

Fill the Nutrient Gap

Nutrition situation analysis framework and decision tool



The summary report and the slide deck can be found here:
<http://www.wfp.org/content/2017-fill-nutrient-gap-pakistan>

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Foreword

Malnutrition is a serious public health problem in Pakistan disproportionately affecting women and children. All forms of malnutrition in children including chronic and acute malnutrition and micronutrient deficiencies are critically high. The stunting prevalence (chronic malnutrition) in children under 5 years is high as 43.7%, whereas prevalence of wasting (acute malnutrition) is 15.1% which is above the WHO's emergency threshold. The hidden hunger of micronutrient deficiency is a universal concern and Pakistan suffers from high prevalence of deficiencies of vitamin A, iron and zinc both in young children and women of reproductive age.

At such high levels of malnutrition, impact on children's physical and cognitive development and their cumulative effects on educational attainment and economic potential for current and future generations are quite evident. Malnutrition in Pakistan has been estimated to cost the economy 7.6 billion USD annually i.e. around 3 percent of GDP per year which is more than the cost due to energy crisis.


The causal factors of malnutrition in Pakistan are numerous and varied, however the major underlying factors include limitations in household access and affordability to nutritious foods, the food habits and preferences which shape food purchasing and preparation practices. It is essential to have an in-depth understanding of how these underlying factors interact to shape household food consumption in order to develop programs and interventions to reduce malnutrition. Pakistan since joining the SUN Movement has endeavoured to create an enabling environment for improving nutrition situation and the cost of the diet analysis is an effort to create evidence for achieving improved nutrition.

Beyond that the Fill the Nutrient Gap (FNG) analysis has been carried out to gain better understanding of the correlation of the effects of buying power on the availability and affordability of nutritious foods that in turn determines nutritional status in Pakistan. The findings in this report pinpoint the major factors that affect the nutrition status of children under five years of age and their mothers, and identify possible avenues for solutions.

At a time when the Government of Pakistan is set to achieve the Sustainable Development Goals by 2030 and the goals identified in Pakistan Vision 2025, the current levels of undernutrition are unacceptable and need to be addressed urgently. This report raises awareness on the importance of addressing malnutrition in Pakistan and provides interventions targeting individuals and priority groups that can reduce the cost of their nutrient needs.

We suggest planners and project managers to read this report in conjunction with the Cost of Diet, Nutrition in the Cities and Economic Consequences of Undernutrition in Pakistan, and act upon the results of these reports in a coordinated way. Under guidance from the competent governmental institutions, and to pave the way to ensure the right to adequate food and nutrition by all the Pakistani population and future success in the drastic reduction of malnutrition in the country. Investing in the identified solutions will have impact in the short term, medium term and long term. To ensure efforts are effectively coordinated, we look

forward to working together across sectors, such as health, agriculture, social protection and education, and across partners, including the private sector, to reduce malnutrition in Pakistan in a sustainable manner.



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Contents

List of Figures and Tables	7
1. List of Acronyms.....	12
2. Executive Summary.....	14
3. Background to the FNG	19
4. Process and Methods for the Pakistan FNG Analysis	22
a) Identification of technical leadership, collation of secondary data and design of FNG approach for Pakistan	22
b) Secondary data analysis.....	23
c) Linear programming analysis and intervention modelling	24
d) Presentation of preliminary findings to technical working group	25
e) Provincial workshops and dissemination.....	25
f) National workshop and dissemination	27
4. Key findings from the analysis of secondary data	28
4.a Affordability is the greatest barrier to achieving a nutritious diet.....	28
4.b Nutrition indicators show a <i>very high</i> prevalence of child malnutrition in Pakistan, with little improvement over the past four decades.....	31
4.c Undernutrition in infants and young children highlights a problem with maternal and adolescent diets	35
4.d High prevalence of micronutrient deficiencies across the population = universally poor diets for women and children in Pakistan	45
4.e Quantity and quality of dietary intake is a problem	49
4.f Food access and nutrition challenges in Pakistan are compounded by rapid population growth and urbanization and natural and man-made shocks.....	63
4.g Continued promotion of strong and consistent multi-sectoral policy and action on nutrition is required.....	74
5. Cost Optimisation and Intervention Modelling	79
5.1 Cost Optimisation	79
5.1.A Content of modelled diets	79
5.1.B Cost of modelled diets	80
5.1.C Affordability of modelled diets	82
5.1.D Limiting Nutrients	83
5.2 Intervention Modelling	85

5.2.A Interventions.....	86
5.2.A Interventions tailored at specific target groups	87
5.2.B Modelling of household-level intervention packages	92
6. Prioritisation of interventions and activities based on province- and national-level workshops.....	97
Reference List.....	105
10. Appendix	110
Appendix 1: Blank data mapping template developed for Pakistan FNG analysis.....	110
Appendix 2: Methods used to develop the data inputs for the 2016 MPDR and WFP CotD analysis and FNG intervention modelling	111
Appendix 3: Household composition used for FNG CotD Modelling.....	112
Appendix 5: Production and climate variation across agro-ecological zones of Pakistan	112
Appendix 6: Costs of a Staple Adjusted Nutritious Diet by individual household member for each province, by season and urban/rural area	114
Appendix 7: Limiting nutrients identified in the Cost of the Diet analysis	119
Appendix 8: List of secondary data sources reviewed for the Pakistan FNG Analysis.....	120
Appendix 9: Nutrient specifications and modelling details for special nutritious foods tested in the CotD Software.....	126
Appendix 10: Results of intervention modelling for individual target groups by province, season and area	128
Appendix 11: Impact on the <u>cost</u> (PKR) and <u>affordability of nutritious diets</u> of household intervention packages by province, area and season	131
Appendix 12: National Workshop Participant List.....	133
Appendix 13: Expenditure curves from the 2014 HIES (Pakistan Bureau of Statistics. Government of Pakistan 2015).....	137

List of Figures and Tables

Figures

Figure 1: UNICEF Conceptual Framework for Causes of Malnutrition (UNICEF 1991)	19
Figure 2: 'The Fill the Nutrient Gap Framework' for situation analysis and decision making	21
Figure 3: FNG Pakistan Process and timeline 2016-2017	22
Figure 4: Level of analysis for the Pakistan FNG, as jointly agreed.....	23
Figure 5: Ability of households to afford a staple-adjusted nutritious diet or a basic diet that meets energy requirements only, by province (MPD & WFP 2016).....	29
Figure 6: Per capita monthly cost of Staple-Adjusted Nutritious Diet and Energy-only diets (PKR) as per 2016 analysis	30
Figure 7: Indicators of malnutrition status for infants and young children aged <5 years in Pakistan by area (NNS 2011).....	31
Figure 8: Provincial trends in stunting prevalence for children aged <5 years 1985-2011(NNS 2011) 32	
Figure 9: Provincial trends in wasting prevalence for children aged <5 years 1985-2011 (NNS 2011)..	32
Figure 10: Distribution of child's size at birth, according to maternal recall, by province (DHS 2012-13)	36
Figure 11: Distribution of child's size at birth, according to maternal recall, by wealth quintile (DHS 2012-13).....	36
Figure 12: Distribution of child's size at birth, according to maternal recall, by maternal age at birth (DHS 2012-13)	37
Figure 13: Prevalence and severity of stunting for children <5 years by age group Pakistan (DHS 2012-13)	37
Figure 14: Prevalence of anaemia, iron deficiency and iron deficiency anaemia for children aged <5 years by age group in Punjab (NNS 2011).....	38
Figure 15: Indicators of nutrition status for non-pregnant mothers in Pakistan by area (DHS 2012-13)	39
Figure 16: Nutritional status of women aged 15-49 years (underweight, overweight and short stature) by wealth quintile (DHS 2012-13)	39
Figure 17: Nutritional Status of women by age group (DHS 2012-13)	40
Figure 18: Nutritional status of women aged 15-49 years by Province (DHS 2012-13)	40
Figure 19: Percentage of adolescent girls in Pakistan who are pregnant with their first child or already a mother by age (DHS 2012-13).....	41
Figure 20: Percentage of adolescent girls aged 15-19 who are pregnant with their first child or already a mother by area (DHS 2012-13)	42
Figure 21: Correlation (-0.64) between median age of women at first marriage and stunting prevalence of IYC<5 years by area in Pakistan (secondary analysis of DHS 2012-13).....	42
Figure 22: Current use of contraception by married women by age group, Pakistan (DHS 2012-13) .	43
Figure 23: Current use of contraception by married women by area, Pakistan (DHS 2012-13)	43
Figure 24: Correlation between use Contraception (any) by married women and Stunting Prevalence for IYC<5 years by province and territory.....	44
Figure 25: Prevalence of micronutrient deficiencies for infants and young children aged <5 years in Pakistan by area (NNS 2011).....	45
Figure 27: Prevalence of micronutrient deficiencies for young children by wealth quintile in Punjab Province (NNS 2011 and Blankenship 2016).....	47
Figure 28: Indicators of micronutrient status for children aged <5 years in Balochistan, KP, Punjab and Sindh Provinces (NNS 2011).....	48

Figure 30: Percentage of households with inadequate energy intake based on caloric consumption below threshold and below minimum energy requirements (MNFSR 2016).....	49
Figure 31: Average daily energy intake (kcal) of mothers nationally and in urban and rural areas compared to recommended dietary allowance (RDA) (Government of Pakistan & UNICEF Pakistan 2011)	50
Figure 32: Food Consumption Score by Province/Territory and Nationally (MNFSR 2016)	51
Figure 33: Percentage of households with low dietary diversity (consumption from <5 food groups) by province or territory (MNFSR 2016).....	52
Figure 34: Percentage of IYC aged 6-23 months for which minimum dietary diversity, meal frequency and minimum acceptable diet were met in the 2011 NNS (Government of Pakistan & UNICEF Pakistan 2011).....	53
Figure 35: Prevalence of households likely to have inadequate intake of Vitamin A, Iron, Zinc and Protein based on reported food consumption (MNFSR 2016)	54
Figure 36: Per capita monthly consumption of major food items by area as per the 2014 HIES (Pakistan Bureau of Statistics. Government of Pakistan 2015)	54
Figure 37: Percentage of monthly expenditure on major food items by commodity for households in the LOWEST Wealth quintile (HIES 2014) (Pakistan Bureau of Statistics. Government of Pakistan 2015)	55
Figure 38: Percentage of monthly expenditure on major food items by commodity for households in the HIGHEST Wealth quintile (HIES 2014) (Pakistan Bureau of Statistics. Government of Pakistan 2015)	55
Figure 39: Overall food consumption by food types as a percentage of the total amount (weight) of food consumed for 0-23mo children by province or territory based on 24hr recall from NNS 2011(Government of Pakistan & UNICEF Pakistan 2011).....	57
Figure 40: Infant feeding practices by age in months Pakistan (DHS 2012-13) (NIPS 2013)	58
Figure 41: IYCF Practices by region and area (NNS 2011) (Government of Pakistan & UNICEF Pakistan 2011)	58
Figure 42: Percentage of IYC aged 0-23 months receiving age appropriate breastfeeding (NNS 2011) (Government of Pakistan & UNICEF Pakistan 2011)	59
Figure 43: Average consumption (grams per day) of meat, eggs and milk by mothers by area (NNS 2011)	59
Figure 44: Average consumption (mL per day) of tea by area by mothers (NNS 2011)	60
Figure 45: Average consumption (grams per day) of wheat, pulse, tubers/roots and rice by mothers by area (NNS 2011)	60
Figure 46: Average consumption (grams per day) of fruit and vegetables by mothers by area (NNS 2011)	61
Figure 47: Population distribution by region, Pakistan 2012-13	63
Figure 48: Land Mass distribution by region, Pakistan	63
Figure 49: Projected Population (millions) in Pakistan 1998-2030 (Jan et al. 2008)	64
Figure 50: Multidimensional poverty (poverty headcount) in Pakistan by region 2014-15 (MPDR 2016)	65
Figure 51: Percentage of Monthly Consumption Expenditure spent on Food & Non Alcoholic Beverages across two HIES surveys (Pakistan Bureau of Statistics. Government of Pakistan 2015) ...	66
Figure 52: Access to agricultural resources by area (NIPS 2013).....	66
Figure 53: Characteristics and timing of main crop seasons in Pakistan (WFP 2016, FAO 2016).....	67
Figure 54: Pakistan crop growth classes and seasonality of adequacy, excess and deficits (PARC 2016)	67

Figure 55: Pakistan cereal crop production (tonnes) 2015-2017, compared to 2011-15 average (FAO 2017)	68
Figure 56: Trends in livestock populations, Pakistan, 1990-2015 (FAO 2003).....	69
Figure 57: Wheat production by province (%) (WFP 2015)	69
Figure 58: Rice production by province (%) (WFP 2015)	69
Figure 59: Monthly wheat flour prices for five markets in Pakistan 2006-16 (WFP VAM 2017)	70
Figure 60: Travel time to nearest city of at least 500,000 people in 2010 (taking into account road quality, transport options, railroads, rivers, land use etc.) (Kedir et al, 2016)	71
Figure 61: Percentage of Population connected to a city with a population of at least 500,000 in 2010	71
Figure 62: Country-wide analysis of the mean annual rainfall, showing a change towards drier conditions from A)1976-1990 and B) 1991-2005 (Salma et al. 2012)	72
Figure 63: Percentage of HHs that experienced shock during last three years (MNFSR 2016).....	73
Figure 64: Main two shocks experienced by households in each province/region 2012-16 (MNFSR 2016)	73
Figure 65: Percentage of households that adopted food-based coping strategies in the 7 days prior to data collection (MNFSR 2016)	74
Figure 66: Percentage of households that adopted different coping strategies on confronting food shortages (MNFSR 2016).....	74
Figure 67: Daily cost (PKR) of the Staple-Adjusted Nutritious Diet (SNUT) by family member in Urban and Rural Sindh by season	82
Figure 68: Cost of the SNUT by household member as a percentage of overall household SNUT cost for Sindh (seasonal and regional average).....	82
Figure 69: Relationship between household non-affordability of the staple-adjusted nutritious diet and the prevalence of stunting for IYC<5 years by province (urban and rural) (Ministry of Planning, Development & Reform Planning Commission 2016)	83
Figure 70: Impact (province average) of selected interventions on the daily cost (PKR) of a nutritious diet for 12-23mo children using in-kind, voucher and market price transfer modalities	88
Figure 71: Impact on weekly diet cost (PKR) (province average) of making fortified wheat flour using current fortification standards or WHO standards available on the local market for key target groups	88
Figure 72: Impact (province average) of selected interventions on the daily cost (PKR) of a nutritious diet for Adolescent Girls using in-kind, voucher and market price modalities.....	89
Figure 73: Impact (province average) of selected interventions on the daily cost (PKR) of a nutritious diet for Lactating Women using in-kind, voucher and market price modalities	90
Figure 74: Impact on overall daily household diet cost (PKR) of making biofortified maize and wheat and fortified wheat flour using current fortification standards or WHO standards available on the local market by province, area and season	91
Figure 75: Impact on overall daily household diet cost (PKR) of intervention packages by province..	93
Figure 76: Impact of intervention packages on overall percentage of households that could not afford a nutritious diet by province	93
Figure 77: Impact of different monthly cash transfer (CT) amounts on overall percentage of households that could not afford a nutritious diet by province (without other interventions)	94
Figure 78: Impact of different Intervention Packages with monthly cash transfer (CT) amounts on overall percentage of households that could not afford a nutritious diet in Punjab Province	95
Figure 79: Impact of different Intervention Packages with monthly cash transfer (CT) amounts on overall percentage of households that could not afford a nutritious diet in Sindh Province	95

