foods and in some cases increased losses due to illness. Only 9 percent of pregnant women and 1 percent of lactating women meet their EAR for iron. Rates are similarly low for calcium, vitamin A, vitamin C, thiamine and riboflavin.[14] Compared to the Philippine food-based dietary recommendations (FBDR) "Pinggang Pinoy"[15], pregnant and lactating women consume staples in excess and do not consume enough fruits and vegetables (Figure 30).

Figure 30: Dietary intake (in g consumed daily) of pregnant and lactating women of four food groups compared to Philippine FBDR Pinggang Pinoy.[15]



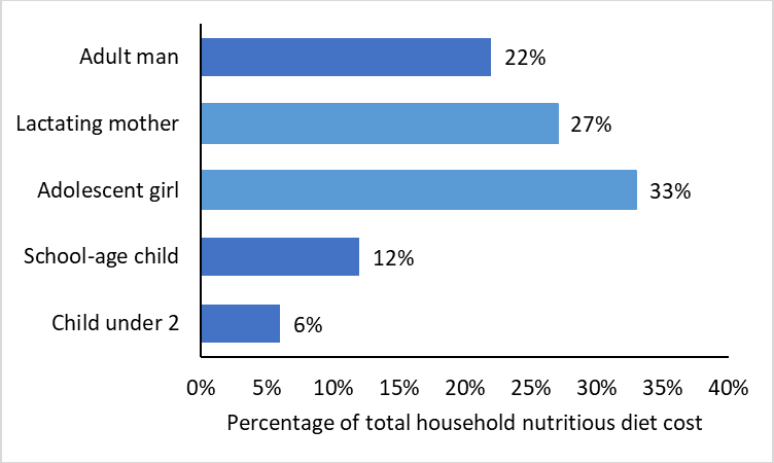
The nutritional needs of adolescent girls, pregnant and breastfeeding women are higher than those of their male counterparts. Therefore, they require the largest share of the more expensive nutritious foods. Men require 10mg of iron per 1000kcal to meet their daily recommended nutrient intake (RNI) for iron; adolescent girls require a 2.5 times higher density of iron in their food than men to meet their RNI of 25mg of iron per 1000kcal. Likewise, lactating women and young children require several times the amount of iron per 1000kcal compared to adult men (see **Error! Reference source not found.**).[16] The requirement for elevated nutrient density for adolescent girls and lactating women means that these individuals require the most amount of nutritious, nutrient-dense foods. The requirement for children 6-9 months may not cost the most because the total amount of food required is low, but it is very difficult to meet the recommended nutrient intake with regular intake of animal source foods several times per week and/or special fortified foods.

Table 1: Daily energy and iron requirements of different individuals, by age, sex and biological status.[16]

Individual	Energy requirement (kcal)	Iron RNI (mg)	Iron RNI per 1000kcal
Men (30-59 years)	2,750	27	10
Women, lactating (30-59 years)	2,867	59	21
Adolescent girls (14-15 years)	2,449	62	25
Children (6-7 years)	1,500	13	8
Children (12-23 months)	561	12	21
Children (6-9 months)	242	19	77

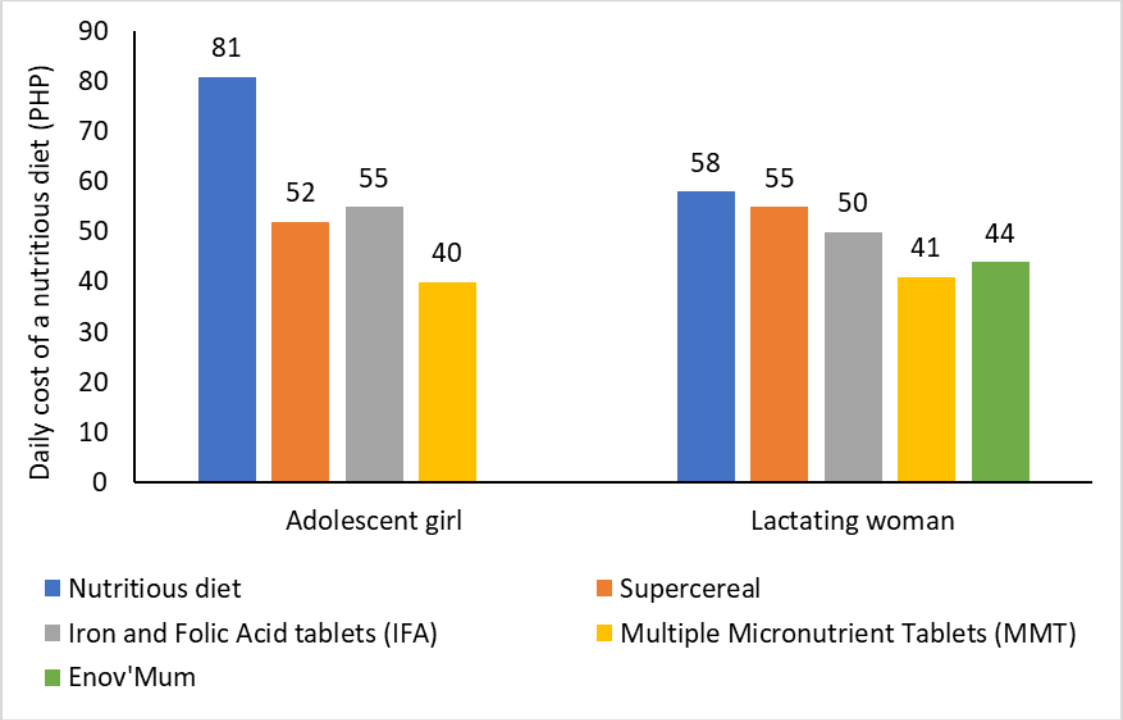
Therefore, meeting the nutrient needs of adolescent girls, pregnant and breastfeeding women would cost the household the most. The CotD analysis identified adolescent girls and lactating women as having the most expensive nutritious diets in the model household. These two household members comprised 60 percent of the total household nutritious diet cost (Figure 31). Economic analysis of intra-household resource allocation suggests that food is distributed based on income earning power and perceived caloric needs, instead of nutrient density needs.[17,18] This finding suggests an insufficient proportion – and total amount – could be allocated to household members particularly in need of more nutrient dense foods. Both prioritization within the household and improving purchasing power for the household to buy nutritious foods are critical for improving access to nutritious diets.

Figure 31: Distribution of household cost for a nutritious diet across members of the model household.



Because nutrient density needs are generally not considered in household food allocation, adolescent girls, pregnant and lactating women and their (unborn) children at greater risk of micronutrient deficiencies. Dietary supplementation can reduce the cost of accessing a nutritious diet for adolescent girls and pregnant and lactating women. To estimate the impact on the cost of a nutritious diet for adolescent and pregnant and lactating women if supplements or specialized nutritious foods (SNFs) are provided, CotD analyses was conducted for in-kind provision of several SNF. These include Supercereal (corn-soy-blend), iron and folic acid tablets, multiple micronutrient tablets (MMT) and Enov'Mum, an LNS-SQ designed for pregnant and lactating women. The analysis shows that each of the five products could reduce the daily cost of the nutritious diet (Figure 32), particularly the MMT and the LNS-SQ (for lactating mothers only). The in-kind provision of MMT reduces the minimum cost of a nutritious diet for an adolescent girl by over 50 percent from 81 to 40 PHP and for a lactating mother by 29 percent from 58 to 41 PHP (averaged across modelling areas).

Figure 32: Daily cost of a nutritious diet for adolescent girls and lactating women with different supplementary foods provided in kind (portion sizes: supercereal 120g; IFA and MMT 1g; Enov'Mum 20g; frequency: up to once daily).



Message 4: Urban Contexts

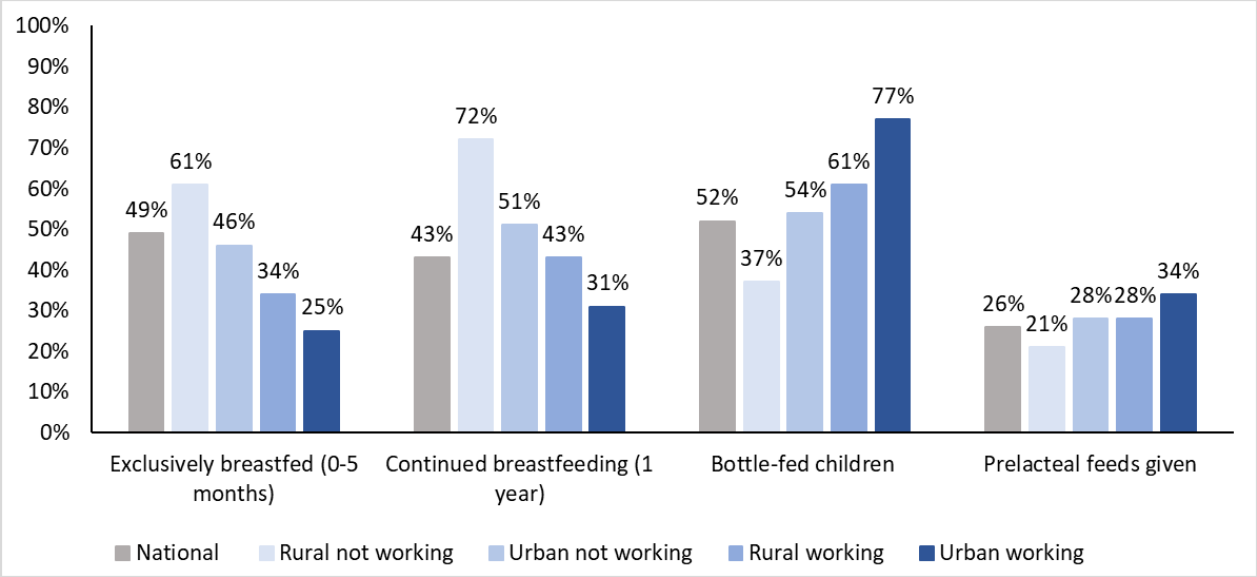
Undernutrition and overweight/obesity among the urban population affects millions of people. The prevalence of overweight/obesity is increasing, especially in Metro Manila. Financial insecurity and high food prices are the main barriers to accessing nutritious diets. Identifying and targeting the most vulnerable populations in informal settlements is an operational challenge.

Although stunting prevalence is lower in NCR (25 percent) than the national average (33 percent), the sheer size of Metro Manila (12.9 million people) makes for a very high caseload of stunting across a relatively small geographic area: 355,000 children under 5 years within NCR are reported to be too short for their age, compared to the WHO international guidelines. Other forms of malnutrition – wasting, micronutrient deficiencies and overweight – make the triple burden of malnutrition an increasing concern. Despite a small decrease from 2013 to 2015, NCR has the highest prevalence of overweight children under 5 (6 percent) and overweight and obesity in adults (37 percent overweight or obese and 10 percent obese).

As urbanisation will continue, and urban areas become even more densely populated, the burden of malnutrition and related burden of poor health in these areas is expected to grow. In this context, vulnerabilities specific to the urban environment are being explored through different agencies, with existing data highlighting the barriers to consuming a nutritious diet that individuals and households face.

Data suggests that IYCF practices are worse in an urban context than in rural environments. Breastfeeding rates are considerably lower in urban areas than in rural areas, and lower among working mothers than non-working mothers. In addition to living in an urban area, maternal workload is associated with increased undesirable and decreased desirable IYCF practices. Consequently, urban working mothers are the group with the poorest IYCF practices: Only 25 percent of urban working mothers practice exclusive breastfeeding for the first 6 months of their infant's life, half that of an already low national average of 49 percent (Figure 33). The exclusive breastfeeding rate for urban working mothers is 9 percentage points lower than for rural working mothers (34 percent) and 30 percentage points lower than for rural non-working mothers. The 25 percent exclusive breastfeeding rate for urban working mothers indicates the range of all children in the age bracket that are exclusively breastfed, there is valid ground for the assumption that exclusive breastfeeding specifically at the 5 months mark is well below that. The reverse trend is visible for the percentage of children 0-23 months who are fed with a bottle. There is a clear association between mothers' workload and reliance on bottle-feeding (on average 45 percent for non-working and 71 percent for working mothers), a factor that is further increased by urban residence, where 77 percent of working mothers' children are bottle fed. By definition, bottle-feeding refers to any type of fluid, whether it is formula, milk or other liquids.

Figure 33: IYCF practices by residence and maternal occupation.[1]

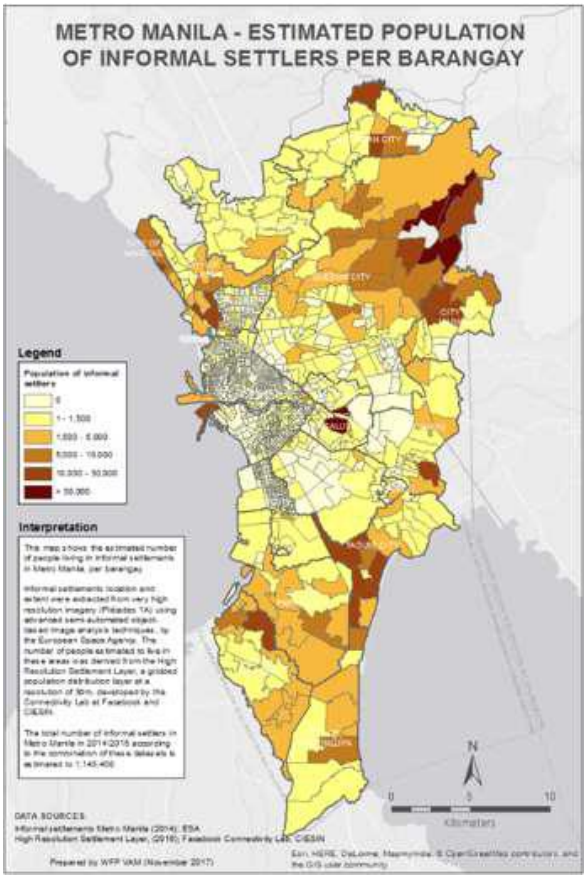


Given that there is virtually no own food production and that urban gardening initiatives are still in their infancy, access to food is governed almost exclusively by purchasing power. In the urban environment, processed food is readily available, ranging from food stalls and street markets to industrially produced ready-to-eat products. Not all urban food vendors are expected to sell food with undesirable effects on nutrition: there are anecdotal examples of street vendor collectives emphasising healthy eating.

However, most of the food that is being advertised is classified as unhealthy, stressing the need for private sector collaboration to improve nutrition. In short, unhealthy foods are cheap and readily available, whereas fresh, nutritious foods are not widely available and if so, often at a high price.

As the urban population continues to grow, reaching the urban poor has been recognised as a priority by government and development partners. Tackling the high numbers and high density of malnutrition is an opportunity and a challenge. It is estimated that around 4 million people in NCR live in informal settlements without access to basic health or sanitation infrastructure. They are vulnerable to security risks and climate shocks, and they are difficult to reach after disasters. The informality of the settlements makes the urban poor more mobile, posing barriers for targeting, monitoring and sustaining interventions. High resolution satellite imagery (Figure 34) has provided initial evidence that the density of informal settlers varies greatly between barangays (the smallest administrative division; the native Filipino term for a village, district or ward), meaning implementers may need to differentiate interventions and programmes at the lowest level.

Figure 34: Estimated density of informal settlements per Barangay.[19]



Formative research carried out in different local government units of Metro Manila by WFP indicated a high variance in vulnerability within a close geographic range, but co-occurring patterns of vulnerability.

LGUs that reported a high prevalence (25 percent or higher) of daily labour or informal sources as their main source of income also had high prevalence (10 percent or higher) for food sourced from landfills and general food insecurity. Focus Group Discussions carried out as part of that research also highlighted that the quality of food is largely dependent on the available budget of the family.

The Focus Group Discussions also confirmed that food access is largely governed by having enough money to buy it. Some exceptions were noted, e.g. that those LGUs with access to bodies of water or access to extra land spaces allowed individuals to source their own food directly, through fishing and/or gardening. However, it was highlighted by focus group participants that this is largely only done by people who do not have enough money to buy food. When asked about their dietary patterns, most respondents reported preferring food that is easy to prepare or ready to eat from street vendors, perhaps explaining in part the high consumption of fried or pre-cooked meals.

