Fill the Nutrient Gap

Nutrition situation analysis framework and decision tool

Fill the Nutrient Gap El Salvador: Full Report

October 2016

Photo: WFFP/Tania Moreno

World Food Programme

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List of Acronyms

BID	Inter-American Development Bank
CO	World Food Programme Country Office
CoD	Cost of the Diet
CONASAN	National Council for Food Security and Nutrition
FCS-N	Food Consumption Score Nutrition Quality Analysis
FESAL	National Family Health Survey
FNG	Fill the Nutrient Gap
HAZ	Height-for-Age Z-Score (indicator used to define stunting)
HQ	World Food Programme Headquarters
IFPRI	International Food Policy Research Institute
INCAP	Nutrition Institute of Central America and Panama
IYC	Infants and Young Children
IYCF	Infant and Young Child Feeding
LAC	Latin America and Caribbean
M&E	Monitoring and Evaluation
MAD	Minimum Acceptable Diet
MICS	Multiple Indicator Cluster Survey
MMT	Multiple Micronutrient Tablet
MNP	Micronutrient Powder
NCD	Noncommunicable Disease
NGO	Non-Governmental Organization
PLW	Pregnant and Lactating Women
RB	World Food Programme Regional Bureau
RNI	Recommended Nutrient Intake
SBCC	Social and Behaviour Change Communication
SC	Supercereal
SC+	Supercereal Plus
SNF	Specialised Nutritious Food
SNUT	Staple-Adjusted Nutritious Diet
SUN	Scaling-Up Nutrition
UN	United Nations
UNICEF	United Nation's Children's Emergency Fund
VAM	Vulnerability Analysis and Mapping
WAZ	Weight-for-Age Z-Score (indicator used to define underweight)
WHO	World Health Organization
WHZ	Weight-for-Height Z-Score (indicator used to define wasting)
WFP	World Food Programme
WRA	Women of Reproductive Age

Background

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

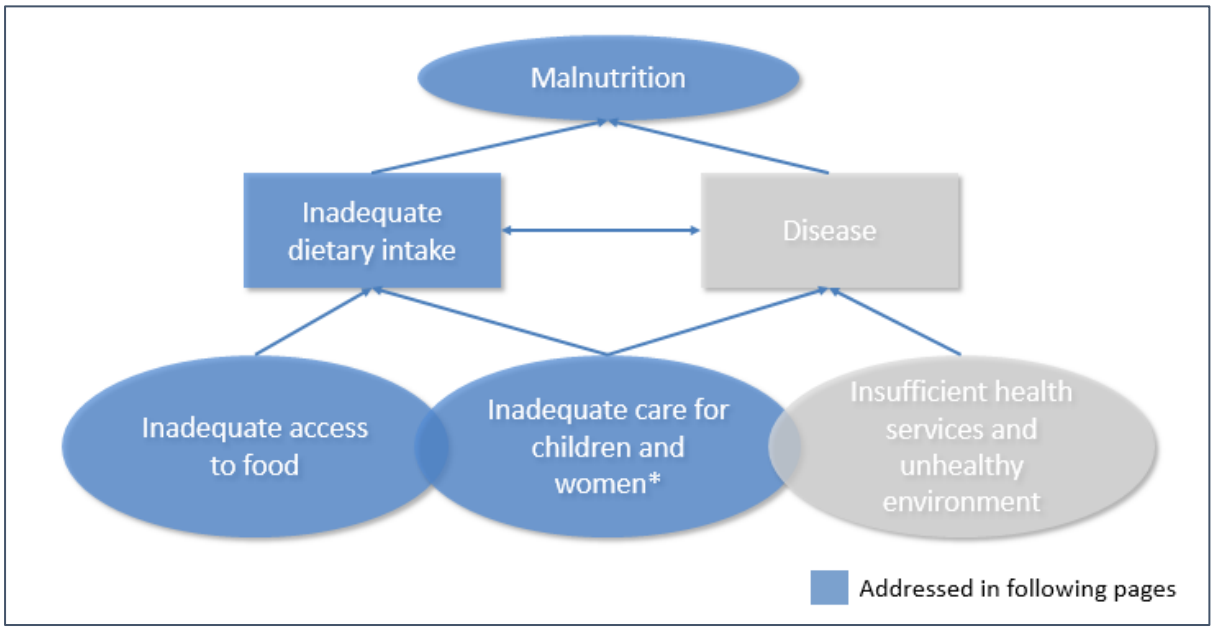

Figure 1: UNICEF Conceptual Framework for Causes of Malnutrition in Society. (Source: UNICEF)

The 'Fill the Nutrient Gap' tool (FNG) primarily uses secondary data in combination with the results from linear programming tools such as Cost of the Diet (CoD) and Optifood to better understand the barriers to adequate nutrient intake in the context and model potential interventions to improve access to nutrients. The framework for analysis depicted in Figure 2 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 if possible data on certain Micronutrient Deficiencies. 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 if the policy environment adequately facilitates access and availability of nutritious foods for the population by identifying possible gaps in 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 in reality. This section is crucial in identifying current or potential entry points for nutrition interventions.

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 it would be possible to meet nutrient needs from locally available foods.

iv) **Access to Nutritious Foods** - determine if the target populations have access to nutritious foods in both lean and non-lean seasons. Also gain a better understanding of the adequacy of nutrient intake at the household level and the ability of households to cope with potential shocks.

v) **Nutrient Intake** - examine likely or confirmed gaps in nutrient intake at the individual level, in particular related to IYCF practices and the coverage of supplementation and/or fortification programmes. Each age group will have different nutrient requirements (e.g. a 6-11 month old child will require a diet with much greater nutrient density in iron and zinc per 100 kcal than an adult male).

vi) **Local Practices** - identify socioeconomic and cultural factors influencing food purchasing patterns and feeding practices that currently act as a barrier to adequate nutrient intake or could in the future limit the effectiveness of certain food-based interventions, particularly among target groups of interest. Information gathered with tools such as ProPAN can be very useful to gain insights into local preferences and behaviours, which can inform strategies such as Social and Behaviour Change Communication (SBCC) to improve feeding practices. Focus Ethnographic Studies or Focus Group Discussions carried out by local academia or NGOs can provide key insights into this often overlooked area of analysis.

vii) **Cost Optimization** - utilising linear programming tools, such as Optifood and CoD, the minimum cost of a locally available nutritious diet can be estimated. An insight can also be gained into what proportion of the population can afford this diet in different geographic areas or among social safety net beneficiaries compared to non-beneficiaries. Tools such as Cost of the Diet can also be used to model possible intervention options that might improve affordability, such as introduction of fortified foods and/or Specialised Nutritious Foods (SNFs) through market channels or social protection programmes, and Cash Transfers.

Once this information has been consolidated and analysed, context-specific optimal packages of policy and programmatic interventions can be identified. These strategies and possible entry points can be collectively identified by the different stakeholders once the preliminary results of the analysis are available.

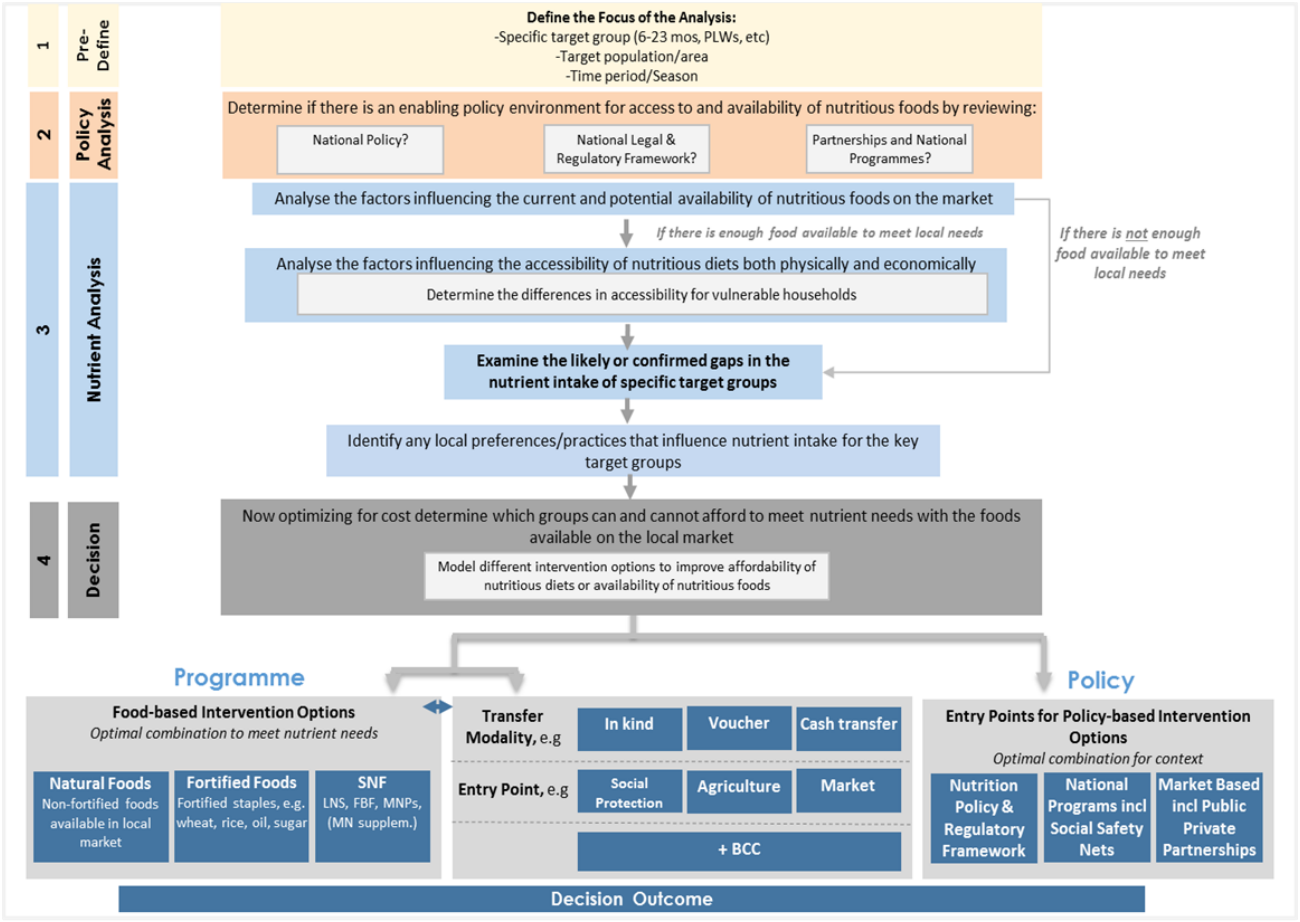

Figure 2: "Fill the Nutrient Gap" Framework for situation analysis and decision making.

Pilot testing of the "Fill the Nutrient Gap" tool is currently ongoing in El Salvador, Ghana and Madagascar. Early learning from these initial pilots demonstrates the operationalization of the framework at country level varies by context. The piloting phase and consolidation of lessons learnt is anticipated to last until Q3 of 2016. After this point a further roll out is envisioned based on the findings from the pilot phase.

The process in El Salvador

The "Fill the Nutrient Gap" process in El Salvador is described in Figures 3-4 below.

The process started in October 2015 with a 3 week in country mission from headquarters (HQ) Fill the Nutrient Gap team (Nutrition Division), which was organized to fit with the timing of the analysis phase of the CoD assessment taking place in El Salvador. This entailed collaboration with different teams within WFP El Salvador Country Office (Nutrition/Social Safety Nets, VAM/M&E, Programme and management) for secondary data consolidation and the CoD analysis and intervention modelling, as well as various stakeholder consultations (National Government, UN agencies and key NGOs).

After a first debriefing to the CO and to a key government partner (The Presidential Technical Secretariat, which is responsible for all national social protection programmes), the process continued remotely with further analysis of the compiled secondary data and Cost of the Diet by the Fill the Nutrient Gap team, in collaboration with CO and RB. Additional work on the Cost of Diet results, as well as direct engagement with various national stakeholders sharing some of these preliminary findings was conducted in CO.

Following the finalization of this report, timing and modalities for Phase 4 - which entails the dissemination of key findings and recommendations with key stakeholders who were engaged during the data consolidation and analysis phase - needs to be coordinated and agreed upon with WFP Country Office, to make the process as effective and inclusive as possible.

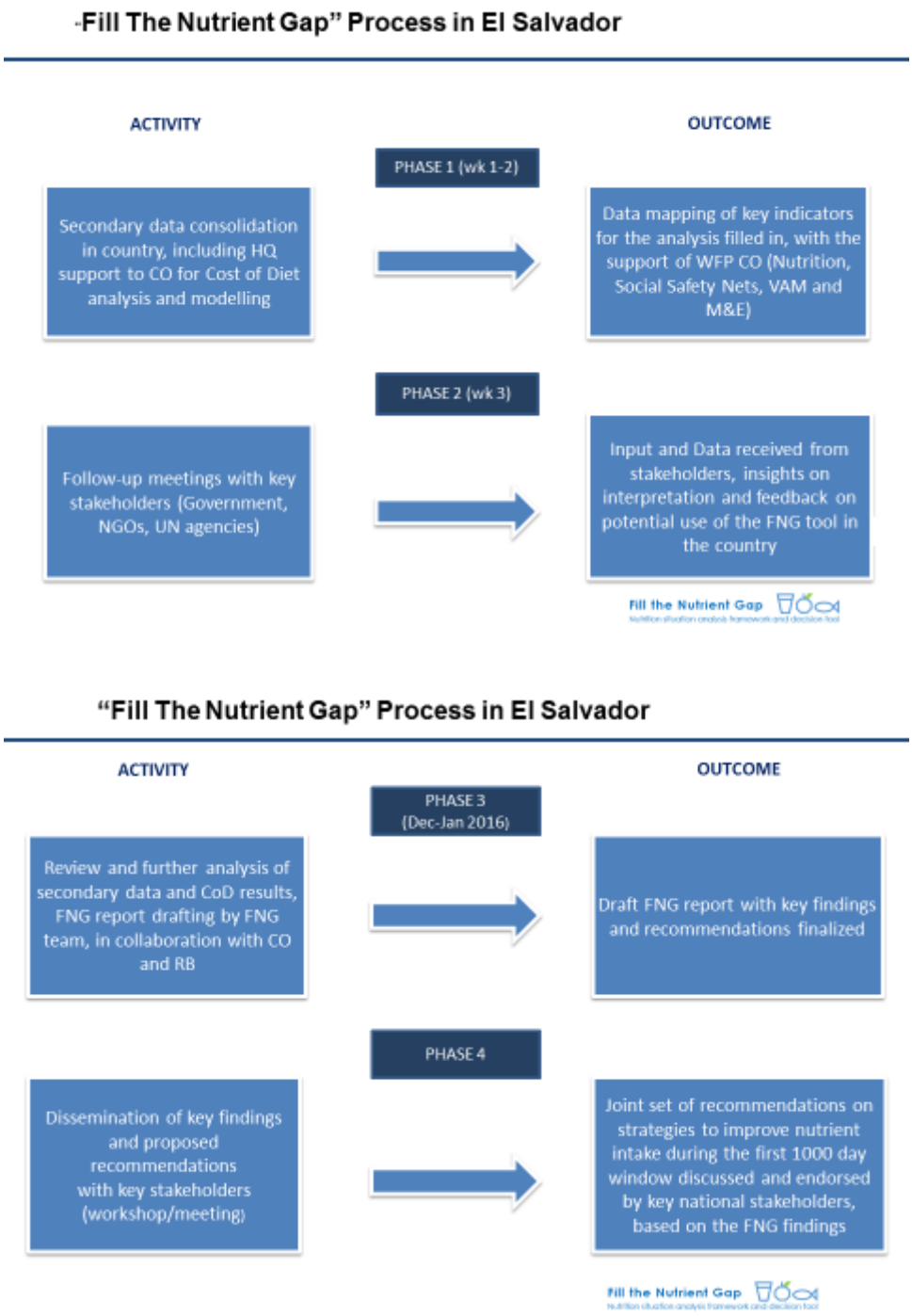

Figure 3-4: The "Fill the Nutrient Gap" process in El Salvador

Introduction

This report seeks to understand the different drivers of the nutrition situation in El Salvador, particularly for the most vulnerable groups, in relation to nutrient access and intake during the first 1000 days of life. It then moves to identify strategies and intervention packages tailored to the context to improve nutrient intake in key target groups with a focus on children 6-23 months as well as pregnant and lactating women (PLW).

It is widely recognised that ensuring adequate complementary feeding is incredibly difficult and stretches beyond what type of foods are fed to ensuring that infants and young children are fed at the right time, in the right place and in the right way. Given the heavy time and financial constraints placed on many caretakers, particularly the poorest, and the high nutrient density required in complementary foods, it is not always feasible to meet nutrient needs only using local unfortified foods. For this reason the report explores options related to fortified foods as well as non-fortified foods, so that the most suitable strategies to improve nutrient intake are identified within the context and all the different constraints placed upon these vulnerable target groups are properly taken into consideration. In the section on Cost Optimization and Modelling a range of different intervention options are modelled to demonstrate their effect on affordability of diets that meet nutrient needs (this includes Specialised Nutritious Foods, Fortified Foods, Cash Transfers and vouchers for local nutrient-rich foods).

El Salvador is the smallest and most densely populated country in Central America - covering a total area of around 21,041km^2 and home to over 6 million people. It is divided in 14 departments for administrative purposes, which can be broadly categorised into 6 livelihood zones (see Annex 5 for map):

1. Staple Grain and Labour Zone (Santa Ana, Chalatenango, Cuscatlan, Cabañas, San Vincente);
2. Coffee, Agro Industrial and Labour Zone (Ahuachapan, Sonsonate, Santa Ana, Usulutan, Morazán);
3. Sugarcane and Agro Industrial Zone (Ahuachapan, Sonsonate, La Paz, Usulután, San Miguel);
4. Eastern Staple Grain, Livestock and Remittance Zone (San Miguel, Morazán, La Union);
5. Central free-trade and industrial labour zone (San Salvador, La Libertad);
6. Fishing, aquaculture, and tourism zone (Narrow area cross Coastline).