Figure 80: Impact of different Intervention Packages with monthly cash transfer (CT) amounts on overall percentage of households that could not afford a nutritious diet in KP Province	96
Figure 81: Impact of different Intervention Packages with monthly cash transfer (CT) amounts on overall percentage of households that could not afford a nutritious diet in Balochistan Province.....	96

Tables

Table 1: Summary on fortification regulatory situation in Pakistan	76
Table 2: Summary of key provincial nutrition and food security indicators burden and underlying causes and context (Zaidi 2013; Zaidi, Mohmand, et al. 2013)	78
Table 3: Foods Selected by the Cost of Diet Software for the Staple-Adjusted Nutritious diet in each Province by urban and rural area	80
Table 4: Daily cost (PKR) of the staple-adjusted nutritious diet for key target groups in each province by urban/rural area and season.....	81
Table 5: Overview of limiting nutrients identified for key target groups in the four provinces of Pakistan.....	84
Table 6: Interventions to be modelled in CotD for Pakistan.....	86
Table 7: Household-level intervention packages modelled for Pakistan.....	92
Table 8: Interventions and activities prioritised by stakeholders during the province- and national-level FNG workshops.....	98

Appendix Figures

Appendix Figure 1: Agro ecological zones in Pakistan (Rasul et al. 2014; Salma et al. 2012)	112
Appendix Figure 2: Daily cost of the Staple Adjusted Nutritious diet by family member in BALUCHISTAN PROVINCE	114
Appendix Figure 3: Average (by season and urban/rural location) cost of a staple-adjusted nutritious diet as a percentage of total household diet cost by family member in BALUCHISTAN PROVINCE .	115
Appendix Figure 4: Daily cost of the Staple Adjusted Nutritious diet by family member in SINDH PROVINCE	115
Appendix Figure 5: Average (by season and urban/rural location) cost of a staple-adjusted nutritious diet as a percentage of total household diet cost by family member in SINDH PROVINCE	116
Appendix Figure 6: Daily cost of the Staple Adjusted Nutritious diet by family member in PUNJAB PROVINCE	116
Appendix Figure 7: Average (by season and urban/rural location) cost of a staple-adjusted nutritious diet as a percentage of total household diet cost by family member in PUNJAB PROVINCE	117
Appendix Figure 8: Daily cost of the Staple Adjusted Nutritious diet by family member in KP PROVINCE	117
Appendix Figure 9: Average (by season and urban/rural location) cost of a staple-adjusted nutritious diet as a percentage of total household diet cost by family member in KP PROVINCE	118
Appendix Figure 10: Monthly per capita food expenditure, by wealth quintile and area for Balochistan Province.....	137
Appendix Figure 11: Monthly per capita food expenditure, by wealth quintile and area for KP Province	137
Appendix Figure 12: Monthly per capita food expenditure, by wealth quintile and area for Punjab Province	138
Appendix Figure 13: Monthly per capita food expenditure, by wealth quintile and area for Sindh Province	138

Appendix Tables

Appendix Table 1: Household composition used for CotD Modelling as part of 2017 FNG.....	112
Appendix Table 2: Characteristics of agro ecological zones in Pakistan ((Rasul et al. 2014; Salma et al. 2012)	113
Appendix Table 3: Production type and land use by agro ecological zone in Pakistan (Rasul et al 2014; Salma et al. 2012).....	113
Appendix Table 4: Limiting nutrients identified for all target groups across all provinces, areas and seasons.....	119
Appendix Table 5: Secondary data sources (articles, datasets, reports, presentations and briefs) collated and reviewed as part of the Pakistan FNG.....	120
Appendix Table 6: Results of intervention modelling on the daily cost of a nutritious diet (PKR) for 12-23mo child household members across summer and winter for rural and urban locations in all provinces.....	128
Appendix Table 7: Results of intervention modelling on the daily cost of a nutritious diet (PKR) for Adolescent Girl household members across summer (S) and winter (W) for rural (R) and urban (U) locations in all provinces.....	129
Appendix Table 8: Results of intervention modelling on the daily cost of a nutritious diet (PKR) for Lactating Women household members across summer (S) and winter (W) for rural (R) and urban (U) locations in all provinces.....	130
Appendix Table 9: Impact on overall daily household diet cost (PKR) of intervention packages by province, area and season	131
Appendix Table 10: Impact of intervention packages on overall percentage of households that could not afford a nutritious diet by province, urban/rural area and season.....	132

1. List of Acronyms

AJK	Azad Jammu and Kashmir
AKU	Aga Khan University
BISP	Benazir Income Support Programme
CIMMYT	International Maize and Wheat Improvement Centre
CotD	Cost of the Diet
CT	Cash Transfer
DHS	Demographic Health Survey
FATA	Federally Administered Tribal Areas
FCS	Food Consumption Score
FNG	Fill the Nutrient Gap
GB	Gilgit Baltistan
GNR	Global Nutrition Report
HGSF	Home Grown School Feeding
HIES	Household Income and Expenditure Survey
ICT	Islamabad Capital Territory
IDS	Institute of Development Studies, University of Sussex
IFA	Iron Folic Acid Supplement
IYC	Infants and Young Children
IYCF	Infant and Young Child Feeding
KP	Khyber Pakhtunkhwa Province
LHW	Lady Health Workers
MDG	Millennium Development Goals
MMT	Multiple Micronutrient Tablet
MNFSR	Ministry of National Food Security and Research
MNP	Multiple Micronutrient Powder
MPDR	Ministry of Planning, Development and Reform Pakistan
MQ-LNS	Medium Quantity LNS
NDMA	National Disaster Management Authority
NFA	National Fortification Alliance
NNS	National Nutrition Survey
PKR	Pakistani Rupee
PLW	Pregnant and Lactating Women
RDA	Recommended Dietary Allowance
RNI	Recommended Nutrient Intake
SBCC	Social and Behaviour Change Communication
SC+	Super Cereal Plus
SDG	Sustainable Development Goals
SNF	Specialised Nutritious Food
SNUT	Staple-Adjusted Nutritious Diet
SUN	Scaling up Nutrition Movement
TFR	Total Fertility Rate
UNICEF	United Nations Children's Fund
WFP	World Food Programme
WHA	World Health Assembly
WRA	Women of Reproductive Age

2. Executive Summary

Cost-effective and sector-specific recommendations for improving nutrition outcomes in Pakistan; Evidence from the Fill the Nutrient Gap Analysis

Summary

Malnutrition prevalence is at alarming levels in Pakistan and rates have remained severe or even deteriorated over the last 50 years. Meeting nutrient needs is a prerequisite to preventing malnutrition, in combination with other proven health interventions, especially for the most vulnerable - children under two, pregnant and lactating women and adolescent girls. Yet, nutrition is not the responsibility of any one sector alone and requires a multi-sectoral commitment to overcome the enormity of the challenges.

The Pakistan Fill the Nutrient Gap analysis identified 10 key findings, to support evidence-based decision making and to identify prioritised actions, to be incorporated into the Multi-sectoral Nutrition Strategy and be included in PC-1 and PC-2 budgets¹. There is much Pakistan can do to improve nutrition. By taking action now, Pakistan will accelerate progress towards improving nutrition indicators and achieve SDG 2, thus supporting its commitment to Sustainable Development Goal 2.2 - to end malnutrition by 2020.

Malnutrition in Pakistan

Sustainable Development Goal 2.2 provides an urgent challenge and opportunity to identify effective, evidence-based and sustainable solutions to end malnutrition by 2030.

Malnutrition prevalence is at alarming levels in Pakistan and rates have remained severe or even deteriorated over the last 50 years. The degree of burden varies across the country, but in all cases progress is hampered by the complexities of poverty, food insecurity, low dietary diversity, increasing prevalence of overweight and obesity, rapid rates of population growth and urbanisation and vulnerability to natural and manmade shocks.

Meeting nutrient needs is a prerequisite to preventing malnutrition, in combination with other proven health interventions. It is most challenging to meet these requirements for children under two, pregnant and lactating women and adolescent girls.

The Fill the Nutrient Gap (FNG) analysis

The Fill the Nutrient Gap (FNG) analysis was designed to identify the main barriers to achieving nutritious diets and to inform decision making on multi-sectoral nutrition actions targeted towards the most vulnerable. This is achieved through two processes. The first reviews available national data on health, food security, nutrition, availability and access to nutritious foods, as well as consumer behaviours and beliefs. The second is referred to as linear programming, which helps better understand the role of unaffordability and models potential solutions towards making nutritious foods more affordable. The FNG process in Pakistan engaged and involved stakeholders

¹ In Pakistan, a PC-1 is a document that is developed to lay out the description, objectives, justification and details for a particular proposed government project/activity that includes cost estimates. A PC-2 is a document outlining feasibility studies, to inform the development of PC-1s.

from a range of government, donor, UN and non-government institutions, representing the nutrition, food security, agriculture, health and education sectors, as well as academia and the private sector.

Key findings

1. **Affordability is the greatest barrier to achieving nutritious diets**, especially for the most vulnerable. *Two out of three Pakistani households wouldn't be able to afford a diet that met their nutritional needs and 5% would not even be able to afford a diet that only met energy needs.*
2. **The prevalence of child malnutrition in Pakistan is very high.** *Almost half of all children under 5 years of age were stunted (not reaching the appropriate height for their age) as per the last Pakistan Demographic Health Survey. This has negative short and long-term consequences for health, education development and economic outcomes. Acute malnutrition also affected 15% of children, putting them at a higher risk of disease and death. In contrast, recent data also suggests that childhood overweight and obesity is increasing.*
3. **High rates of child malnutrition also highlight a problem with the nutritional status and diets of women and adolescent girls.** *A fifth to a quarter of infants in Pakistan are born too small and, a quarter of children are already too short for their age before they are 6 months old. This shows that women's diets prior to and during pregnancy and whilst breastfeeding, do not meet their needs.*
4. **The quantity and quality of diets is a problem, at both the household and individual level, especially for women and children.** *Overall only 39% of households regularly eat enough of the foods that can ensure adequate nutrition and, the majority of the population do not consume enough vitamin A, iron, zinc or protein. Further, only 3% of infants and young children (IYC) are consuming enough of a range of foods often enough to meet their needs, an indicator that there is little diversity in the foods that they are fed. Even in urban areas, the percentage of IYC meeting consuming diets that were adequately diverse (6.2%) was only slightly higher than in rural areas.*
5. **High prevalence of micronutrient (vitamin and mineral) deficiencies across geographical areas and wealth quintiles, indicates universally poor diets.** *In Punjab, for example, 58% of the poorest children had iron deficiency and 57% vitamin A deficiencies and this was only slightly different to children in the highest wealth group (59% for iron and 51% for vitamin A). Deficiency rates for women are also similar, across wealth groups and urban/rural areas, indicating that even if families have greater access to nutritious foods, they are not consuming nutritious diets.*
6. **The double burden of malnutrition – the co-occurrence of undernutrition and overweight in the population- is a growing concern and indicative of a nutrition transition.** *Nationally 40% of women are overweight or obese. Overweight is not only affecting the more affluent in society - In Punjab it was estimated that 1 in 4 stunted children have an overweight mother. This issue is expected to increase in future generations, as stunted children are at risk of becoming overweight when they become adults. To know the latest figures, the results of the new Demographic Health Survey are eagerly awaited.*
7. **Nutrition challenges are compounded by the rapid pace of population growth and urbanization and are high susceptibility to natural and man-made shocks.** *With an urbanisation rate of 3% per year, half of Pakistan's population is predicted to live in urban areas by 2030. This will place extreme pressure on health services, housing, employment and resources and will increase the population in already crowded urban slums. In addition, on average, 1 in 5 households were affected by a 'shock' (floods, earthquakes, drought and price hikes) in the three years preceding 2016. The negative impact of shocks is always greatest in areas of high poverty.*

8. **Meeting the nutrient needs of adolescent girls is a both a challenge and a priority.** *Within a standard household, the nutrient needs of an adolescent girl are the most expensive to meet - accounting for as much as a third of the cost of a nutritious diet for a six-person household. One fifth of 19 year old girls in Pakistan are either pregnant or already have a child. Thus, ensuring adequate diets for this target group is essential for their own growth and development as well as that of any children they may have.*
9. **Intervention packages to fill the nutrient gap, for both individual target groups and households, could be used singularly or in combination to improve access to and affordability of nutritious diets.** *The interventions modelled by the FNG analysis included vouchers for nutritious foods, cash transfers, specialised nutritious foods and food fortification. These interventions were modelled in different combinations with and without cash transfers, to show the potential impact of multi-sectoral interventions and strategies. The modelling showed that a combination of public and market-based platforms is required to reach different segments of the population and; that a combination of a conditional cash transfer, for the household, and nutrition-specific interventions targeting the most vulnerable, offered the greatest potential to improve the affordability of nutritious diets in Pakistan.*
10. **There is a need for the continued promotion of strong and consistent multi-sectoral action and investment in nutrition.** *The SUN movement in Pakistan has made great strides in bringing people together around the common goal of ending malnutrition. This momentum must be scaled-up and now is the time to translate policies into actions.*

Prioritised actions

The FNG highlighted the significant and multi-faceted nutrition challenges facing Pakistan. Economic access to nutritious foods, as well as poor dietary practices, contribute to the significant levels of malnutrition across the country. Through provincial and national-level FNG workshops, representatives from the health, education, social protection, agriculture, media and food fortification sectors converged to review and discuss the FNG findings and, together, identified and agreed on prioritised interventions and activities to improve access to nutritious diets and overall nutrition.

SECTOR	PRIORITISED INTERVENTIONS
Health and Nutrition	Formative research to understand current knowledge, practices and barriers to appropriate infant and young child feeding (IYCF).
	Provincial budget allocation for evidence-based IYCF promotion and increased access to nutritious foods.
	Implementation of provincial IYCF strategies, including development of evidence-based SBCC messages, training and support for health workforce, IYCF counselling at health services and multimedia campaigns to promote good IYCF and other practices, including WASH.
	Simultaneous activities to increase access to nutritious foods, such as special fortified complementary foods and locally available nutritious natural foods.
	Commercialisation of specialised complementary foods for key target groups to increase access to safe, specialised nutritious foods for women and children and demand creation activities.
	Improved provision of family planning services, especially for adolescent girls.
Fortification	Development/ harmonisation of fortification legislation and standards and harmonisation of standards at provincial level in accordance with the national standards for uniformity and ease of implementation.
	Monitoring & enforcement of legislation; Strengthen capacity of Provincial Fortification Alliances to plan and implement fortification program.
	Building technical capacity of industry.
	Increasing access to and demand for fortified staples (wheat flour, salt and cooking oil).
Social Protection	Incorporation of nutrition-sensitive activities into existing social-protection programming by developing multi-sectoral working teams, reviewing existing programmes and piloting conditional cash transfer programmes incorporating a mix of cash, vouchers for locally-available nutritious foods and in-kind provision of specialised nutritious foods for key target groups.
Education	Incorporation of nutrition education into school curriculum.
	Incorporation of nutrition into university health syllabuses.
	Actions to build national workforce of nutrition professionals, including development of tertiary nutrition courses.
	Nutrition-sensitive school feeding, including piloting of nutritious school-meal programs for primary school children and adolescent girls, linkages for home-grown school feeding with smallholder farmers, scale-up of successful school feeding models and incorporation of micronutrient supplementation as part of school feeding where appropriate.
Agriculture	Promoting diversity of local production & nutritious food availability, including piloting activities to support local production of nutritious, diverse foods, including biofortified foods via home and small-scale production. Provision of greater access to nutritious local foods using voucher transfer via markets.
	Advocacy for greater investment in and support to agricultural sector.
	Improved support to food producers with low resources, including improved market linkages and storage capacity.