5.3 – Demand Creation

Message 5: Diets

Consumption of staple food such as rice is above recommended levels. Dietary diversity increases with wealth, but consumption of fruits and vegetables is low regardless of economic status. *A comparison of average food intake compared with Pinggang Pinoy food-based dietary guidelines shows the national diet is high in cereals and tubers and low in fruits and vegetables (Figure 35).Figure 35 This is in line with reported energy consumption; nationwide, 73 percent of energy comes from staples compared to WHO recommended 50 percent. This pattern is consistent for all socioeconomic strata, with a small decrease in cereal consumption for the richest wealth quintiles (*

Figure 36). Individuals in the poorest wealth quintile consume very small quantities of meat and poultry. Individuals in the richest wealth quintile consume almost six times as much meat and five times as much poultry as the poorest wealth quintile but less vegetables than the poorest quintile. For the total population, from 1978 to 2013, per capita daily consumption has decreased by 21 percent for vegetables, decreased by 61 percent for fruits and increased by 227 percent for meat and poultry (Figure 37).[14]

Figure 35: Actual intake of foods as reported by NNS 2013 compared to recommended Pinggang Pinoy food-based dietary guidelines.[14]

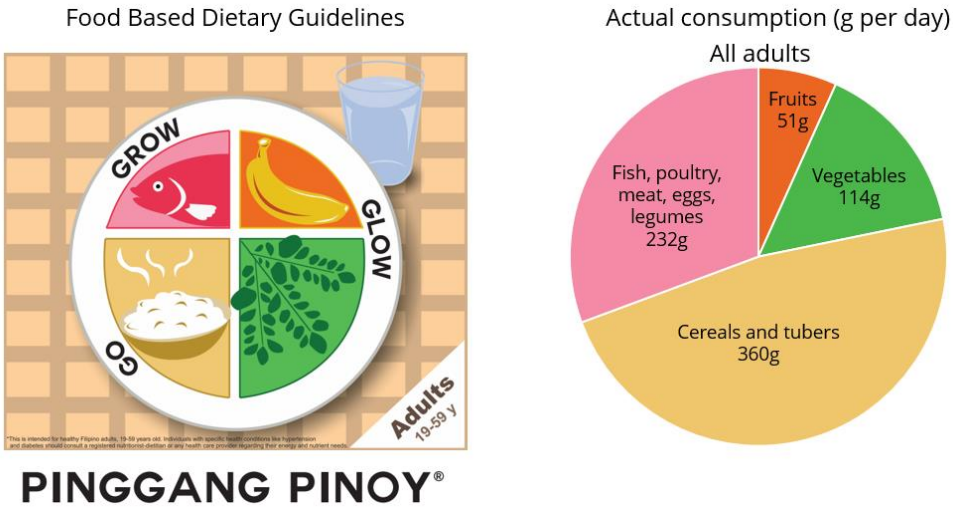


Figure 36: Daily per capita consumption by food group across socioeconomic quintiles.[14]

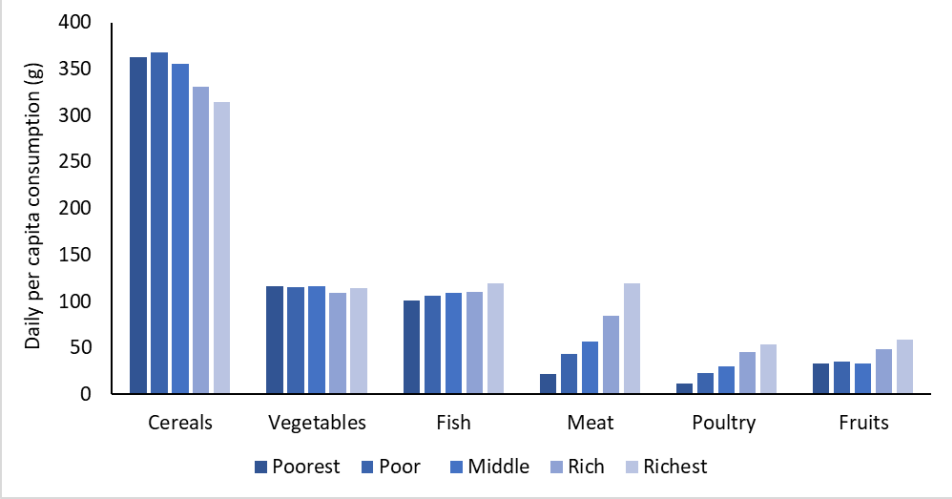
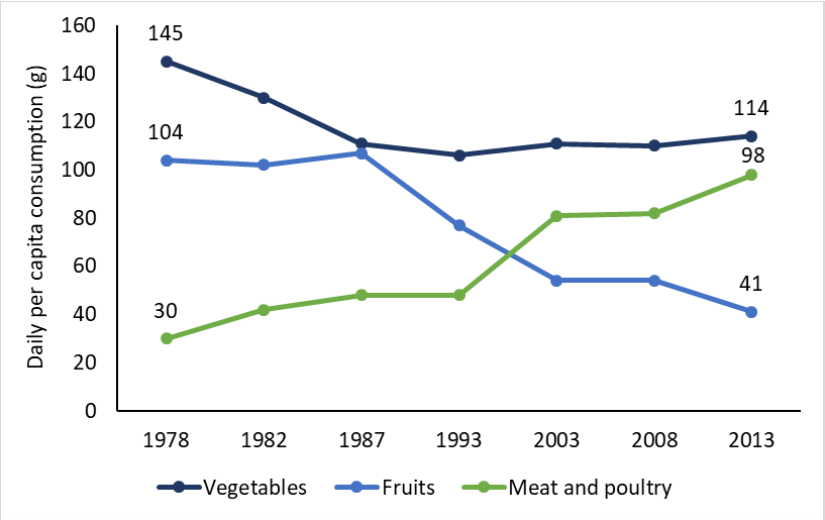


Figure 37: Trends over time for daily per capita consumption by food group for vegetables, fruits and meat and poultry.[14]



Dietary consumption patterns by socioeconomic strata and over time suggest that although consumption of meat and poultry is higher among wealthier populations and in recent years, consumption of other fresh nutritious foods, particularly fruits and vegetables, may not increase as a result of the economic growth forecasted in the Philippines in the years ahead. Improving the nutrition situation in the Philippines will require addressing dietary preferences as well as economic access to nutritious foods. One concern is that foods consumed at low levels regardless of income – mainly fruits and vegetables – are the most affordable sources of many (but not all) micronutrients, including green leafy vegetables, legumes, papaya, pepper, water spinach, carrot, avocado and banana. This suggests that households that could likely afford a nutritious diet are not consuming it, with negative impacts on micronutrient intake and nutritional status.

The high consumption of staple foods suggests that fortifying rice could be an entry point for improving nutrient intake in the short term. Despite strong legislation mandating rice fortification with iron dating back to 1952 only 2 percent of the national rice supply is fortified.[20] One issue with fortification of rice in the Philippines is that as an early adopter the Philippines started fortifying with ferrous sulfate, a fortificant that turned rice a brownish colour that was not accepted by consumers. Although the Philippines no longer uses ferrous sulfate and the current fortification method[3] is virtually undetectable by consumers the perception that fortification will turn rice brown persists. There are roughly 11,000 rice mills in the Philippines.[21] Most mills are small and dispersed across many islands creating logistical issues for delivering and local storage of fortified kernels, ensuring they are blended properly and enforcing and incentivizing compliance with legislation.[21] Decentralized industry, non-formal industry and village level mills could not feasibly fortify rice in the short term.[20] The Rice Fortification Research Group estimates that 35 percent of rice could feasibly be fortified by enforcing existing legislation, including domestic production from large mills, public programmes and imports.[20] One key opportunity highlighted by stakeholders would be for the National Food Authority (NFA) to fortify the rice it

[3] 6. Composition of multi-micronutrient fortified kernels per WFP's specification, available at: http://foodqualityandsafety.wfp.org/specifications (Select "Rice: 25% Broken Fortified Rice")

distributes. An impediment is that NFA currently operates at a loss and would need additional revenue to pay 2 PHP per kilogram to fortify rice. CotD analysis suggests fortified rice would be beneficial for improving nutrient intake. The following model considers the daily cost of a nutritious diet for the model household consuming non-fortified rice as the staple in comparison with: 1) iron-fortified rice as per current government guidance (2 mg per 100 g rice, achieved with a 1:200 blending ratio of fortified kernels to unfortified rice), 2) iron-fortified rice with a higher concentration, achievable through modifying the fortified kernel's iron concentration (3.5 mg per 100 g rice, same blending ratio), 3) multi-micronutrient-fortified rice (1:200 blending ratio), 4) multi-micronutrient-fortified rice with an increased blending ratio (1:100, which is more common internationally), 5) biofortified Golden Rice with vitamin A, 6) biofortified rice with zinc (see

Table 2). CotD analysis found multi-micronutrient-fortified rice blended with a 1:100 ratio could reduce the cost of a nutritious diet for the model household the most, by 21 percent (Figure 38), due to its higher content of a range of micronutrients. Multi-micronutrient-fortified rice blended with a 1:200 ratio and iron-fortified rice with higher iron content in premix could reduce the cost of a nutritious diet by 13 percent. Iron-fortified rice with the current premix composition could reduce the cost of a nutritious diet by 8 percent. Although both varieties of biofortified rice reduced the daily cost of the diet by only 1 PHP, for households not currently consuming a nutritious diet these interventions could increase micronutrient intake of vitamin A and zinc, respectively, as the nutritious diet cost assumes households are purchasing nutritious foods; consumption patterns in the National Nutrition Survey show households are not purchasing optimized diets. Biofortified rice may also reach other consumers because it does not require blending with fortified kernels.

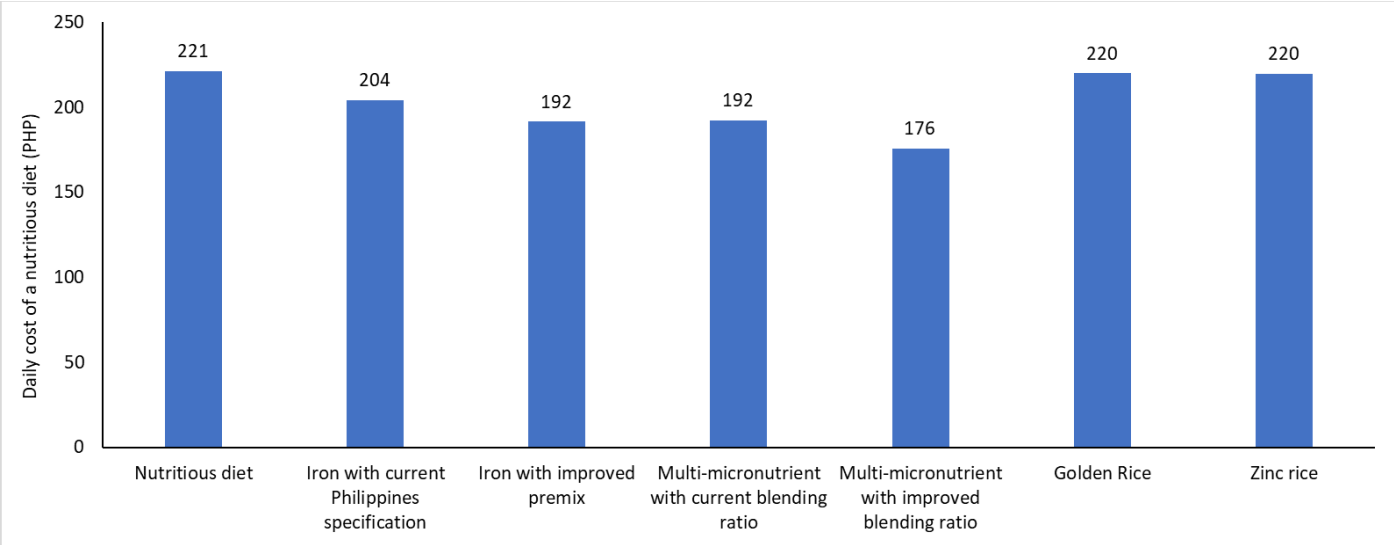
Table 2: Comparison of micronutrient content for 1) non-fortified rice, 2) iron fortified rice with current 400 mg Fe in premix kernels, 3) iron fortified rice with improved 700 mg Fe in premix kernels, 4) fortified rice with 8 micronutrients using a 1:200 ratio of premix kernels currently used for iron fortified rice and 5) fortified rice with 8 micronutrients using an improved 1:100 ratio of premix kernels.

Type of rice	**Rice, white milled**	**Iron with current Philippines specification**	**Iron with improved premix**	**Multi-micronutrient with current blending ratio**	**Multi-micronutrient with improved blending ratio**	**Golden Rice**	**Zinc rice**
Micronutrients	n/a	Fortified with iron (2 mg/ 100g)	Fortified with iron (3.5 mg/ 100g)	Fortified with vitamin A, vitamin B1, niacin, vitamin B6, folate, vitamin B12, iron and zinc	Fortified with vitamin A, vitamin B1, niacin, vitamin B6, folate, vitamin B12, iron and zinc	Biofortified with vitamin A (125 ug RAE retinol/ 100g)	Biofortified with zinc (2.1 mg/100g)

Blend ratio (fortified kernels: unfortified rice)	n/a	1:200	1:200	1:200	1:100	n/a	n/a
Price	Market price (average across modelling areas: 4.5 PHP per 100g)	Additional 0.2 PHP per 100g	Additional 0.2 PHP per 100g	Additional 0.2 PHP per 100g	Additional 0.2 PHP per 100g	Market price	Market price
Iron absorption factor	5%	5%	5%	7%[4]	7%	5%	5%
RAE (ug retinol)	0			75	150	125	
B1 (mg)	0.06			0.25	0.5		
Niacin (mg)	2.4			3.5	7		
B6 (mg)	0			0.3	0.6		
Folate (mcg DFE)	6			108.5	217		
B12 (mcg)	0			0.5	1		
Iron (mg)	0.6	2	3.5	2	4		
Zinc (mg)	1.1			3	6		2.1

Figure 38: Daily cost of the nutritious diet for a model household with non-fortified rice compared to fortified rice and biofortified rice (averages across modelling regions).

[4] Multi-micronutrient fortification has a higher iron absorption factor because the fortificant includes iron absorption enhancers.



Message 6: Agriculture

The policy focus on rice self-sufficiency, combined with low demand for vegetables, does not incentivise agricultural diversification. Growth in agricultural productivity has been slow in recent years due to limited access to inputs and technology, and uncertain property rights. Expanding homestead production of fruits and vegetables can improve access to nutritious diets.

Agriculture comprises almost one-third of total employment in the Philippines but contributes one-tenth of the total GDP.[22] Compared to other Southeast Asian countries, production and productivity growth has lagged for decades, despite government support to agriculture (3.3 percent of GDP from 2012-2014) being five times the OECD average.[22] Agricultural policy focused on rice self-sufficiency has encouraged producers to increase their share of rice in total production, by value and by land use. Rice production increased from 16 percent of total value in 1991 to 22 percent in 2013 and from 26 percent of harvested area in 1990 to 33 percent in 2013.[22] Greater policy focus on diversification could improve food security and nutrition by increasing the production of nutritious foods and high-value crops (such as, mangoes, tropical fruit, fresh vegetables, pineapples, coffee, sugar cane, cassava, onions and rubber). Greater investment and improvement in agricultural extension services could increase productivity and diversity and hence the income of farmers, particularly smallholder farmers, and improve dietary diversity. Agricultural intensification is especially important with 0.13 hectares of agricultural land per person and a growing population (1.7 percent annual population growth).[22]

The agrarian reform process, designed to redistribute public and private land to landless farmers and farm workers, started in the late 1980s, has affected ownership of close to three-quarters of total agricultural land and has yet to be finalized, with the property rights to much of that land still uncertain.[22] As a result, farmers struggle with securing financing, and investment in agricultural infrastructure is low.

The Philippines' archipelagic geography complicates supply chain infrastructure and distribution of fresh foods across more than 7,000 islands. High transportation costs and connectivity gaps encourage decentralized production and disincentivize distribution of foods to potential consumers within the region. While many foods are transported to Metro Manila for a guaranteed market, few mechanisms are in place to distribute across and within regions and low storage capacity in areas of production leads to post-harvest losses when foods are not shipped quickly.