El Salvador has one of the highest rates of homicide in the world and violence related to gang activities impact daily life and security, as well as the ability of organisations to effectively operate in many areas. The country is also prone to severe weather conditions, such as heavy rainstorms and droughts, which impacts food and nutrition security. Coffee rust is another issue impacting access to adequate nutrition.

Malnutrition Characteristics

A review of key nutrition indicators for children under 5 years in El Salvador suggest that while the situation for stunting has improved recently, the country is facing an increasing double burden of childhood overweight alongside undernutrition, as shown in Figure 5.

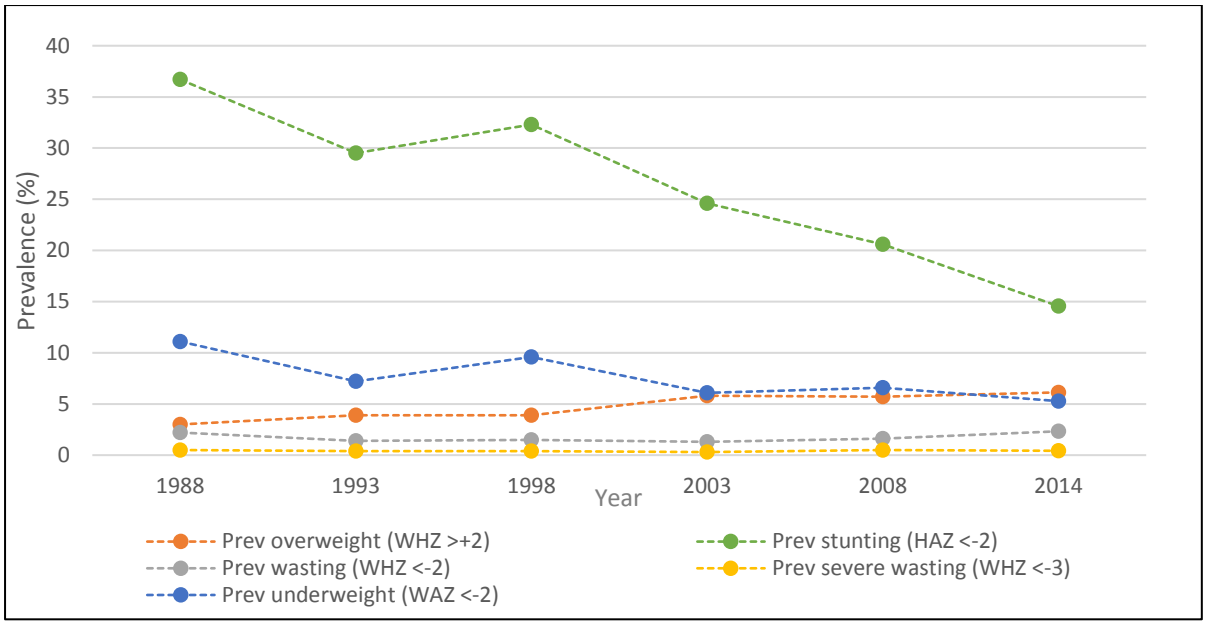

Figure 5: Trends in the Key National Nutrition Indicators 1988-2015 for children under 5 years[1][2] (Source: World Bank Database)

The prevalence of acute malnutrition, characterised by wasting, nationally was 2% in 2014,[3] a level considered comparable to most developed nations. It slightly increased compared to the previous measure of 1.6% in 2008.[4] There is also some variation at departmental level, with both Chalatenango and Usulután reporting prevalence of above 4% (MINSAL 2015). Thus, while still considered low, recent figures highlight the need to continue monitoring this issue closely.

Chronic malnutrition, characterised by stunting, is still an issue but is improving considerably. The prevalence of stunting in children under five has been consistently declining since at least 1988, when prevalence was 37%. The most recent national figures indicate a prevalence of 15% in 2014 – this represents approximately one in seven children. At department level, stunting prevalence is lowest in San Salvador and La Libertad (both 11%) and highest in Cabanas (18%) and Cuscatlán (19%) (MINSAL 2015).

The FESAL 2008 report also shows that chronic malnutrition disproportionately affects children in poorer and rural households. While the national prevalence of stunting in 2008 was around 20%, the rate was over 30% for both children in households of the lowest quintile and children of mothers with

[1] HAZ = Height for age z score, WAZ = Weight for age z score, WHZ = Weight for height z score
[2] Nutrition status defined using WHO cut-offs for child growth http://www.who.int/childgrowth/en/.
[3] UNICEF Child malnutrition estimate database lists 2.0% as pending reanalysis. Using an unweighted average of departmental weight for height z-score (2 SD) of the 2014 MICS data yields 2.3%.
[4] Both the UNICEF Child malnutrition estimates and the GNR report refer to this number, while the FESAL 2008 publication lists 1.0%.

no education. Similarly, children from rural households showed almost double the stunting prevalence of urban households (24% vs 13%, respectively) (MINSAL 2009)[5].

While progress is evident on issues of undernutrition, the data also shows a simultaneous rise in the rates of overweight and obesity. Nationally, overweight and obesity rates for adult women (66% overweight and obese and 33% are obese), adult men (59% overweight and obese and 20% are obese) (WHO, 2014), and adolescents (29% overweight and obese, 10% obese) (MINSAL 2015) are alarmingly high. Overweight (WHZ >+2) in children under five is currently reported at 6% and has been increasing steadily since 1998. The departments of Santa Ana (10%), La Libertad (9%) and La Union (7%) have the highest rates of child overweight, which does not appear to be correlated with the stunting levels (MINSAL 2015).

Likely linked to increasing overweight and obesity diabetes is a serious emerging public health concern. El Salvador, like most of Central America, has a high prevalence of type 2 diabetes at 8.8% and type 2 diabetes is the fourth leading cause of hospital deaths ((IDF 2015; PAHO 2012). With overweight increasing for children under five the risk of early-onset diabetes and other complications in children may grow in the future.

Some important micronutrient deficiencies are also present in the population at large. Anaemia, an overall indicator of micronutrient deficiencies and poor health status, affects a significant proportion of both women and children under five.[6] In children, anaemia prevalence shows a troubling trend (see Figure 6). After at least ten years of consistent decline, anaemia prevalence in children increased consistently from around the year 2000 to 2011. The prevalence in 2011 (30%) is actually higher than that recorded for 1990 (28%). Anaemia rates in women are also high – as of 2011, 28% of pregnant women and 23% of non-pregnant women were anaemic – however these figures show a slow but fairly consistent declining trend over the past 20 years.[7]

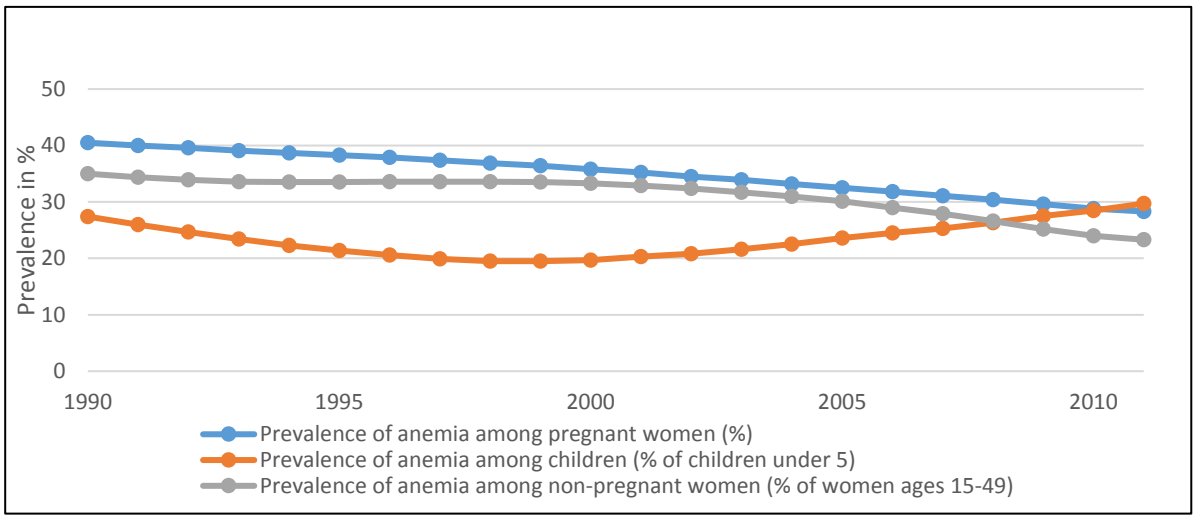

Figure 6: Trends in Anaemia prevalence 1990-2011. N.B.: No data available post-2011 (Source: WBD)

[5] Updated information for 2014 was not available at the time of writing.

[6] Anaemia is defined by the world health organisation as haemoglobin levels of < 11.0 g/dL for children aged 6-59 months, < 11.0 g/dL for pregnant women and < 12.0 g/dLfor non-pregnant women over 15 years old (World Health Organisation 2001).

[7] It should be noted that data sources for anaemia are limited and conflicting. Prevalence rates given in this paragraph are sourced from the World Bank Development Indicator database, however the only other source or information, the FESAL 2008, reports much lower prevalence figures (around 10% anaemia in women). Interviews with key informants suggest that the World Bank figures are more in line with actual conditions.

The FESAL 2008 study shows that anaemia prevalence is higher in children from households that have a lower income or are in rural areas, in children of mothers with lower education levels, and younger children (MINSAL 2009). Similar results were also found by a study conducted by the Inter-American Development Bank (BID) as part of the "Proyecto Salud Mesoamerica", carried out in 2011, which shows an anaemia prevalence of 61% for children 6-11 months, and an overall prevalence of 29% among children 6-59 months (BID 2015). Both studies also highlight that the departments which are most affected by anaemia are Morazán and La Libertad, as shown in Figure 7.

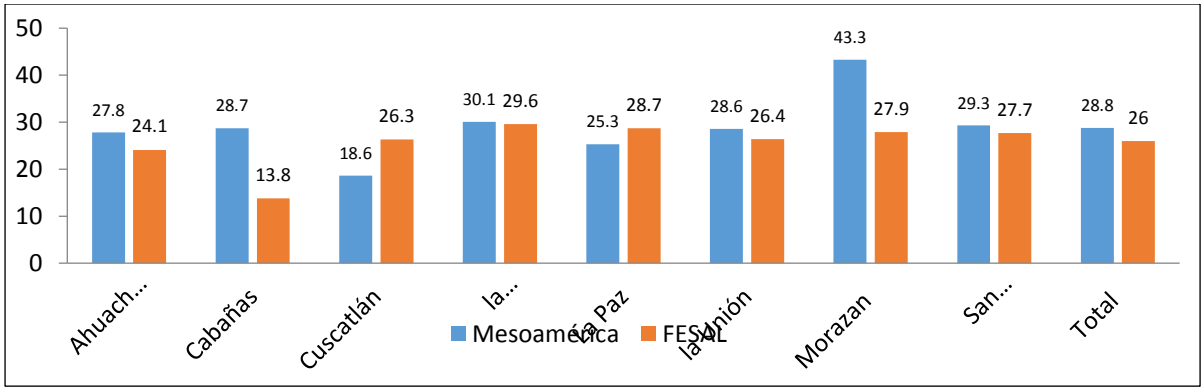

Figure 7. Prevalence of anaemia in children 6-59 months by department in El Salvador. Sources: MINSAL 2009 and BID 2015.

In terms of socio-economic differences in the prevalence of anaemia in El Salvador, the poorest quintile show a higher prevalence (31%) than the highest quintile (17%) (MINSAL 2009). However, anaemia seems to be a problem of moderate public health relevance across all of the different wealth quintiles and not only a problem for the poorest.[8] For women at reproductive age (15-49 years), prevalence of anaemia does not significantly differ by department or by urban/rural residence.

Iron deficiency also appears to have only decreased slightly in children 12-25 months from 27% in 2006 to 23% in 2010 (FAO 2015). Looking at coverage of iron supplementation in children 6-59 months with anaemia, 34% of children with anaemia had received an iron supplement, while 67% had either not received the supplement at all or had not received it for more than two months (MINSAL 2009).

Calcium and zinc deficiencies are also a concern, as reports show there may be issues with availability of these minerals, as well as inequitable consumption based on household income. According to the International Zinc Consultative Group (IZINCG), El Salvador is at high risk of zinc deficiency (IZINCG 2007). Zinc deficiency is estimated to be high in those populations with high prevalence of stunting, combined with maize-based diets, which is an inhibitor of zinc absorption. A 2004 study on osteoporosis found that the vast majority of women were not consuming enough calcium to meet 60% of their RNI (Hernandez-Rauda and Martinez-Garcia 2004).

Deficiencies of vitamin A and iodine do not appear to be a significant issue, likely due to the fortification of sugar and salt, as well as past supplementation efforts through the public health system. Prevalence of Vitamin A deficiency (serum retinol below cut-off level) in children aged 12-25 months has decreased from 36% in 2006 to 5% (FAO 2015). A 2012 study of urinary iodine

[8] According to WHO classification, an anemia prevalence of 5-19% represents a mild public health problem; 20-39% is a moderate public health problem; > 40% is a severe public health problem.

measurements in school age children found iodine levels to be adequate or above recommended levels for all departments (IPC 2012).

Overall, El Salvador can be characterized as a country in the midst of a nutrition transition. While undernutrition indicators show improvement (much slower progress on anaemia), the simultaneous increase of overweight and obesity, driven by a general shift in the diet towards highly processed food consumption and lower fruit and vegetable consumption, combined with a reduction in physical activity, particularly in urban areas, suggest a greater focus should be placed on addressing micronutrient deficiencies. But despite the fact that stunting prevalence at national level is now below WHO threshold for a national public health problem, it is still a serious concern in rural areas and lower socio-economic wealth quintiles. Therefore, it is still considered an issue to continue to dedicate attention to by the national government and development partners.

In addition, because the benefits of economic growth has not been equally distributed amongst the population, a particular emphasis should be placed on vulnerable households who will continue to bear the largest burdens. The double burden of malnutrition in the country is shown by the high percentage of households with both a stunted child and an overweight mother (MINSAL 2009). Overall, prevalence of overweight and obesity among women at reproductive age is already very high, with 32% of overweight and 26% obesity (MINSAL 2009). Women with lower levels of education also show higher prevalence of overweight (65%) compared to more educated women (50% approx.) (BID, 2015). The department which is most affected by overweight is Cuscatlan (40%), while La Union and San Salvador show the highest obesity prevalence (32% and 30% respectively, MINSAL 2009). Overweight is also rapidly increasing among children, with 22% prevalence among primary school children in public schools. Prevalence is even higher in private schools, reaching 41% (MINSAL 2012).

Define Focus and Key Target Groups

Key highlights:

The key target groups for analysis were identified in collaboration with stakeholders based on consideration of current malnutrition characteristics across El Salvador.

Children 6-23 months

- ➔ Stunting: 15% of children under 5 (decreased in the past 20 years but prevalence nearly double among children in poorer and rural households).
- ➔ Anaemia: 30% of children under 5 (increase in prevalence in recent years)

Pregnant and lactating women (PLW)

- ➔ Anaemia: 28% of pregnant women and 23% of non-pregnant women
- ➔ Overweight and obesity: 66% overweight and 33% obesity among adult women
- ➔ Other common micronutrient deficiencies include calcium and zinc

Adolescent girls (10-19 years)

- ➔ Overweight/Obesity: 29% among adolescents (13-15 years old)

Nutrition-related policies, programmes and regulatory framework

El Salvador became a Scaling Up Nutrition (SUN) country in 2012. The National Council for Food Security and Nutrition (CONASAN) co-ordinates interventions in Food and Nutrition Security and promotes coordination between the relevant stakeholders. CONASAN is made up of representatives from the Ministry of Health, the Ministry of Agriculture, the Technical Secretariat of the President's Office, the Technical Secretariat for Social Inclusion and an Inter-Institutional Technical Committee (SUN 2015). According to the SUN Annual Progress Report 2015, El Salvador has made progress in all four of its markers[9]: 1) Bringing people together into a shared space for action; 2) Ensuring a coherent policy and legal framework; 3) Aligning actions around a Common Results Framework; 4) Financial tracking and resource mobilization.

The current legal and policy framework on nutrition and food security is rather comprehensive and is complemented by a range of national programmes on agriculture, income generation and social protection.

In 2011, the National Food Security and Nutrition Policy was approved. Its objective is to "ensure the right to a healthy diet for the entire population in El Salvador, with special focus on vulnerable groups, by promoting food and nutrition security and food sovereignty in a sustainable way, as well as gender equality, thereby contributing to an overall improvement of the quality of life of the population". Linked to the policy, the 2014-2019 National Strategic Plan for Food Security and Nutrition was developed.

The objective of this plan is to:

1. Improve national food production and socio-economic conditions of households at risk of food and nutrition insecurity;
2. Improve physical and economic access to adequate food for families;
3. Improve feeding and care practices of vulnerable groups;
4. Reduce the prevalence of infectious diseases associated with hygiene practices, access to safe water and basic sanitation for households and communities;
5. To promote and ensure women's access to and control over decisions on productive resources and to promote fair distribution of tasks and responsibilities within families, society and the state in food security and in the care and reproduction of human life;
6. Develop the skills, strengths and competencies of the different sectors involved in the different levels of intervention: national, departmental, regional and municipal, on food and nutrition security;
7. Strengthen legal and institutional frameworks for food and nutritional security;
8. Establish a system for monitoring, assessment and early-warning of the food and nutrition situation and the implementation of policy.

A bill on Food Sovereignty and Food and Nutritional Security is currently awaiting Parliament's approval (BID and FUSADES 2015).

There is also a strong legal framework for the protection of breastfeeding, through the 2011 Policy on the Promotion, Protection and Support of Breastfeeding and the 2013 Breastfeeding Promotion, Protection and Support Act. The goal of this legislation is to promote exclusive breastfeeding to six months and prolonged breastfeeding until two years. Both the legislation and the policy guarantee the right to breastfeeding and regulate the marketing of breast milk substitutes. As will be further

[9] These markers are self-evaluated by the country.

elaborated upon in the section on Nutrient Intake, there has been a notable improvement in breastfeeding practices over the last few years.