How the FNG findings can be used to benefit Pakistan

Now is a crucial time for nutrition policy and programmes in Pakistan, as the national government is in the process of finalising the Multi-sectoral Nutrition Strategy. The findings of the FNG will be useful in refining this strategy.

It is essential that both government and non-government entities, across different sectors, appreciate the need to invest wisely in nutrition and make decisions based on evidence in order to reap tangible results and adequately respond to Pakistan's significant malnutrition burden. These results highlight economic access as a key, but not the only, barrier to adequate nutrient intake. Nutrition is not the responsibility of any one sector alone, and improvements will only be achieved if all sectors work together on solutions that address all the main causes taking into consideration the local context.

The analysis identified multiple interventions using different entry points across a range of sectors. If combined, these interventions could effectively both reduce the cost of and, increase the affordability of nutritious diets for the most vulnerable in the population. The food system should be leveraged to increase availability and access to safe, affordable, nutritious food, through private sector initiatives, combined with regulatory framework strengthening and, social protection and safety net programmes for the most vulnerable.

A key follow-on from the launch of the national Multi-sectoral Nutrition Strategy, should be the development or review of provincial policies and strategies, to incorporate new evidence and harmonise efforts whilst adapting them to the local context.

The full FNG report contains findings pertaining to each sector and, the results of the linear programming analysis and intervention modelling, are provided for each target group covering both rural and urban areas across the four provinces. As such, the FNG can be used as a leveraging tool for beginning, reigniting or fuelling planning conversations with multi-sector stakeholders in each province and to identify complementary sector-specific opportunities to address malnutrition. The national and provincial SUN Secretariats have been instrumental in the FNG process in Pakistan and, should continue their commitment to improving nutrition, by providing leadership across sectors and stakeholders.

With Pakistan's next Five Year Plan currently under development, the prioritized interventions identified for provincial and national level actions should be taken on board to reach the most vulnerable areas and target groups. In addition, the necessary budget allocations, either as a pilot or feasibility assessment phase through a PC-2, or scaled up interventions through PC-1, must be committed. In this way, Pakistan will accelerate progress towards improving nutrition indicators and achieving SDG 2.

3. Background to the FNG

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

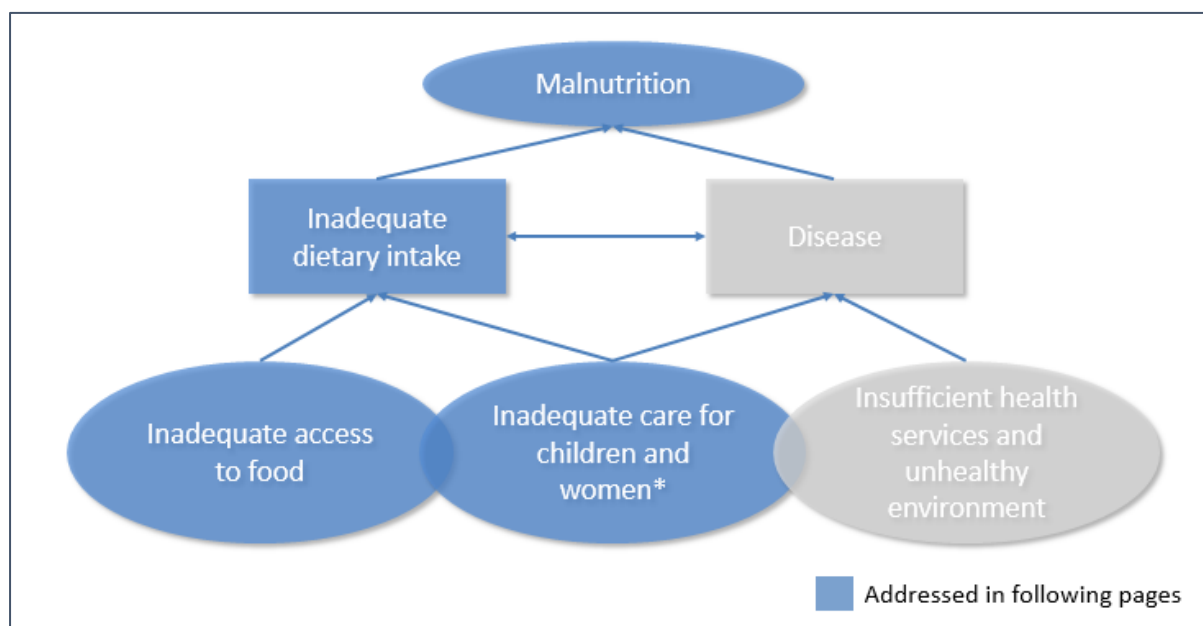


Figure 1: UNICEF Conceptual Framework for Causes of Malnutrition (UNICEF 1991)

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 (CotD) and Optifood to better understand the barriers to adequate nutrient intake in a country’s context and model potential interventions to improve access to nutrients, in particular from nutritious foods and income support. The framework for analysis depicted in Figure 2: ‘The Fill the Nutrient Gap Framework’ for situation analysis and decision making helps to consolidate and analyse existing secondary data at country level based on the following categories:

- i) **Malnutrition Characteristics** - review prevalence data of malnutrition characteristics (Stunting, Wasting, Anaemia, Underweight, Overweight and Micronutrient Deficiencies) by geographic area, population group and socio-economic status. If relevant, seasonal patterns of various nutritional problems within populations can be considered. Malnutrition characteristics are reviewed in the initial stage to define priority groups for the analysis.
- ii) **Enabling Policy Environment** - analyse the extent to which the policy environment adequately facilitates access and availability of nutritious foods for the population by identifying possible opportunities to strengthen national policy, and national legal or regulatory frameworks related to access and availability. Enforcement of these policies and regulations is a key part of the analysis; for example, while there may be a mandatory national fortification policy, compliance of this policy may be low in reality. Existing partnerships (e.g. private public partnerships) and initiatives to improve availability and affordability and consumption of safe, nutritious foods are also

identified and reviewed. This section is crucial in identifying current or potential entry points for nutrition interventions through different sectors.

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

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

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

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

vii) Cost Optimization - use linear programming tools, such as Cost of the Diet (CotD) and Optifood, to determine the (minimum) cost of meeting nutrient needs for modeled households (i.e. with specific individuals such as a breastfed child, lactating woman, adult man, school going child and adolescent girl) using local foods and what proportion of the population could afford a nutritious diet. Linear Programming is also used to model the economic and nutritional impact of possible nutrition interventions identified in the secondary data analysis and by stakeholders, such as introduction of fortified foods and/or Specialised Nutritious Foods (SNFs) through market channels or social protection programmes, improve access to nutrient-rich unfortified foods through homestead food production or vouchers, price reductions of certain foods as well as cash transfers. Once this information has been consolidated and analysed, context-specific optimal packages of policy and programmatic interventions can be identified, based on the relative contribution of different interventions to reduce cost and improve affordability of nutritious diets. These strategies and possible entry points can be collectively identified by the different stakeholders once the preliminary results of the analysis are available.

Pilot testing of the “Fill the Nutrient Gap” tool took place in El Salvador, Ghana and Madagascar in 2015-16. The application of this tool was validated in a consultation with the key technical partners in September 2016. Further roll out of the tool began with Guatemala, Tanzania and Pakistan in late 2016, Lao PDR and Cambodia followed early in 2017, and Sri Lanka, Mozambique and Niger have now started. More countries are planned for the end of 2017 and the first half of 2018, including Uganda, Rwanda, Zimbabwe, Sudan, Peru, Philippines and Myanmar.

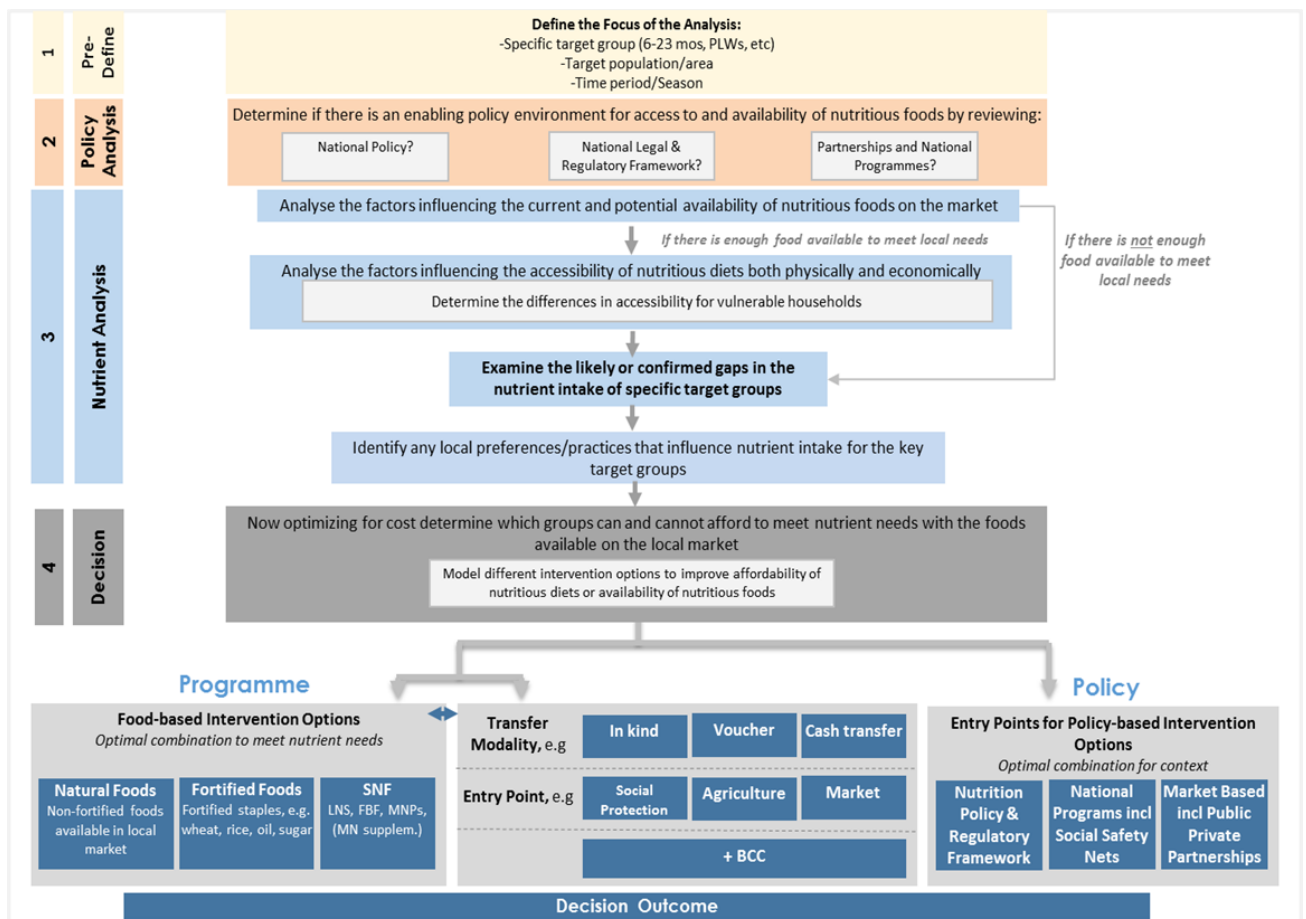


Figure 2: 'The Fill the Nutrient Gap Framework' for situation analysis and decision making

4. Process and Methods for the Pakistan FNG Analysis

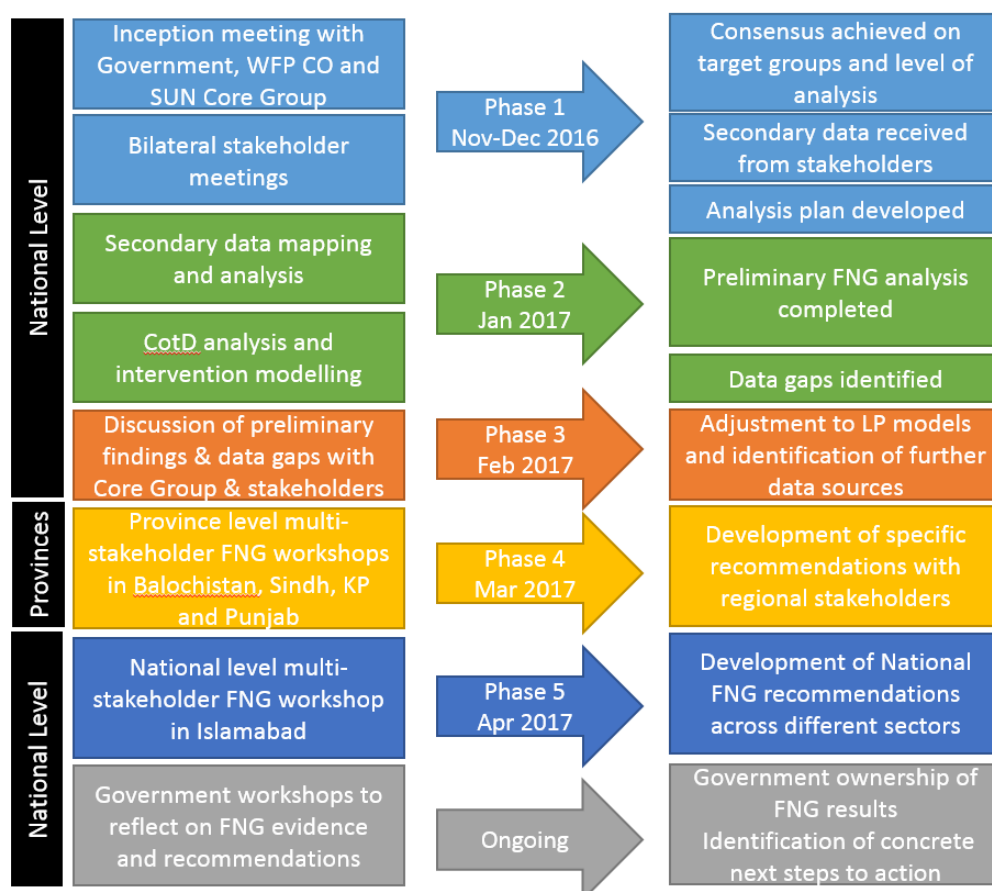


Figure 3: FNG Pakistan Process and timeline 2016-2017

a) Identification of technical leadership, collation of secondary data and design of FNG approach for Pakistan

In November 2016, WFP Pakistan and the Ministry of Planning, Development & Reform (MDPR), with the support of WFP HQ FNG team and the Scaling up Nutrition (SUN) Core Group, initiated the Fill the Nutrient Gap process for Pakistan. Over a three-week period, the FNG team met with a variety of government, non-government, UN and donor stakeholders to introduce the FNG process, decide on the level of analysis for the FNG, collate key secondary data and identify possible interventions, entry points and transfer mechanisms to test in the CotD modelling.