More than half of green, leafy and yellow vegetables (FNRI classifies as green, leafy and yellow vegetables malunggay, carrot, squash fruit, kamote and kangkong) and more than one-quarter of other vegetables (FNRI classifies as other vegetables onion, garlic, eggplant, string beans and cabbage) consumed in the Philippines are produced by the households consuming them.[5] This finding highlights the potential of home gardening interventions to improve access to nutritious foods. This may require households to grow a greater or different variety of crops and increase the size and productivity of their plots.

Based on monitoring data provided by Helen Keller International (HKI), CotD analysis modelled the production of fresh foods such as kangkong, squash, tomatoes, eggplant, string beans and watermelon through kitchen garden interventions. The model included consumption of own production (22 percent of total production), plus the selling of surplus production (74 percent of total production with 4 percent losses) at reported farmgate prices and the selling of surplus at market prices (Table 3). Across rural areas in the regions modelled (excluding NCR) own consumption of garden crops could reduce the daily cost of the nutritious diet for the model household from 171 PHP to 157 PHP. Consumption of fruits and vegetables in the model was 3.7 times the reported per capita consumption in the 2013 NNS, 139g actual per capita daily fruit and vegetable consumption compared to 520g modelled per capita daily fruit and vegetable consumption.[5] Households would need to change current consumption patterns considerably for the kitchen garden model to achieve the modelled impact.

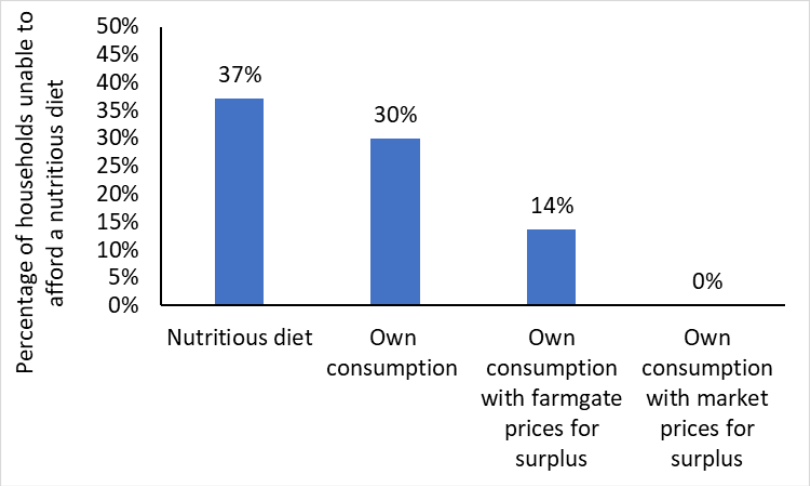
CotD analysis estimates that without an intervention 37 percent of the rural population in these six areas could not afford the nutritious diet. With own consumption of kitchen garden crops 30 percent of the rural population would not be able to afford the nutritious diet. If households would sell surplus production at reported farmgate prices (37 PHP daily income) 14 percent of the rural population would not be able to afford a nutritious diet. If households were able to sell their products at market prices (148 PHP potential daily income) virtually all of the rural population would be able to afford the nutritious diet (Figure 39). This finding suggests the potential of homestead gardening to improve access to nutritious diets, assuming households produce high yields of fruits and vegetables from backyard gardens, consume a good proportion of these foods, sell surplus production, receive market prices for surplus production and purchase nutritious foods with income earned from sales.

Table 3: Weekly household consumption of fruits and vegetables from kitchen gardens with farmgate prices and market prices. Assumed that 22% is consumed, 74% is sold and 4% is lost.

	Weekly Consumption (g)	Farmgate price[23]	Market price[5]

Ampalaya	890	20	57
Kangkong	145		35
Squash	378	6	28
Tomatoes	1,272	10	67
Sweet pepper	87	16	148
Eggplant	1,399	19	43
Cucumber	320	11	23
Upo	145	10	22
Okra	610	16	55
String beans	734	10	46
Watermelon	12,224	10	30

Figure 39: Percentage of households unable to afford the nutritious diet with consumption and sale of kitchen garden crops (averages across rural areas in six modelling regions).



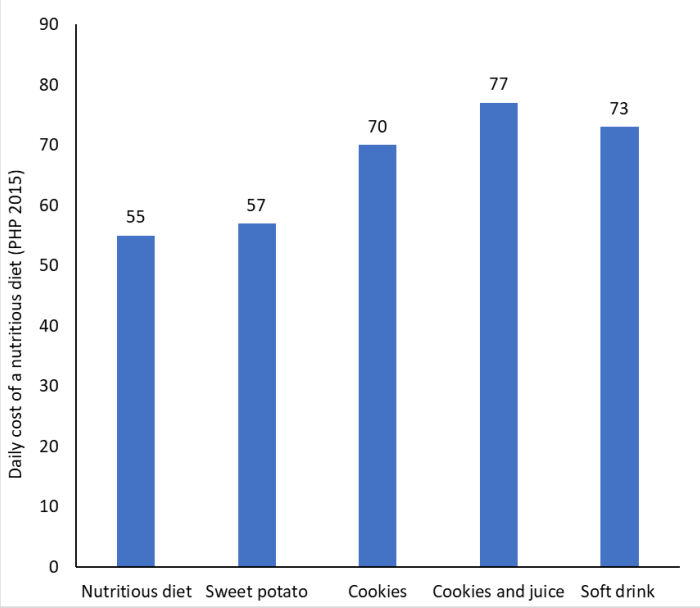
Message 7: Overweight and Obesity

Increasing prevalence of overweight and obesity throughout the Philippines is a growing concern. Advertising unhealthy food high in calories and low in micronutrients influences food choices. Urbanisation generally results in increased sedentary lifestyles and changing food consumption patterns.

The Philippines is facing a double burden of malnutrition with a persistently high prevalence of undernutrition and an increasing prevalence of overweight/obesity. On average, 18 percent of food consumed is processed. FNRI defines processed food as "food that has been changed from its natural state, either for safety reasons or convenience. It may contain additives, artificial flavourings or chemical ingredients and is usually packed in boxes, cans, plastics or bags."[5]. For 36 percent of households at least one family member reportedly consumes meals or snacks outside the home daily.[5]

CotD analysis estimated the cost of a nutritious diet with snacks and found that for an adolescent girl unhealthy snacks increased the daily cost of the nutritious diet by as much as 40 percent (Figure 40). Compared to consuming a healthy snack, represented by boiled sweet potato with relatively low energy content, unhealthy snacking contributes to the energy requirement without contributing nutrients. As a result, remaining food consumed must be more nutrient-dense and this is more expensive. In reality, overconsumption of energy might lead to overweight or obesity rather than the consumption of more nutrient-dense food. Whether or not individuals compensate for unhealthy snacking by eating more nutrient-dense food, an increasing cost of meeting nutrient needs is a barrier to adequate nutrient intake. Unhealthy snacking not only increases the risk of overweight/obesity but also the likelihood of micronutrient deficiencies. Access, ease of consumption, affordability and taste preferences are considered the main drivers of the high demand for unhealthy foods.

Figure 40: Daily cost of nutritious diet for adolescent girl with snacking



Note: averages across modelling regions except for NCR where a nutritious diet could not be calculated for an adolescent girl due to exceeding energy limits. Portion sizes (daily): sweet potato 50g; cookies 30g; juice 180 mL; soft drink 194 mL.

A survey of food and drink advertising around schools in Manila estimated that 85 percent of advertised food and drink is "unhealthy," classified as not contributing to recommended daily nutrient requirements (Figure 41).[24] Soft drink ads were most frequent. Advertising of unhealthy food high in calories and low in micronutrients is ubiquitous. The television advertising budget of one ice cream company was reported to be more than 10 times the National Nutrition Council's (NNC) budget for programmes and projects (

Figure 42). This indicates the importance of encouraging private sector actors to acknowledge their role in nutrition, and the shared responsibility of working to improve the nutrition situation given the sector's expertise and success targeting and messaging to different consumer groups.

Figure 41: Percentage of advertising around schools in Manila for unhealthy food and drinks and for healthy food and drinks.

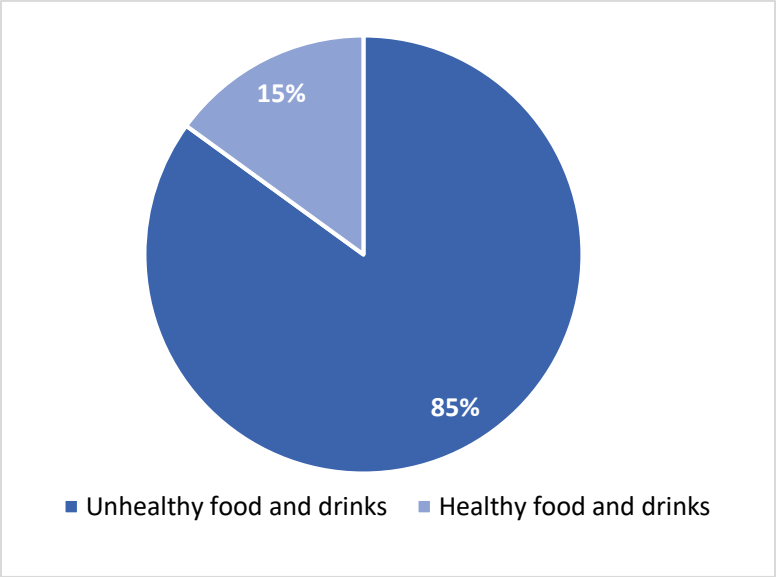
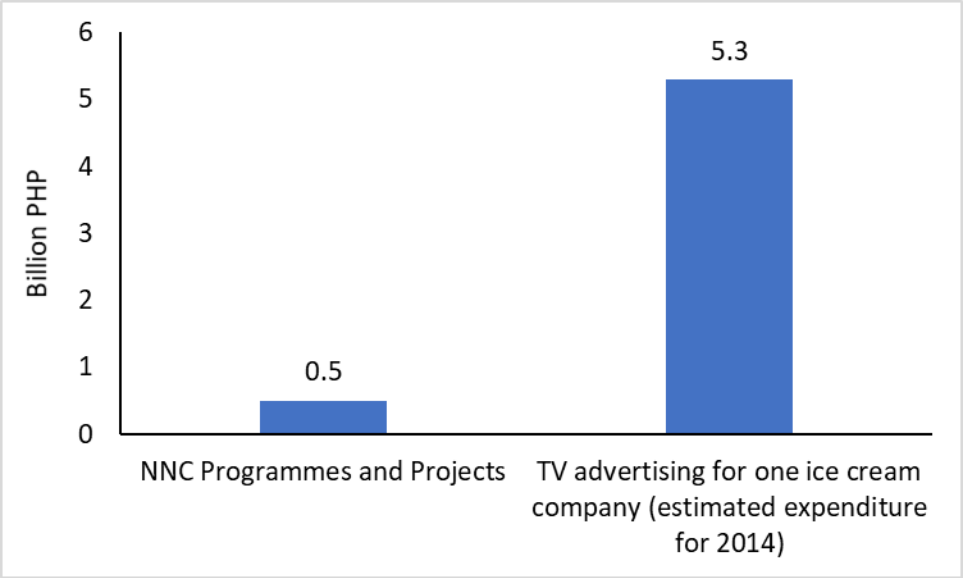


Figure 42: NNC programmes and projects annual budget compared to TV advertising for one ice cream company (estimated expenditure for 2014).



To estimate the economic costs of overweight and obesity in the Philippines the Economist Intelligence Unit developed a model that considered as direct costs the healthcare costs to treat five diseases often linked with obesity: type 2 diabetes, stroke, hypertension, colon rectal cancer and coronary heart disease.[25] The model considered as indirect costs the broader productivity losses from an obese person being less productive at work, dropping from the workforce due to early death or due to low average effective retirement age.[25] The study found that in the Philippines the total economic cost of obesity was between 4-8 percent of total health care expenditure.[25] The total economic cost of obesity was estimated to range between US$0.57B and US$1.08B, as much as 0.4 percent of the entire Philippines economy.[25] Direct costs were estimated at US$0.5-1B and indirect costs were estimated at around US$0.1B.[25] Among obese males in the Philippines 8-12 productive years were lost, the highest figure for the six ASEAN countries considered in the study.[25] These estimates consider obesity alone (5 percent of the adult population in 2014) and would likely be considerably higher if they were to consider the cost of being overweight as well.

The causes of increasing overweight and obesity rates in the Philippines include the availability and access to energy-dense foods in urban areas, low consumption of fruits and vegetables, the deluge of unhealthy food advertisements throughout the Philippines and the lack of physical activity, especially in urban areas where infrastructure is not in place for children to exercise.[25]

To address overweight and obesity there is global evidence that targeting food intake shows the most promise.[25] Population-wide interventions with strong global evidence include reducing portion sizes,

taxing specific food types, such as sugar-sweetened beverages, and implementing school and workplace policies that remove unhealthy foods.[25] A Cochrane systematic review found moderate to strong evidence that individual exercise and increased physical activity can help tackle obesity, especially when combined with diet modification.[25]

5.4 – Entry Points

Message 8: Emergencies

Considering the vulnerability of the Philippines to natural disasters, emergency preparedness plans, programmes and monitoring tools need strengthening to include nutrition.

Much of the Philippines is exposed to typhoons, especially the northern and eastern parts of the country. Coastal populations are vulnerable to rising sea levels and urban populations are vulnerable to floods due to inadequate drainage infrastructure. Both droughts and landslides are increasing. Among the lessons learned from the typhoon Haiyan response in 2013 was that after the disaster livelihoods and assets were destroyed and incomes were reduced for months, while markets functioned relatively well albeit with increased food prices due to increased supply chain costs as a result of damaged infrastructure.[26] Nevertheless, emergency situations often affect the vulnerable disproportionally hard and many may rely on in-kind provision of foods for a certain period of time.[27]

This provision of food provides therefore a two-fold opportunity for nutrition: one, to target the vulnerable with healthy, nutritious foods and two, to channel steady demand for nutritious foods to suppliers to make production and distribution of nutritious commodities a feasible opportunity. Both points are true for rice fortification, a vehicle that has proven to improve nutrition in several countries in the world.[21] One particular approach relevant to the Philippines could be to promote the development and production of local SNFs, with emergency response operations as a source of demand. WFP in the region has had success developing locally-produced SNFs for pregnant and lactating women and for children under two in Pakistan.

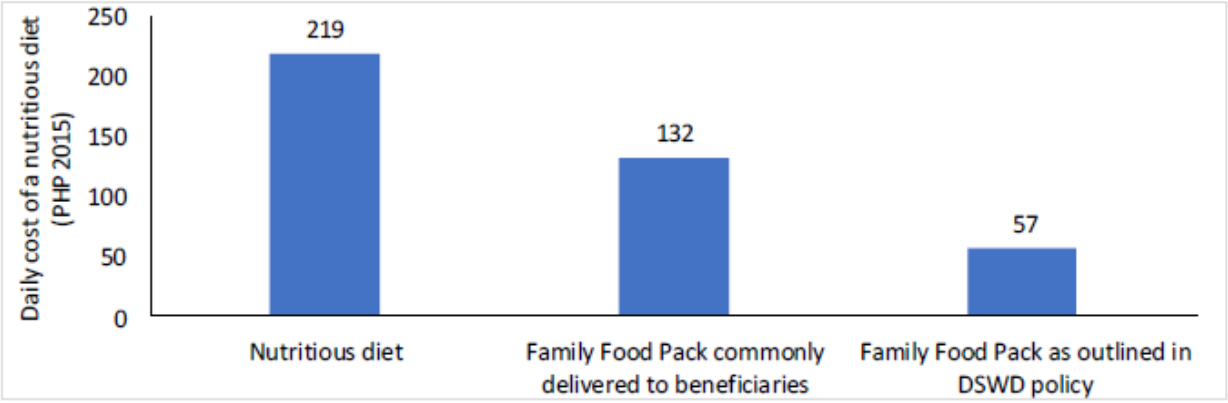
The Department of Social Welfare and Development's (DSWD) Family Food Pack, designed to support families affected by natural disasters, was developed with the nutrient values of specific target groups in mind and covers most of the nutrient needs for a family of five.[28] However, in regional FNG consultations stakeholders reported that food provided does not match the ration outlined in the policy (Table 4). One factor is the delay in procurement — provisions delivered in 2018 were procured in 2016 before the adoption of the new policy. Canned Laing and canned Pinakbet are not delivered because they are not popular among beneficiaries according to regional stakeholders consulted during FNG validation. Multi-Nutrient Growth Mix (MGM) is not provided due to limited national production capacity. Most of the rice provided is not fortified due to increased cost and limited availability of fortified rice that can be quickly mobilized.