Food security and nutrition comprise one of the strategic pillars of the National Health Policy 2009-14. It is not clear how well the Programme of Food Security and Nutrition that falls under this pillar is implemented. According to some key informants, previously successful programmes such as nutrition education, fortification and micronutrient supplementation, are not implemented with as much success compared to the previous five years (BID and FUSADES 2015).

In April 2014, the Law of Development and Social Protection was passed, featuring key social programmes, including school feeding, family agriculture and programmes which guarantee minimum income for the most vulnerable. There are also a number of nutrition sensitive laws including the Bill for School Meals Act, Universal Social Protection and Development Act, Consumer Protection Act, Comprehensive Protection for Childhood and Adolescence Act, and Land Use and Development Act.

Under the National Strategy for the Control of Micronutrient Deficiencies (MINSAL 2010), both staple food fortification and micronutrient supplementation for specific vulnerable groups (children under five and PLW) are included. There is mandatory fortification of the following staple foods:

- **Iodized salt** (first phase 1967-77, second phase since 1993);
- **Sugar** with vitamin A (since 1990);
- **Wheat flour** with iron, folic acid and other B complex vitamins (since 1995);
- **Maize flour** with iron, folic acid and other B complex vitamins (since 2003);
- **Pasta** with iron, folic acid and other B complex vitamins (since 2010)

It is estimated that coverage of fortified foods in the general population is over 90% (MINSAL 2010). It should be noted, however, that a test of the levels of fortification of samples of fortified foods in 2012 showed wide variation in compliance. Iodized salt and French bread with iron showed the poorest results, with low levels of fortification and high variability among the five regions (range of 27% to 58% for iodized salt and 11% to 68% for French bread). Sugar with vitamin A and pasta with iron showed moderate results, with samples reaching between 63% and 86% of recommended levels. Samples of maize flour fortified with iron were the most consistently fortified product, with all regions reaching at least 85% of recommended levels (DIGESTYC 2013). According to some key informants, salt and sugar fortification levels should be revised, based on consumption of these foods and latest assessments on these deficiencies.

A National Strategy for Infant and Young Child Nutrition also exists (MINSAL 2011) and is operational. It has four components:

1. Growth monitoring
2. Provision of complementary foods and micronutrient supplementation to both, children 6-23 months and pregnant and lactating women, at risk of undernutrition
3. Early stimulation, caring and feeding practices
4. Information, Education and Communication on nutrition

The strategy describes the nutrient content and composition of the fortified blended food to be provided to children 6-23 months and PLW, which is a corn soy blend fortified with a premix including iron and zinc, thiamine, riboflavin, niacin and folic acid (30 g/day for children 6-23 months and 45 g/day for PLW).

The nutrient profile of the fortified blended food provided by the government is currently under revision. INCAP has developed an alternative formulation for the product, other options include SC+ formulation, which is currently being used under WFP-supported programmes.

"*Comunidades Solidarias*" is the national strategy for the Universal Social Protection system in El Salvador. The national social protection system and programme is coordinated by the Presidential Technical Secretariat (*Secretaria Técnica de la Presidencia*), and operating through the Inter-sectoral Committee for the Universal Social Protection System. The social protection programme targets the poorest households throughout the country (based on a unique registry of participants in the social protection programmes). *Comunidades Solidarias* was established through an executive decree (56, 9 October 2009) with the objective of providing integrated support to families and people affected by extreme poverty and/or social exclusion. The programme includes *Comunidades Solidarias Urbanas* y *Comunidades Solidarias Rurales*, tailored at rural and marginal urban context. In El Salvador various geographic targeting mechanisms and tools have been established, such as the "Poverty map" and the "Urban poverty and social exclusion map". The programme has four components:

1. Human capital
2. Basic services
3. Income generation
4. Decentralized management.

The first two components are the most relevant to nutrition and health. Component 1 includes: a conditional cash transfer[10] on health and education; health and education services; the programme "Our main rights", which includes: universal retirement fund; health and nutrition promotion; "Learning together" (adult literacy programme); citizenship and rights awareness training; "Recreating traditions and culture" (promotion of local culture and traditions); promotion of economic autonomy; improving and rehabilitating spaces. Component 2 includes: health, education and interventions "piso y techo" (floor and roof).

El Salvador is heavily reliant on imports for most commodities, including the key staples as shown in Figure 8. Import restrictions apply only to sugar.

[10] Conditional cash transfers provide US$15 per month for health benefits and US$20 per month for households eligible for both the health and education benefits (De Brauw & Peterman 2011). Education transfers were conditional on households having a child age 6 to 15 who was enrolled in primary school. Health transfers were conditional on households with a pregnant woman or child under five completing growth monitoring visits every two months, vaccinations for children and prenatal monitoring for pregnant women.

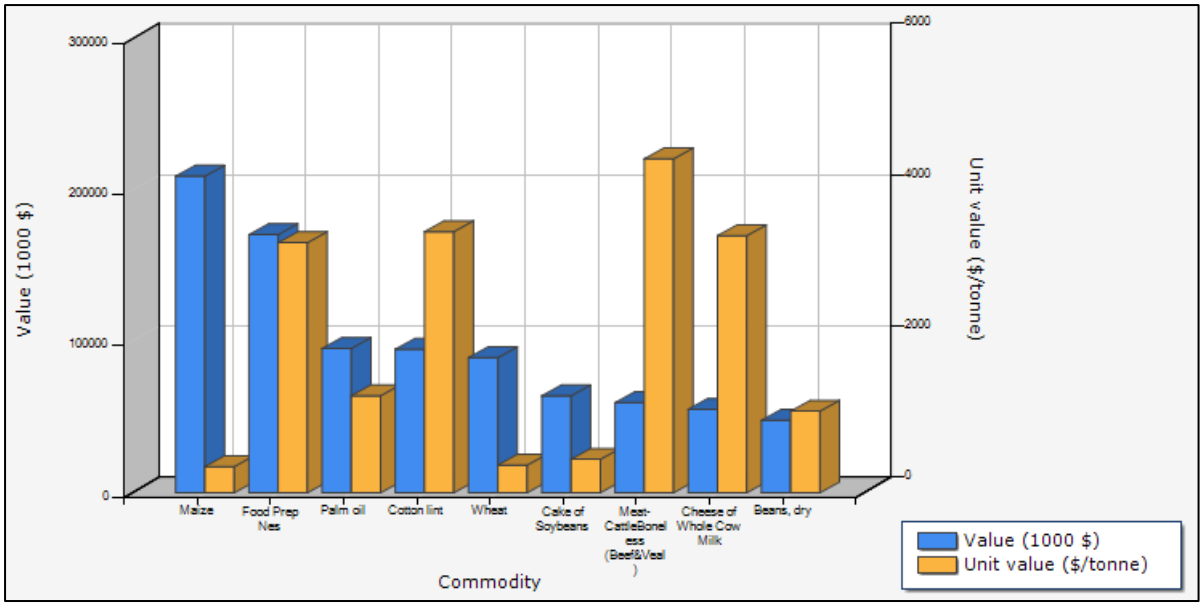

Figure 8: Top imports in El Salvador, 2011 (FAOSTAT 2011)

Policy Analysis

Key highlights:

National policy, legal and regulatory framework

- ➔ National Food Security and Nutrition Policy: approved in 2011
- ➔ Bill on Food Sovereignty and Food and Nutritional Security: awaiting approval by Parliament
- ➔ Policy on Promotion, Protection and Support of Breastfeeding (2011), Breastfeeding Promotion, Protection and Support Act (2013)
- ➔ National Health Policy 2009-2014 has food security and nutrition as a strategic pillar
- ➔ National Strategy for Infant and Young Child Nutrition (2011) is operational
- ➔ Mandatory fortification under National Strategy for the Control Of Micronutrient Deficiencies: wide variation in compliance, especially low for iodized salt and French Bread (iron)
    - Wheat Flour, Maize Flour and Pasta: B vitamins, iron, zinc, folic acid
    - Sugar: vitamin A
    - Salt: iodine
- ➔ SUN movement: joined in 2012

Fortified Complementary Foods and SNFs

- ➔ Imported specialized nutritious foods (incaparina, Chapuditos, Cereal Fortificado) available through government programs
- ➔ Incaparina also available on the market; Super Cereal Plus sold in Super Selectos supermarkets
- ➔ High heterogeneity in nutrient content and geographic availability of different foods, linked to programmes supported by different development partners

Social Protection

- ➔ Law of Development and Social Protection (2014) includes nutrition-sensitive programmes
- ➔ "Comunidades Solidarias": no specific nutrition targeting, but cash transfer conditionalities include use of health services

Availability of Nutritious Foods

Seasonality is not a major issue impacting the availability of foods, as El Salvador is largely dependent on imports for food consumption. There are indications that prices can be volatile for certain commodities, depending on factors impacting the regional producers (WFP 2015).

A recent market survey conducted by WFP as part of the CoD analysis (2015) showed a variety of unique food items available on local markets (over 100), with all food groups represented. Although the survey found that diverse and nutritious food choices are available in many markets, the price of food items rich in calcium (e.g. dairy products) is highly variable across departments, and in some cases these also vary substantially in availability. This makes nutritious diets further out of reach for poor households.

Availability of fortified foods and SNFs

Several staples are fortified by law and widely available, such as maize flour, wheat flour, pasta, sugar, and salt; however as indicated in the policy section, compliance levels vary substantially.

Different types of specialized nutritious products in the form of fortified blended foods (e.g. Incaparina, Chapuditos, and Cereal Fortificado) are available through government programs to specific target groups Incaparina is also available on the market and SC+ is also now available for purchase through the supermarket chain Super Selectos. These products are imported and there is no local production occurring presently or foreseen in the near future. However, there is regional production of these commodities, in Guatemala.

Nutrient Availability

Key highlights:

There is generally goof availability of nutritious foods year round, with no real lean season

- ➔ Seasonality- El Salvador relies largely on imports for staple foods, and therefore does not experience important problems of seasonality
- ➔ Staples: Maize (tortillas), rice and red beans
- ➔ There is no local production of specialized nutritious foods, but regional production exists in Guatemala.

Access to Nutritious Foods

As indicated above, in theory and based on local food availability throughout the year, it should be possible to meet nutrient needs at household level, assuming good access. Food consumption scores based on data collected by WFP also reveal that the vast majority of households attain “acceptable” levels of consumption. However, two main constraints seem to limit access to adequate levels of nutrients. Firstly, due to high levels of income inequality in the country many households are unable to afford nutritious foods and thus are unable to access diets that adequately meet their nutrient needs. Second, a lack of diversity in diets and a shift in dietary habits towards greater consumption of processed foods and lower consumption of fruits and vegetables, indicate that dietary habits may not support nutritious diets (Bermudez and Tucker 2003). This dietary shift could be driven by a number

of factors some of which could be related to economic access, such as unaffordability of nutritious foods or unavailability of adequate food storage for nutritious foods, leading people to consume more durable staples. This shift could also be driven by personal taste.

A study conducted by INCAP in 2011 highlighted that the majority of foods rich in micronutrients, including foods rich in iron, calcium, vitamin A, vitamin C, and riboflavin, were purchased less frequently by poorer households (INCAP 2011). The exception was zinc, which is slightly more accessible for poorer households due to their higher consumption of cereals. However as noted earlier, maize consumption is an inhibitor of zinc absorption so it is still highly likely that households may be deficient, in particularly young children due to their high requirements. Consumption of energy-dense diets was higher in poorer households, due to the greater consumption of cereals.

Having sufficient income to access nutritious foods is a pre-requisite for food and nutrition security. Unfortunately high levels of poverty throughout the country mean that this pre-requisite is not met for many thousands of households. Furthermore, already vulnerable households have experienced reduced incomes and subsistence crop production due to recent crises such as coffee rust and drought, further limiting their ability to access adequate and nutritious food.

While it is clear that financial access constraints are in part responsible for burdening poorer households with a larger dietary deficit with respect to most micronutrients, it should be noted that better-off households face significant deficits as well.

Part of this deficit may be attributable to dietary habits and choices, which do not seem to support diverse and nutritious diets across the income spectrum. The INCAP study showed that the poorest households tended to have a diet consisting of about 17 food items, and 24 items for better-off households (INCAP 2011). These numbers include coffee, sugar, soft drinks, condiments, dehydrated soups, and oil, items which were consumed by all income groups.

The typical diet consists heavily of cereal-based foods, tortilla in particular. In extremely poor households, cereals and sugars contribute about 70% of total energy intake. The proportion of energy from both protein and fat were very low in poorer households (about 8% and 6% respectively). In wealthier households, the contribution by protein increased to 16% but fat remained at 6%.

Animal products were generally limited to eggs, cheese, chicken, and cream, often in small quantities. The diet of wealthier households also included beef and milk.

Very little variety is evident in fruit and vegetable consumption. The majority of households consumed only tomatoes, potatoes, and onions, though the latter two are consumed in much smaller quantities than tomatoes. Even in the highest income group, the only addition to this list were plantain, squash (guisquil), and sweet chilies and these were present in generally small amounts within diets at a household level and in a smaller proportion of households. Fruits are very rarely consumed in poorer households and consumed in very small quantities by households that are slightly better-off but would still be classified as –“poor households”.

Dietary diversity was found to be lower in rural areas and in the Western region.

A 2003 study on dietary patterns of Latin American populations showed that across the region, diets are shifting towards increased consumption of fat, animal products, and sugar, and decreased consumption of cereals, fruits and vegetables (Bermudez and Tucker 2003). Processed foods, including traditionally homemade products such as tortillas, are becoming more commonly consumed. These shifting patterns are consistent with a “nutrition transition”, which results in diets with less room for nutritious foods.

There are many factors which could influence the dietary patterns currently seen in El Salvador. For poorer households, financial access likely plays a large role. However, with even better-off households consuming very inadequate amounts of nutritious foods, it is clear that financial access is not the only barrier, and investigation into local practices, cultural preferences, knowledge of nutrition, and many other factors are needed to understand more fully the drivers of these dietary patterns.

At present, there is no data available on social constraints to access to food, nor on intra household sharing, so our ability to understand the effect on traditionally vulnerable groups such as women and children is limited by lack of data.

Household Vulnerability to shocks

Although seasonality is not a major issue in El Salvador due to its reliance on imports, households are still vulnerable to internal shocks impacting their economic access to nutritious foods. The two main vulnerability factors are drought and coffee rust. Drought particularly affects the eastern part of El Salvador, consisting of San Miguel, Morazán and La Union. In these areas food security is dependent both on income as well as subsistence farming. The latter can counterbalance some of the effects of a reduction in income, but droughts are likely to reduce both income and crop harvest (WFP, USAID and MFEWS 2010; DIGESTYC 2008).

During the 2015 drought 70% of households surveyed in the affected areas applied negative coping strategies - reducing the number of meals eaten per day, reducing the size of meals, borrowing money and consuming cheaper, less preferred food. 9% of households applied emergency coping strategies - selling female animals and consuming seed stocks that were intended to be sold next season. 52% applied crisis level strategies - selling productive assets, limiting expenditure on productive assets, fertilizers, pesticide and animal feed. 76% applied stress level strategies - spending their savings, purchasing food on credit and borrowing food (WFP 2015).

Access to Nutrients

Key highlights:

High income inequality makes a nutritious diet unaffordable for a large portion of the population

Access

- ➔ Most households have “acceptable” Food Consumption Scores, but high income inequality creates an important economic barrier to access for poorer households
- ➔ Lack of dietary diversity and shift in dietary habits toward greater consumption of processed foods may be driven by factors including unaffordability of nutritious foods and unavailability of adequate fresh food storage.
- ➔ Access of vulnerable households has recently further decreased due to crises such as coffee rust and El Niño-induced drought, which have reduced incomes and subsistence crop production.

Nutrient Intake

Secondary information on nutrient intake was mostly derived from the 2011 INCAP study, in combination with 2014 Multi-Indicator Cluster Survey (MICS), in particular for IYCF practices. Additional insight was gained from the Food Consumption Score Nutritional Quality Analysis (FCS-N).

The presence of both significant rates of undernutrition and overweight/obesity indicates that a large proportion of the population in El Salvador is facing a nutrient gap. While undernutrition has been improving considerably in the past decade, it is not clear whether this is driven by improved food intake or decreases in disease incidence, or a combination of both.

It is clear, however, that a large proportion of households face an intake gap when it comes to most major micronutrients. While this gap is larger for poorer households, even better-off households lack adequate amounts of diverse foods to meet their RNI. It is unknown how this gap affects individuals within the household.

Very high anaemia rates are present in children, and pregnant and non-pregnant women. While it is not clear how much of this phenomenon is attributable to a gap in iron intake, since the majority of available iron is in non-heme form it is likely that low intake plays some role, in particular for poorer households who do not have as much access to animal products.

The main drivers of the nutrient gap are likely to be affordability and dietary habits. There is generally good availability of nutritious foods year round, with no real lean season. But a nutritious diet is not affordable to a large proportion of the population in every department. Dietary habits may also be contributing to the nutrient gap as even non-poor households do not consume many fruits and vegetables, despite the fact that fruits and vegetables appear to be widely available. It should be noted that these are the two main drivers which can be inferred from the data available. Several other factors, such as constraints on caregivers' time, lack of adequate food storage, or lack of nutrition knowledge may also be contributing to the existence of a nutrient gap, however lack of data limits the ability to understand these aspects fully.

A 2011 study by INCAP that analysed food expenditure as a proxy for food consumption showed that availability of most macronutrients was generally sufficient across all departments and income groups. The FCS-N also indicated that 70% of households had adequate protein intake, however also pointed out that most protein comes from high consumption of cereals, rather than animal protein foods (Mathiassen et al. 2015).

Intake of micronutrients

At the micronutrient level, the INCAP study showed that the availability of individual nutrients within the foods purchased by households varies considerably, in particular for key nutrients iron, calcium and zinc. It should be noted, however, this information is based on household purchasing patterns, so does not necessarily accurately reflect consumption. It also does not account for differences in intra-household food-distribution, so it is possible that there are disparities in the typical apparent consumption of our targets groups (PLWs, adolescents and children under 5). The Cost of the Diet Study conducted by WFP in 2015 indicated that from the food available on the market the problem nutrients are calcium, vitamins C, B5, B6 and zinc (for the child under 2).