The SUN Core group in Pakistan was the key source of technical review and input for the FNG analysis. The Core group is led by the Ministry of Planning Development & Reform – Nutrition Section/SUN Secretariat; and members represent the Ministry of National Health Services Regulation & Coordination – Nutrition Wing; Ministry of National Food Security & Research – Food Commissioners; WFP; WHO; UNICEF; FAO; World Bank; DFID (UK AID); DFAT (Australian Aid); European Union; Save the Children; Nutrition International (NI); Global Alliance for Improved Nutrition (GAIN); and Harvest Plus.

Based on a review of the malnutrition situation, it was decided by the SUN Core Group that the secondary data analysis for the Pakistan FNG would be carried out at a national level, presenting regionally-specific data when available. However, due to limited data availability, the linear programming analysis, intervention modelling and dissemination would be carried out for the country's four provinces (Figure 3).

Figure 4: Level of analysis for the Pakistan FNG, as jointly agreed

Areas for analysis:		Key Target Groups:
<ul style="list-style-type: none"> • Sindh Urban • Sindh Rural • Punjab Urban • Punjab Rural 	<ul style="list-style-type: none"> • Balochistan Urban • Balochistan Rural • KP Urban • KP Rural 	<ul style="list-style-type: none"> • Life-cycle approach, focussing on the first 1000 days • Infants and young children aged 0-23 months • Pregnant Women • Lactating Women • Adolescent girls (pre-pregnancy)

Based on early mapping and analysis of secondary data sources carried out in country and consultation with the SUN Core Group and other stakeholders, potential interventions for improving the nutrient intake of key target groups, as well as possible entry points for these interventions were identified. A draft analysis plan was discussed with the SUN Core Group, who provided further detail on interventions to be modelled using the CotD software.

b) Secondary data analysis

Between November 2016 and February 2017, the secondary data analysis was carried out by the FNG Team. A data mapping template (see Appendix 1) was developed to assist the identification and review of different information sources relevant to the FNG analysis and to highlight areas where data had not been found.

Data sources were identified, mapped and reviewed over three main stages:

1. Consultation with National Stakeholders

Prior to and during the November mission to Pakistan, information about the data requirements for the FNG analysis and the FNG data mapping template were shared with the WFP country office and national stakeholders, via the SUN Core Group, who, in turn, shared relevant datasets, reports, articles, and documents on standards and regulations with the FNG team. Academic partners, including Aga Khan University and Collective for Social Science Research, were also consulted to identify studies relevant to the FNG analysis.

2. Literature Search

In addition to obtaining data through national stakeholders, a web-based literature search was carried out to identify any further articles or reports relevant to the FNG analysis and to provide a contextual overview of the nutrition situation in Pakistan. PubMed and Google Scholar were used to search for data from studies in academic journals, institutional reports, and working paper series published in the last 20 years.

3. Follow up on identified data gaps

Once the data mapping overview spreadsheet had been populated with information sources from stakeholders and the literature review, data gaps, in terms of themes, areas of the country or population groups, could be identified. The FNG team then shared this list with the SUN Core group in Pakistan to inquire whether any additional information sources were available. A further, targeted literature search focussing on these specific gaps was also conducted.

Through consultation with national and international stakeholders and a review of relevant literature, 190 sources were identified and reviewed (Appendix 8). Despite being a large and data-rich country, a number of data gaps could not be filled; there was a lack of representative data on

dietary practices and preferences and little province-specific quantitative dietary intake data. In addition, there was no data available on dietary intake and practices of adolescent girls. For geographic areas from which only a few studies or studies from small samples were available, summarised results have not been generalised to the provincial-level.

c) Linear programming analysis and intervention modelling

Cost of the Diet (CotD) linear programming software, developed by Save the Children, was used to estimate the cost and affordability of nutritious diets and model potential nutrition interventions for rural and urban households across summer and winter in the four Provinces of Sindh, Balochistan, Punjab and KP. This tool models the cheapest possible diet for each member of a modeled household based on the available foods and in accordance with their individual recommended nutrient intakes (RNIs) and the portion size each individual is expected to reasonably consume.

This component of the FNG incorporated and built upon the CotD analyses carried out by the Ministry of Planning, Development and Reform and WFP in 2016 (Ministry of Planning, Development & Reform Planning Commission 2016). Secondary data from the 2013-2014 Pakistan Household Integrated Economic Survey (HIES) were used to estimate food prices², seasonal food availability and average household size for the CotD analysis. Consumer Price Index (CPI) data (2013-2014) was used to validate the food prices taken from the HIES (Ministry of Planning, Development & Reform Planning Commission 2016). Further detail on the data inputs used for this analysis are provided in Appendix 2.

Average household size was calculated for each province for both rural and urban areas for the 2016 CotD analysis. The household composition was based on a combination of individuals whose energy requirement was equivalent to the national Ministry of Planning, Development and Reform average energy requirement standard of 2350 kcal per day (Ministry of Planning, Development & Reform Planning Commission 2016). Household composition was adjusted for the FNG intervention modelling to allow for the inclusion of adolescent girls to test interventions directed at this target group. Details of the household composition used for each province in the FNG analysis is provided in Appendix 3. The 12-23 month-old child was used as a proxy for children 6-23 months, for intervention modelling purposes. Further, exclusive breastfeeding was assumed in the models for 0-5 month-old children, and for the 6-23 month-old children, continued breastfeeding according to WHO recommendations was assumed.

The CotD software was used to estimate the cost and content of a household-level 'staple-adjusted nutritious diet' (SNUT); the minimum cost nutritious diet that contains a daily serving of the main staple. The SNUT is based on a nutritious diet (NUT) that meets recommended intakes for energy, protein, fat and 13 micronutrients. The SNUT includes staple foods that will generally be eaten every day for all household members except for young children, as well as constraining for foods that would be taboo for any household members. In Pakistan at least one daily serving of non-fortified wheat (atta) flour was included for all household members except for the young child (12-23 months) as the staple food for all provinces. No taboos foods were identified for the Pakistan CotD analysis as the secondary data and stakeholder consultation did not identify any that were influential enough for them to be particularly relevant to the modelled family composition. Optimal breastfeeding levels were assumed for the 12-23 months-old child.

² The methods used to calculate food prices and availability are described in Appendix 2

The distribution of reported per capita food expenditure from the HIES was used to estimate the proportion of the population that would be able to afford the staple-adjusted nutritious diet. This expenditure data was then used further to estimate the potential impact of different individual- and household-level interventions on the cost of nutritious diets and the level of estimated non-affordability. All interventions identified during phase 1 and detailed in the analysis plan were tested at the individual and household level for each province in urban and rural areas and across both summer and winter seasons.

d) Presentation of preliminary findings to technical working group

Members of the HQ FNG team travelled to Islamabad in late February 2017 to share and discuss preliminary findings of the secondary data analysis and CotD modelling with the WFP Pakistan Country Office, Ministry of Planning, Development & Reform Planning Commission, SUN Core Group and relevant stakeholders and plan for upcoming provincial and national dissemination and decision-making workshops.

The main objective of this mission was to gain stakeholder insights on the preliminary findings and make adjustments as needed to the analysis plan for interventions modelled using the CotD software. As an outcome from this mission, the Core Group and FNG team came to agreement on the key messages of the Pakistan analysis for discussion with provincial-level stakeholders during the March workshops.

e) Provincial workshops and dissemination

The next step for the FNG in Pakistan was to present context-specific findings at the provincial level so that stakeholders could jointly discuss and prioritise interventions and intervention entry points across different sectors and decide upon prioritised actions for their areas.

In March 2017, provincial-level workshops were held in Karachi, Quetta, Lahore and Peshawar, coordinated by the provincial and national SUN movements with the support of WFP provincial offices, the WFP country office and the WFP HQ FNG team. Between 40-75 stakeholders from provincial government and SUN offices, NGOs, UN and academia participated per province, representing health, education, social protection, agriculture and food fortification.

During these workshops, the main province-specific findings of the FNG analysis were presented to representatives from a range of sectors, institutions and disciplines. Participants then split into sector-specific groups and worked together to identify and prioritize context-specific interventions, programmes and actions affecting the enabling environment to fill nutrient gaps for key target groups, and contribute to fight malnutrition, including listing necessary activities in the short term, medium term and long term.



Photo 1: FNG Workshop Lahore



Photo 2: FNG Workshop Lahore



Photo 3: FNG Workshop Peshawar

f) National workshop and dissemination

As a last step, a national workshop was held to share and discuss the findings from the FNG and the proceedings of the provincial workshops with national-level stakeholders and, together, develop over-arching prioritised actions.

The national workshop took place in Islamabad on the 11th of April 2017. Over 75 stakeholders from different sectors representing national and provincial government departments, UN organisations, NGOs, academia and donors participated (Appendix 12). In addition the meeting was attended by the global SUN secretariat.

The workshop began with the presentation of national-level findings from the FNG analysis and a summary of the key intervention priorities identified in the four provincial workshops. Following this, in sector-specific groups, participants discussed and prioritised national policy actions needed to support the prioritised provincial actions. The outcome of this national consultation was the listing of national-level prioritised interventions and activities to fill the nutrient gap among key target groups across different provinces and settings in Pakistan.

4. Key findings from the analysis of secondary data

4.a Affordability is the greatest barrier to achieving a nutritious diet

Despite increases in national food production and decline/stability in staple prices, household food insecurity remains a significant concern across Pakistan, especially for the poorest and most vulnerable and dietary diversity is universally poor (MNFSR 2016; Government of Pakistan & UNICEF Pakistan 2011). The main constraint to providing nutritious diets and meeting nutrient requirements in Pakistan is economic access; compounded by suboptimal food choices and vulnerability to shocks.

Food and Nutrition security are determined by access, availability and utilisation of nutritious foods. The Cost of Diet analysis across Pakistan's provinces found that only about one in four households would be able to afford a nutritious diet and that affordability was unequal across and within provinces. As presented in section 4.f, Pakistan enjoys strong food production and stable prices of staple foods, however the benefits from agricultural growth are limited to a minority of the population and favourable growing conditions are found in only some parts of the country. Likewise, many in Pakistan, especially in urban areas, benefit from good market and food access as a result of rapid infrastructure development, however others in rural and remote areas have been left behind. For the rural poor, especially in Balochistan and KP, poor access to land and assets and difficult climatic or seasonal conditions mean that meeting nutrient needs either through their own, diversified production or obtaining sufficient income for food purchasing, is extremely difficult. High, unequal levels of poverty and food insecurity across the country all compound significant issues with economic access to nutritious diets.

- Cost and affordability of a nutritious diet

In the 2016 CotD analysis for Pakistan, carried out by the MPDR and WFP nutritious diets were calculated across all study areas for all individuals in the model household. The ability to model these diets indicates sufficient diversity of foods at the provincial urban and rural market level to allow for macro- and micronutrient requirements of individuals to be met (Ministry of Planning, Development & Reform Planning Commission 2016). At the province level, the per capita cost of providing a diet that met energy requirements only ranged from 694PKR in KP to 949PKR in Sindh (Figure 6**Error! Reference source not found.**). The per capita costs of providing staple-adjusted³ diets that meet the minimum requirements for a range of macro and micronutrients did not follow the same provincial pattern and ranged from 2061PKR in Punjab to 2415PKR in Balochistan. Further, the cost of the staple-adjusted nutritious diet was slightly higher in urban areas than rural areas on average. These disparities were reflective of differences in the cost of staple foods (for energy only diet) and variances in the availability and costs (access) of nutritious foods in each province (Ministry of Planning, Development & Reform Planning Commission 2016).

The CotD study estimated that 67.6% of households in Pakistan would be unable to afford a nutritiously adequate diet that included local staples (Ministry of Planning, Development & Reform Planning Commission 2016). Furthermore, 4.7% of households would not be able to afford a diet that only met the minimum requirements for energy (Ministry of Planning, Development & Reform Planning Commission 2016).

³ A staple-adjusted diet is a diet that must reflect the local patterns of staple food consumption

The estimated proportion of households unable to afford a staple-adjusted nutritious diet varied across the provinces, as shown in Figure 5. The highest proportion was in Balochistan where 83.3% of households would be unable to afford a diet that met minimum nutrient requirements.

In KP province, over two thirds of households (67.4%) would be unable to afford a nutritious diet however the estimated proportion of households unable to afford a diet sufficient in energy only was less than 1%. This could imply that meeting basic caloric needs in KP is relatively inexpensive, compared to meeting requirements for essential macro- and micronutrients (Ministry of Planning, Development & Reform Planning Commission 2016). Punjab province had the highest proportion of households that could afford a nutritious diet (34.5%) yet also the highest proportion of households that could not afford a diet sufficient in energy only (6%) (Ministry of Planning, Development & Reform Planning Commission 2016). This could be reflective of higher staple food prices in this province yet also, for some, higher incomes, meaning there may be substantial disparity between the richest and poorest in the population.