Table 4: Composition of planned Family Food Pack commonly delivered to beneficiaries compared to Family Food Pack as outlined in DSWD policy.

	Rice, Iron Fortified	Rice, Not Fortified	Corned Beef, Canned	Sardines, Canned	Laing, Canned	Pinakbet, Canned	Multi-Nutrient Growth Mix (2g/serving)	Instant Coffee
Family Food Pack [1] (actually delivered)		3000	150	310				60
Family Food Pack [2] (DSWD Policy)	3000		150	310	155	225	20	60

The memorandum clearly outlines the ambition to meet micronutrients that are usually limiting in the Filipino context: "We have included here energy and protein, and the key micronutrients of iron and Vitamin A that are usually limiting in the Filipino diet."[28] It is therefore essential to the basic intention of the family food pack to deliver what has been initially designed. CotD analysis estimated the difference between the Family Food Pack outlined in DSWD policy and the actual Family Food Pack commonly delivered to beneficiaries. Both Family Food Packs reduce the cost substantially. However, the analysis shows that with Family Food Pack [1], households would need to spend more than twice as much on the market in addition to the Family Food Pack to meet nutrient needs, compared to the amount they would have to spend if they received Family Food Pack [2] (Figure 43).

Figure 43: Daily Cost of a nutritious diet with Family Food Pack as delivered to beneficiaries compared to Family Food Pack as outlined in DSWD policy (average based on modelling areas).



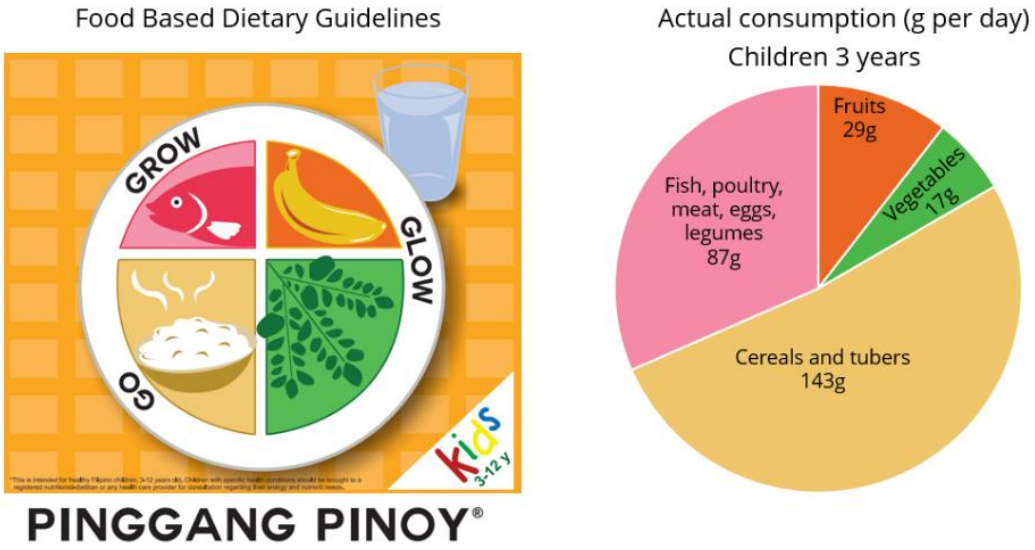
This highlights the importance of designing policies that are realistic and accepted by beneficiaries and making sure that delivered interventions meet the standards defined in policy. After a disaster, affected households may be economically dependent on food assistance for months. If delivery of interventions, such as the Family Food Pack, fall short compared to the standards in the programme's design, beneficiary needs will not be met for a substantial period of time. This increases their risk of poor health, lowers productivity, and can affect growth and development of young children.[29]

Message 9: School Feeding

Existing (pre-)school meal programmes can provide children with nutritious food. To improve their contribution to meeting nutrient requirements, the school meal needs to include more nutritious food.

Existing (pre-)school meal programmes provide children with nutritious foods. The diets of children in school are often deficient in micronutrients and improving nutrient intake has the potential to improve learning outcomes. A comparison of actual consumption with the Philippine FBDR Pinggang Pinoy for 3-year old children shows that fruit and vegetables make up only 17 percent of a child's actual diet compared to 50 percent of the recommended diet. Likewise, cereals and tubers constitute over 50 percent of a preschool age child's diet[5] compared to approximately 30 percent according to recommendations (Figure 44).[15] In addition, children face unhealthy food environments around their schools. A study evaluating food advertising around schools in Manila found that in the immediate vicinity of school the density of food advertising is twice as high as areas further from schools and that 85 percent of the foods advertised were unhealthy.[24] From a review in 2006, WHO concluded that such food advertising highly influence children's food preferences, purchasing behaviour and consumption.[30]

Figure 44: Dietary intake (in g) of children years old of four food groups compared to Philippine FBDR Pinggang Pinoy.[15]



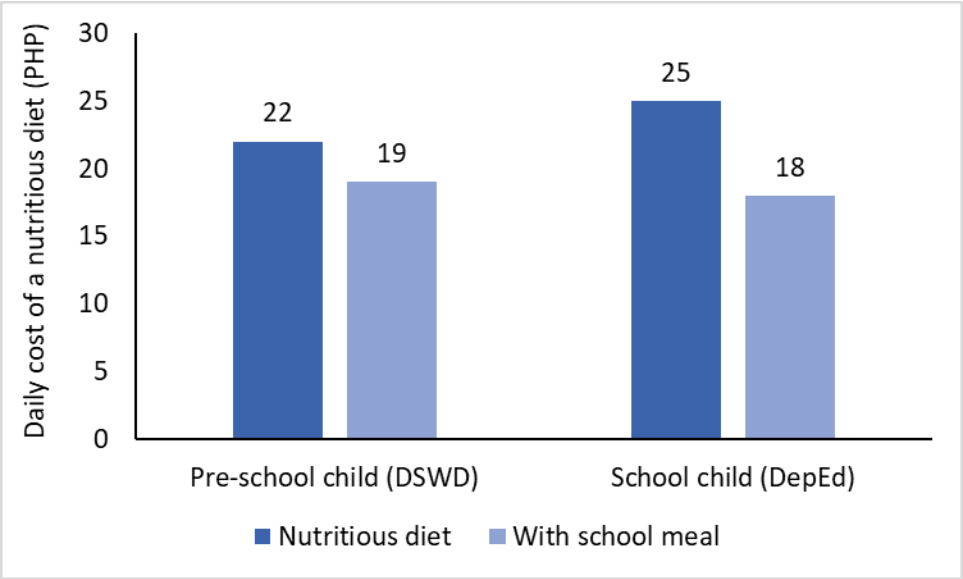
In the Philippines 96 percent of children are enrolled in primary school[31], which means that school meal programmes are an entry point through which a large number of school-aged children can be reached. Pre-school feeding programmes are currently implemented by DSWD and school feeding programmes by DepEd. To estimate the contribution of nutrition of current preschool and school meal programs, five

[5] The average amount of total grams of cereals and tubers consumed is above 50 percent of total consumption for all classified age groups of children 6 months to five years old (6 months to one year old; one year old; two years old; three years old; four years old; and five years old).

meals per week were included free of cost in the child's diet. For pre-school children the recipes were taken from a recipe book on iron-rice meals developed by FNRI[32]. For school children recipes from the cycle menus for feeding programs[33] were chosen. For each age group, recommended recipes were chosen (see appendix). The recipes did not include foods that are considered taboo in certain areas of the country. The results presented here are an average of the recommended school meals.

Findings from the analysis suggest that the current preschool and school meal programmes provide nutritious meals to children and have the potential to reduce the daily cost of a nutritious diet to the household for a school-aged child by up to 28 percent (Figure 45).

Figure 45: Daily cost of nutritious diet for a preschool aged child (4-5 years) and for a school aged child (6-7 years) with school meals (averages across modelling regions).



To improve the contribution of (pre-)school meals to meeting daily nutrient requirements, school meals need to include more nutritious foods. DepEd's target for the percentage of RNI for key micronutrients met by preschool and school meals is currently 30 percent.[34] This is below WFP's draft international guidelines for school meal programmes, which sets the target at 50-70 percent of RNI.[35] WFP's targets are set at such a high standard as it is assumed that the food that children receive at home is less nutrient dense.

Assuming preschool and school meals contribute to nutrient intake for only five out of seven days per week, the weekly targets in the following analysis were adjusted by the factor 5/7 respectively. Based on the model described above, current preschool meals meet DepEd's target for most micronutrients except folic acid and calcium; only five out of 13 micronutrients are provided in a sufficient amount to satisfy WFP draft targets (Figure 46). Current school meals meet DepEd's target for all micronutrients, but five out of 13 micronutrients are provided in an insufficient amount to satisfy WFP draft targets, including iron, calcium, folic acid and zinc (Figure 47). Reformulating school meal nutrient content targets and recipes could improve the nutrient intake of preschool and school-aged children.

Figure 46: Percentage of weekly REI and RNI of 4-5-year-old child provided by preschool meals compared to WFP's draft target and DSWD's target (averages across modelling regions).

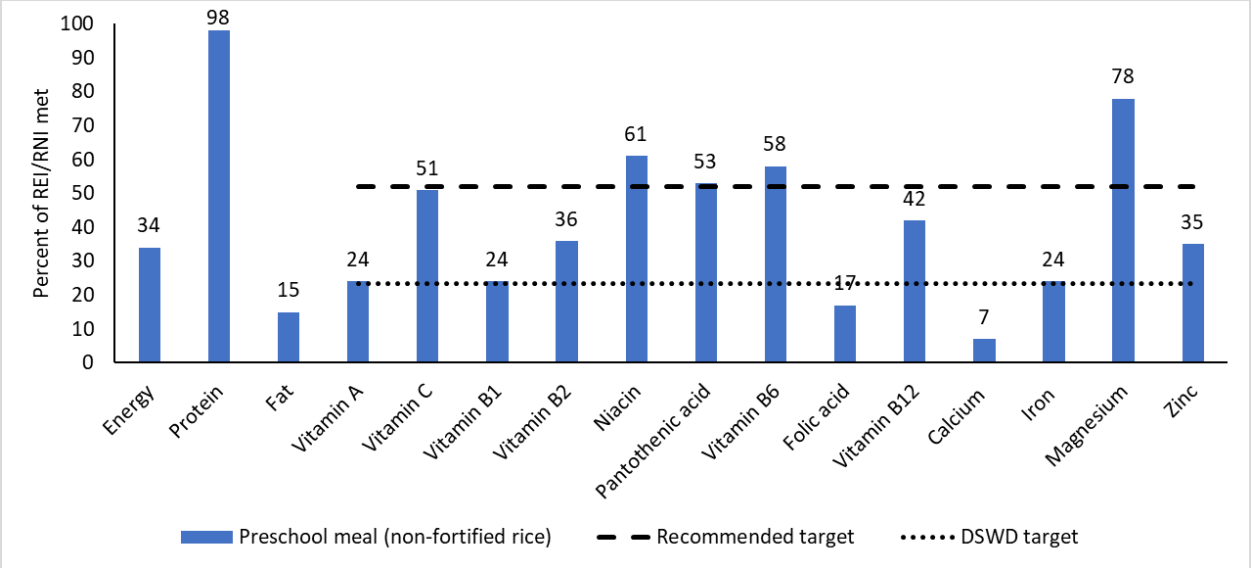
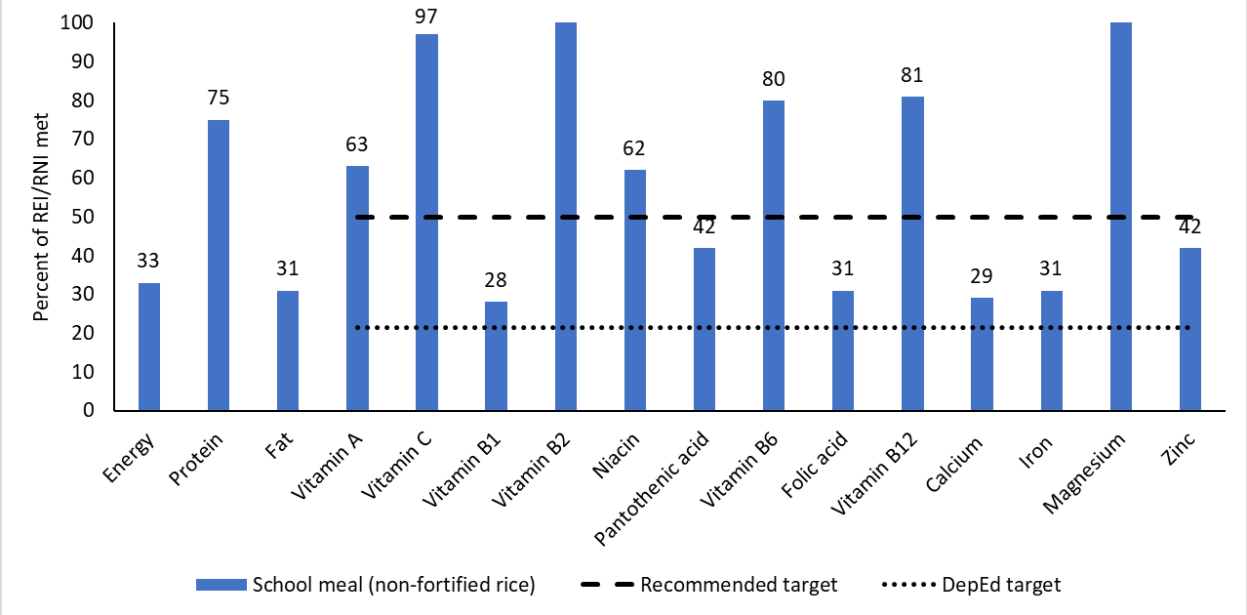


Figure 47: Percentage of weekly REI and RNI of 6-7-year-old child provided by school meals compared to WFP's draft target and DSWD's target (averages across modelling regions).



In addition, the government is making efforts to improve the food environment in schools. To facilitate healthy food and beverage choices, the DepEd classifies all food into one of three categories (red, yellow, green). For processed and packaged food this classification is according to the food's content of saturated fat, trans fat, sugar (or total carbohydrates where there is no dietary fibre) and sodium. For non-processed foods, the guideline provides a specific classification. Only food items classified as yellow

or green may be sold at school canteens. Yellow items should be served with care; green items should always be available.[36]

During national and regional consultations, stakeholders identified a number of challenges to implementation of the pre-school and school feeding programmes. These include the decentralized structure of the program where each school/child care centre is individually responsible for procuring and preparing foods; the non-adherence to current recipes; the weak link between local agricultural supply and demand generated by school meals; and the rising prices of fresh produce which make it increasingly difficult for schools and child care centres to provide nutritious meals at the budget they are provided per child per meal.

Message 10: Households Packages

Multisectoral interventions, as defined in the PPAN, have the potential to significantly improve access to nutritious diets and reduce malnutrition. To realise the PPAN's full potential, national and local commitment to nutrition must be strengthened and coordination improved. *A combination of multisectoral interventions for each target group as defined in the PPAN was modelled to estimate the potential reduction in the percentage of households unable to afford the nutritious diet (Table 5). These interventions included a daily portion of Rimo blend for the child under two, a school meal for the child aged 6–7, and iron and folic acid tablets for the adolescent girl and lactating woman. An estimate of the percentage of households unable to afford the nutritious diet if all households received the PHP 1,400 cash transfer through 4Ps was performed, and assumed households spent 70 percent of the transfer on nutritious food in addition to what they already spend on food. Without an intervention 35 percent of households in the modelling areas could not afford a nutritious diet. This percentage was reduced to 22 percent of households with 4Ps cash transfer, 21 percent of households with the intervention package and 7 percent of households with the combination of the intervention package and 4Ps cash transfer (*

Figure 48).

Effective implementation of the multi-sectoral intervention package requires: 1) consistent delivery of high-quality supplements and nutritious food; 2) messaging campaigns promoting compliance and addressing concerns with acceptability and; 3) monitoring and evaluation to identify issues in implementation and inform iteration in response.