Iron-rich foods are generally consumed in adequate quantities at the per capita level across all departments (according to purchasing patterns examined in the INCAP study), however the consumption at household level varies with income. 45% of poorer households do not have purchase enough iron-rich food to meet 70% of RNI. The same is true for one-third of better-off households

(INCAP 2011). The FCS-N shows, on contrast, that only 7% of households meet or exceed 70% of RNI for iron (Mathiassen et al. 2015).

Consumption of calcium-rich foods per capita is more varied (also according to purchasing patterns), both geographically (households in the West have the lowest availability of calcium at 63% of adequate levels, while the San Salvador metropolitan area reaches 93%) and well as by income level (43% for extreme poor and 90% for non-poor households). Market surveys also show that milk and milk powder, both rich sources of calcium, are not as widely available in markets as most other products.

The results of the INCAP study indicated that consumption of zinc is well below adequate levels across all regions (ranging from 47-62%) and does not follow a typical pattern with respect to income. Zinc is estimated to be consumed in slightly greater quantities in poor households, due to their higher purchase of cereals, however the vast majority of households do not demonstrate adequate intake of zinc, regardless of income level - more than 70% of all households do not have enough zinc available to meet 70% of their RNI.

The same study indicated that Vitamin A is generally consumed at adequate levels (45% of vitamin A intake is attributed to fortified sugar) but 25% of all households and 45% of poor households still do not meet 70% of RNI. The FSC-N also estimates 41% of households have adequate access to Vitamin A, showing that the majority (74%) of Vitamin A comes from consumption of Vitamin A-rich foods (Mathiassen et al. 2015).

Similarly, Vitamin C appears to be adequately consumed at the population level but shows considerable differences by income. Average consumption of foods-rich in Vitamin C for non-poor households is 123% of recommended levels, while for extreme poor it is only 58%.

Availability of riboflavin at population level is estimated to be generally near or above 100% of requirements for all regions when considering purchasing patterns. Despite this, approximately one-third of all households are estimated to face a deficiency of 30% or more of RNI. This figure exceeds 45% in extremely poor households (INCAP 2011).

Breastfeeding and IYCF practices

59% of children under 6 months are predominantly breastfed and 47% of children under 6 months are exclusively breastfed (MINSAL 2015)[11]. The rate of exclusive breastfeeding has increased from 16% in 1998 to 24% in 2003 to 31.4% in 2008 (IFPRI 2014). 75% of children continued breastfeeding until 1 year and 55% until 2 years (MINSAL 2015). In terms of complementary feeding patterns, 66% of breastfed children and 67% of non-breastfed children were reported to meet the Minimum Acceptable Diet (combination of frequency and diversity) (MINSAL 2015). Minimum Meal Frequency is better than Minimum Dietary Diversity (86% vs 78%). 90% of children 0-23 months were introduced solid and semi-solid foods between 6-8 months (MINSAL 2015). A regional breakdown is not available for these indicators.

Consumption of other foods

Junk foods such as soft drinks, potato chips, biscuits and other high-calorie snack foods are widely available and anecdotal evidence suggests these foods are increasingly chosen for both adults and children. More information would be needed on specific nutrient profiles and consumption of these foods by young children and PLW.

[11] Predominantly breastfed are those children that receive breast milk and/or liquids, exclusively breastfed are those children that receive only breast milk (MICS 2014).

Nutrient Intake

Key highlights:

In addition to affordability constraints, dietary habits contribute to malnutrition, as even non-poor households consume few fruits and vegetables, despite wide availability.

- ➔ 75% of children are breastfed until 1 year, and 55% until 2 years of age, 47% of children are exclusively breastfed under 6 months.
- ➔ Minimum Acceptable Diet is 66%, dietary diversity is lower than minimum meal frequency.
- ➔ Increasingly, diets are energy dense but not adequately nutrient dense; even wealthier households are not meeting recommended nutrient intakes.
- ➔ Poorer households, in particular, are less likely to purchase foods rich in iron, calcium, vitamin A, vitamin C, and riboflavin.
- ➔ For extremely poor households, cereals and sugars contribute approximately 70% of total energy intake.

Local Practices

Further information is required to understand more about the influence of local practices on nutrient intake. Interviews with key informants indicate that fish consumption is considered a taboo for PLWs and children under 12 months. Some women also believe that consuming cheese and chocolate during lactation increases milk, so consumption of these products are typically high during this period. It also appears that knowledge of IYCF is low and many caretakers give maize coffee and rice water to young infants who should be breastfeeding exclusively.

Local Preferences and Practices

Key highlights:

- ➔ Taboos: in some areas PLW and children under 12 months are discouraged from eating fish.
- ➔ High consumption of cheese and chocolate may be encouraged during lactation, as this is believed to increase milk production.
- ➔ Generally low knowledge of good IYCF practices.
- ➔ Infants are often given maize coffee and rice water, rather than being exclusively breastfed.
- ➔ Violence may contribute to rising overweight and obesity, due to lifestyle effects such as reduction of physical activity.

Cost Optimization

Cost of the Diet Methodology

A Cost of the Diet market survey, analysis and modelling was conducted by WFP El Salvador in September 2015 in 49 municipalities within 9 departments, reflecting the market access of 27% of the population. Eight assessment zones were selected to represent: 1) emergency areas, affected by coffee rust or drought, 2) areas with high rates of malnutrition, measured by stunting prevalence and 3) livelihood zones characterized as: staple grain and labour; coffee; sugarcane; eastern staple grain; livestock and remittances; central free-trade; and fishing and aquaculture). See Annex 5 for an overview matching criteria with departments.

Cost of the Diet Linear Optimization Software (developed by Save the Children) was used to assess minimum cost nutritious diets available locally for four person and five person households. Household composition was modelled based on the selected target groups and data from the 2013 National Household Study (EHPM 2013). Both households consisted of a 6-8 months old child, a 6-7 years old child, a lactating woman 30-59 years old (lactation period 7-12 months) and an adult man 30-59 years old, with the addition of one 14-15 years old adolescent girl for the five person household. This assessment focussed on a diet called the Staple-Adjusted Nutritious Diet (SNUT), which is a minimum cost nutritious diet constrained to include daily servings of the main staples (rice, red beans and maize flour) and no servings of widespread taboo foods for relevant household members (fish for PLWs and children under one year of age). A daily portion of staples is included to account for those food preferences that are energy-dense and that make up the major part of local food habits. A food list for market assessment was compiled using INCAP data, key informants (WFP Nutrition and VAM Staff) and an initial pilot to an urban market in Santa Tecla in San Salvador. Soybeans were excluded from the food list because they were only found in three markets and are not consumed regularly in El Salvador (EHPM 2013, WFP 2012). Income data adjusted for household size was used to calculate affordability of nutritious diets.

For the purposes of modelling potential changes in affordability through food-based interventions only the five person household was used as the reference household. Five person households are more reflective of lower wealth quintiles, whereas the higher wealth quintiles consist of 3-4 members per household (EHPM 2013). No modelling was undertaken for four person households. Individuals, based on both sex and age, were selected based on vulnerability to malnutrition, with a goal of targeting nutrition during the first 1000 days of life.

Survey and Affordability Analysis Results

The Cost of the Diet market survey indicated wide availability of a variety of food items, however, price ranges differed between assessed zones. This is particularly true for milk-based foods, such as cheese, milk-powder and milk itself. As Figure 9 illustrates, main staples were accessible throughout the country with very little price difference, but prices for milk-based foods and animal sources of iron varied across departments. There was no consistent pattern for variation between departments. The overall tendency was for costs to be higher in the eastern region of El Salvador, a trend that is also reflected in the daily cost of a SNUT (see Figure 10).

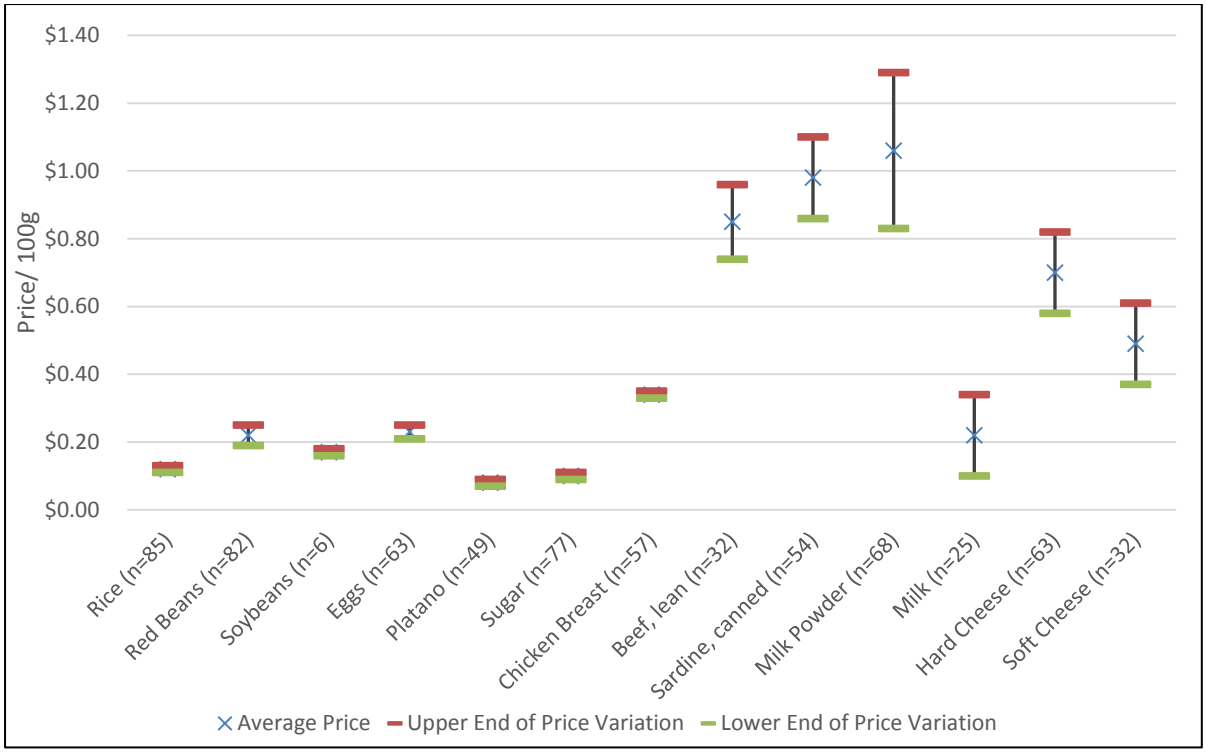

Figure 9: Average prices per 100g and price variation across the country

The Cost of the Diet analysis found that a large proportion of households could not afford a theoretical nutritious diet (constrained for staples and taboos) based on a conservative estimation of 70% expenditure of income on food, which is applicable for the poorer households. On average, 30% of five-person households and 24% of four-person households could not afford a SNUT.[12] Non-affordability varied by department – in Morazán, 44% of five-person households could not afford a SNUT, while in the San Salvador/ Santa Ana[13] zone non-affordability levels were at 9% for a five person household.

Although the characteristics of malnutrition, i.e. limiting nutrients and prevalence, were homogenous across livelihood zones, prices for nutritious diets were higher in Eastern El Salvador. Three out of the four assessment zones in the Eastern region were above the national average for the cost of a staple adjusted nutritious diet. This corresponds to the areas most heavily impacted by drought, affecting the ability of subsistence farmers to grow crops and making them dependent on market access for food.

[12] Averages were calculated with no weights. Applying weights based on population would overestimate the low affordability for the urban areas on a national level. For a discussion of this please refer to section "Limitations, Data Gaps and Further Questions".

[13] Santa Ana and San Salvador as well as Ahuachapán and Sonsonate were paired to form one livelihood zone, respectively, due to their similar characteristics.

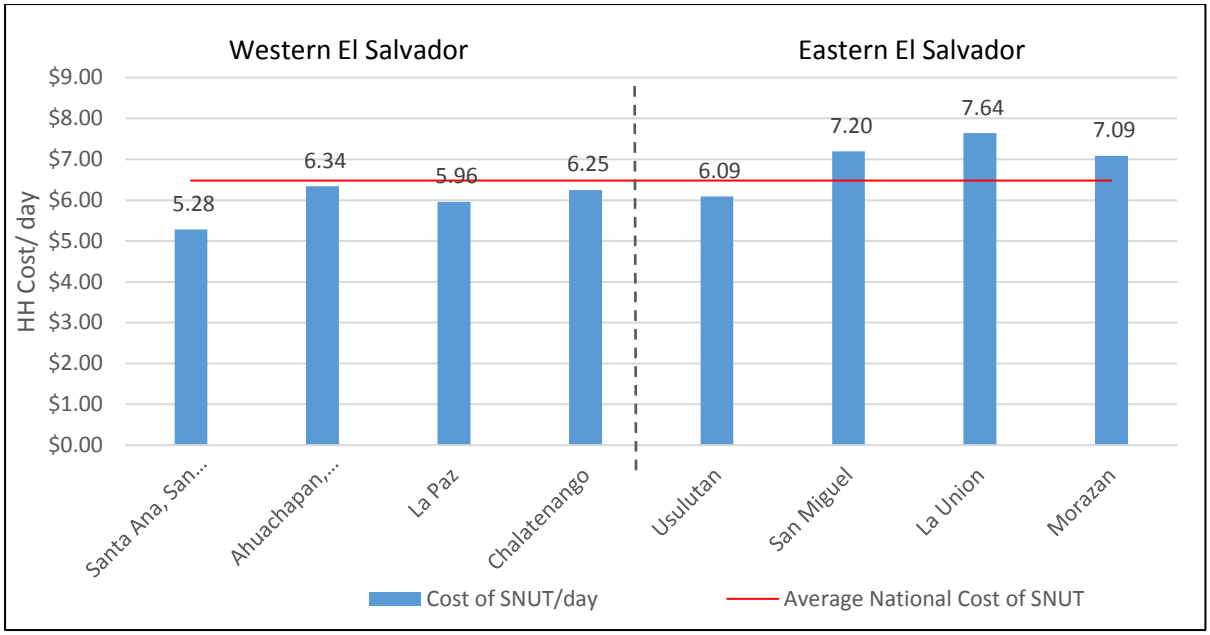

Figure 10: Daily Cost of SNUT for a 5 person household

Non-affordability levels and cost of SNUT are positively correlated (for correlation Graph, see Annex Figure 3), however, non-affordability was also impacted by household income per region. Therefore, due to their differences in average income and income distribution, Chalatenango and Usulutan showed different non-affordability levels, though the absolute cost was nearly identical across the zones.

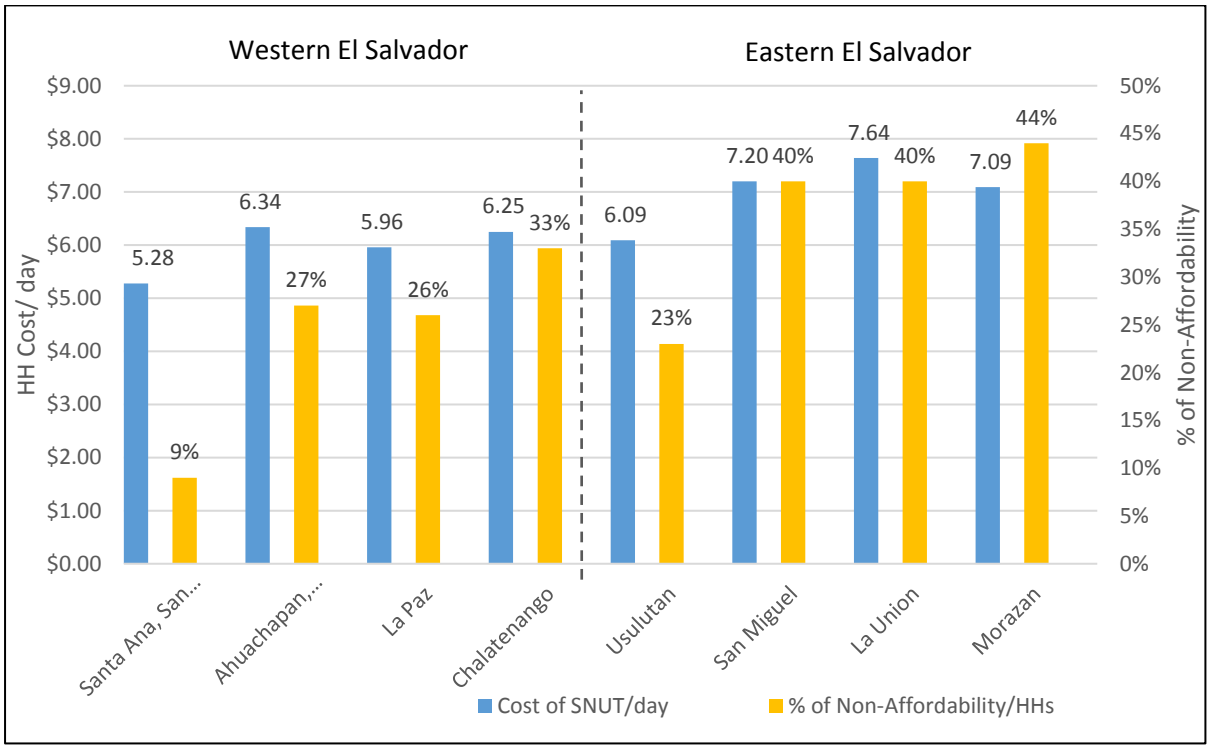

Figure 11: Daily Cost of SNUT and Non-Affordability per Region

A nutrient that is below 100%, i.e. cannot meet the recommended intake, is called a problem nutrient. No problem nutrients were found in the El Salvador regions when modelling the SNUT. A number of

limiting nutrients were found when calculating the SNUT diet. Limiting nutrients are nutrients that are difficult to be met with the foods that are available at the market, without exceeding the prescribed energy limit. This is indicated by the software meeting nutrient requirements by 100% exactly.