Figure 5: Ability of households to afford a staple-adjusted nutritious diet or a basic diet that meets energy requirements only, by province (MPD & WFP 2016)

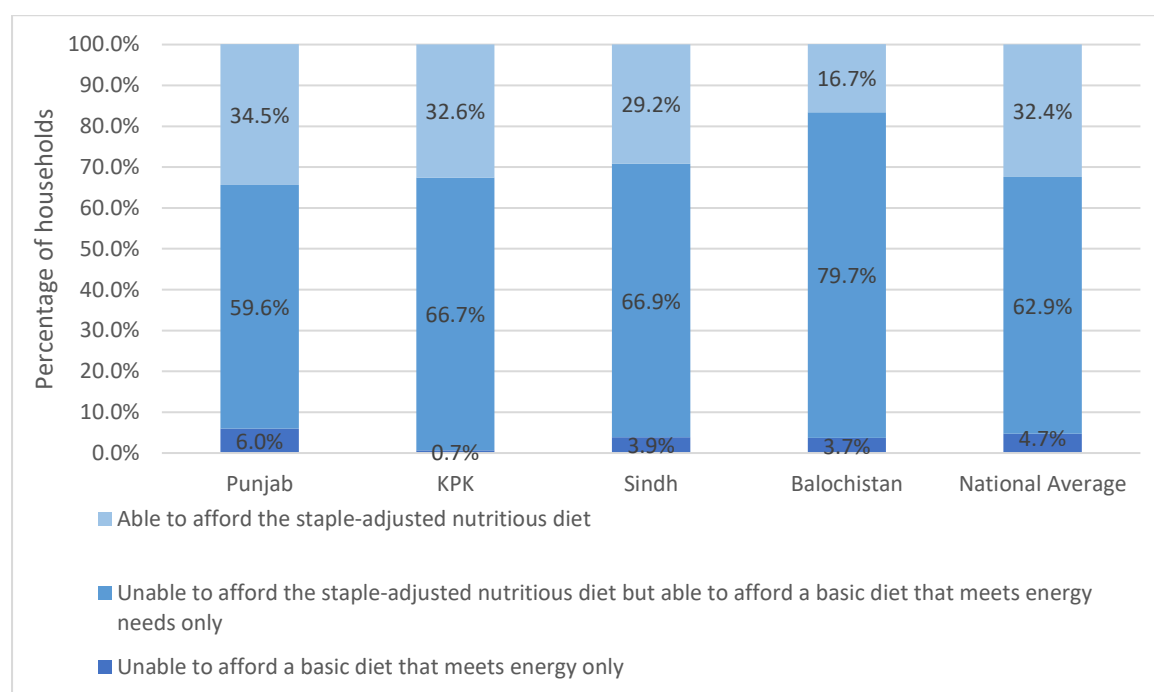
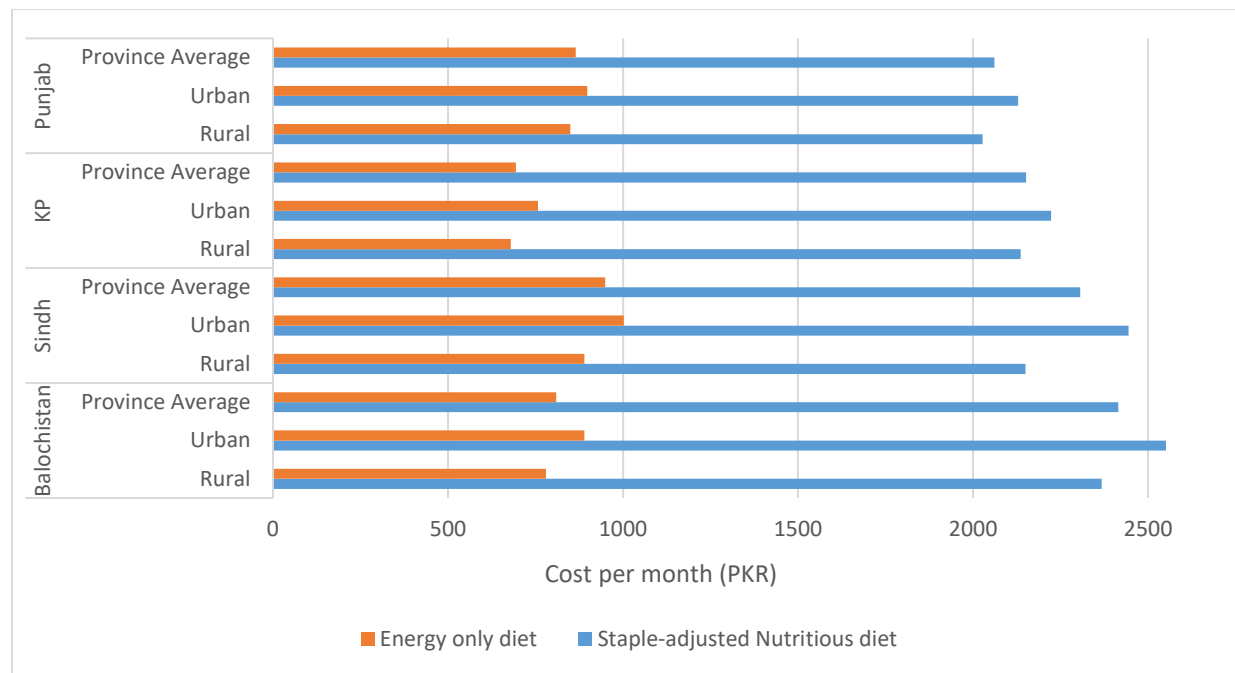


Figure 6: Per capita monthly cost of Staple-Adjusted Nutritious Diet and Energy-only diets (PKR) as per 2016 analysis

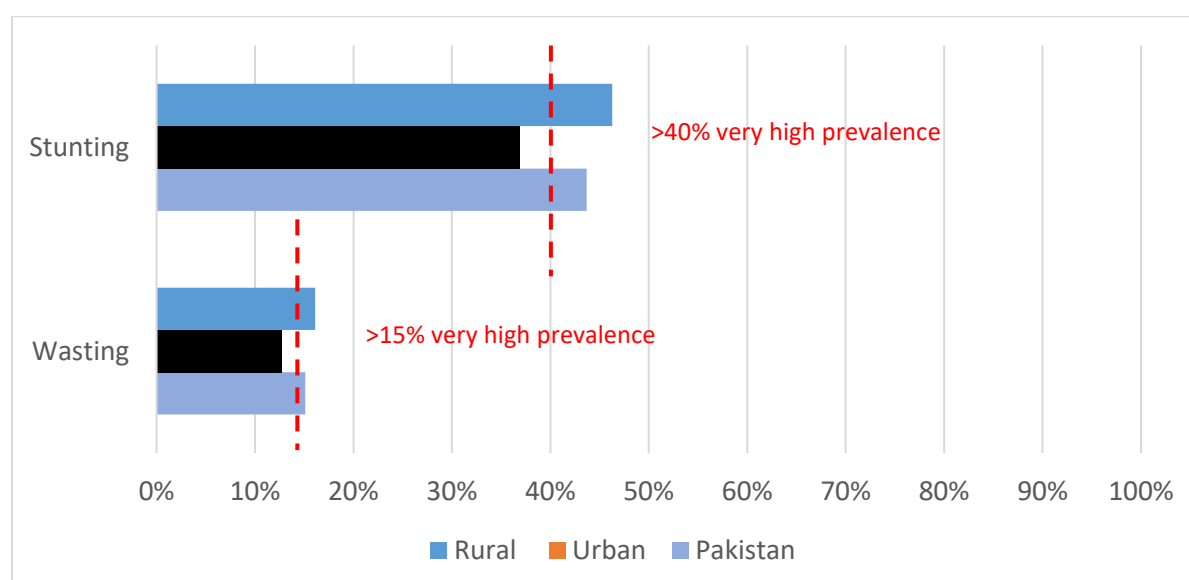


4.b Nutrition indicators show a *very high* prevalence of child malnutrition in Pakistan, with little improvement over the past four decades.

This has significant short-term and long-term implications for health, educational and economic outcomes in Pakistan.

The malnutrition situation for young children in Pakistan is characterised by very high stunting, affecting almost half of the population. Available data also suggest that childhood overweight and obesity is increasing.

Figure 7: Indicators of malnutrition status for infants and young children aged <5 years in Pakistan by area (NNS 2011)



¹ WHO cut-offs for malnutrition severity <http://www.who.int/nutgrowthdb/about/introduction/en/index5.html>

² Stunting defined as Height for Age Z score (HAZ) of ≤ -2 as per WHO standards (WHO, 2006)

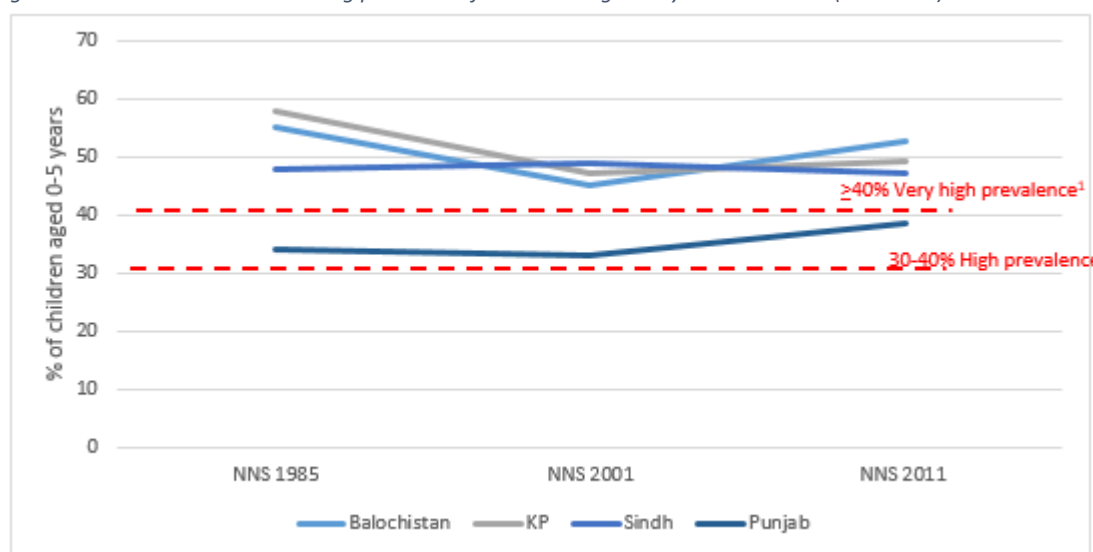
³ Wasting defined by Weight for Height Z score (WHZ) of ≤ -2 as per WHO standards (WHO, 2006)

Based on a very high prevalence of 43%⁴, an estimated 10.5 million children aged under five are stunted ($HAZ \leq -2$) in Pakistan (Government of Pakistan & UNICEF Pakistan 2011). Worryingly, half of these children are severely stunted ($HAZ < -3$) and stunting prevalence has either increased or remained at high or very high levels across Pakistan over the past few decades (Figure 8) (Government of Pakistan & UNICEF Pakistan 2011). Stunted growth as a result of frequent or chronic infections and inadequate nutrition is an indicator of chronic malnutrition and an important cause of morbidity and mortality in infants and children (Stevens et al. 2012).

According to the 2011 NNS, stunting prevalence is 10 percentage points higher in rural areas (46.3%) compared to urban areas (36.9%) of Pakistan (data not shown) (Government of Pakistan & UNICEF Pakistan 2011). Stunting is highest in the Federally Administered Tribal Areas (FATA) territory, where 59.8% of children under five are affected. Stunting prevalence is classed as very high and above the national average in the provinces of Balochistan (52.8%), KP (49.2%) and Sindh (47.3%), and classed as 'high' in the Punjab province (38.4%) (Figure 8) (Government of Pakistan & UNICEF Pakistan 2011).

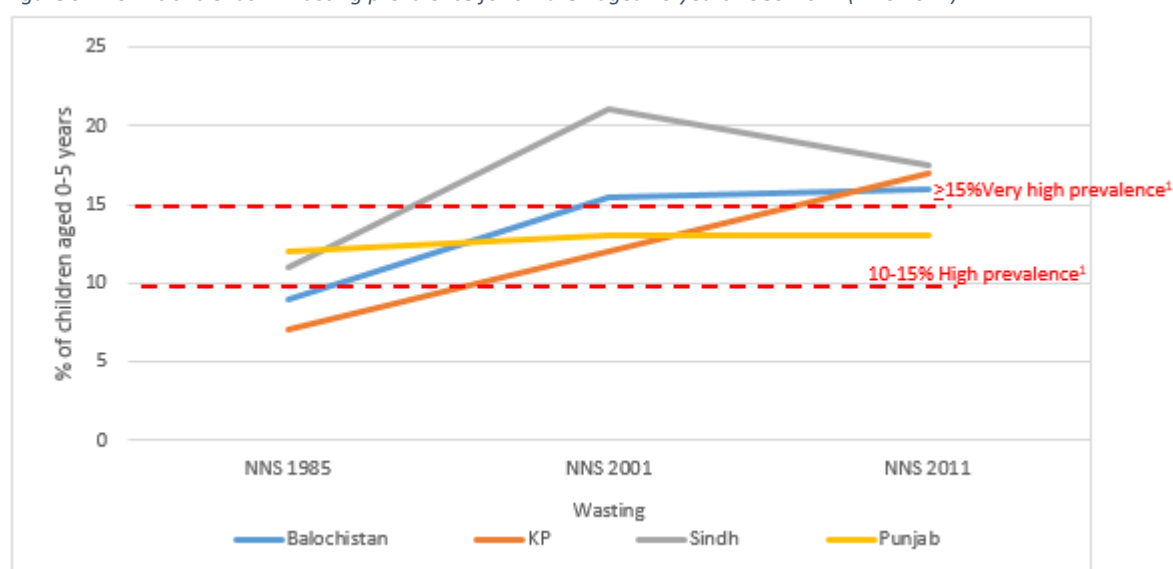
⁴ Whilst more recent data sources were reviewed, as per stakeholder guidance, the prevalence figures for malnutrition presented here are from the 2011 National Nutrition Survey (NNS)

Figure 8: Provincial trends in stunting prevalence for children aged <5 years 1985-2011(NNS 2011)



¹ WHO cut-offs for malnutrition severity <http://www.who.int/nutgrowthdb/about/introduction/en/index5.html>

Figure 9: Provincial trends in wasting prevalence for children aged <5 years 1985-2011 (NNS 2011)



WHO cut-offs for malnutrition severity <http://www.who.int/nutgrowthdb/about/introduction/en/index5.html>

At 15.1%, the prevalence of wasting in Pakistan, according to the 2011 NNS, also falls within the WHO classification of 'very high', affecting an estimated 4 million children aged under five nationally (World Health Organisation 2016; Government of Pakistan & UNICEF Pakistan 2011). A third of these wasting cases are severe, (WHZ<-3) (Government of Pakistan & UNICEF Pakistan 2011). Wasting, defined by low weight for height, is indicative of recent and severe weight loss in children, generally associated with acute starvation and/or illness (WHO 2017). Wasting prevalence is particularly high in South Asia, and is significant not only in areas characterised by a high vulnerability to seasonal food insecurity and shocks, but also areas with high disease incidence and/or inadequate care practices (UNICEF 2013).

Wasting prevalence is higher in rural areas of Pakistan (16.1%) compared to urban areas (12.7%). In the 2011 NNS, wasting prevalence was *very high* in Sindh (17.5%), Balochistan (16.1%) and KP

(17.3%) and *high* in Punjab (13.7%) (Figure 9). Multiple Indicator Cluster Surveys undertaken in 2014 however estimated a lower prevalence in Sindh (15.4%) and higher prevalence for Punjab (18%) (Bureau of Statistics. Planning & Development Department. Government of the Punjab 2014; Sindh Bureau of Statistics and UNICEF 2015). It is important to note that individual nutrition surveys in vulnerable districts within these provinces have found much higher malnutrition rates, often associated with seasonal food insecurity (Concern Worldwide 2016; Hussain 2014; Hossain et al. 2013).

Available, nationally representative anthropometric data from the NNS and DHS suggests that between 3.2-5% of children aged less than 5 years could be classed as obese or overweight in Pakistan (IFPRI 2015; NIPS 2013; Government of Pakistan & UNICEF Pakistan 2011). Further, it is estimated that half of overweight children under five are also stunted (Blankenship 2016a). The prevalence of overweight and obesity in under-fives is increasing (Government of Pakistan & UNICEF Pakistan 2011) and, based on smaller studies and observed increases in the availability and consumption of processed, highly energy-dense foods, rates are expected to be higher in the 2017 NNS. In a secondary analysis of NNS and DHS data, it was found that young children of educated mothers and from higher wealth quintiles as well as children with overweight mothers were more likely to be overweight or obese (Blankenship 2016a). A study of Lahori primary school children found prevalence of overweight increased with age and children living in urban areas with high SES were significantly more at risk for being overweight or obese (both $P < 0.001$) as compared to children living in the urban area with lower SES and rural children (Mushtaq et al. 2011). A cross-sectional study of 501 high school students in Hyderabad found significant risk factors for overweight and obesity were male sex (15% prevalence compared to 8% for females) and middle socioeconomic status (Ahmed et al. 2013).