Cash transfers effectively improving access to nutritious food requires: 1) households understanding which food is nutritious; 2) nutritious food being available in local markets and; 3) beneficiaries having the desire to purchase and consume nutritious food.

Corresponding behaviour change messaging would be necessary to help achieve this outcome. One strategy to link cash transfers to nutrition would be to combine cash with in-kind or commodity specific e-vouchers. This would increase demand for nutritious food and provide an incentive for food manufacturers to produce these products by providing a consumer base.

Table 5: Overview of package of PPAN interventions.

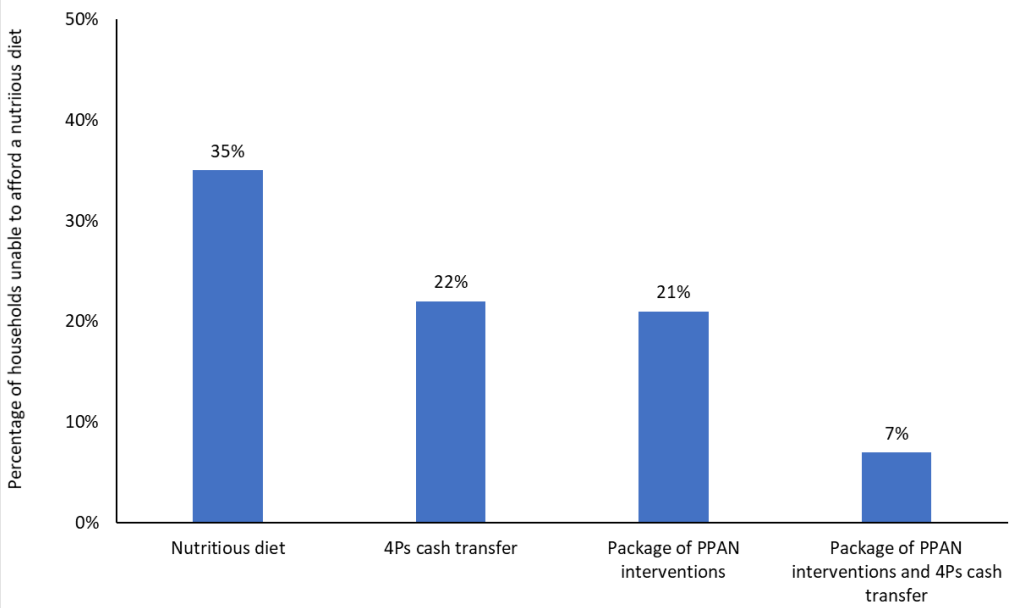
Package of PPAN interventions

Target group	*Modelled intervention*
Child under two	Rice monggo (30 g daily)
School-age child	Average of current DepEd menus
Adolescent girl	Iron and folic acid tablet
Lactating woman	Iron and folic acid tablet

Cash transfer

Target group	*Intervention*
Household	1400 PHP per month

Figure 48: Percentage of households unable to afford a nutritious diet with a multi-sectoral intervention package and with 4Ps cash transfers (averages across modelling regions).



6 - Recommendations

After the dissemination workshop participants were asked to work together in groups to develop recommendations based on the validated findings. Participants were asked to identify what existing PPAN programs and projects were feasible given two different scenarios: A) implementing programs and projects within one year, but access to all funds needed and B) implementing programs and projects within three years, but no additional funding available. Those two directions were used to highlight the key parameters which can be used to effectively and efficiently improve nutrition through different platforms. Participants were divided into 6 groups: Health, Education, Social Welfare, Food Processing,

Agriculture and Governance. After having spent time in the groups to develop these recommendations, findings were consolidated and reported to the whole group.

Participants included representatives from the following government agencies and organizations: National Nutrition Council (NNC), Department of Health (DoH), Regional Health Office, Department of Social Welfare and Development (DSWD), Department of Agriculture (DA), Department of Science and Technology Food and Nutrition Research Institute (DOST—FNRI), Department of Education (DepEd), Department of Interior and Local Government (DILG), National Food Authority (NFA), National Economic Development Authority (NEDA), Office of the Vice President (OVP), Plan International, Save the Children-Philippines, Nutrition International, International Rice Research Institute (IRRI), International Care Ministries Foundation Inc (ICM), Nutridense Food Manufacturing Corporation, Alcanz International LLC, University of the Philippines Diliman, University of the Philippines Los Banos Institute of Human Nutrition and Food College of Human Ecology (UPLB-IHNF-CHE), WFP, UNICEF, FAO, WHO, Adventist Development and Relief Agency (ADRA), Kalusugan ng Mag-Ina (KMI), Nutrition Center of the Philippines (NCP), Philippines Society of Nutritionist and Dietitian (PSND).

1. Health

The health group focused their efforts on IYCF programming outlined in the PPAN (including the National Dietary Supplementation Program, National Nutrition Promotion Program for Behaviour Change and Micronutrient Supplementation), because of the importance of IYCF interventions to improve the overall nutrition situation and the leverage of the health sector's position to implement IYCF interventions. The group highlighted three main strategies that need to be taken to improve and coordinate existing efforts: keep ongoing investment in place, prioritize pregnant and breastfeeding women and adolescents and continue to address the double burden, with SBCC messaging across all nutrition activities. The health group emphasized that the Philippines has policies in place to move in the right direction, but the implementation is not as coordinated as it could be. More specifically, the group suggested:

a) **Keep investing in the First 1000 Days and improve the nutrition component of the Maternal Newborn Child Health and Nutrition strategy.** This point emphasises practices focused on children, such as immediate postpartum and postnatal care, the promotion of IYCF practices, for example the timely introduction of complementary feeding and the promotion of best practices to achieve minimum acceptable diets. The group highlighted the need to continue the support of exclusive and continued breastfeeding with initiatives such as further extension of maternity leave and tax incentives for companies with good maternity schemes.

b) **Prioritize pregnant and breastfeeding women, and adolescents.** For this section the group highlighted the importance of scaling up targeted interventions and expanding the programmes to meet the needs of the vulnerable. For the first point, iron and folic acid as well as multi-micronutrient tablets were considered a good vehicle to target individuals with interventions that match their nutrient gaps. However, the group mentioned that nutrition programming could be implemented with a wider range

and delivered via existing adolescent health clinics currently managed by DoH. Tailoring these interventions closely to vulnerable populations will ensure that the issue is being addressed where it is the most urgent.

c) **Continue to include overweight and obesity prevention in health policy measures.** A point that was considered to be underrepresented in the current PPAN was a programmatic and policy approach to combatting the double burden, an increasing concern in the Philippines. It was suggested that food labelling and regulations for health and nutrition claims would be a first step to improving information on nutritious diets, especially when complemented by strong education campaigns to inform consumers about the meaning of this type of labelling. The enforcement of existing policies, such as implementation of only healthy foods at school was considered pivotal to making such change early in the lives of vulnerable people. A proposed sugar tax, that could potentially decrease the economic appeal of unhealthy snacks and drinks relative to more healthy options, would be an additional measure to combat overconsumption of sweetened commodities. At the same time such tax could be used to fund the public health impact costs that have emerged related to unhealthy diets, such as treatment of NCDs and cardiovascular diseases.

d) **Deliver strong and consistent social behaviour change communication on improving dietary diversity.** The last point made by this group was the importance of social behaviour change communication that needs to cut across sectors and interventions. This was deemed necessary to reflect the individual's role in making healthy choices and the impact this can have on the health sector.

Other highlighted activities were: building capacities directly in LGUs, particularly around logistics, human resources and facilities; using supervised neighbourhood play for nutrition messaging and establishing peer-to-peer counselling as part of a larger health and nutrition support network.

2. Education

The participants working on education as a platform for nutrition identified 3 main opportunities to leverage improved nutrition within that sector: recognizing and realizing the opportunity of school meals to reach a large number of children and adolescents, connecting the demand of school meals to local production and specialized nutritious foods and capitalizing on nutrition curriculum development in school. The recommendations are built on the PPAN components (National Dietary Supplementation Program, National Nutrition Promotion Program for Behaviour Change, Micronutrient Supplementation, Overweight and Obesity Management and Prevention Program, Nutrition Sensitive Program) focused on improving food and nutrition security in the Philippines through school interventions.

a) **Use opportunity to reach a large number of children and adolescents.** The group stated a general consensus that there remains room for improvement to make the best use of education as an existing entry point for nutrition. Amongst other considerations, the participants highlighted the need to improve dietary diversity of the school meal and micronutrient fortification and supplementation, consider age-specific needs and include overweight and obesity prevention as part of standard procedures for school meals. Although it was mentioned as an obstacle that the current practice of targeting special meals for children identified as undernourished will be challenging and potentially emotionally hurtful for individuals, the general consensus was that meals could be used in a more

nuanced way for individual consumption. Stringent implementation of policies that focus on regulation of marketing and sale of unhealthy food, the increased availability of low-cost healthy food options in schools and continued work towards ensuring an anti-obesogenic school environment are part of this effort.

b) **Connect school meals.** It was important to the group members to also use the educational entry point beyond schools and carry the benefits of successful nutritious school meals to local producers supplying food. The major direction is to use existing demand to incentivize production of nutritious foods, either on a local level by connecting to smallholder farmers and providing consistent demand for fresh foods, or on a larger scale with private sector production of specialized nutritious foods. Suggestions of modification of the current programmes were the expansion to provide meals to undernourished adolescents in secondary schools, to include micronutrient supplementation (iron with folic acid provided by the health sector) for all adolescent females once a week and the general use of biofortified/fortified staples (such as rice, flour or salt) and other food products offered in school canteens. Challenges foreseen include the fidelity to standardized recipes in school meals, which would have to be ensured through local channels.

c) **Capitalize on nutrition curriculum development initiatives.** The last suggestion of this group was to use education not only as an entry point for school feeding, but also as a way of disseminating nutrition information. A stronger inclusion and strengthening of awareness around nutrition, ideally in coordination with interventions detailed above and other sectors, such as health, would allow for an improved promotion of good practices past the school age.

3. Social Welfare

Participants in the social welfare group highlighted opportunities within supplementary feeding for pre-school children and the nutrition sensitivity of social welfare programmes currently being implemented. To leverage the social welfare sector for nutrition, they saw opportunities in the inclusion of nutrition indicators in revised social protection strategies and to re-design and standardize pre-school feeding recipes. One aspect under discussion from different members of this group was the role of targeting different vulnerable groups and forms of malnutrition. Whereas one part of the group argued that a shift should take place toward only providing meals to undernourished children, the other part held the opinion that it would be hard to justify only providing meals to a subset of children and that implementation of such targeting would be very difficult, with no clear cut-offs or guidelines available to when to feasibly stop providing meals. General consensus, however, existed on the following:

a) **Ensure inclusion of nutrition indicators in revised social protection strategy.** As part of the revised social protection strategy the nutrition-sensitivity of existing programmes, such as 4Ps and the sustainable livelihood programme, could be improved by including indicators as part of the M&E framework and adding nutritionally relevant outcome variables. Discussions are currently underway within DSWD to include nutrition indicators as social protection outcomes in 2019.

b) **Re-design and standardize pre-school feeding recipes.** The group advocated for a stronger standardization of what food is given at preschools. They argued that the preschool meal is an opportunity to compensate for gaps at home and that target levels of nutrient intake and food

composition should be guided by strong information to ensure best practices are implemented. It is therefore additionally important that preschool feeding extends to not only those that are visibly malnourished, because a complement to the home diet is important for many, especially to fill a gap in micronutrient intake that may not be immediately visible. Preschool meals can also provide children and parents with an example of healthy, nutritious meals sourced with local foods. A challenge that was pointed out was to ensure that all children are included in day care centres and/or child development centres so that they can be reached with improved programming. Likewise, appropriate coverage for children with disabilities and children from indigenous communities should be enforced to not discriminate against these particularly vulnerable. Lastly, as with education as an entry point, this group recognized the potential that nutritious pre-school meals could have on local supply and the overall supply chain and highlighted the need to review best practices for local procurement of nutritious foods.

4. Food Processing

The participants that were working together in the group on food processing began their considerations by outlining the current bottlenecks and limitations in the private sector and food processing environment in the Philippines. A special focus was set on rice fortification and how – despite mandatory legislation since the 1950s – roll-out of fortified rice has been problematic over the last decades, and hence not achieving the impact on nutrition that has been demonstrated in other countries. The group identified that in some cases the mandate for food processing is simply not enforced (e.g. for fortification), that there is a lack of prioritization, that previous bad experience with the choice of iron fortificant that gave the kernels a brown colour over time gave fortified rice a poor reputation, that rice is cost-sensitive and fortification increases the price of rice and that national and local government are not yet committed to making an impact with fortified rice. This group focused on demonstrating and unleashing the potential of fortification, capitalizing on the NFA's unique position to bring fortified rice to scale and to support blenders to be able to allow for an increased demand, starting with public sector purchases.

a) **Demonstrate and unleash the potential of fortification.** Due to previous bad consumer experience with earlier fortification technology no longer in use, rice fortification needs to be re-proven in the Philippine context. This includes demonstrating that there is no (more) taste or colour difference between fortified rice and standard rice. Government food purchases are a first important entry point as it should be easier to enforce mandatory fortification standards with government distributed rice and government purchases would create sufficient demand to ensure a return on investment for producers who have invested in fortification technology. Close Monitoring and Evaluation will be required in the initial phase to ensure that issues with procurement, blending, distribution and consumption can be addressed as quickly as possible. WFP Philippines has the capacity and commitment to support the expansion of fortification.

b) **Capitalize on NFA's unique position and scale with fortified rice.** As a next step the group suggested using the NFA's role to procure, store and distribute rice for social safety nets and emergency response as a further entry point to increase demand and distribution of fortified rice. This would require additional resources to pay for a slightly more expensive staple (2 PHP additional cost per kg) and would require directives such as a presidential memo to see the process through.

c) **Support blenders.** Lastly, food processing needs to be addressed from the supply side, making sure demand for nutritious foods can be met nationally, with appropriate use technology. This would include increasing the number of blenders that can blend at the appropriate ratio for rice fortification as well as quality control mechanisms. Once in place, incentives to fortify – such as tax breaks or increased demand through social safety nets (school meals, NFA stocks for emergencies, general food distribution) – are good next steps to direct local food processing to a sustainable business model.

5. Agriculture

The focus for the group identifying agricultural activities was the Community, Household and School Food Gardening section in the PPAN (Nutrition Sensitive Program). The agriculture group was the thematic counterpart to groups that focused on education and social welfare to create demand, looking at production and consumption from a supply side angle. The agriculture group highlighted a need for more diversification, investment in the productivity of smallholder farmers, improvement in the quality of homestead gardens and increased scale-up of demand for nutritious foods through public channels as main opportunities and promising next steps.

a) **Think beyond rice.** Although rice is the single most important crop for the Philippines by standards of consumption, the policy focus on rice self-sufficiency has come at the cost of a lack of diversified agriculture. The agriculture group suggested promoting diversification and the intensification of production to improve the availability of nutritious foods. They emphasized the need for increased research, development and (commercial) promotion of nutritious foods to ensure the right varieties are grown, sold and consumed. Geographically this was mentioned to be a concern particularly in upland areas, where inhabitants are primarily poor farming families.

b) **Invest in productivity of smallholder farmers.** Although commercial farming and specialization will become an increasingly viable livelihood and change the way agriculture is carried out, increasing the productivity of smallholder farmers without transitioning to a new paradigm of agriculture shows a lot of potential. The group highlighted community organization in cooperatives, including clustering of farms, could have large productivity growth, increasing yields without necessarily changing the size of land area harvested. Improved agricultural extension work, through the government and the private sector, was another key variable to ensure good practices are spread and transferred across farmers. The private sector plays a major role in making technology and improved inputs, such as irrigation and fertilization, accessible and affordable to the majority of smallholder farmers, who are often using traditional methods that are less effective. Lastly, the ability to store products for a longer period of time post-harvest, for example, through adequate drying and storage facilities, was considered an important investment in the livelihood of smallholder farmers.

c) **Grow quality homestead gardens.** The group highlighted the need for homestead gardens to become more nutritious so households can source a variety of fresh foods themselves. This means producing the right varieties in good quantities should be promoted through public information channels.

d) **Promote nutrition and food security in schools and communities.** Two possible channels to raise awareness of the importance of nutrition and its role in food security are schools and communities.