		Nutrients															
Region	**Target group**	**Energy**	**Protein**	**Fat**	**Vitamin A**	**Vitamin C**	**Vitamin B1**	**Vitamin B2**	**Niacin**	**Pantothenic acid**	**Vitamin B6**	**Folic acid**	**Vitamin B12**	**Calcium**	**Iron**	**Magnesium**	**Zinc**
Chalatenango	**PLW**			X						X	X			X	X	X	
	Adolescent Girl			X		X				X	X			X	X	X	
	Child 6-8 months													X	X		X
Usulutan	**PLW**			X		X					X			X	X	X	
	Adolescent Girl			X		X								X	X	X	
	Child 6-8 months													X	X		X
Ahuachapan, Sonsonate	**PLW**			X						X	X			X	X	X	
	Adolescent Girl			X		X				X	X			X	X	X	
	Child 6-8 months													X	X		X
Morazan	**PLW**			X						X	X			X	X	X	
	Adolescent Girl			X		X								X	X	X	
	Child 6-8 months														X		X
La Paz	**PLW**			X		X					X			X	X	X	
	Adolescent Girl			X	X	X				X					X		
	Child 6-8 months													X	X		X
San Miguel	**PLW**			X						X	X			X	X		
	Adolescent Girl			X		X					X			X	X	X	
	Child 6-8 months													X	X		X
La Union	**PLW**			X		X				X	X			X	X		
	Adolescent Girl			X		X								X	X	X	
	Child 6-8 months													X	X		
Santa Ana, San Salvador	**PLW**			X		X					X			X	X	X	
	Adolescent Girl			X		X								X	X	X	
	Child 6-8 months													X	X		X

Table 2: Limiting Nutrients for key vulnerable groups in each region (X indicates that the diet only just managed to fulfil 100% of the nutrient requirement). Source: WFP Analysis

Calcium and iron were key limiting nutrients for the 5 person household modelled. Zinc was a constant limiting nutrient for the child 6-8 months and Magnesium for both the adolescent girl and the PLW.

Fat was also found to be a limiting nutrient, which can be explained by the linear optimization that included food items with low fat content due to nutrient requirements.[14]

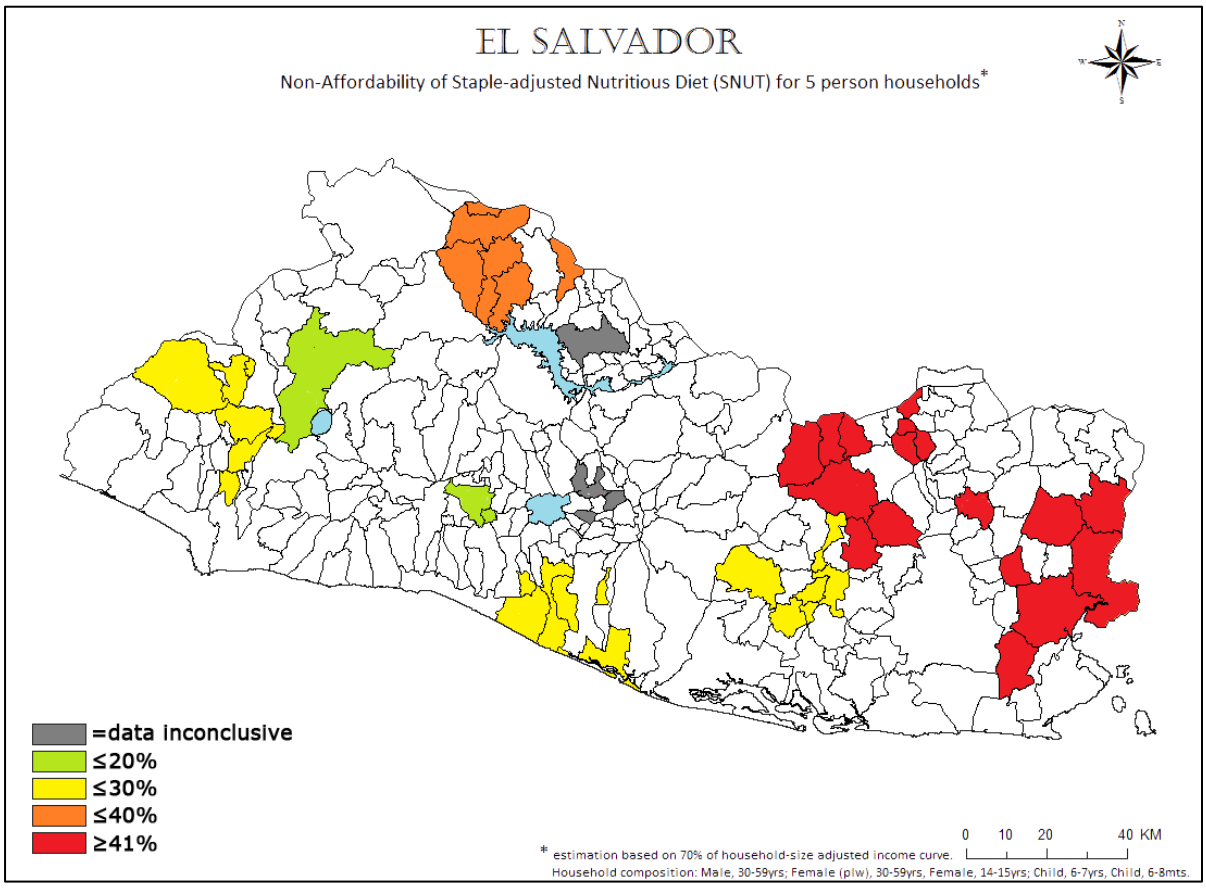

Figure 12: Map showing non-affordability of SNUT in 5-person HHs

Modelling Plan

In order to improve affordability of a SNUT a number of interventions were modelled targeting PLWs and children aged 6-8 months. Cash transfers were modelled targeting the overall household. The following types of interventions were modelled using locally available options:

1. Specialised Nutritious Foods (SNFs) for children 6-23 months and PLW available through the market at full price: Incaparina and SC+ (Nutrient profiles in Annex Figure 1).
2. In-kind provision of Super Cereal+, Incaparina, Cereal Fortificado and Chapuditos to children 6-8 months and PLW at a rate of 7 portions per week

[14] Limiting nutrients should be understood as a hypothetical indicator of the difficulty in meeting nutrient requirements with a balanced diet that does not overconsume on energy. They are not an indicator of what nutrients are lacking in the diet that people are actually consuming. Any diet that consumes calories beyond the suggested daily limit may or may not have these limiting nutrients. An Optifood analysis is needed to further understand nutrient limitations in actual diets.

Daily portions for each commodity as follows:

- *SC+: 100g, 400 Kcal (PLW); 47g, 188 Kcal (6-8 months)*
- *Incaparina: 60g, 246 Kcal (PLW); 45g, 184.5 Kcal (6-8 months)*
- *Cereal Fortificado: 60g, 246 Kcal (PLW); 45g, 184.5 Kcal (6-8 months)*
- *Chapuditos: 18.7g, 69 Kcal (6-8 months)*

3. In-kind provision of Micronutrient Powder (MNP) for children 6-8 months and Multi-Micronutrient Tablet (MMT) for adolescent girls.
4. Fruit and Egg Voucher for PLW and adolescent girls.
5. Subsidised Voucher Scheme at 50% of market price for SNF that demonstrated the biggest improvement in household affordability. One scenario provides up to three portions per day through subsidised vouchers, whereas the other limits the portion to one per day.
6. Cash transfer ($15, $20, $40 and $61.50, per month) to the household

The effect on household affordability was assessed and compared for each modelled intervention. Interventions that showed the greatest improvement in affordability for target groups and the overall household were then combined to assess the potential overall improvement on household affordability.

Due to the homogeneity of the country, nutrition-specific interventions that are modelled as part of the Cost of the Diet analysis showed the same pattern of effectiveness across all livelihood zones and no significant regional differences with respect to limiting nutrients were found. Therefore, no geographical distinctions were applied to intervention method. Instead, and as discussed in the following section, interventions were targeted at closing individual nutrient gaps across El Salvador, as discussed in the following section.

Modelling Results

Target Group: Pregnant and Lactating Women

A lactating woman with 7-12 months lactation requirements was the reference household member to represent the needs of PLW. For all regions Incaparina and Super Cereal+ were modelled at full price as to simulate their availability on the local markets. Daily in-kind provision (i.e. no cost) of Cereal Fortificado, Incaparina, Super Cereal+, and a portion of fruit and egg were each modelled to see how they could reduce cost of the diet for this target group. Different subsidised voucher schemes (unlimited vouchers, limited vouchers and combination with in-kind provision) were also included as an indicator of how much cost improvement is possible. As is shown in Figure 13, among in-kind interventions SC+ was most effective in reducing cost for the PLW. A daily in-kind provision of SC+ reduced cost by 31% ($0.54 per day).

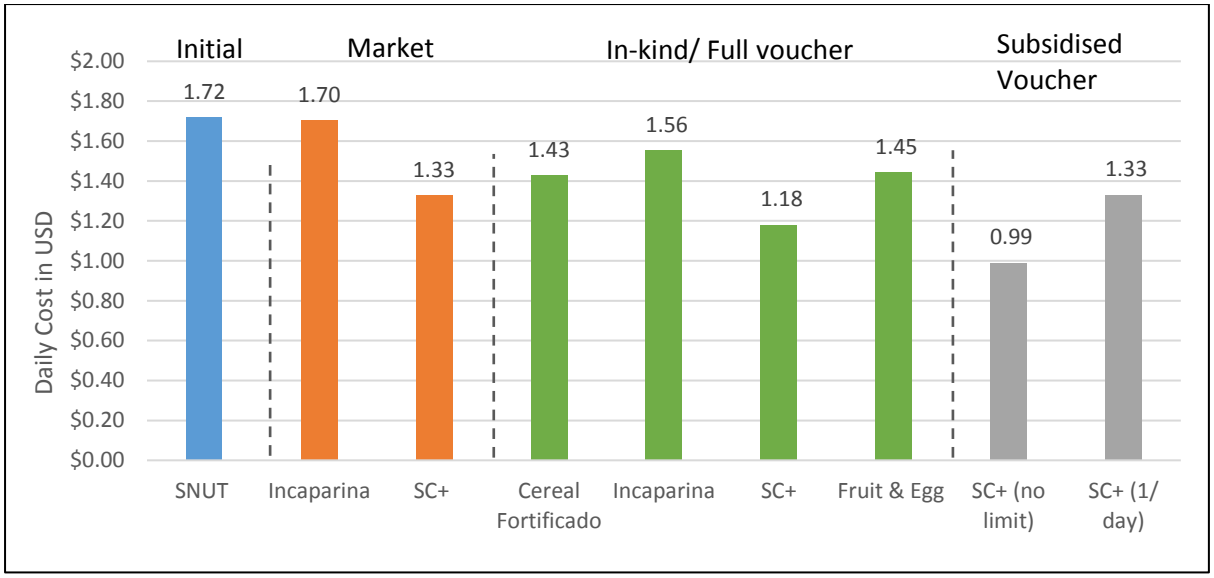

Figure 13: Comparison of the Average National Daily Cost of the Diet of a Lactating Woman

Target Group: Adolescent Girls

Interventions for adolescent girls were modelled, as this target group is critical in breaking the cycle of malnutrition. This target group contributes the largest portion to the household cost, because their nutrient needs are hardest to meet due to above average recommended intake for iron, calcium and zinc. Because of high obesity prevalence in adolescent girls (UNICEF 2014), modelling was restricted to a daily provision of fruit and egg, and multi-micronutrient tablets (MMTs), to avoid energy-dense interventions. The fruit and egg intervention reduced costs by 12%, a daily ration of MMT by 18%.

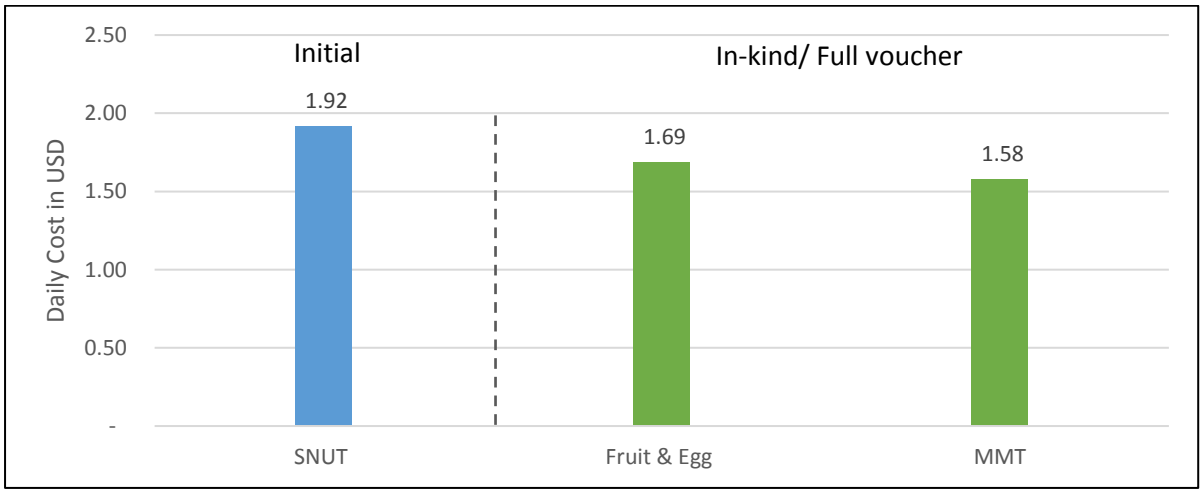

Figure 14: Comparison of the Average National Daily Cost for an Adolescent Girl

Target Group: Children under 2 years

A daily portion of Chapuditos was most effective at reducing the cost of the diet of children 6-8 months old. SC+, Incaparina and MNP, which reduced costs to half of the initial price, did not fulfil calcium or iron supplementation as well as Chapuditos.

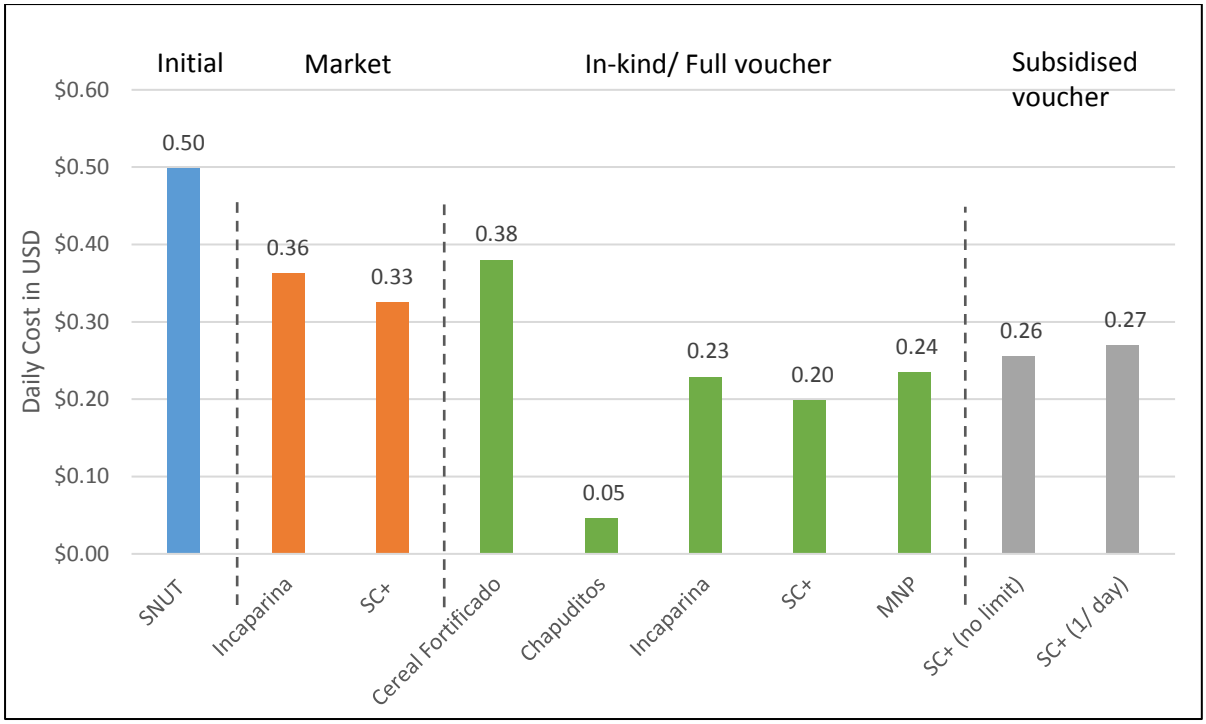

Figure 15: Comparison of the Average National Daily Cost of the Diet of a Child when SNFs are provided in-kind[15]

Change in overall non-affordability

Of the four specialized nutritious foods that were modelled, SC+ was found to be most effective at household level in reducing costs for SNUT when provided in-kind (Figure 16).[16] SC+ showed the greatest reduction in average cost of diet for the child 6-8 months, as shown in Figure 13. For the child Chapuditos was most effective in reducing the cost (Figure 15). The following information can explain these findings:

- Incaparina's formulation does not include most limiting nutrients. It also did not meet nutrient needs when included daily in the diet of the child aged 6-8 months.
- Cereal Fortificado (CF) includes only 33% of the calcium level of SC+ and does not meet nutrient requirements for infants. When Cereal Fortificado was introduced (in kind), diets could not meet nutrient needs. Forcing CF with relatively low nutrient density into the diet meant energy limits were met without meeting needs for essential nutrients.
- Chapudito has the highest calcium content per 100g and lowest energy density, which makes it fit the nutrient gap of the child 6-8 months best.

A breakdown of the daily costs for a SNUT after the interventions for a 5 person household shows that SC+ is the most effective supplementary food for intervention in the context of El Salvador (Figure 16). Availability of SC+ at full market price reduced household cost for a SNUT by 9% (in orange). In-Kind

[15] Note that all SNFs were included on a daily basis except for Incaparina as this did not meet nutrient needs if consumed daily, instead it was consumed between 4 and 5 times per week.