According to the most recent Global Nutrition Report (GNR), 51% of children aged 6 to 59 months in Pakistan are either stunted or wasted and the country is off course to meet World Health Assembly (WHA) targets of reducing under 5 wasting and off course with no progress to reduce stunting rates (IFPRI 2016). The GNR also reports that Pakistan is off course and at risk for not meeting the WHA target for no increase of under-5 overweight (IFPRI 2016).

The short and long-term effects of malnutrition, including under-nutrition and over-nutrition, have significant consequences for the health and development of children. In the short term, malnourished children face a higher risk of mortality than non-malnourished children. Looking at chronic malnutrition, moderately stunted children are 2.3 times more likely to die and severely stunted children 5.5 times more likely (IFPRI 2016). Similarly, for acute malnutrition, moderately wasted children are 3.0 times more likely and severely wasted children 11.6 times more likely to die (Black et al. 2008).

If they survive, malnourished children will suffer the long-term educational, economic and health consequences of under-nutrition. In addition to an increased risk of morbidity due to reduced immune function, children who were wasted or stunted at an early age are more likely to become overweight as adults and experience chronic diseases associated with being overweight (Victora et al. 2008). Further, as a result of reduced cognitive development and IQ, experience of stunting and wasting in early childhood is associated with decreased educational attainment and economic achievement (Stein et al. 2008). Both the reduced workforce performance and participation and health care burden and costs have flow-on effects affecting regional and national economic productivity (IFPRI 2016).

Focus on Malnutrition in Urban Areas

Prevalence of both wasting and stunting is higher in rural Pakistan compared to urban areas. Nonetheless, malnutrition is still widespread in cities and towns and the most vulnerable, in terms of socio-economic status, are disproportionately affected. On average over a third (36%) of urban children are stunted, some 2.75 million individuals (Government of Pakistan & UNICEF Pakistan 2011; Blankenship 2016a). Stunting prevalence is highest among urban children from the lowest wealth quintile (49%), however even in the wealthiest urban households, one in five children are stunted (22%) (Blankenship 2016a; Government of Pakistan & UNICEF Pakistan 2011). Given that large-scale surveys do not currently allow for disaggregation of urban children by slum and non-slum areas, it is not possible to estimate prevalence for slum and non-slum areas separately and the malnutrition burden in urban areas of Pakistan is underestimated (Blankenship 2016a).

The prevalence of overweight and obesity for children under five in urban Pakistan is 5%, which is higher than in rural areas (2-3%) (Government of Pakistan & UNICEF Pakistan 2011; Blankenship 2016a). Overweight in young children is significantly associated with stunting; of the overweight and obese children identified in urban areas in the 2011 NNS, half were also stunted (Blankenship 2016a). KP province has an exceptionally high prevalence (14.5%) of urban overweight for young children at almost three times the urban prevalence of the other provinces Balochistan (6.3%), Punjab (5.2%) and Sindh (4.1%) (Government of Pakistan & UNICEF Pakistan 2011; Blankenship 2016a). Overweight is much more prevalent in women than children, affecting 2 out of every 5 women (NIPS 2013). In many cases, overweight and stunting exist in the same household; an analysis of MICS and NNS data in Punjab found that one in four stunted children had an overweight mother (Blankenship 2016b).

The increasing prevalence of overweight in children in Pakistan is an important concern given the rapid processes of urbanisation and economic growth that are being experienced in the country (Blankenship 2016a).

4.c Undernutrition in infants and young children highlights a problem with maternal and adolescent diets

As per the 2012-13 DHS, between one fifth to one quarter of infants in Pakistan are born too small⁵ and a quarter of infants aged less than six months are stunted (NIPS 2013). These small sizes at birth are suggestive of intrauterine growth restriction, an indicator of poor nutritional status of women prior to and during pregnancy. Similarly, whilst stunted growth in early infancy can be an indicator of poor exclusive breastfeeding practices, they can also indicate limited intrauterine growth as a result of poor maternal nutrition.

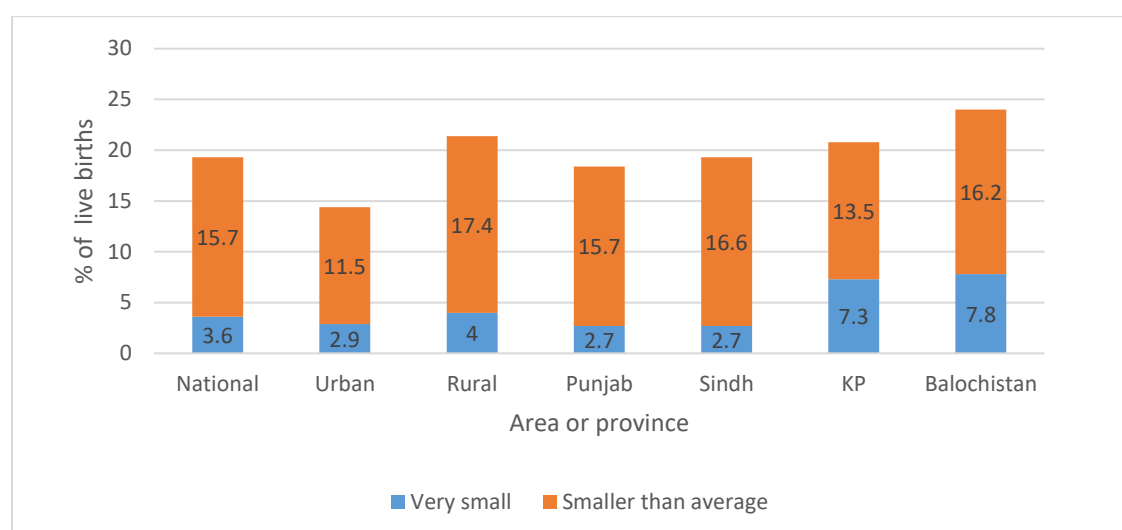
Indeed, poor anthropometric indicators for women were reported in the 2012-13 DHS, including significant prevalence of underweight for women in rural areas and adolescent girls. Associations between adolescent pregnancy rates, limited access to and use of contraception and child malnutrition further highlight the particular need to safeguard nutrition for adolescent girls for their own benefit as well as their future offspring. An increasingly dramatic prevalence of overweight and obesity, especially in urban areas and in the provinces of KP and Punjab, also points to a growing double burden of malnutrition in Pakistan.

Studies of longitudinal birth cohorts have found that, while there are certainly determinants between birth and two years of life, as well as beyond, a substantial part of the origins of childhood undernutrition lie within the gestational period (Christian 2014). This underlines the need to focus on nutrition at earlier stages; during pregnancy and even pre-conceptionally and encourages the placement of more emphasis on maternal nutrition in general as well as adolescent nutrition in particular (Christian 2014).

Small size at birth is a major determinant of mortality, morbidity and disability in childhood, has long-term impacts on health outcomes and is indicative of poor maternal nutrition and health during pregnancy (Black et al. 2008). As shown in Figure 10 below, according to maternal recall in the last DHS, 3.6% of children nationally were 'very small' at birth and a further 15.7% were 'smaller than average' (NIPS 2013). Mothers were more likely to report that their children were small at birth in rural areas compared to urban Pakistan and, looking across the four provinces, Balochistan had the highest percentage of low birth sizes.

⁵ The 2012-13 Pakistan DHS questionnaire recorded the birth weight of children born in the five years preceding the survey if available from written records (12.2% of respondents). In addition, mothers' recall of their child's size at birth was also obtained and responses were categorized as "very small," "smaller than average," "average," "larger than average," and "very large." According to the DHS, maternal estimates, though subjective, can be a useful proxy for official birth weight. This is particularly true in the Pakistani setting, where babies are often delivered at home and not weighed at birth (NIPS 2013).

Figure 10: Distribution of child's size at birth, according to maternal recall, by province (DHS 2012-13)



Reported birth size is associated with indicators of socio-economic status. The percentage of children deemed smaller than average or very small at birth according to maternal recall was almost twice as high for the lowest wealth quintile (24.6%) as the highest wealth quintile (13.8%) (Figure 11) (NIPS 2013). Similarly, more children were reportedly born small to mothers who had no education (22%) compared to women who had primary (17.2%), middle or secondary (15.5%) or higher (13.7%) education (NIPS 2013) (data not shown).

As shown in Figure 12, babies born to adolescent girls (<20 years of age) were more likely reported to be small at birth (24.3%) than those born to women aged between 20-34 years (18.6%) (NIPS 2013). This could suggest that pregnant adolescent girls have poorer nutritional status than pregnant adult women.

Figure 11: Distribution of child's size at birth, according to maternal recall, by wealth quintile (DHS 2012-13)

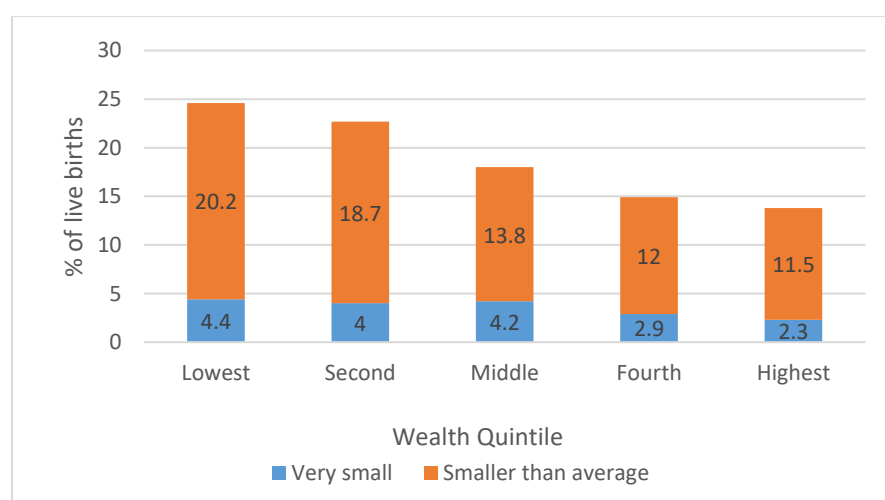
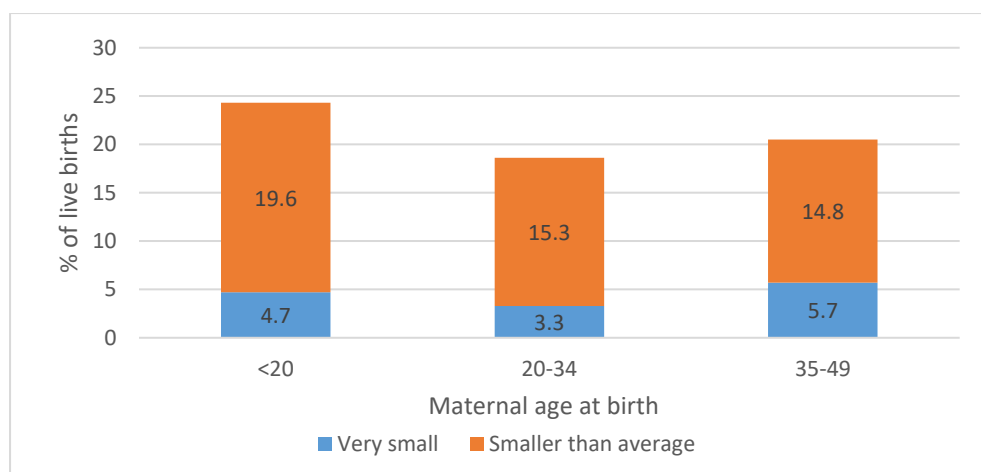


Figure 12: Distribution of child's size at birth, according to maternal recall, by maternal age at birth (DHS 2012-13)



As shown in Figure 13, a quarter (25.5%) of all infants in Pakistan below the age of six months were already stunted, which suggests that during pregnancy and the first six months of life, when exclusive breastfeeding is recommended, nutrition has not been adequate'. Of these stunted infants, half (12.7%) are severely stunted (NIPS 2013). Further, in the case of Punjab, half (53%) of infants aged below six months are anaemic and over a third (38%) have iron deficiency (Figure 14) (Government of Pakistan & UNICEF Pakistan 2011). This early presentation of poor nutrition in infants aged less than six months is likely contributed to by poor maternal nutrition status prior to and during pregnancy and poor lactation practices .

Figure 13: Prevalence and severity of stunting for children <5 years by age group Pakistan (DHS 2012-13)

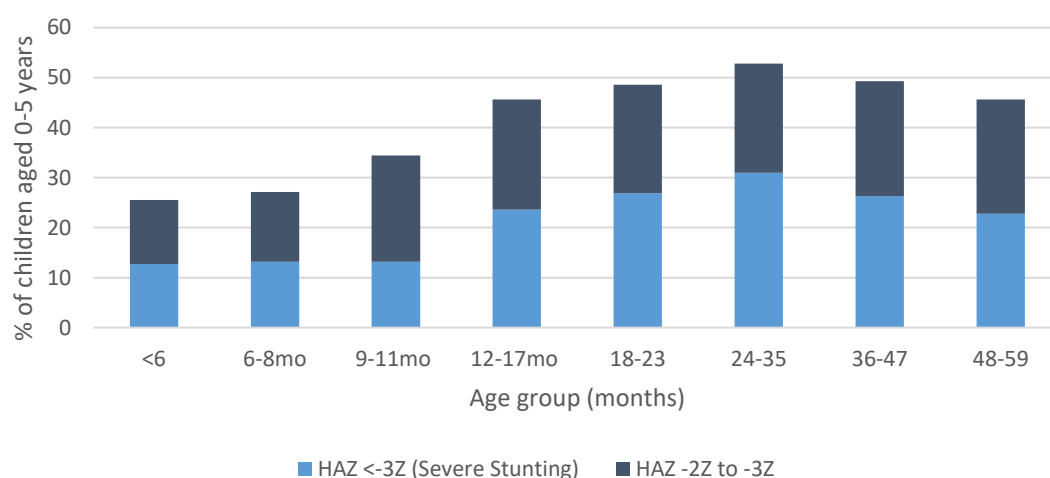
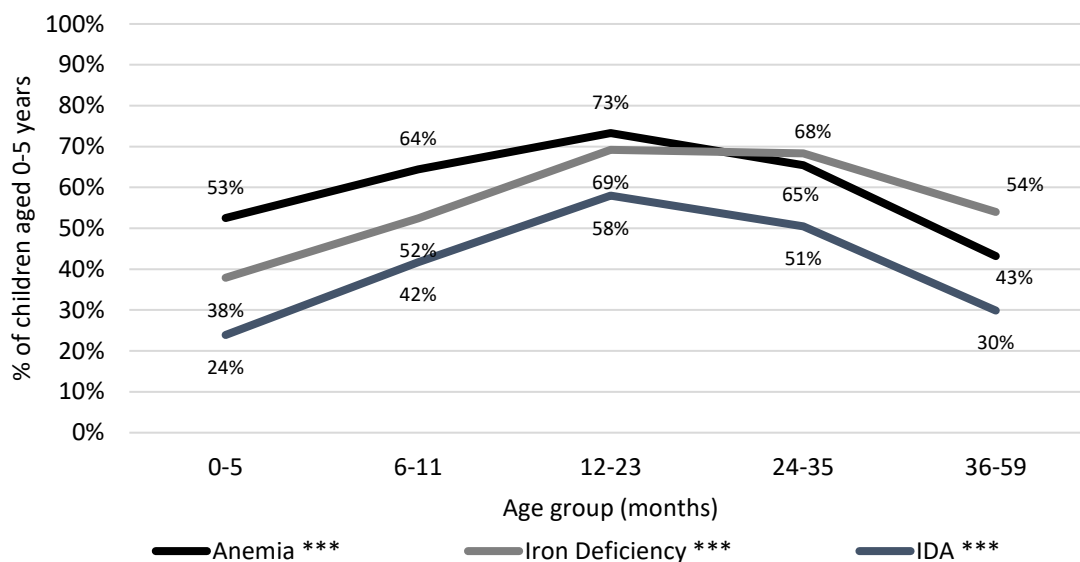


Figure 14: Prevalence of anaemia, iron deficiency and iron deficiency anaemia for children aged <5 years by age group in Punjab (NNS 2011)



As per the last DHS, 5% of Pakistani mothers are of short stature and 14% have a 'thin' BMI of less than 18.5; indicating undernutrition (Figure 15) (NIPS 2013). Many more women (40%) were found to be overweight or obese (NIPS 2013). Poorer women and women living in rural areas were more likely to suffer from undernutrition while women living in urban areas and from higher wealth quintiles were more likely to be overweight or obese (Figures 15-16) (NIPS 2013). Further 1 in 5 adolescent girls are underweight whilst half of all middle-aged women are obese or overweight (Figure 17) (NIPS 2013).