Participants mentioned the best way to move forward is to demonstrate value with actual projects, such as supporting school gardening by linking with local farmers. Other suggestions were targeted at the LGU and community level to increase community livestock ownership, for example, through programs on dairy production and processing as well as school milk feeding programmes. Although implementation challenges such as the teachers' or the LGU's officials' workload as well as food quality and safety issues need to be taken into account, the group highlighted that direct programme implementation would be the most effective way of showcasing the effect community-based agricultural interventions can have on nutrition.

6. Governance

One of the key findings that was highlighted during every regional consultation preceding the final dissemination was the issue of governance, LGU mobilization and coordination across different government levels and sectoral agencies. For the dissemination workshop one group, in which regional nutrition coordinators were participating, focussed on addressing the issue of governance and focussed on how best to mobilize LGUs for delivery of nutritional outcomes through the NNC sub-regional network. The group identified several steps that would be effective in coordinating these efforts: build on regional and provincial guidance for implementation, base allocation of funds on the inclusion of nutrition in investment plans, reinforce accountability of other sectors and include nutrition in the management of LGUs and barangays.

a) **Build on regional and provincial guidance for implementation.** While regional and provincial guidelines for implementation exists, further detailed information is needed to guide nutrition officials on how to deliver nutrition programming at the municipal and barangay levels. Therefore, as a first step it was suggested using existing guidance as a basis to expand implementation guidelines to a more granular level. As a further step the group outlined the need to develop a checklist for local government officials in the role of having to implement in a municipal context, such as mayors and nutrition action officers and the barangay officials.

Additional initiatives that were thought to mainstream nutrition in national and local governance were:
i) the use of the DILG orientation package to sensitize newly elected government officials on nutrition. This would increase the awareness of the importance of nutrition and the understanding that little public health progress will be made without addressing those issues through different sectors (i.e. adding to the nutrition objectives in all sectoral programs and projects).
ii) Adding nutrition pillar to Seal of Good Governance, a badge of excellence for well-managed LGUs. This would reinforce nutrition as a more structural prerequisite of what is expected from municipal officials.
iii) Revisit human resource requirements for Barangay Nutrition Scholars and Nutrition Action Officers: It was also important to participants to stress that only so much can be done with current human resource requirements. Government officials working in nutrition are often overstretched with work, dealing with several commitments or sometimes even roles at the same time and may therefore not always have the capacity to deliver nutrition programming as desired. Improving the funding dedicated to human resources at the lowest administrative level will also ensure that issues arising at that level can be managed locally.

b) **Base internal revenue allocation on inclusion of food and nutrition security in investment plans.** To incentivize the inclusion of nutrition in local government planning, the group suggested using the internal revenue allocation as a tool. This would allow officials to allocate more money to municipalities that have included food and nutrition security in their investment plans. As a further step, matching grant schemes could be explored.

c) **Reinforce accountability of other sectors to support nutrition.** It was stressed that if nutrition is a serious priority in the Philippines, its implementation could not be a stand-alone effort from the health sector. As documented and evidenced by several publications, such as this report, multi-sectoral action is needed to impact malnutrition. Accountability measures of other sectors are a pre-requisite for nutrition to not be deprioritized. As the health sector and National Nutrition Council have limited leverage over other sectors, it was considered to have the Cabinet Secretary as focal point to report on updates of multi-sectoral nutrition efforts to the Office of the President.

7 – References

1. Food and Nutrition Research Institute. *The Philippine Nutrition Facts and Figures 2015: Overview*. Bicutan, Taguig City, Metro Manila; 2016.
2. National Statistics Office of the Philippines. *2012 Family Income and Expenditure Survey*.; 2014.
3. National Nutrition Council R of the P. Philippine Plan of Action for Nutrition, 2017-2022. 2016;(December). http://www.nnc.gov.ph/plans-and-programs/ppan/item/download/136.
4. World Bank. World Bank Data: Philippines. World Bank data. https://data.worldbank.org/country/philippines?view=chart. Published 2018.
5. Food and Nutrition Research Institute. 8th National Nutrition Survey: Philippines, 2013. 2013.
6. PSA. Family Income and Expenditure Survey (FIES). Raw Data. 2015.

7. National Wage and Productivity Commission. Summary of Daily Minimum Wage Rates per Wage Order, by Region Non-Agriculture (1989 - Present). 2018. http://www.nwpc.dole.gov.ph/wp-content/uploads/2018/11/Summary-of-DMWR-by-Region-and-Category-1989-Present-Non-Agri-1.pdf. Accessed December 12, 2018.

8. The World Bank. An Update on Philippine Conditional Cash Transfer (Pantawid, we are closer to getting out of poverty!). *Philipp Soc Prot Note*. 2015;(8):1-12.

9. Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). Philippine Nutrition Facts and Figures 2015: Maternal Health and Nutrition and Infant and Young child Feeding Survey. 2016.

10. WFP. *Food Gaps, Knowledge, Attitudes and Practices on WASH, Childcare, Health and Nutrition in PRRO Areas in Mindanao*.; 2018.

11. ABS-CBN News. Congress ratifies expanded maternity leave bill. ABS-CBN.

12. Euromonitor. *Baby Food in the Philippines*. 2017.

13. WHO. *Complementary Feeding: Report of the Global Consultation, and Summary of Guiding Principles for Complementary Feeding of the Breastfed Child. Geneva.* Geneva; 2002.

14. National Nutrition Survey. *Philippine Nutrition Facts and Figures 2013: 8th National Nutrition Survey Dietary Survey*.; 2015.

15. FNRI. Pinggang Pinoy. Healthy Food Plate for Filippinos.

16. WHO/FAO. *Vitamin and Mineral Requirements for Human Nutrition.* Geneva; 2004.

17. Senauer B, Garcia M, Jacinto E. Determinants of the intrahousehold allocation of food in the rural Philippines. *Am J Agric Econ*. 1988;70(1):170-180.

18. Dubois P, Ligon EA. Incentives and nutrition for rotten kids: intrahousehold food allocation in the Philippines. *CUDARE Work Pap*. 2011. https://cloudfront.escholarship.org/dist/prd/content/qt0c6758hs/qt0c6758hs.pdf.

19. Global Food Security Cluster, WFP VAM. Adapting to an Urban World. 2017.

20. Maberly GF. Rice Fortification: A key Part of the Solution to Micronutrient Deficiencies. In: *World Bank*. Washington D.C: Agriculture and Rural Development and the Health, Nutrition and Population Team; 2011.

21. Alavi S, Bugusu B, Cramer G, et al. Rice Fortification in Developing Countries : A Critical Review of the Technical and Economic Feasibility. 2008;(April):0-74.

22. OECD. *Agricultural Policies in the Philippines*.; 2017. doi:10.1787/9789264269088-en.

23. Helen Keller International. Homestead food production model contributes to improved household food security, nutrition and female empowerment – Experience from scaling-up programs in Asia (Bangladesh, Cambodia, Nepal and Philippines). *Nutr Bull*. 2010;8(1):1-8. http://www.fao.org/fileadmin/user_upload/wa_workshop/docs/Homestead_Food_Production_

Nutrition_HKI.pdf.

24. Kelly B, King L, Jamiyan B, et al. Density of outdoor food and beverage advertising around schools in Ulaanbaatar (Mongolia) and Manila (The Philippines) and implications for policy. (Special Issue: "Big Food": critical perspectives on the global growth of the food and beverage industry.). *Crit Public Health*. 2015;25(3):280-290. doi:http://dx.doi.org/10.1080/09581596.2014.940850.

25. The Economist. An Economist Intelligence Unit report commissioned by the Asia Roundtable on Food Innovation for Improved Nutrition Tackling obesity in ASEAN. 2017:19. doi:10.1360/jos171588.

26. WFP, OCHA. Haiyan Multi-Cluster Needs Assessment. doi:10.1136/bmj.316.7142.1448.

27. Cluster PN. Haiyan Case Study. :1-10.

28. DSWD. Memorandum for the Secretary - Enhancement of Family Food Packs. 2015.

29. UNICEF. The Economic Consequences of Undernutrition in the Philippines : A Damage Assessment Report(DAR). 2017;(June).

30. Hastings G, Mcdermott L, Angus K. *The Extent, Nature and Effects of Food Promotion to Children: A Review of the Evidence*.; 2006.

31. World Bank. World Bank Open Data.

32. FNRI. Iron Rich Recipes. 2017.

33. DSWD. Amended Omnibus Guidelines in the Implementation of the Supplementary Feeding Program. Administrative order No. 04. 2016.

34. DSWD. Amended Terms of Reference for the Implementation of the Supplementary Feeding Program in Partnership with Legislators. Administrative Order No. 22. 2011.

35. WFP. School Feeding Programme Guidance Manual. Nutrition in Ration Development. 2017.

36. Education D of. *Policy and Guidelines on Helathy Food and Beverage Choices in Schools and in DepEd Offices. DepEd Order No. 13*.; 2017.

Appendix

Full CotD results by province

Table 6: Full CotD results for energy only and nutritious diets by province disaggregated urban/rural.

		Energy only diet daily cost	Energy only diet non-affordability	Nutritious diet daily cost	Nutritious diet non-affordability
I - Ilocos	rural	111	3%	178	27%
	urban	114	2%	179	20%
II - Cagayan	rural	108	2%	160	18%
	urban	116	1%	190	16%
III - Central Luzon	rural	122	2%	235	36%
	urban	111	0%	167	6%
IVa - Calabarzon	rural	100	1%	218	31%
	urban	134	1%	203	10%
IVb - Mimaropa	rural	114	8%	212	54%
	urban	98	4%	196	28%
V - Bicol	rural	110	4%	145	18%

	urban	129	7%	162	18%
VI - Western Visayas	rural	109	4%	166	23%
	urban	128	5%	190	24%
VII - Central Visayas	rural	89	4%	203	53%
	urban	101	2%	219	28%
VIII - Eastern Visayas	rural	95	5%	191	50%
	urban	128	12%	225	41%
IX - Zamboanga Peninsula	rural	84	6%	148	43%
	urban	80	0%	188	23%
X - Northern Mindanao	rural	66	2%	197	71%
	urban	78	1%	197	42%
XI - Davao	rural	82	1%	190	48%
	urban	86	0%	199	21%
XII - Soccsksargen	rural	76	2%	171	42%
	urban	105	3%	199	35%
CARAGA	rural	83	2%	196	55%
	urban	85	1%	218	45%
CAR	rural	96	2%	225	54%
	urban	109	1%	201	17%
ARMM	rural	123	24%	165	59%
	urban	104	11%	165	56%
NCR	urban	133	1%	316	35%

Table 7: Full CotD results for energy only and nutritious diets by province (weighted average of urban and rural populations).

		Energy only diet daily cost	Energy only diet non-affordability	Nutritious diet daily cost	Nutritious diet non-affordability
I - Ilocos	I	111	3%	178	26%
II - Cagayan	II	109	2%	163	18%
III - Central Luzon	III	116	1%	200	21%
IVa - Calabarzon	IVa	120	1%	209	19%
IVb - Mimaropa	IVb	111	7%	209	48%
V - Bicol	V	113	4%	148	18%
VI - Western Visayas	VI	115	4%	174	23%
VII - Central Visayas	VII	94	3%	210	42%
VIII - Eastern Visayas	VIII	98	5%	194	49%
IX - Zamboanga Peninsula	IX	83	4%	162	36%
X - Northern Mindanao	X	71	1%	197	59%
XI - Davao	XI	84	1%	196	32%
XII - Soccsksargen	XII	89	2%	184	38%
CARAGA	XVI	83	2%	202	53%

CAR	XIV	100	2%	219	45%
ARMM	XV	120	23%	165	58%
NCR	XIII	133	0%	316	35%

Table 8: Daily cost of a nutritious diet for a child (12 to 23 months) with different levels of breastfeeding.

		Optimal breastfeeding (532g/day)	Breastmilk 50% (266g/day)	Breastmilk 0% (0g/day)
IVb - Mimaropa	rural	12	14	17
	urban	11	13	16
V - Bicol	rural	8	9	12
	urban	9	12	16
VI - Western Visayas	rural	10	11	14
	urban	12	16	19
VIII - Eastern Visayas	rural	11	12	15
	urban	14	16	19
XII - Soccsksargen	rural	10	11	13
	urban	10	12	15
ARMM	rural	9	12	15
	urban	10	11	13
NCR	urban	13	17	22

Weighted average	**11**	**14**	**17**

Table 9: Daily cost of a nutritious diet for children (12 to 23 months) if with different supplementary foods are provided in kind.

		Nutritious diet	Supercereal+ (30g)	Rimo Blend (30g)	LNS-SQ (20g)	Momsie™ (25g)	Micronutrient Powder (MNP) (1g)
IVb - Mimaropa	rural	12	6	10	6	8	11
	urban	11	6	8	7	7	7
V - Bicol	rural	8	5	6	5	5	7
	urban	9	4	8	6	7	6
VI - Western Visayas	rural	10	5	7	6	6	8
	urban	12	4	11	7	9	12
VIII - Eastern Visayas	rural	11	6	7	6	6	7
	urban	14	7	11	8	9	12
XII - Soccsksargen	rural	10	6	9	6	7	8
	urban	10	6	9	6	6	9
ARMM	rural	9	5	8	6	7	9
	urban	10	5	10	5	7	10
NCR	urban	13	6	13	8	10	12
Weighted average		**11**	**6**	**9**	**6**	**7**	**10**

Table 10: Daily cost of a nutritious diet for adolescent girls with different supplementary foods provided in kind.

		Nutritious diet	Supercereal (120g)	Iron and Folic Acid tablets (IFA) (476mcg folic acid and 60g iron)	Multiple Micronutrient Tablets (MMT) (1g)
IVb - Mimaropa	rural	71	69	54	46
	urban	63	62	51	35
V - Bicol	rural	47	47	37	29
	urban	41	33	39	32
VI - Western Visayas	rural	50	45	43	32
	urban	50	36	50	50
VIII - Eastern Visayas	rural	63	43	49	31
	urban	66	61	59	49
XII - Soccsksargen	rural	54	50	46	35
	urban	70	70	55	38
ARMM	rural	47	43	42	37
	urban	53	38	45	40

NCR	urban	141	61	76	51
Weighted average		**81**	**52**	**55**	**40**

Table 11: Daily cost of a nutritious diet for lactating women with different supplementary foods provided in kind.

		Nutritious diet	Supercereal (120g)	Iron and Folic Acid tablets (IFA) (476mcg folic acid and 60mg iron)	Multiple Micronutrient Tablets (MMT)	LNS-SQ (20g)
IVb - Mimaropa	rural	60	55	50	44	60
	urban	58	52	51	35	29
V - Bicol	rural	39	37	34	31	26
	urban	47	35	46	37	29
VI - Western Visayas	rural	48	41	43	34	28
	urban	51	37	51	48	39
VIII - Eastern Visayas	rural	55	49	46	32	28
	urban	67	57	60	48	40
XII - Soccsksargen	rural	48	42	41	34	30
	urban	55	53	47	38	32
ARMM	rural	47	43	43	37	31
	urban	45	37	39	33	31

NCR	urban	76	79	63	51	43
Weighted average		**58**	**55**	**50**	**41**	**36**

Table 12: Daily cost of the nutritious diet for a model household with non-fortified rice compared to fortified rice and biofortified rice (details can be found in Table 2 on page 43).

		Nutritious diet	Iron with current Philippines specification	Iron with improved premix	Multi-micronutrient with current blending ratio	Multi-micronutrient with improved blending ratio	Golden Rice	Zinc rice
IVb - Mimaropa	rural	212	204	192	195	179	211	212
	urban	196	187	176	176	154	194	196
V - Bicol	rural	145	141	134	136	125	147	146
	urban	162	164	162	156	151	161	162
VI - Western Visayas	rural	166	163	157	158	148	166	166
	urban	190	193	193	187	185	188	190
VIII - Eastern Visayas	rural	191	181	170	167	148	183	191
	urban	225	219	210	208	191	226	225
XII - Soccsksargen	rural	171	166	159	162	152	172	171
	urban	199	191	172	185	167	199	169
ARMM	rural	165	164	160	158	149	162	165
	urban	165	162	156	157	145	164	165
NCR	urban	316	271	248	249	223	316	316
Weighted average		**221**	**204**	**192**	**192**	**176**	**220**	**220**

Table 13: Percentage of households unable to afford the nutritious diet with consumption and sale of kitchen garden crops[6].