[16] Effectiveness was measured based on the recommended portion size. To ensure that the differences in recommendations did not affect what was considered most effective, we also modelled all supplementary foods at a 60g (U2) and 150g (PLW) portion size. No perceived difference in effectiveness was found, confirming that it is nutrient composition rather than portion size that influences impact on cost.

provision of SC+ (in green) reduced cost by 12%.[17] Cost-effectiveness of SC+ is affected by different intervention modalities, such as offering subsidised vouchers (in grey), allowing households to purchase a daily ration ("w/ limit") or allowing purchase of up to three rations per day ("no limit") of SC+ at half price to optimize their diet.

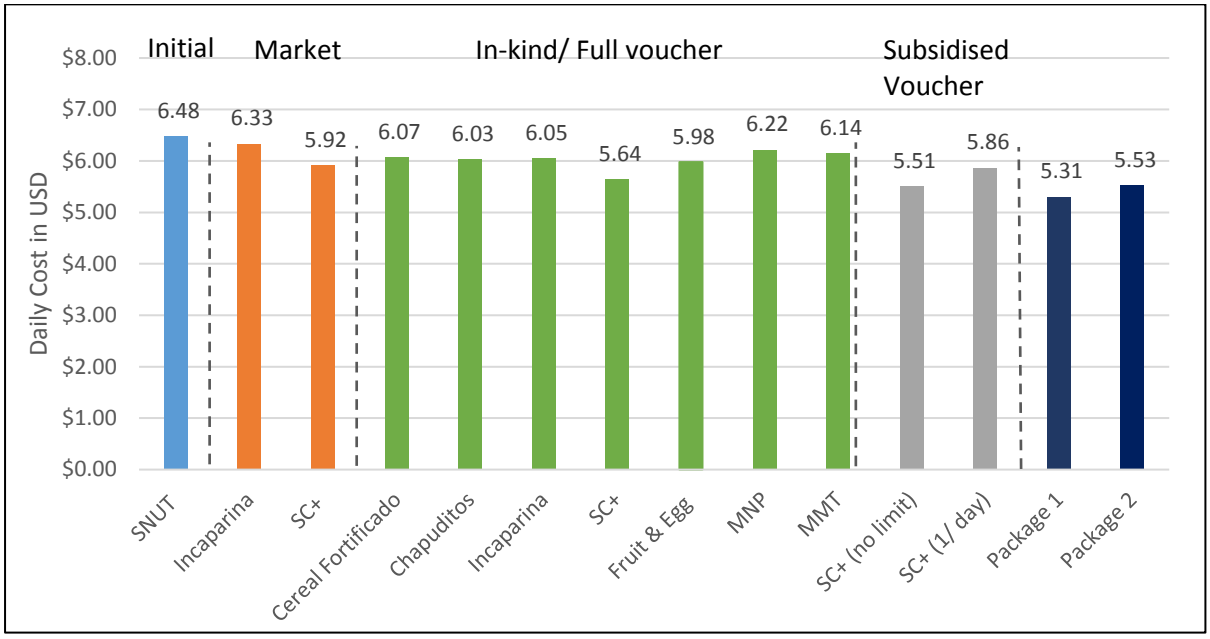

Figure 16: Average National Daily Cost after interventions for a 5 person household

Two packages targeting the PLW, the adolescent girl and the 6-23 month old child, were made up of a combination of the most efficient interventions (in dark blue). Package 1 consisted of a daily in-kind provision of SC+ for both the PLW and the 6-23 month old child and a daily portion of an MMT for the adolescent girl, which reduces cost by 18% to $5.31 per household per day. Package 2 consisted of a daily serving of fruit and egg to the PLW and the adolescent girl and a daily ration of Chapuditos to the child under two. This package reduced the daily cost to $5.53, which is equivalent to a 15% decrease.

The impact of cash transfers on non-affordability were also modelled. Amounts to be modelled were chosen based on existing programmes or suggested by stake holders. Table 3 shows a breakdown of different cash amounts and the level of non-affordability achieved by cash transfers.

[17] It should be noted, however, that the unlimited scenario allows households to optimize their diet beyond a daily portion of SC+. Therefore, while the unlimited SC+ voucher indicates the theoretically possible lower boundaries of the cost for a nutritious diet, the realization of this strongly depends on behaviour change.

Department	Current Non-Affordability	Cash Transfer $15	Cash Transfer $20	Cash Transfer $40	Cash Transfer $61.50
Chalatenango	33%	31%	29%	24%	18%
Usulután	23%	19%	18%	15%	11%
Sonsonate + Ahuachapan	27%	24%	23%	18%	13%
Morazán	44%	40%	39%	35%	31%
La Paz	26%	23%	22%	18%	13%
San Miguel	41%	38%	36%	30%	23%
La Unión	40%	36%	35%	29%	26%
Santa Ana/San Salvador	9%	8%	8%	7%	6%
National Average	**30%**	**27%**	**26%**	**22%**	**18%**

Table 3: Changes in Household Non-affordability of SNUT with provision of different levels of Cash Transfers to all households.

We combined the two intervention packages (Package 1: SC+ & MMT/ Package 2: Fruit and Egg & Chapuditos) with a monthly cash transfer of $61.50 to demonstrate the maximum reduction in the non-affordability of SNUT according to the model. As illustrated by figure 17, an average reduction of 19 percentage points – or 63% – is possible for combined interventions. Figure 20 provides a breakdown of these estimates on assessment level.[18]

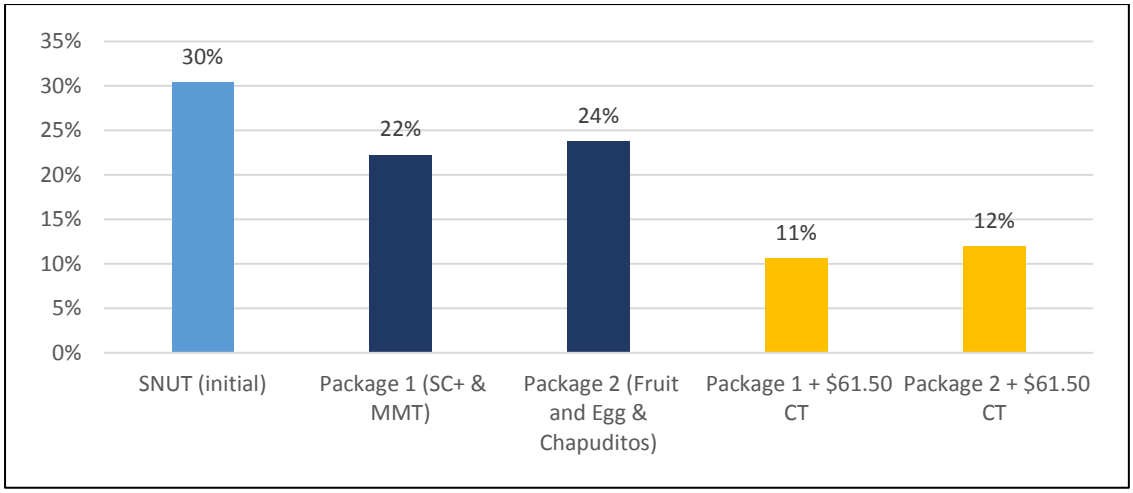

Figure 17: Non-Affordability after Intervention Package and Package plus Cash Transfer

The mechanism behind the cost reduction is displayed in Figure 18 (1.) refers to the initial non-affordability as determined by 70% of expenditure and cost of SNUT. As can be seen, introduction of package 1 (in-kind provision of SC+ for PLW and the child, 6-8 months, and MMT for the adolescent girl) reduces the baseline of monthly cost per household for a nutritious diet. The Cash Transfer is modelled by an elevated food expenditure curve. The intersection of the intervention baseline and elevated expenditure curve represents the new non-affordability level (2.).

[18] It should be noted that this analysis does not yet include a full cost-benefit analysis. A preliminary cost-benefit analysis of different transfer modalities for SC+ interventions can be found in Annex X. We can therefore only interpret interventions according to their effectiveness in reducing costs, not their efficiency.

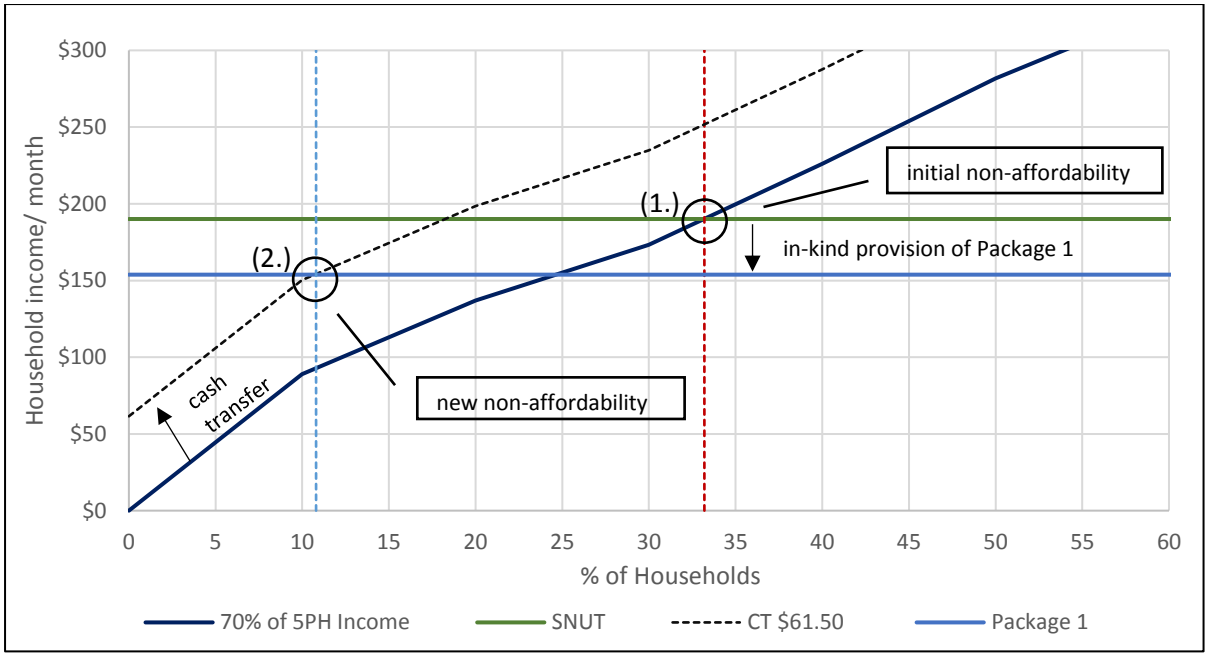

Figure 18: Mechanism of combining $61.50 Cash Transfer and Package 1 Intervention for Chalatenango

Proceeding with this methodology across assessment areas for both intervention packages yields the following results across El Salvador. As illustrated below, the result of interventions is similar across regions with a general divide between Eastern and Western regions. Based on the data collected and analysis conducted, we can see a clear trend for prices and non-affordability to be higher in the Eastern Regions, but the statistical significance of these findings has not been explored.

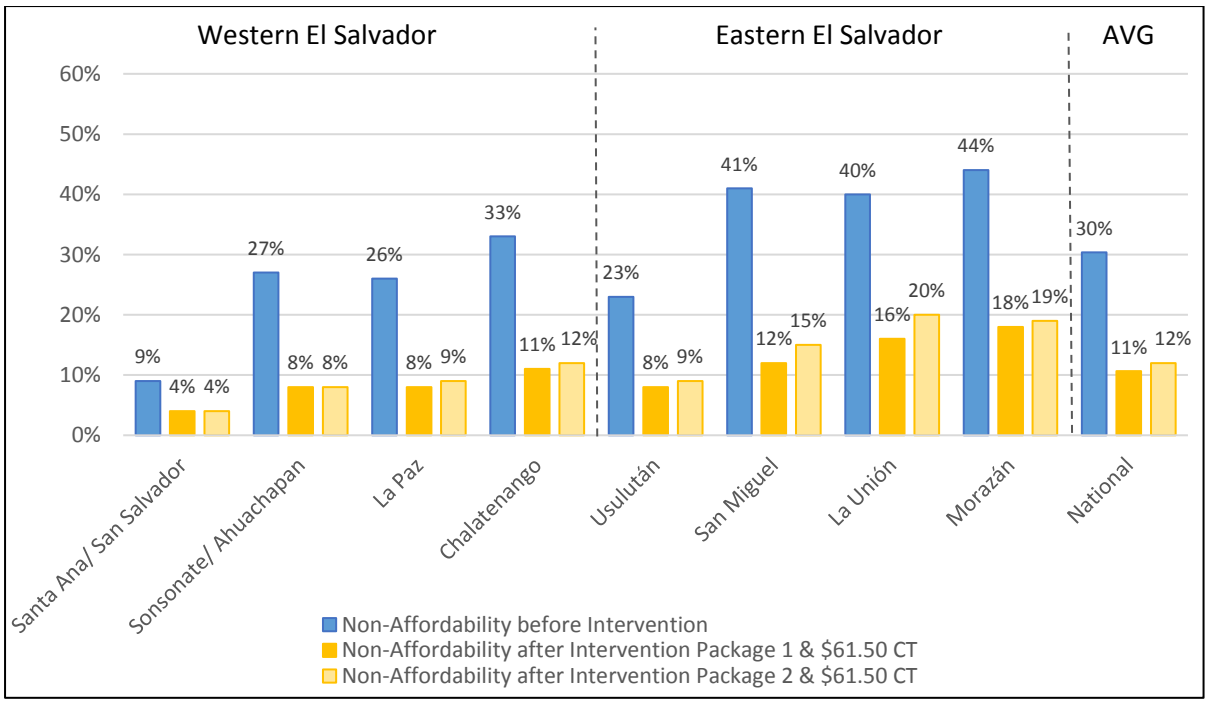

*Figure 19: Graph showing the change in non-affordability following two interventions ((*Package 1: SC+ & MMT/ Package 2: Fruit and Egg & Chapuditos) *and a cash transfer of $61.50 for a household made up of 5 people*

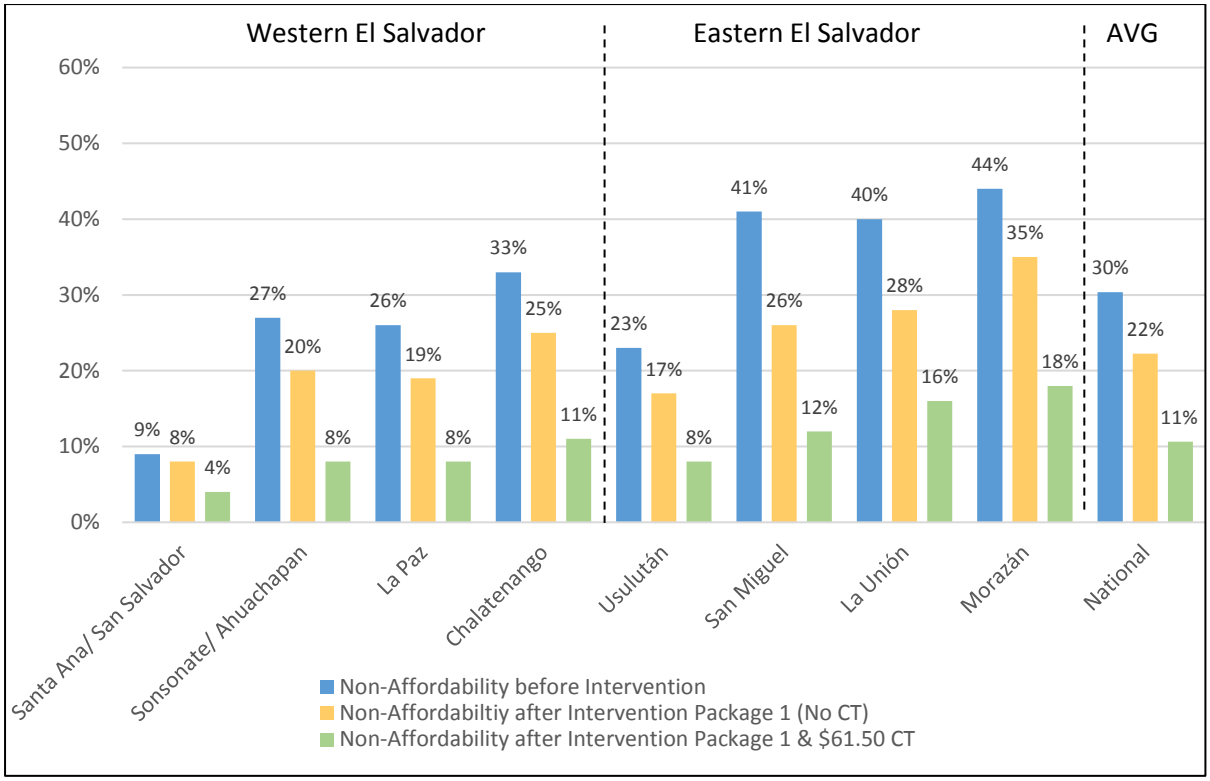

Figure 20: Graph showing the change in non-affordability following the intervention (Package 1: SC+ & MMT*) with and without a cash transfer of $61.50 for a household made up of 5 people*

Further Recommendations

In addition to combining different interventions for individuals into one package an intervention package can be segmented for different wealth groups. Such an intervention design would be more susceptible for cost-efficiency of different options, with highest-need households receiving the bulk of the intervention. Figure 21 illustrates how intervention types can be selected and combined based on their perceived efficiency, based on the amount of households able to afford a SNUT that were not able to afford it through another intervention. A daily SC+ in-kind provision and a $61.50 cash transfer are modelled for the lowest wealth quintile, i.e. those people that are already enrolled in the national social safety net. The medium decile (20-30%) can be reached by smaller amounts of cash transfer (between $20 and $40) and access to subsidised SC+. This leaves a small percentage of people whose access to a SNUT can be facilitated by vouchers for SC+. Such a combination would reduce non-affordability from 35% to almost 10%. Reaching the bottom 10%, the poorest of the country, would require interventions beyond supply of nutritious foods, subsidies and cash transfers of the type modelled in this analysis.