As shown in Figure 18, prevalence of overnutrition for women was highest in KP and Punjab provinces where 1 in every 2 women and 2 in every five women respectively had a Body Mass Index (BMI) greater than 25 (NIPS 2013). Undernutrition for women, characterised by thinness (BMI<18.5) was highest in Sindh (19.6%), followed by Punjab (13.9%), Balochistan (9%) and KP (6.3%) (NIPS 2013).

Figure 15: Indicators of nutrition status for non-pregnant mothers in Pakistan by area (DHS 2012-13)

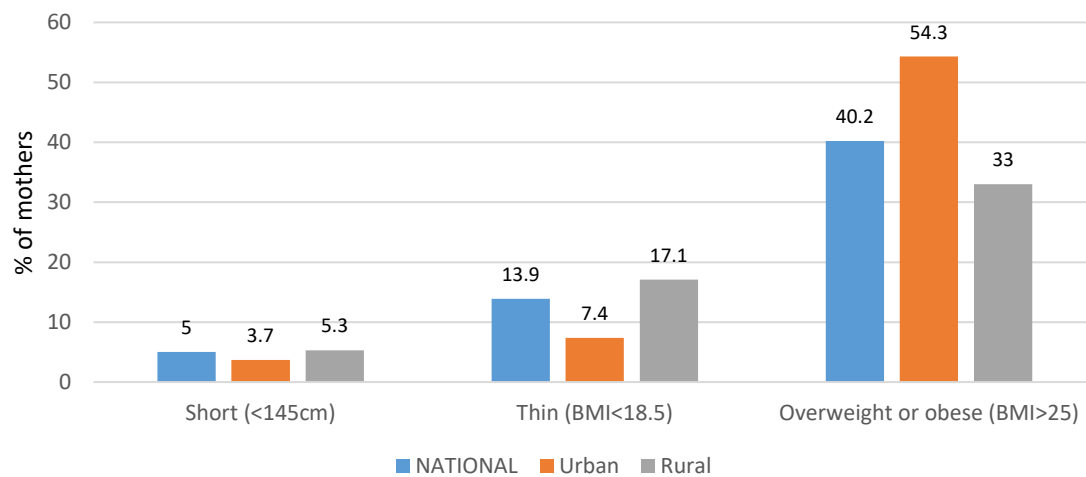


Figure 16: Nutritional status of women aged 15-49 years (underweight, overweight and short stature) by wealth quintile (DHS 2012-13)

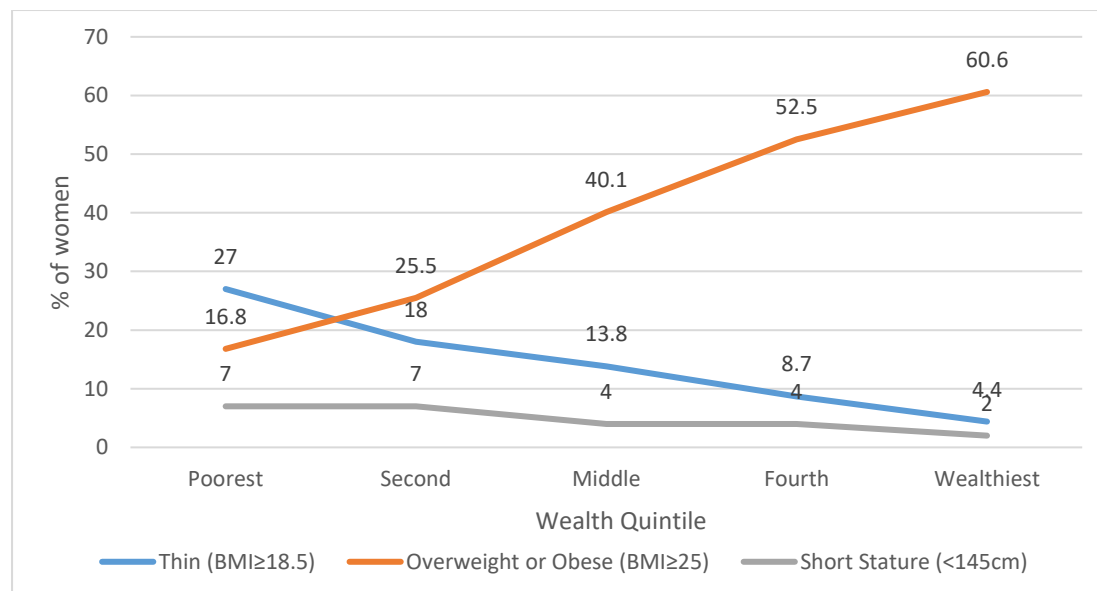


Figure 17: Nutritional Status of women by age group (DHS 2012-13)

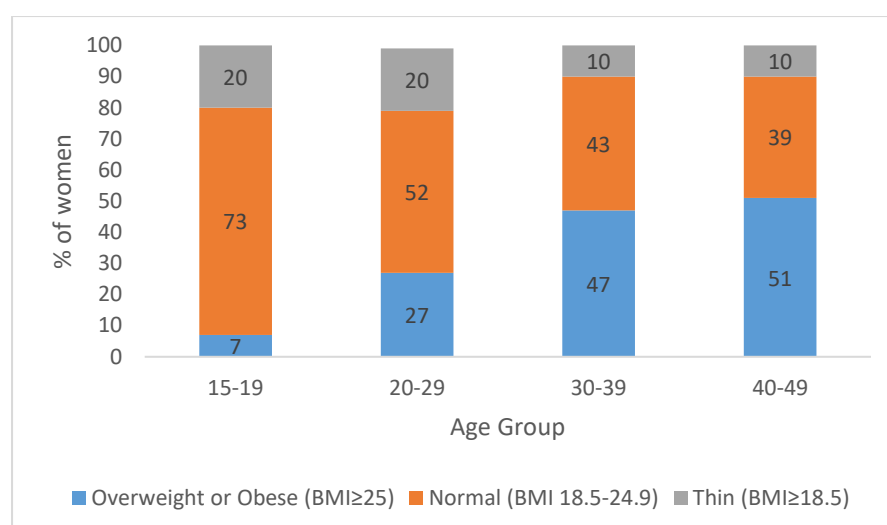
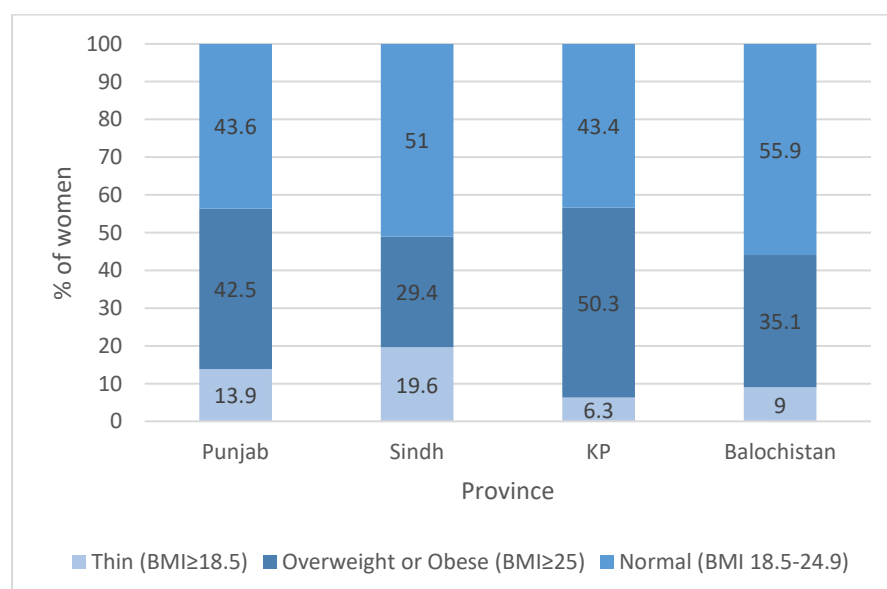


Figure 18: Nutritional status of women aged 15-49 years by Province (DHS 2012-13)



There is evidence for a growing double burden of malnutrition and overweight; demonstrated by a high prevalence of stunting and wasting in children, high prevalence of micronutrient deficiencies (see next section) as well as increasing maternal BMI. Recent analysis suggests that in many cases the double burden exists within the same household; in Punjab province for example a quarter of stunted children have an overweight or obese mother and the prevalence of stunted child-overweight mother double burden is 10.3% for the entire population (data not shown) (Blankenship 2016b). As such, it is important to consider this double burden during program design and ensure that interventions targeting undernutrition of women, infants and young children do not contribute to overweight prevalence.

The GNR found most nutrition plans to be lacking in terms of targets for maternal as well as infant health, education, employment and female empowerment. Women's status and power are shown to be important drivers of nutrition outcomes globally; adolescent mothers are more likely to have

stunted children, and children are less likely to be stunted if their mother has secondary education (IFPRI 2016). As of the 2012-13 DHS, 15-19 year old girls surveyed had only completed an average of 3.4 years of school and almost two out of five were illiterate (NIPS 2013). It is thus important not only to incorporate nutrition for women, especially adolescent girls, into national nutrition plans, but consider nutrition sensitive interventions such as delaying marriage or pregnancy by enabling or encouraging girls to stay in formal education for longer, through behaviour change, and by increasing access to and acceptability of family planning (Christian 2014; IFPRI 2016).

According to secondary data analysis, half of Pakistani women aged 20-49 years were married when they were between 15-19 years old with a mean age of first marriage of 19 years (data not shown) (Salam et al. 2014). As shown in Figure 19, 8% of adolescent girls aged 15-19 years are already mothers or pregnant with their first child in Pakistan (NIPS 2013). This ranges from 1% among 16 year olds to 17% among 19 year old girls (Figure 19Figure 17) (NIPS 2013). Adolescent girls are more likely to be pregnant or already mothers in rural compared to urban areas and prevalence was higher in KP (10.2%) than other provinces (Figure 20). As shown in Figure 21, secondary analysis found that in areas where women marry younger, stunting prevalence is higher (correlation = -0.64) (NIPS 2013).

Figure 19: Percentage of adolescent girls in Pakistan who are pregnant with their first child or already a mother by age (DHS 2012-13)

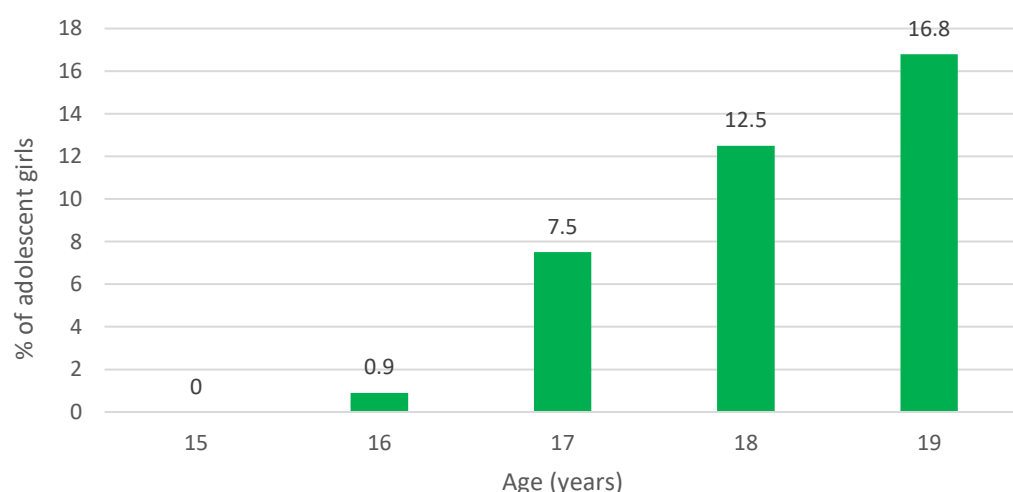


Figure 20: Percentage of adolescent girls aged 15-19 who are pregnant with their first child or already a mother by area (DHS 2012-13)