		Nutritious diet	Own consumption	Own consumption with farmgate prices for surplus	Own consumption with market prices for surplus
IVb - Mimaropa	rural	54%	49%	30%	0%
V - Bicol	rural	18%	15%	2%	0%
VI - Western Visayas	rural	23%	14%	4%	0%
VIII - Eastern Visayas	rural	50%	44%	26%	0%
XII - Soccsksargen	rural	42%	35%	18%	0%
ARMM	rural	59%	45%	16%	0%
Weighted average		**37%**	**30%**	**14%**	**0%**

*Table 14: Daily cost of nutritious diet for adolescent girl with snacking (averages across modelling regions except for NCR where a nutritious diet could not be calculated for an adolescent girl due to exceeding energy limits). Portion sizes (daily): sweet potato 50g; cookies 30g; juice 180 mL; soft drink 194 mL. *Indicates the nutritious diet could not be met without exceeding the limit for energy intake.*

		Nutritious diet	Sweet potato	Cookies	Cookies and juice	Soft drink
IVb - Mimaropa	rural	71	73	88	94	78
	urban	63	65	77	83	70
V - Bicol	rural	47	50	65	69	54
	urban	41	42	52	58	46
VI - Western Visayas	rural	50	51	58	67	55
	urban	50	52	63	67	55
VIII - Eastern Visayas	rural	63	66	81	88	71
	urban	66	67	77	85	71
XII - Soccsksargen	rural	54	56	68	74	60
	urban	70	73	89	111	80
ARMM	rural	47	48	60	66	53
	urban	53	55	67	74	59
NCR	urban	141	158*	162*	141*	150*
Weighted average		**55**	**57**	**70**	**77**	**73**

[6] Weekly production of ampalaya 890g, kangkong 145g, squash 378g, tomatoes 1,272g, sweet pepper 87g, eggplant 1,399g, cucumber 320g, upo 145g, okra 610g, string beans 734g, watermelon 12,224g. Assumed 22% of production consumed by household, 74% of production sold and 4% lost.

Table 15: Daily Cost of a nutritious diet with Family Food Pack as delivered to beneficiaries compared to Family Food Pack as outlined in DSWD policy (Table 4 on page 51).

		Nutritious diet	Family food pack commonly delivered to beneficiaries	Family Food Pack as outlined in DSWD policy
IVb - Mimaropa	rural	212	132	58
	urban	196	126	49
V - Bicol	rural	145	47	24
	urban	162	65	34
VI - Western Visayas	rural	166	89	38
	urban	190	67	46
VIII - Eastern Visayas	rural	191	119	48
	urban	225	122	58
XII - Soccsksargen	rural	171	96	44
	urban	199	122	58
ARMM	rural	165	86	41
	urban	165	89	44
NCR	urban	316	226	91
Weighted average		**219**	**132**	**57**

Table 16: Daily cost of nutritious diet for a preschool aged child (4-5 years) without and with receipt of preschool meals.

		Nutritious diet	Preschool meals
IVb - Mimaropa	rural	23	20
	urban	18	17
V - Bicol	rural	16	14
	urban	17	17
VI - Western Visayas	rural	19	16
	urban	25	22
VIII - Eastern Visayas	rural	21	15
	urban	25	21
XII - Soccsksargen	rural	15	16
	urban	20	18
ARMM	rural	20	17
	urban	18	15
NCR	urban	28	23
average	**weighted**	**22**	**19**

Table 17: Daily cost of nutritious diet for a school aged child (6-7 years) without and with consumption of school meals.

		Nutritious diet	School meals
IVb - Mimaropa	rural	25	19
	urban	22	16
V - Bicol	rural	18	14
	urban	23	16
VI - Western Visayas	rural	21	15
	urban	27	21
VIII - Eastern Visayas	rural	23	15
	urban	27	21
XII - Soccsksargen	rural	21	15
	urban	23	17
ARMM	rural	22	17
	urban	21	14
NCR	urban	30	22
average	**weighted**	**25**	**18**

Table 18: Percentage of households unable to afford a nutritious diet with a multi-sectoral intervention package and with 4Ps cash transfers (Table 5 on page 57).

		Nutritious diet	4Ps cash transfer	Package of PPAN interventions	Package of PPAN interventions and 4Ps cash transfer

IVb - Mimaropa	rural	54%	41%	45%	28%
	urban	28%	17%	19%	12%
V - Bicol	rural	18%	5%	10%	1%
	urban	18%	8%	11%	5%
VI - Western Visayas	rural	23%	9%	15%	5%
	urban	24%	11%	16%	7%
VIII - Eastern Visayas	rural	50%	35%	40%	22%
	urban	41%	33%	37%	26%
XII - Soccsksargen	rural	42%	28%	34%	18%
	urban	35%	21%	25%	12%
ARMM	rural	59%	32%	49%	23%
	urban	56%	34%	45%	17%
NCR	urban	35%	26%	14%	7%
Weighted average		**35%**	**22%**	**21%**	**7%**

Products included in CotD modelling

Table 19: Nutrient composition for products modelled in CotD for child under 2.

	Supercereal +	Rimo Blend	LNS-SQ	Momsie™	MNP
Portion size (g per serving)	30	30	25	25	1
Frequency (days per week)	7	7	7	7	3
Nutritional composition (per 100g)					
Energy (kcal)	395	380	480	550	
Protein (g)	16	13	12	14	
Fat (g)	10	1	24	35	
Vit A (ug retinol)	1045	10	1371	452	40000
Vit C (mg)	92		90	91	3000
Vit B1 (mg)	1		2	0.2	50
Vit B2 (mg)	2		6		50
Niacin (mg)	11		33	4	600
Vit B6 (mg)	2		5	0.2	50

Folic acid (ug)	286		949	2805	25500
Vit B12 (ug)	2		5		90
Calcium (mg)	525		1278	894	
Iron (mg)	11	13	23	25	1000
Zinc (mg)	8	7	26	14	410

Table 20: Percentage of nutrient requirement met with products modelled in CotD for child aged 6-23 months.

	Supercereal +	Rimo Blend	LNS-SQ	Momsie™	MNP
% of nutrient requirement met					
Energy	13	13	13	15	
Protein	35	30	22	26	
Fat	10	1	20	29	
Vit A	78	1	86	28	43
Vit C	92		75	76	43
Vit B1	36		100	10	43
Vit B2	108		300		43
Niacin	53		137	15	43
Vit B6	90		250	10	43
Folic acid	34		93	275	43
Vit B12	77		139		43
Calcium	32		64	45	
Iron	29	48	69	53	52
Zinc	56	48	159	83	43

Table 21: Percentage of nutrient requirement met with products modelled in CotD for adolescent girl.

	Supercereal	Iron and Folic Acid	MMT
% of nutrient requirement met			
Energy	19		
Protein	36		

Fat	11		
Vit A	208		133
Vit C	270		175
Vit B1	22		127
Vit B2	168		140
Niacin	60		113
Vit B6	100		158
Folic acid	33	170	167
Vit B12	100		108
Calcium	33		
Iron	13	19	68
Zinc	83		

Table 22: Nutrient composition for products modelled in CotD for adolescent girl and lactating woman.

	Supercereal	Iron and Folic Acid	MMT	LNS-SQ (lactating woman only)
Portion size (g per serving)	120	1	1	60
Frequency (days per week)	7	7	7	7
Nutritional composition (per 100g)				
Energy (kcal)	380			480
Protein (g)	14			12
Fat (g)	6			24
Vit A (ug retinol)	1039		80000	1371
Vit C (mg)	90		7000	90
Vit B1 (mg)	0.2		140	2
Vit B2 (mg)	1.4		140	6
Niacin (mg)	8		1800	33
Vit B6 (mg)	1		190	5
Folic acid (ug)	187	809200	113334	949
Vit B12 (ug)	2		260	5
Calcium (mg)	90			1278
Iron (mg)	6.5	6000	3000	23
Zinc (mg)	5			26

Table 23: Percentage of nutrient requirement met with products modelled in CotD for lactating woman.

	Supercereal	Iron and Folic Acid	MMT	LNS-SQ
% of nutrient requirement met				
Energy	17			10
Protein	30			13
Fat	12			23
Vit A	147		94	97
Vit C	154		100	77
Vit B1	16		93	80
Vit B2	105		88	225
Niacin	57		106	117
Vit B6	60		95	150
Folic acid	26	136	133	67
Vit B12	86		93	107
Calcium	43			77
Iron	13	20	71	33
Zinc	83			191

Preschool and school meal recipes included in the modelling

EGG SARCIADO WITH BOTTLE GOURD (UPO)		
INGREDIENTS	**UNIT OF MEASUREMENT**	**QUANTITY (serves 10)**
Egg P5.00/pc	Pieces	10
Bottle gourd (Upo), sliced thinly and crosswise P30/pc	Kilogram	½
Onion, big, finely chopped P75/kg; P6/pc	Pieces	1
Garlic, crushed P70/kg; P3/bulb; P0.37/clove	Cloves	5

Tomato, finely chopped P25/kg;	Kilogram	¼
Water	Cup	2
Cooking oil P45/L(Palm Oil); P0.67/Tbsp.	Tablespoon	3
Salt – according to taste		
Ground black pepper - according to taste		
FOOD SERVING PER CHILD	1 piece egg and vegetables (50g upo, 6.5g onion, 25g tomato)	

FISH IN GINGER STEW WITH SWEET POTATO		
INGREDIENTS	**UNIT OF MEASUREMENT**	**QUANTITY (serves 10)**
Fish, medium size, cut into 10 pieces P180/kg;18.00	Kilogram	1
Sweet potato, yellowish, quarter sliced P40/kg	Kilogram	½
Pechay , sliced in 2 P10/bundle	Bunch	1
Onion, large size, quarter sliced P75/kg; P6/pc	Piece	1
Ginger, small, finely chopped and lengthwise P10/small	Piece	1
Tomato, quarter sliced P25/kg; P2/pc	Piece	2
Rice washing	Litre	1
Cooking oil P45/L(Palm Oil); P0.67/Tbsp.		1
Whole black peppercorns P5/pack	Grains	5
Salt – according to taste		
FOOD SERVING PER CHILD	1 slice of fish, 2 pieces of sweet potato and vegetables (15g pechay, 6.5g onion, 25g tomato)	

GINULAYANG MONGGO

ESTIMATED ENERGY AND NUTRIENT CONTENT PER SERVING SIZE

Energy, kcal	242
Protein, g	11.02
Vit. A, µg RE	208.7
Vit. C, mg	33.5
Thiamin, mg	0.25
Riboflavin, mg	0.15
Niacin, mg	4.22
Calcium, mg	206.9
Iron, mg	3.34

Yield: 10 Serving
Serving size: ½ Cup (126.5g)

Ingredients	As purchased Market Order guide	Edible Portion Weight	Household Measure
♦Oil, coconut, for frying	*180 ml*	*180 ml*	*¾ cup*
♦Monggo, green	*240 g*	*240 g*	*1 cup*
♦Oil, coconut, for sautéing	*45 g*	*45 g*	*3 Tbsp*
♦Garlic, minced	*20 g*	*15 g*	*1 Tbsp*
♦Onion, chopped	*65 g*	*60 g*	*¼ cup*
♦Dilis, fresh, head removed	*190 g*	*160 g*	*⅔ cup*
♦*Kamote*, yellow, cubed	*615 g*	*540 g*	*2 ¼ cups*
♦Salt, iodized	*10 g*	*7.5 g*	*½ Tbsp*
♦Patis	*25 ml*	*22.5 ml*	*1 ½ Tbsp*
♦*Kamote*, talbos	*240 g*	*120 g*	*½ cup*
♦Ampalaya, leaves	*260 g*	*100 g*	*1 ¾ cups*

Procedure

1. *Boil monggo until cooked over medium fire. Set aside.*
2. *Heat oil, sauté garlic and onion.*
3. *Add dilis and kamote. Season with salt and patis.*
4. *Add the water used in monggo. Let it simmer for 10 minutes.*
5. *Add monggo, talbos ng kamote and ampalaya leaves. Continue cooking for 5 minutes.*

8

GINISANG TOGUE

ESTIMATED ENERGY AND NUTRIENT CONTENT PER SERVING SIZE

Energy, kcal	322
Protein, g	6.92
Vit. A, µg RE	42.1
Vit. C, mg	22.6
Thiamin, mg	0.08
Riboflavin, mg	0.09
Niacin, mg	2.22
Calcium, mg	110.8
Iron, mg	3.07

Yield: 10 Serving
Serving size: ½ Cup (86g)

Ingredients	As purchased Market Order guide	Edible Portion Weight	Household Measure
♦Oil, coconut, for frying	*240 ml*	*240 ml*	*1 cup*
♦Tokwa	*300 g*	*300 g*	*1 ¼ cups*
♦Oil, coconut for sautéing	*25 ml*	*22.5 ml*	*1 ½ cups*
♦Garlic, minced	*35 g*	*30 g*	*2 Tbsp*
♦Onion, sliced	*65 g*	*60 g*	*¼ cup*
♦Togue	*395 g*	*360 g*	*1 ½ cups*
♦Water	*480 ml*	*480 ml*	*2 cups*
♦Salt, iodized	*5 g*	*5 g*	*1 tsp*
♦Soy sauce	*60 ml*	*60 ml*	*¼ cup*
♦Sugar, white, refined	*15 g*	*15 g*	*1 Tbsp*
♦Kinchay, leaves	*120 g*	*60 g*	*½ cup*
♦Puso ng saging, sliced	*230 g*	*120 g*	*½ cup*

Procedure

1. *In a pan heat oil, fry tokwa until golden brown. Set aside.*
2. *In another pan heat oil, sauté garlic, onion and togue.*
3. *Add fried tokwa and season with soy sauce and sugar. Cook for 5 minutes over medium fire.*
4. *Add kinchay and puso ng saging. Let it simmer for another 3 minutes.*

1

Full list of sources reviewed

Abrigo, M. R. M. (2016). Who weans with commodity price shocks? Rice prices and breastfeeding in the Philippines. PIDS Discussion Paper Series, No. 2016-28, Philippine Institute for Development Studies (PIDS), Makati City.

Acampado, E., Valenzuela, M. (2018). Physical Activity and Dietary Habits of Filipino College Students: A cross-sectional study. Kinesiology 50(1): 57-67.

Acosta, P. A., & Velarde, R. (2015). “Sa Pantawid, Malapit nang Makatawid!” (With Pantawid, we are closer to getting out of poverty!). An Update of the Philippines Conditional Cash Transfer's Implementation Performance. Philippines Social Protection Note. No. 8. World Bank.

Alavi, S., Bugusu, B., Cramer, et al. (2008). Rice fortification in developing countries: a critical review of the technical and economic feasibility. Institute of Food Technologists, Washington DC.

Arnold, T., Nishtar, S., Singh, Ss. (2018). Snacks in the city: the malnutrition cocktail. Foodtank.

ASEAN (2017). ASEAN Statistics Report on Millennium Development Goals 2017. Jakarta: ASEAN Secretariat

ASEAN, UNICEF (2016). Regional Report on Nutrition Security in ASEAN - Volume 1. Jakarta: ASEAN Secretariat.

ASEAN, UNICEF (2016). Regional Report on Nutrition Security in ASEAN - Volume 2. Jakarta: ASEAN Secretariat.

Balatibat, E. (2004). The Linkages between Food and Nutrition Security in Lowland and Coastal Villages in the Philippines. PhD dissertation. University of Wageningen.

Barba, C. V., & Cabrera, M. I. Z. (2008). Recommended energy and nutrient intakes for Filipinos 2002. Asia Pacific journal of clinical nutrition, 17(S2), 399-404.

Briones, R., Antonio, E., Habito, C., et al. (2017): Strategic Review - Food Security and Nutrition in the Philippines. BrainTrust Inc.

Briones, R., Felipe, J. (2013). Agriculture and Structural Transformation in Developing Asia: Review and Outlook. ADB Economics Working Paper Series. No. 363.

Bündnis Entwicklung Hilft (2017). WorldRiskReport Analysis and prospects 2017.