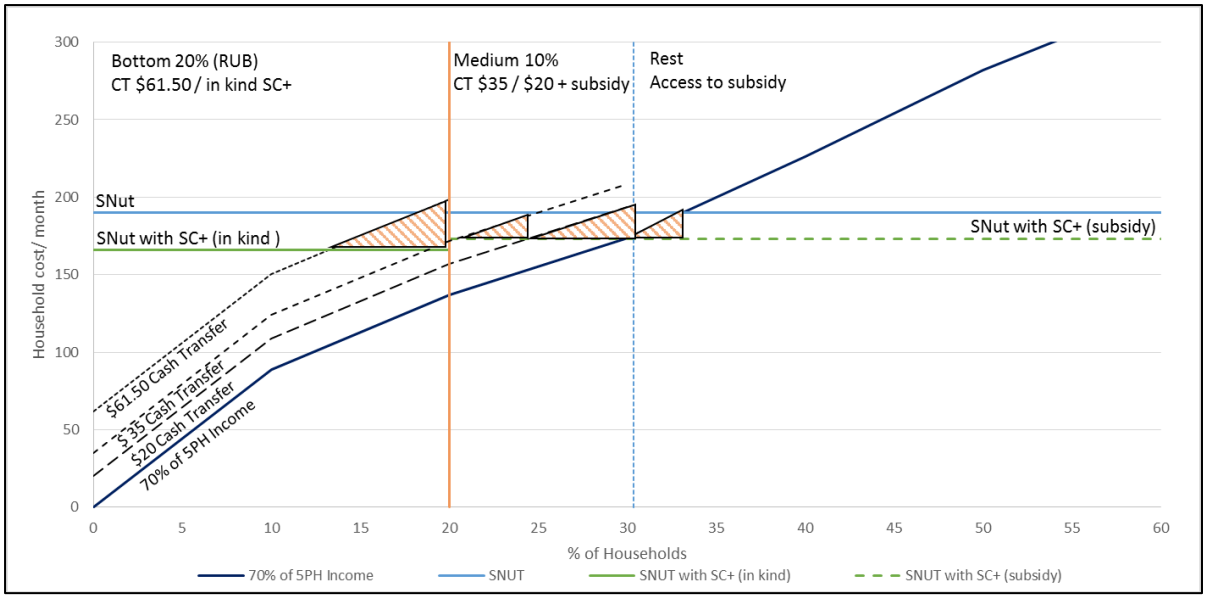

Figure 20: Mixed Intervention Strategies for different wealth deciles

One possible further intervention would be the introduction of soybeans to the diet. Soybeans were excluded from the food list because they are not commonly consumed in El Salvador and were not widely available (WFP 2012). However, including them in the modelling for the SNUT cost estimation in two regions (Morazán and San Miguel) that did have soybeans available on the market showed strong potential for intervention based on soy commodities. Assuming successful Behaviour Change Communication (SBCC) can facilitate the inclusion of soy products into the typical diet, non-affordability would be decreased by 5 percentage points in Morazán and 9 percentage points in San Miguel.

Limitations, Data Gaps and Further Questions

There are a number of data gaps that limit our understanding of the barriers to adequate nutrient intake in El Salvador, in particular the lack of information on individual dietary consumption, especially for young children and PLW. Additional qualitative information on local practices would provide a more holistic picture of behavioural patterns and a better understanding of trends contributing to the acceleration of overweight and obesity, in particular among women of reproductive age. It would also be useful to have further information on issues related to food storage and the role violence plays in limiting access to nutritious foods.

One limitation of the study is the low level of non-affordability for the urban areas of San Salvador, Soyapango and Santa Ana. It is unclear whether the situation of the urban poor is adequately captured by this analysis. This could be for a number of reasons. First and foremost, there is no basis of knowing whether the income data used for these regions is representative of the urban core. Non-affordability is estimated based on income distribution at the departmental level and financial access to a nutritious diet in the urban core may be overestimated. Secondly, due to urban sprawl, geographic access to a nutritious diet may be an additional limitation not considered in this analysis. The data collected shows good availability in the central markets, but no data was gathered for remote and peri-urban markets. It is unclear whether non-central markets in the urban environment offer similar variety of foods at similar prices or provide a limited selection of food items. With these considerations in place actual non-affordability may be higher than suggested by this analysis.

Modelling Dietary Improvement

Key highlights:

The ability of optimised diets based on locally-available foods to meet nutrient needs for chosen target groups was assessed primarily using CoD collected by WFP El Salvador in September 2015 in 49 municipalities within 9 departments. Analysis was conducted in zones representing: 1) emergency areas affected by coffee rust or drought, 2) areas with high rates of malnutrition, and 3) principal livelihood zones. Household composition and expenditure data was extracted from EHPM 2013.1

For standard households in each region, CoD modelled lowest cost diets to meet energy needs only and lowest cost diets to meet requirements for energy, protein, fat and 13 micronutrients, with at least one serving per day of the key local staples, maize, rice and beans, (SNUT).

On average, 30% of the five-person households modelled could not afford SNUT, ranging from 44% unaffordability in Morazán (US$225/month) to 9% in San Salvador/Santa Ana (US$178/month). Unaffordability was generally higher in the Eastern part of the country, where households are more vulnerable to coffee rust and drought.

Four types of potential interventions to improve affordability were modelled based on the secondary data analysis, current or planned national interventions, and stakeholder suggestions: Locally available nutritious foods (voucher); Multi-micronutrient tablets (MMT) and micro-nutrient powders (MNP) (in-kind); Specialised nutritious foods (SNFs) (market, subsidy, in-kind); Cash Transfers.

Food-based interventions modelled as part of the CoD analysis showed the same pattern of effectiveness across all livelihood zones and no significant regional differences with respect to limiting nutrients were found. Specialised nutritious foods were selected based on commodities that were already locally available (on the market or through national or other programmes), or commodities that would be feasible to import.

The most effective interventions for each target group were as follows:
Children 6-23 months: Of the 4 SNFs modelled, a voucher for a daily portion of Chapuditos (fortified blended food) was most effective, reducing the daily cost of the child's diet by 90%, from US$0.50 to US$0.05.
Pregnant and Lactating Women: In-kind provision of SC+ was most effective, reducing the daily cost of the PLW's diet by 31%, from US$1.72 to US$1.18.
Adolescent girls: Due to the high recommended intake of iron, calcium, and zinc, girls contributed the largest portion of the household cost of SNUT. Vouchers for locally available nutritious foods (fresh fruit and eggs) reduced the daily cost of the girl's diet by 12% (from US$1.92 to US$1.69), and in-kind provision of MMTs reduced the cost by 18%, to US$1.58**.**

Two packages were created by combining the most effective interventions. Package 1 consisted of a daily in-kind provision of SC+ for both the PLW and the 6-23 month old child and a daily portion of an MMT for the adolescent girl, which reduced cost by 18% to $5.31 per household per day. Package 2 consisted of a daily serving of fruit and egg to the PLW and the adolescent girl and a daily ration of Chapuditos to the child under two. This package reduced the daily cost to $5.53, which is equivalent to a 15% decrease. These were then combined with a Cash Transfer that further reduced non-affordability.

Summary of Key findings

The situation analysis based on a combination of secondary data and Cost of the Diet analysis highlighted the following issues:

Malnutrition Characteristics:

Double burden:

- High prevalence of type 2 diabetes at 8.8%, which is the fourth leading cause of hospital deaths
- Adolescents' overweight: 29% and obesity: 10% in 2013. Very high in adult women (66%) and in men (59%)
- As stunting was higher before (1988 data showed 37% prevalence against 15% in 2014), it can be estimated that at least 37% of these overweight women are also stunted (higher risk factors for NCDs and maternal health complications)
- Relatively low national stunting prevalence in children under five (15% in 2014, acceptable level according to WHO standards) ; however, the prevalence can be up to twice as high in poor and rural areas, especially those affected by drought and coffee rust.

Anaemia/Micronutrient Deficiency:

- Increasing in children under five (from 20% in 1998 to 30% in 2011) and high in pregnant women (around 30% in 2011) and non-pregnant women (23% in 2011)
- Calcium and zinc are key problem nutrients for older infants and young children (CoD).
- Calcium, zinc, magnesium, pantothenic acid, Vit C and Vit B6 are problem nutrients for PLW (CoD).
- Actual iron fortification level in maize and wheat flour inconsistently meets fortification requirements (in particular French bread)
- Vit A and iodine deficiencies do not seem to be a problem, even if fortification levels are not always met (iodized salt 27-58% met required fortification levels, Vit A fortified sugar 64-86%)

Availability and access to nutrients at the household level:

- Food consumption score at the household level and food availability are generally good
- However, households are still vulnerable to shocks impacting their economic access to nutritious foods. There are two main vulnerability factors: drought and coffee rust.
- Heavy reliance on imports also make food prices more subject to fluctuations, depending on factors impacting the regional producers of imported commodities.
- Affordability of a nutritious diet is a major constraint throughout the country affecting at least a third of all households within the country (as per CoD results).

Nutrient intake for key target groups and dietary practices/IYCF practices:

- A large proportion of households face an intake gap when it comes to key micronutrients. While this gap is larger for poorer households, even better-off households lack adequate amounts of diverse foods to meet their recommended nutrient intakes (RNI). This particularly affects adequacy of intakes of children aged 6-23 months, adolescent girls and PLW.

- There is an increasing trend at the household level towards energy dense diets (which provide an excess of macronutrient intake, also shown by the high prevalence of overweight and obesity in women at reproductive age and adolescents), but not adequately nutrient dense (in particular in terms of micronutrient content).
- Violence seems to be another potential contributor to rising overweight and obesity, due to the reduction of physical activity and impact on overall lifestyle of the population in El Salvador.
  Exclusive breastfeeding patterns could be improved (48% of children 0-6 months are exclusively breastfed)
  In terms of complementary feeding patterns, 66% of breastfed children and 67% of non-breastfed children were reported to meet the Minimum Acceptable Diet (MAD).
- Sub-optimal IYCF practices and limited dietary diversity at household level seem to be linked to non-affordability, but also to cultural factors, which should be better explored and understood.

Enabling environment: national policies, programmes and regulatory framework:

- El Salvador is a SUN country, with quite a rich legal and policy framework related to nutrition and food security, in particular related to improving nutrient intake during the first 1000 day window.
- Compliance with policies (e.g. meeting adequate fortification levels as per mandatory fortification policy) still needs to be strengthened.
- Key entry points and platforms for nutrition interventions are both public health/health system, under the larger social protection umbrella, as well as the commercial market (with a growing development of supermarket chains across the country).
- A fortified complementary food is currently provided in some areas through the social protection programme to both PLW and children 6-23 months. However, a review of the nutrient content of some SNFs that are currently used in comparison to the identified nutrient gap has shown that the nutrient profile of the product is not adequate for the estimated nutrient gap of the target groups and should therefore be adjusted or replaced with a more suitable product.
- The targeting of the social protection programme and the amount of the conditional cash transfer currently provided to vulnerable households also needs to be reassessed, in light of its potential contribution to meet nutrient requirements at household level, as well as specific needs of older infants and young children and PLW.

Recommendations

Potential strategies identified to fill the nutrient gap for children 6-23 months and PLW

Programmes

Food-based approaches to fill the described nutrient gap for children 6-23 months and PLW may include:

Children 6-23 months (up to 5 yrs.): Addressing the micronutrient deficiencies in children under five, especially those aged 6-23 months, through fortifying foods/drinks commonly consumed by this target group and/or home-fortification, in addition to efforts to increase dietary diversity and promote good IYCF practices (see demand creation point below).

In light of the key problem nutrients identified through the FNG process, re-assess the nutrient profile of the specialized nutritious food provided to children 6-23 months and PLW through the national social protection programme (see below in policy recommendations).

Pregnant and Lactating Women (PLW) and adolescent girls: Tailor interventions to improve micronutrient intake without doing harm on overweight and obesity, in particular for PLW and adolescent girls. For example, fortifying commonly consumed foods and/or supplementation; fresh food vouchers tailored at food rich in the key problem nutrients identified through the FNG process.

Demand side interventions/SBCC include:

- Based on the identified problem nutrients of calcium and zinc for children 6-23 months, promote the consumption of calcium and zinc rich foods (milk, cheese, poultry, beef) as part of IYCF promotion and social behaviour change communication approaches, at community level and through the health system.
- Promote broader efforts (both through public and private sector) to raise demand for good nutrition, dietary diversity and healthy lifestyles at household level, to contribute to prevention of micronutrient deficiencies as well as to the increasing prevalence of overweight and obesity.
- Improve access to cold food storage at the household level (i.e. refrigeration) to potentially improve purchase and consumption of nutritious foods with a short shelf-life.

Supply side interventions to improve affordability and access to a nutritious diet (1000 days and beyond):

- Improve availability of nutritious complementary foods on the market, of adequate nutrient density that meet quality and safety standards.
- Improve access to these foods among the most vulnerable, either through subsidized prices or through vouchers (through social protection platform).
- Currently programming exists that places Super Cereal Plus, a fortified supplementary food, on supermarket shelves and provides vouchers for this food through health centres. This should be scaled up further to make these foods available and accessible.
- Consider developing a seal for foods that are adequately nutritious and safe
- Stimulate private sector initiatives, also through SUN Business network as a potential platform, to improve availability of affordable nutritious foods for children 6-23 months and PLW of adequate nutrient content, quality and safety

- Improve supply chain of transportation, logistic and storage at household level for commodities with shorter shelf-life but higher nutrient content (e.g. sources of animal protein), to contribute to ultimately increase intake of these commodities in more remote areas.

Policy

- National nutrition-sensitive social protection programmes are a very promising platform to incorporate nutrition specific interventions targeted at children 6-23 months and PLW for the most vulnerable households. For example, one way would be to add vouchers for a complementary food with adequate nutrient profile (see below point on SNF) to be targeted at the most vulnerable households through the social protection programme.
- Support national government in the redesign of targeting mechanisms for social protection and social safety net programmes.
- In light of the existing nutrient gap characterization, review nutrient profile of the specialized nutritious food (SNF) provided to children 6-23 months and PLW through the social protection programme, which is currently not the most adequate. Among the products reviewed and included in the CoD analysis Chapuditos seems to most effectively address the identified nutrient gaps (calcium and zinc) for children.
- Review nutrient content/composition of food supplements provided to PLW through public programmes (to prevent overweight and obesity while still addressing MND). Consider increasing access and proper storage of fresh food vouchers for vulnerable households.
- Staple food fortification: a) potential for voluntary rice fortification (private sector initiative) b) ensuring compliance with existing mandatory fortification of specific foods to meet required nutrient target by improved quality analysis.
- Support national government to review standards of complementary foods, snacks and other processed foods to set limits for sodium, sugar, trans fat content (for overweight and obesity prevention) and monitor compliance.

Annex

Nutrient	Super Cereal+	Cereal Fortificado	Chapuditos	MNP	Incaparina	RNI 6-8 months	RNI Lactating Woman (19-50)	RNI Pregnant woman (19-50)
Energy	400.00	410.00	373.33	0.00	368.00	615	2700	2300
Total Fat	9.00	9.00	5.33	0.00	2.00	30	n/a	n/a
Carbohydrates	63.00	60.00	64.00	0.00	68.00	95	210	175
Protein	16.00	16.00	21.33	0.00	20.70	9.1	71	71
Fibre	0.00	2.90	10.67	0.00	0.00	n/a	29	28
Calcium (mg)	400.00	130.00	1066.67	0.00	305.00	400	1000	1000
Phosphor (mg)	500.00	200.00	800.00	0.00	0.00	275	700	700
Magnesium (mg)	112.00	N/A	213.33	0.00	0.00	54	320	360
Zinc (mg)	8.00	4.00	48.00	500.00	15.00	4.1	12	11
Iodine (mg)	N/A	40.00	480.00	N/A	N/A	130	290	220
Copper (mcg)	0.40	N/A	1600.00	0.3	0.00	220	1300	1000
Iron (mg)	11.00	8.00	64.00	1250.00	20.00	9.3	9	27
Selenio (mcg)	N/A	N/A	90.67	N/A	N/A	20	70	60
Manganese (mg)	0.40	N/A	0.91	0	0.00	0.6	2.6	2
Vitamin A (mcg RE)	800.00	499.20	1333.33	30000.00	1350.00	400	1300	770
Pantothenic Acid	2.00	6.70	9.60	N/A	0.00	1.8	7	6
Vitamin E (mg)	N/A	8.30	26.67	N/A	N/A	5	19	15
Vitamin C (mg)	60.00	100.00	213.33	3000.00	0.00	30	120	85
Tiamin (mg)	0.40	0.13	2.67	50.00	1.20	0.3	1.4	1.4
Riboflavin (mg)	1.60	0.45	2.67	50.00	1.30	0.4	1.6	1.4
Vitamin B6 (mg)	0.80	1.70	2.67	50.00	0.00	0.3	2	1.9
Vitamin D (mcg)	N/A	4.00	26.67	N/A	N/A	10	15	15
Niacin (mg)	10.00	4.80	32.00	600.00	16.00	4	17	18
Biotin (mcg)	N/A	N/A	42.67	N/A	N/A	6	35	30
Vitamin B12 (mcg)	2.00	2.00	4.80	90.00	1.01	0.7	2.8	2.6
Vitamin K (mcg)	N/A	100.00	N/A	N/A	N/A	2.5	90	90
Folate (mcg)	160.00	60.00	853.33	N/A	0.00	80	500	600
Potassium (mg)	600.00	400.00	N/A	N/A	0.00	700	5100	4700

Colour legend: Limiting nutrients for: Mother Child and Mother

Figure 1: Comparative table of nutrient content of different types of SNF targeted at children 6-8 months and PLW modelled through the CoD analysis *(Source: WHO 2005, Manufacturer)*