Cabalda, A. B., Rayco-Solon, P., Solon, J. A. A., & Solon, F. S. (2011). Home gardening is associated with Filipino preschool children's dietary diversity. Journal of the American Dietetic Association, 111(5), 711-715.

Capanzana, M. (2018). Scaling-Up rice Fortification Program Through Techno-Transfer: A Strategy Towards Nutrition Security. Presentation.

Claridades, J. (2014). Philippine Food Retail - A growing Opportunity for U.S. F and B. GAIN Report.

Cruz, R. V. O., Aliño, P. M., Cabrera O. C., et al. (2017). 2017 Philippine Climate Change Assessment: Impacts, Vulnerabilities and Adaptation. The Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation, Inc. and Climate Change Commission.

Department of Budget and Management (2017): People's Budget 2017.

Department of Education (2017). Policy and Guidelines on Healthy Food and Beverage Choices in Schools and in DepEd Offices. Order Nr. 13/2017. Pasig City.

Department of Social Welfare and Development. Cycle Menu for meals at Child Development Centers.

Detzel, P., Wieser, S. (2015): Current evidence suggests that food fortification is a cost-effective menas of addressing iron deficiency at the population level, particularly in infants and young children. Annals of Nutrition and Metabolism 66(suppl 2):35-42.

Dikhanov, Y., Palanyandy, C., Capilit, E. (2011). Subnational Purchasing Power Parities towards Integration of International Comparison Program and Consumer Price Index: The Case of the Philippines. Asian Development Bank Economics Working Paper Series No. 290.

Dikitanan, R., Grosjean, G., Nowak, A., Leyte, J. (2017). Climate-Resilient Agriculture in the Philippines. CGiAR.

Disaster Response Assistance and Management Bureau (DReAMB) (2015) Memorandum for the Secretary on Enhancement of Family Food Packs.

Dumaguing, N. V., Ignacio, J. L. C., Naupal, R. T., et al. (2011). Knowledge, Attitude, and Practices of Complementary Feeding by Mothers in the BayaniJuan Southville 7 Resettlement Village in Calauan, Laguna, Philippines. Journal of Human Ecology (Philippines).

ENN, Global Nutrition Cluster (2016): Case Study Philippines. Lessons learnt from the response to Typhoon Haiyan.

Filmer, D., Friedman, J., Kandpal, E., & Onishi, J. (2018). General equilibrium effects of targeted cash transfers: nutrition impacts on non-beneficiary children. Policy Research Working Paper 8377. World Bank: Washington, DC.

Food and Nutrition Research Institute (FNRI) (2015). Philippine Dietary Reference Intakes 2015: Summary of Recommendations. Philippines.

Food and Nutrition Research Institute (FNRI) (2018). Philippine Dietary Reference Intakes 2015: Summary Tables (revised 2018). Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2015). Philippine Nutrition Facts and Figures 2013: Anthropometric Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2015). Philippine Nutrition Facts and Figures 2013: biochemical Survey. Taguig City, Philippines. 2nd edition.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2015). Philippine Nutrition Facts and Figures 2013: Clinical and Health Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2015). Philippine Nutrition Facts and Figures 2013: Food Consumption Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2015). Philippine Nutrition Facts and Figures 2013: Food Security Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2015). Philippine Nutrition Facts and Figures 2013: Government Program Participation Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2015). Philippine Nutrition Facts and Figures 2013: Maternal and IYCF Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2015). Philippine Nutrition Facts and Figures 2013: Overview. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2016). Philippine Nutrition Facts and Figures 2015: Anthropometric Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2016). Philippine Nutrition Facts and Figures 2015: Anthropometric Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2016). Philippine Nutrition Facts and Figures 2015: Food Security Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2016). Philippine Nutrition Facts and Figures 2015: Government Program Participation Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2016). Philippine Nutrition Facts and Figures 2015: Government Program Participation Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2016). Philippine Nutrition Facts and Figures 2015: Maternal and IYCF Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2016). Philippine Nutrition Facts and Figures 2015: Maternal Health and Nutrition and Infant and Young child Feeding Survey. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2016). Philippine Nutrition Facts and Figures 2015: Overview. Taguig City, Philippines.

Food and Nutrition Research Institute - Department of Science and Technology (FNRI-DOST). (2016). Philippine Nutrition Facts and Figures 2016: Clinical and Health Survey. Taguig City, Philippines.

Food and Nutrition Research Institute. Bigmo Curls. Brochure.

Food and Nutrition Research Institute. Complementary Food for Children and Adults. Brochure.

Food and Nutrition Research Institute. Extruded Iron Rice Premix and Iron Fortified Rice. Brochure.

Food and Nutrition Research Institute. Iron Fortified Rice. Brochure.

Food and Nutrition Research Institute. Rice-Mongo Crunchies. Brochure.

Food and Nutrition Research Institute. Rice-Mongo-Sesame Ready to Cook Baby Food. Brochure.

Food and Nutrition Research Institute. Technology on Iron Rice Premix and Iron Fortified Rice. Presentation.

Food Research and Development Group (2016). Micronutrient Growth Mix (MGM).

Food Research and Development Group (2016). Ready-to-eat Complementary Food Paste for Infants and Young Children.

Forsman, C., Milani, P., Schondebare, J. A., et al. (2014). Rice fortification: A comparative analysis in mandated settings. Annals of th New York Academy of Sciences. 1324:67-81.

Global Nutrition Cluster, Philippines Nutrition Cluster (2014). Lessons learned in Philippines Nutrition Cluster.

Global Nutrition Report (2017). Nutrition Country Profile Philippines.

Golloso-Gubat, M. J., Magtibay, E. V. J., Gironella, G. M. P., Tajan, M. G., & Constantino, M. A. S. (2015). Beverage consumption of Filipino children and adolescents (7th national nutrition survey): nutritional concerns and potential policy implications. Philippine Journal of Science, 144(1), 31-41.

Habito, C. F., Briones, R. M. (2005). Philippines Agriculture over the Years: Performance, Policies and Pitfalls.

Hastings, G., McDermott, L., Angus, K., Stead, M., Thomson, S. (2006). The Extent, Nature and Effects of Food Promotion to Children: A Review of the Evidence. World Health Organization.

Helen Keller International (2006). Production, Consumption, Sales and Income of the vegetables in the Dema Garden in 8 barangays, Wao, Lanao del Sur.

Helen Keller International (2007). Homestead Food Production Project (HFPP) Accomplishments.

Helen Keller International (2008). Homestead Food Production - an effective integrated approach to improving food and nutrition security among vulnerable households in the Philippines' Autonomous Region in Muslim Mindanao. Nutrition Bulletin. Vol. 3 Issue 1.

Helen Keller International (2010). Homestead Food Production Model contributes to improved Household Food Security, Nutrition and Female Empowerment - Experience from scaling-up programs in Asia. Nutrition Bulletin. Vol. 8 Issue 1.

Helen Keller International. Comparison of food intake homestead gardening and 2003 6th NNS.

Huelar, P. (2016). The Influence of Sangkap Pinoy Seal Program on the Purchasing Behavior of Mother/Caregivers in the Elimination of Micronutrients Deficiencies among Preschoolers of Pasig City, Philippines. Graduate Student's Thesis.

Integrated Food Security Phase Classification (2015). Philippines: Chronic Food Insecurity Situation 2015-20.

Inter-Agency Regional Analysts Network (2016). Socio-economy of chronic malnutrition in the Philippines: A preliminary key trends analysis by 2030.

International Care Ministry (). 2018-2019 Annual Report. Hope that Transforms.

International Institute of Rural Reconstruction (2018). Improving Food and Nutrition Security in the Philippines through School Interventions.

Joint Monitoring Program (2018). WASH Data.

Jollibee Foods Corporation (2018). 40 Years - A journey Full of Joy. 2017 Annual Report.

Jollibee Studios (2016). Ang Regalo ni Lolo. YouTube. 10 Dec 2016.

Jollibee Studios (2018). Kwentong Jollibee Father's Day: High Five. YouTube. 13 Jun 2018.

Jollibee Studios (2018). Kwentong Jollibee Mother's Day Trilogy: Amor. YouTube. 1 May 2018.

Jollibee Studios (2018). Kwentong Jollibee: Biyahe (Journey). YouTube. 4 Sep 2018.

Kandpal, E., Alderman, H., Friedman, J., Filmer, D., Onishi, J., & Avalos, J. (2016). A Conditional Cash Transfer Program in the Philippines Reduces Severe Stunting–3. The Journal of nutrition, 146(9), 1793-1800.

Kelly, B., Cretikos, M., Rogers, K., King, L. (2018). The commercial food landscape: outdoof food advertising around primary schools in Australia. Australian and New Zealand Journal of Public Health. 32(6):522-528.

Kelly, B., King, L., Jamiyan, B., et al. (2015). Density of outdoor food and beverage advertising around schools in Ulaanbaatar (Mongolia) and Manila (The Philippines) and implications for policy. Critical Public Health, 25 (3), 280-290.

Knowles, J. M., Garrett, G. S., Gorstein, J., Kupka, R., Situma, R., Yadav, K., ... & Aaron, G. J. (2017). Household coverage with adequately iodized salt varies greatly between countries and by residence

type and socioeconomic status within countries: results from 10 national coverage surveys. The Journal of nutrition, 147(5), 1004S.

Knowles, J., van der Haar, F., Shehata, M., Gerasimov, G., et al. (2017). Iodine intake through processed food: Case studies from Egypt, Indonesia, the Philippines, the Russian Federation and Ukraine, 2010–2015. Nutrients, 9(8), 797.

Laguna, E. (2016). Sizing Up - The Stunting and Child Malnutrition Problem in the Philippines. Save the Children: Makati, Philippines.

National Capital Region (2018). 2018 Operation Timbang Plus Results. Presentation. National Nutrition Council.

National Capital Region (2018). 2018 Operation Timbang Plus Results. Raw data. National Nutrition Council.

National Nutrition Council (2015): Annual Balance Sheet 2014.

National Nutrition Council (2018). Memorandum on Scaling up Rice Fortification with Iron for the Social Safety Net Programs (SSNP) in the Philippines [draft].

National Nutrition Council (2018). Regional Plan of Action for Nutrition 2018-22 for Autonomous Region in Muslim Mindanao (ARMM). [draft].

National Nutrition Council (2018). Regional Plan of Action for Nutrition 2019-22 for MiMaRoPa Region [draft].

National Nutrition Council (2018). Regional Plan of Action for Nutrition 2019-22 for National Capital Region. [draft].

National Nutrition Council (2018). Regional Plan of Action for Nutrition 2019-22 for Region 6 Western Visayas [draft].

National Nutrition Council (NNC) (2016). Philippine Plan of Action for Nutrition 2017-22. Executive Summary. Manila: NNC.

National Nutrition Council (NNC) (2016). Philippine Plan of Action for Nutrition 2017-22. Manila: NNC.

National Statistics Office (NSO) (2003). Maternal and Child Health Survey 2002. Final Report. Manila: NSO.

National Statistics Office (NSO) [Philippines] and Macro International Inc (MI). 1994. National Demographic Survey 1993. Calverton, Maryland: NSO and MI.

National Statistics Office (NSO) [Philippines], and ICF Macro. 2009. National Demographic and Health Survey 2008. Calverton, Maryland: National Statistics Office and ICF Macro.

National Statistics Office (NSO) [Philippines], and ORC Macro. 2004. National Demographic and Health Survey 2003. Calverton, Maryland: NSO and ORC Macro.

National Statistics Office (NSO) [Philippines], Department of Health (DOH) [Philippines] and Macro International Inc (MI). 1999. National Demographic Suvrey 1998. Manila: NSO and MI.

Niehof, A., Gartaula, H., & Quetulio-Navarra, M. (2018). Diversity and dimensions of food wellbeing. In Diversity and change in food wellbeing: Cases from Southeast Asia and Nepal. Wageningen Academic Publishers.

Nutridense (2017). Rich Nutty Chocolate Flavored Complementary Food. Malanay: Nutridense.

Nutrition International, UNICEF. The Ascent of Local Governments in Nutrition in the Philippines. A Compendium of Action on Nutrition.

OECD (2017). Agricultural Policies in the Philippines. OECD Publishing, Paris.

Orbeta Jr, A. C., Abdon, A., del Mundo, M., Tutor, M., Valera, M. T., & Yarcia, D. (2014). Keeping Children Healthy and in School: Evaluating the Pantawid Pamilya Using Regression Discontinuity Design Second Wave Impact Evaluation Results. World Bank, Washington, DC.

Perlas, L. A., Ulanday, J. R. C., Marcos, J. M., Serafico, M. E., Desnacido, J. A., Alibayan, M. V., ... & Capanzana, M. V. (2017). Iodine deficiency disorder among Filipino school children, pregnant and lactating women and the elderly 20 years after the act for salt iodization nationwide law. Journal of Endocrinology and Metabolism, 7(3), 86-93.

Philippine Statistics Authority (PSA) and ICF. 2018. Philippines National Demographic and Health Survey 2017. Quezon City, Philippines, and Rockville, Maryland, USA: PSA and ICF.

Philippine Statistics Authority (PSA), and ICF. 2014. Philippines National Demographic and Health Survey 2013. Manila, Philippines, and Rockville, Maryland, USA: PSA and ICF.

Philippine Statistics Authority (2017). Gender Statistics on Labor and Employment. Manila, Philippines.

Philippines Statistics Authority (2015). Major Crops Statistics of the Philippines (2010-2014).

Philippines Statistics Authority (2016). Census 2015. Summary tables.

Philippines Statistics Authority (2016). Philippines - Family Income and Expenditure Survey 2006, FIES Volume 2: Data on Income and Detailed Expenditure. Philippines.

Philippines Statistics Authority (2016). Selected Statistics on Agriculture 2016.

Philippines Statistics Authority (PSA) (2016). Family Income and Expenditure Survey. Raw Data. Manila, Philippines.

Philippines Statistics Authority (PSA) (2016). Family Income and Expenditure Survey. TABLE 1. Manila, Philippines.

Philippines Statistics Authority (PSA) (2016). Family Income and Expenditure Survey. TABLE 2. Manila, Philippines.

Philippines Statistics Authority (PSA) (2016). Family Income and Expenditure Survey. TABLE 8. Manila, Philippines.

Philippines Statistics Authority (PSA) (2016). Family Income and Expenditure Survey. TABLE A. Manila, Philippines.

Reeve, E., Thow, A. M., Bell, C., et al. (2018). Implementation lessons for school food policies and marketing restrictions in the Philippines: a qualitative policy analysis. Globalization and Health 14:8.

Safir, A., Piza, S. F., Skoufias, E. (2013). Disquiet on the Weather Front. The Welfare Impacts of Climatic Variability in the Rural Philippines. Policy Research Working Paper 6579. The World Bank.

UNICEF (2016). Business Case for Nutrition Investment in the Philippines.

UNICEF (2016). The Economic Consequences of Undernutrition in the Philippines. A Damage Asessement Report (DAR).

UNICEF (2017). Launch of UNICEF's Climate Landscape Analysis for Children (CLAC) in the Philippines. Presentation on 23 Nov 2017.

UNICEF (2018). Situation Analysis of Children in the Philippines. UNICEF. Philippines.

Vollmer, S., Harttgen, K., Subramanyam, M. A. (2014). Association between economic growth and early childhood undernutrition: evidence from 121 Demographic and Health Surveys from 36 low-income and middle-income countries. Lancet Global Health 2:e225-34.

WFP (2015). Philippines. More intense typhoons: What does a changing climate mean for food security in the Philippines?

WFP (2016). Food Gaps, Knowledge, Attitudes and Practices on WASH, Childcare, Health and Nutrition in PRRO Areas in Mindanao. Philippines.

WFP (2018). Comprehensive Food Security and Vulnerability Analysis in the Autonomous Region of Muslin Mindanao (ARMM). [draft] WFP: Manila.

WFP, Food Security Cluster (2017). Philippines. Food security in the urbanizing landscape of Metro Manila. Concept Note.

WFP, OCHA (2013). Multi-cluster Needs Assessment. Philippines Typhoon Haiyan. Manila, Philippines.

WHO (2006). Vitamin and Mineral Nutrition Information System. Global Database on Anaemia. Philippines.

World Bank (2013). Getting a Grip… on Climate Change in the Philippines. Executive Report.

World Bank (2014). Philippines Conditional Cash Transfer Program. Impact Evaluation. Report Number 75533-PH.

World Bank (2018). World Development Indicators.