RNI Pregnant Women (19-50y)					
	RNI	**Super Cereal+ /100g (a)**	**Cereal Fortificado /60g**	**MNP /1g**	**Incaparina /60g**
Nutrient		**% RNI**	**% RNI**	**% RNI**	**% RNI**
Energy					
Total Fat (g/d)	n/a				
Carbohydrates (g/d)	175	36.0	20.6	0.0	23.3
Protein (g/d)	71	22.5	13.5	0.0	17.5
Fibre (g/d)	28	10.4	6.2	0.0	0.0
Calcium (mg)	1000	36.2	7.8	0.0	18.3
Phosphor (mg)	700	40.0	17.1	0.0	0.0
Magnesium (mg)	360			0.0	0.0
Zinc (mg)	11	45.5	21.8	45.5	81.8
Iodine (mcg)	220	18.2	10.9		
Copper (mcg)	1000			0.0	0.0
Iron (mg)	27	24.1	17.8	46.3	44.4
Selenio (mcg)	60				
Manganese (mg)	2			0.0	0.0
Vitamin A (mcg RE)	770	134.8	38.9	39.0	105.2
Pantothenic Acid	6	26.7	67.0		0.0
Vitamin E (mg)	15	55.3	33.2		
Vitamin C (mg)	85	105.9	70.6	35.3	0.0
Tiamin (mg)	1.4	14.3	5.6	35.7	51.4
Riboflavin (mg)	1.4	100.0	19.3	35.7	55.7
Vitamin B6 (mg)	1.9	52.6	53.7	26.3	0.0
Vitamin D (mcg)	15	73.3	16.0		
Niacin (mg)	18	44.4	16.0	33.3	53.3
Biotin (mcg)	30	27.3			
Vitamin B12 (mcg)	2.6	76.9	46.2	34.6	23.3
Vitamin K (mcg)	90	33.3	66.7		
Folate (mcg)	600	18.3	6.0		0.0
Potassium (mg)	4700	3.0	5.1		0.0

(a) Based on most recent specs

Figure 2: Percentage of RNI for Pregnant Women met by each SNF

RNI Lactating women (19-50y)					
	RNI	**Super Cereal+ /100g (a)**	**Cereal Fortificado /60g**	**MNP /1g**	**Incaparina /60g**
Nutrient		**% RNI**	**% RNI**	**% RNI**	**% RNI**
Energy					
Total Fat (g/d)	n/a				
Carbohydrates (g/d)	210	30.0	17.1	0.0	19.4
Protein (g/d)	71	22.5	13.5	0.0	17.5
Fibre (g/d)	29	10.0	6.0	0.0	0.0
Calcium (mg)	1000	36.2	7.8	0	18.3
Phosphor (mg)	700	40.0	17.1	0.0	0.0
Magnesium (mg)	320			0	0
Zinc (mg)	12	41.7	20.0	41.7	75.0
Iodine (mcg)	290	13.8	8.3		
Copper (mcg)	1300			0.0	0.0
Iron (mg)	9	72.2	53.3	138.9	133.3
Selenio (mcg)	70				
Manganese (mg)	2.6			0.0	0.0
Vitamin A (mcg RE)	1300	79.8	23.0	23.1	62.3
Pantothenic Acid	7	22.9	57.4		0.0
Vitamin E (mg)	19	43.7	26.2		
Vitamin C (mg)	120	75.0	50.0	25.0	0.0
Tiamin (mg)	1.4	14.3	5.6	35.7	51.4
Riboflavin (mg)	1.6	87.5	16.9	31.3	48.8
Vitamin B6 (mg)	2	50.0	51.0	25.0	0.0
Vitamin D (mcg)	15	73.3	16.0		
Niacin (mg)	17	47.1	16.9	35.3	56.5
Biotin (mcg)	35	23.4			
Vitamin B12 (mcg)	2.8	71.4	42.9	32.1	21.6
Vitamin K (mcg)	90	33.3	66.7		
Folate (mcg)	500	22.0	7.2		0.0
Potassium (mg)	5100	2.7	4.7		0.0

(a) Based on most recent specs

Figure 3: Percentage of RNI for Lactating Women met by each SNF

RNI 6-8 mo.**						
	RNI	**Super Cereal+ /60g (a)**	**Cereal Fortificado /60g**	**Chapuditos/38g**	**MNP /0.43g****	**Incaparina /60g**
Nutrient		**% RNI**	**% RNI**	**% RNI**	**% RNI**	**% RNI**
Energy	615	40	40	23.1	0	35.9
Total Fat (g/d)	30	18	18	6.8	0	4.0
Carbohydrates (g/d)	95	39.8	37.9	25.6	0.0	42.9
Protein (g/d)	9.1	105.5	105.5	89.1	0.0	136.5
Fibre (g/d)	n/a					
Calcium (mg)	400	54.3	19.5	101.3	0.0	45.8
Phosphor (mg)	275	61.1	43.6	110.5	0.0	0.0
Magnesium (mg)	54			150.1	0.0	0.0
Zinc (mg)	4.1	73.2	58.5	444.9	52.3	219.5
Iodine (mcg)	130	18.5	18.5	140.3		
Copper (mcg)	220			276.4	0.0	0.0
Iron (mg)	9.3	41.9	51.6	261.5	57.6	129.0
Selenio (mcg)	20			172.3		
Manganese (mg)	0.6			57.6	0.0	0.0
Vitamin A (mcg RE)	400	155.7	74.9	126.7	32.1	202.5
Pantothenic Acid	1.8	53.3	223.3	202.7		0.0
Vitamin E (mg)	5	99.6	99.6	202.7		
Vitamin C (mg)	30	180.0	200.0	270.2	42.9	0.0
Tiamin (mg)	0.3	40.0	26.0	338.2	71.4	240.0
Riboflavin (mg)	0.4	210.0	67.5	253.7	53.6	195.0
Vitamin B6 (mg)	0.3	200.0	340.0	338.2	71.4	0.0
Vitamin D (mcg)	10	66.0	24.0	101.3		
Niacin (mg)	4	120.0	72.0	304.0	64.3	240.0
Biotin (mcg)	6	82.0		270.2		
Vitamin B12 (mcg)	0.7	171.4	171.4	260.6	55.1	86.6
Vitamin K (mcg)	2.5	720.0	2400.0			
Folate (mcg)	80	82.5	45.0	405.3		0.0
Potassium (mg)	700	12.0	34.3			0.0

* RNI's are not corrected for breastmilk intake. When correcting for BM intake, the contribution of these complementary foods to energy and nutrient intakes (%RNI-CF) would be higher

** 3x 1g sachets a week

(a) Based on most recent specs

Figure 4: Percentage of RNI for Children 6-8 months met by each SNF

RNI 9-11 mo.*						
	RNI	**Super Cereal+ /80g (a)**	**Cereal Fortificado /80g**	**Chapuditos/44g**	**MNP/ 0.43g****	**Incaparina /80g**
Nutrient		**% RNI**	**% RNI**	**% RNI**	**% RNI**	**% RNI**
Energy	686	47.8	47.8	23.9	0	42.9
Total Fat (g/d)	30	24.0	24.0	7.8	0	5.3
Carbohydrates (g/d)	95	53.1	50.5	29.6	0.0	57.3
Protein (g/d)	9.6	133.3	133.3	97.8	0.0	172.5
Fibre (g/d)	n/a					
Calcium (mg)	400	72.4	26.0	117.3	0.0	61.0
Phosphor (mg)	275	81.5	58.2	128.0	0.0	0.0
Magnesium (mg)	54			173.8	0.0	0.0
Zinc (mg)	4.1	97.6	78.0	515.1	52.3	292.7
Iodine (mcg)	130	24.6	24.6	162.5		
Copper (mcg)	220			320.0	0.0	0.0
Iron (mg)	9.3	55.9	68.8	302.8	57.6	172.0
Selenio (mcg)	20			199.5		
Manganese (mg)	0.6			66.7	0.0	0.0
Vitamin A (mcg RE)	400	207.6	99.8	146.7	32.1	270.0
Pantothenic Acid	1.8	71.1	297.8	234.7		0.0
Vitamin E (mg)	5	132.8	132.8	234.7		
Vitamin C (mg)	30	240.0	266.7	312.9	42.9	0.0
Tiamin (mg)	0.3	53.3	34.7	391.6	71.4	320.0
Riboflavin (mg)	0.4	280.0	90.0	293.7	53.6	260.0
Vitamin B6 (mg)	0.3	266.7	453.3	391.6	71.4	0.0
Vitamin D (mcg)	10	88.0	32.0	117.3		
Niacin (mg)	4	160.0	96.0	352.0	64.3	320.0
Biotin (mcg)	6	109.3		312.9		
Vitamin B12 (mcg)	0.7	228.6	228.6	301.7	55.1	115.4
Vitamin K (mcg)	2.5	960.0	3200.0			
Folate (mcg)	80	110.0	60.0	469.3		0.0
Potassium (mg)	700	16.0	45.7			0.0

* RNI's are not corrected for breastmilk intake. When correcting for BM intake, the contribution of these complementary foods to energy and nutrient intakes (%RNI-CF) would be higher

** 3x 1g sachets a week

(a) Based on most recent specs

Figure 5: Percentage of RNI for Children 9-11 months met by each SNF

RNI 12-23 mo.*						
	RNI	**Super Cereal+ /100g (a)**	**Cereal Fortificado /100g**	**Chapuditos/56g**	**MNP /100g**	**Incaparina /100g**
Nutrient		**% RNI**	**% RNI**	**% RNI**	**% RNI**	**% RNI**
Energy	894	45.9	45.9	23.4	0	41.2
Total Fat (g/d)	n/a					
Carbohydrates (g/d)	130	48.5	46.2	27.6	0.0	52.3
Protein (g/d)	10.9	146.8	146.8	109.6	0.0	189.9
Fibre (g/d)	19	15.3	15.3	31.4	0.0	0.0
Calcium (mg)	500	72.4	26.0	119.5	0.0	61.0
Phosphor (mg)	460	60.9	43.5	97.4	0.0	0.0
Magnesium (mg)	60			199.1	0.0	0.0
Zinc (mg)	4.1	122.0	97.6	655.6	52.3	365.9
Iodine (mcg)	90	44.4	44.4	298.7		
Copper (mcg)	340			263.5	0.0	0.0
Iron (mg)	5.8	112.1	137.9	617.9	92.4	344.8
Selenio (mcg)	20			253.9		
Manganese (mg)	1.2			42.5	0.0	0.0
Vitamin A (mcg RE)	400	259.5	124.8	186.7	32.1	337.5
Pantothenic Acid	2	80.0	335.0	268.8		0.0
Vitamin E (mg)	6	138.3	138.3	248.9		
Vitamin C (mg)	30	300.0	333.3	398.2	42.9	0.0
Tiamin (mg)	0.5	40.0	26.0	299.0	42.9	240.0
Riboflavin (mg)	0.5	280.0	90.0	299.0	42.9	260.0
Vitamin B6 (mg)	0.5	200.0	340.0	299.0	42.9	0.0
Vitamin D (mcg)	15	73.3	26.7	99.6		
Niacin (mg)	6	133.3	80.0	298.7	42.9	266.7
Biotin (mcg)	8	102.5		298.7		
Vitamin B12 (mcg)	0.9	222.2	222.2	298.7	42.9	112.2
Vitamin K (mcg)	30	100.0	333.3			
Folate (mcg)	150	73.3	40.0	318.6		0.0
Potassium (mg)	300	46.7	133.3			0.0

* RNI's are not corrected for breastmilk intake. When correcting for BM intake, the contribution of these complementary foods to energy and nutrient intakes (%RNI-CF) would be higher

** 3x 1g sachets a week

(a) Based on most recent specs

Figure 6: Percentage of RNI for Children 12-23 months met by each SNF

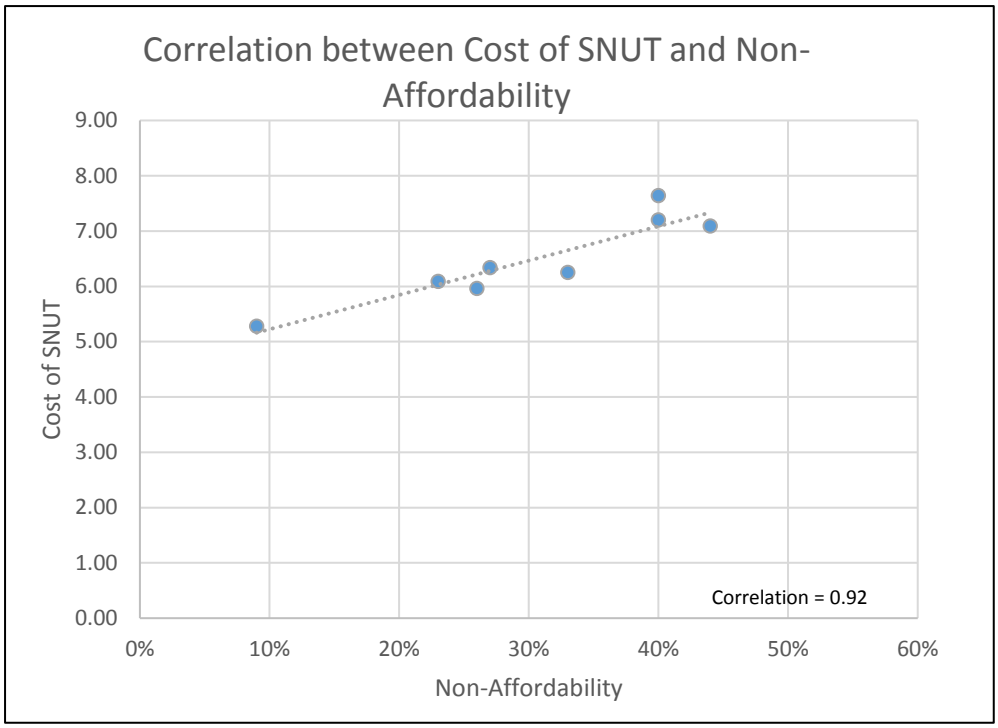

Figure 7: Correlation between Cost of SNUT and Non-Affordability Graphs

Intervention	Total Cost*	Total Benefit**	Total Gains	Cost/Benefit Ratio
B1 SC+ (in kind 7 portion)	$3.19	$8.82	$5.63	1:2.8
B2 SC+ (subs. no limit)	$3.14	$9.66	$6.52	1:3
B2 SC+ (subs. 7 portion)	$1.59	$7.28	$5.69	1:4.5

Figure 8: Cost/Benefit Analysis of SC+ transfer modalities in Chalatenango per week

* includes logistics through private sector, excludes programme costs. Cost per 100g are $0.15 for subsidised SC+ and $0.31 for full price

** Benefits have solely been calculated as the reduction in overall cost of the diet for the PLW and child under 2

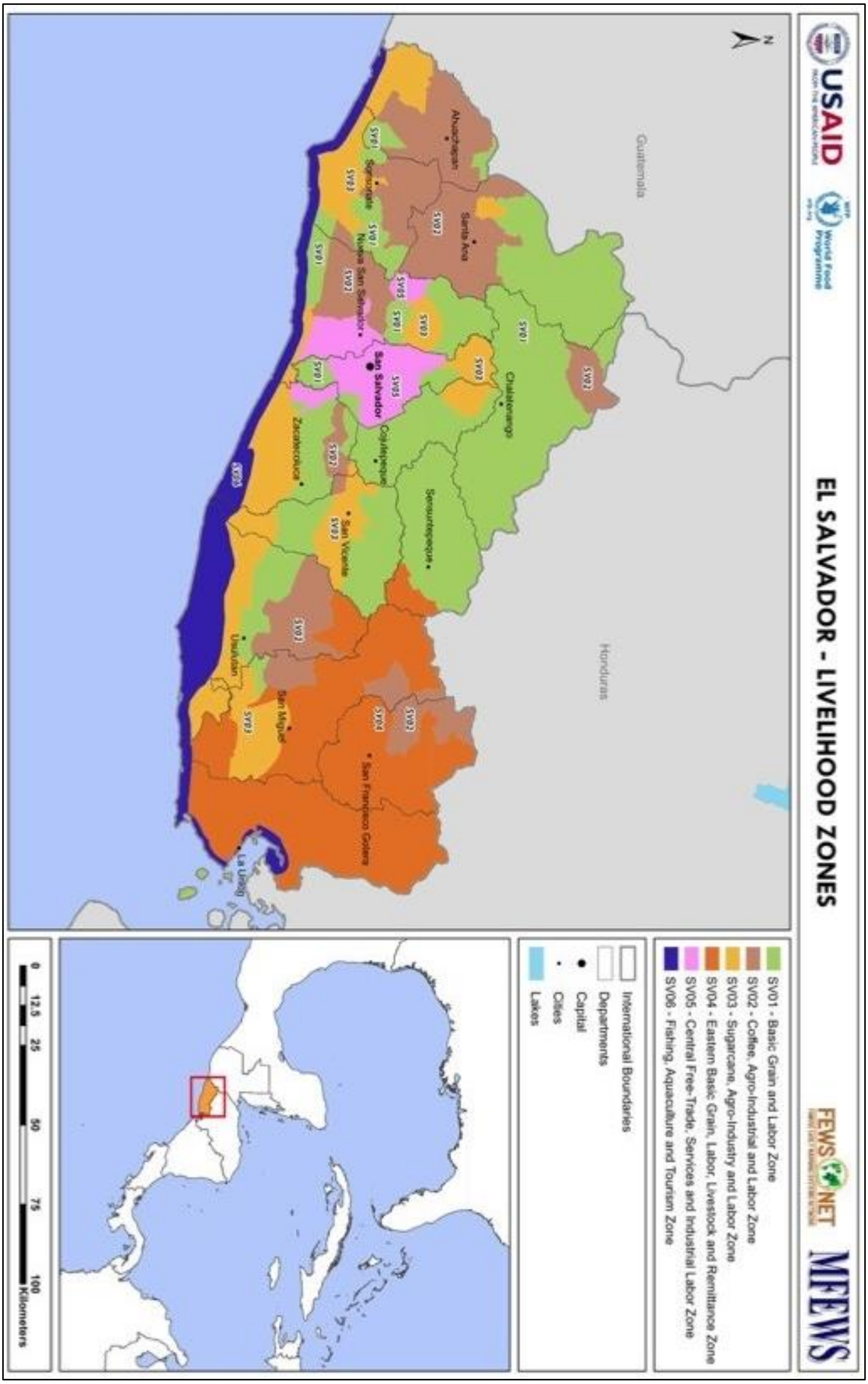

Figure 9. Livelihood Zones in El Salvador

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