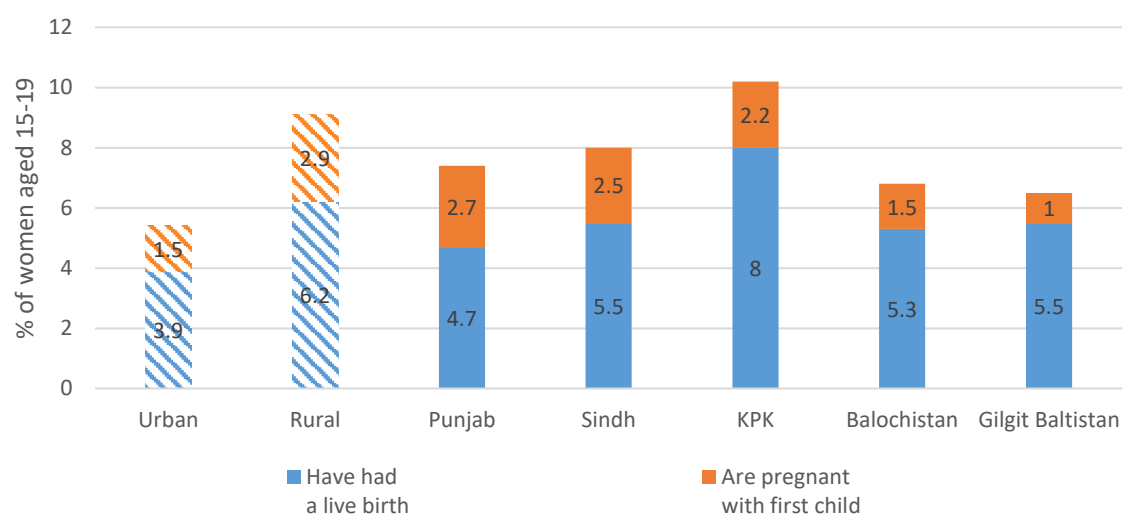
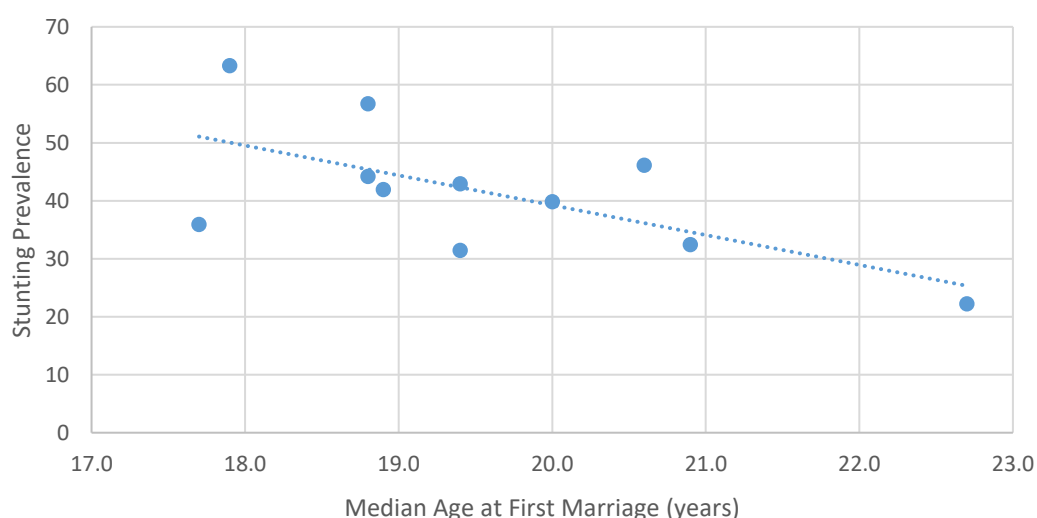


Figure 21: Correlation (-0.64) between median age of women at first marriage and stunting prevalence of IYC<5 years by area in Pakistan (secondary analysis of DHS 2012-13)



Married adolescent girls are much less likely to access and use contraception than adult married women (Figure 22) (NIPS 2013). Only 10% of adolescent girls are using a method of contraception, compared to 21% of 20-24 year olds, 31% of 25-29 year olds and 41% of women aged 30-34. Women living in urban areas are more likely than rural women to be using a method of contraception and use was higher in Punjab province (41% of married women) compared to Sind (30%) and KP (28%) and much lower in Balochistan (20% of married women) than all other provinces (Figure 23) (NIPS 2013). As shown in Figure 24, secondary analysis found that in areas with lower use of contraceptive methods, stunting prevalence is higher (correlation = -0.84) (NIPS 2013).

These data showing significant incidence of marriage and pregnancy for adolescent girls and low use of contraceptive methods, especially for younger women, and anecdotally low school attendance/high dropout rates provide further rationale for a greater focus on nutrition sensitive interventions that could improve the nutrient intake of women and adolescent girls and empower

girls to complete their own growth and development before becoming pregnant, ultimately ensuring improved nutritional status for women leading up to, during and following childbirth.

Figure 22: Current use of contraception by married women by age group, Pakistan (DHS 2012-13)

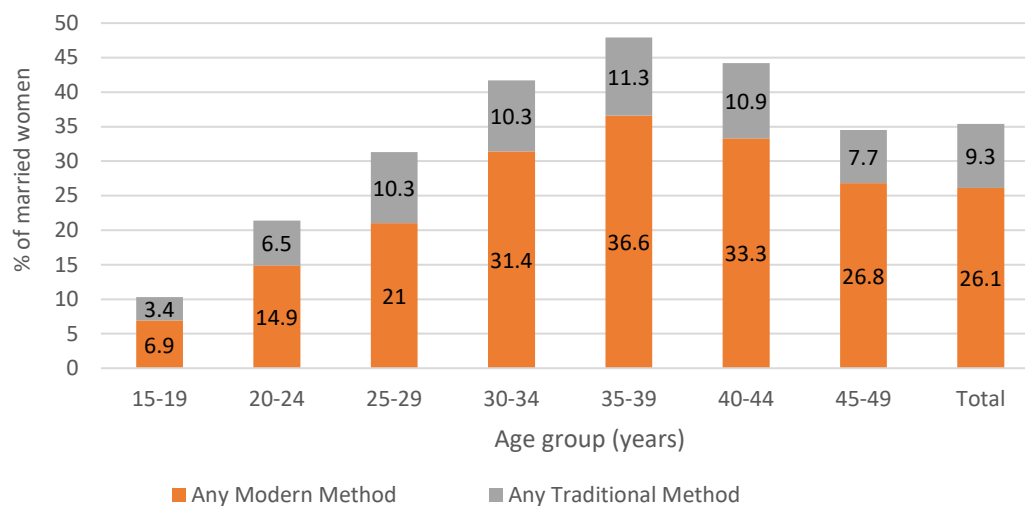


Figure 23: Current use of contraception by married women by area, Pakistan (DHS 2012-13)

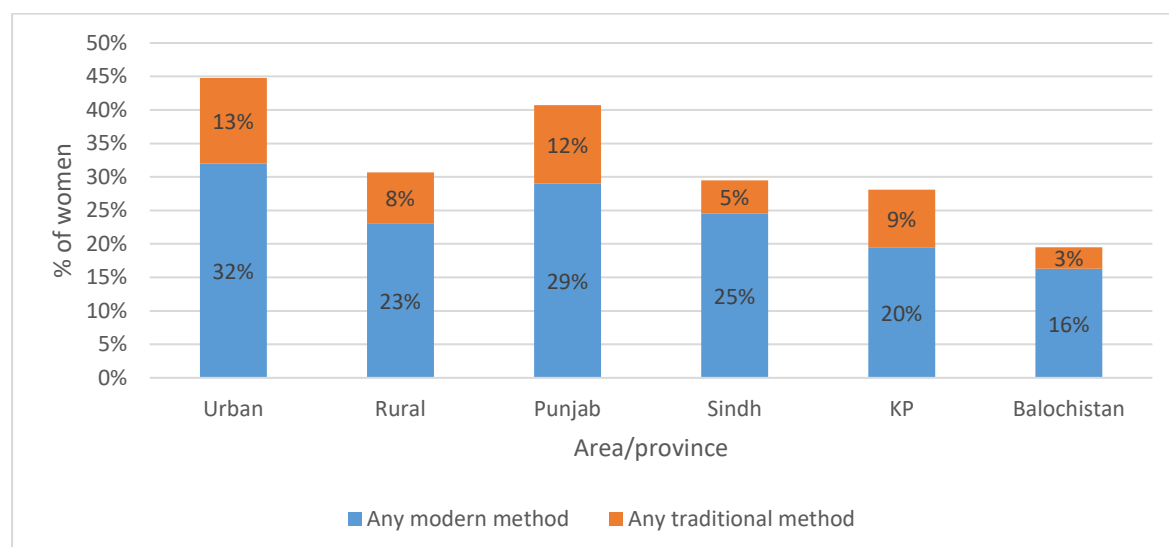
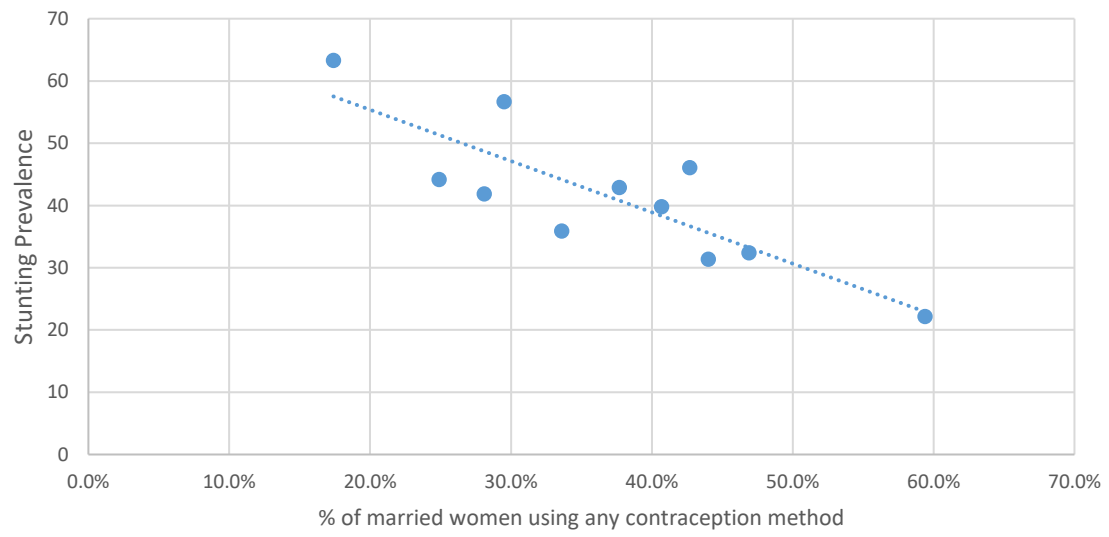


Figure 24: Correlation between use Contraception (any) by married women and Stunting Prevalence for IYC<5 years by province and territory

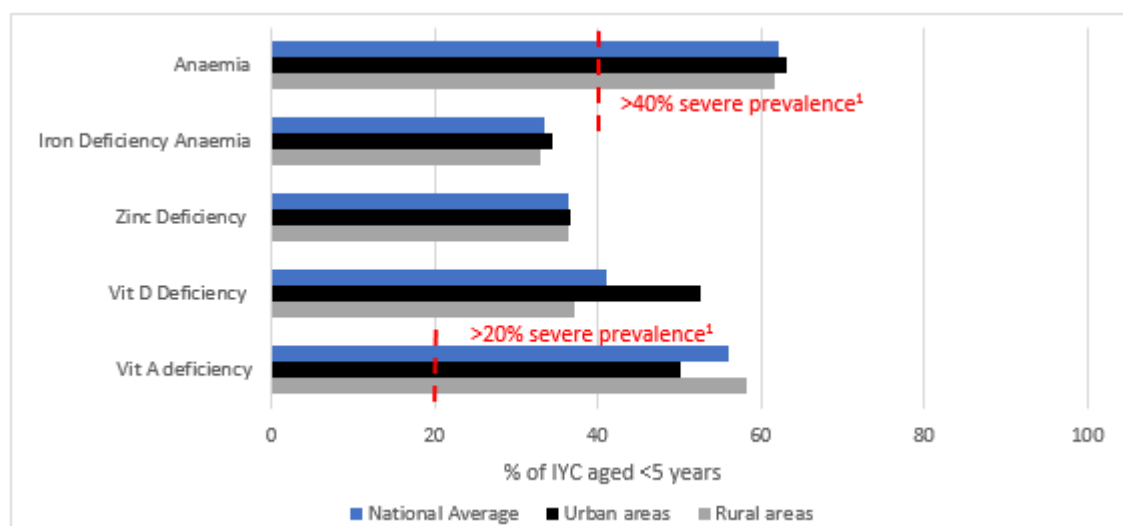


4.d High prevalence of micronutrient deficiencies across the population = universally poor diets for women and children in Pakistan

While there were no notable differences in anthropometric measurements for women and children by indicators of socio-economic status and urban/rural location in the Pakistan NNS and DHS, micronutrient deficiencies tended to affect populations indiscriminately and dietary diversity was universally poor. This suggests that whilst dietary intake in terms of quantity and frequency may differ across wealth quintiles or geographical areas, intake in terms of micronutrients is lacking in general. This indicates that interventions are required across the population, tailored to the local context, to respond to issues of poor dietary quality.

The findings from the 2011 NNS in terms of micronutrient deficiencies were extremely concerning. Figure 25 compares the prevalence of anaemia and micronutrient deficiencies for young children in urban and rural areas. Almost two thirds (62.1%) of children nationally were anaemic, over the WHO cut off for 'severe prevalence' and one third (33.4%) had iron deficiency anaemia (Government of Pakistan & UNICEF Pakistan 2011). The prevalence of zinc, vitamin D and vitamin A deficiencies was also very high, affecting 36.5%, 41.1% and 56% of young children nationally. There was very little difference (1.5 percentage points or less) in prevalence of vitamin D, zinc and iron deficiency anaemia and only 8.2 percentage points of difference for vitamin A. There was slightly higher prevalence of vitamin D deficiency for children living in urban areas (15.4 percentage points difference), however other studies have found high levels of deficiency across all age groups, income levels and locations in Pakistan (Riaz et al. 2016; Masood & Iqbal 2008).

Figure 25: Prevalence of micronutrient deficiencies for infants and young children aged <5 years in Pakistan by area (NNS 2011)

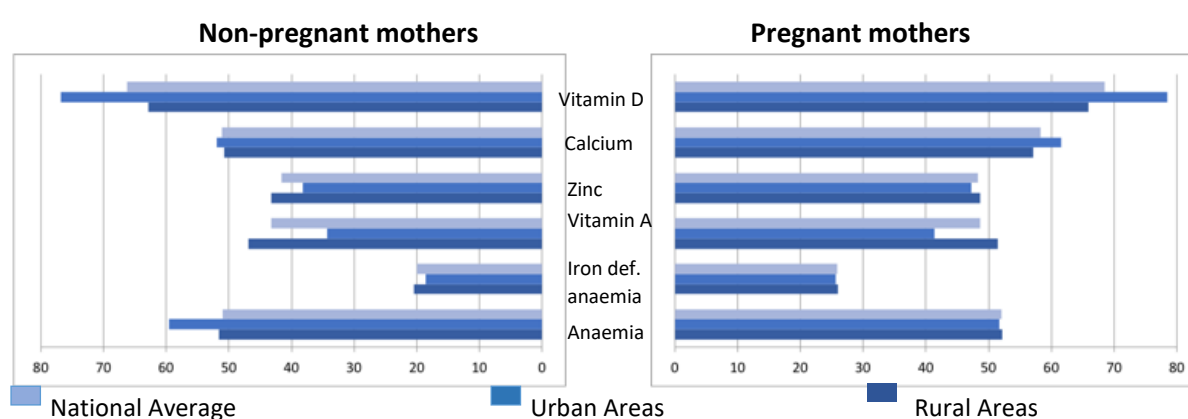


¹ WHO cut-offs for evaluating the public health significance of micronutrient malnutrition
http://www.who.int/nutrition/publications/micronutrients/GFF_Part_2_en.pdf?ua=1

Figure 26 displays the prevalence of anaemia and micronutrient deficiencies for pregnant and non-pregnant mothers nationally and in urban and rural areas. There was a high prevalence of micronutrient deficiencies for both groups; vitamin D deficiency affected over two thirds of women and the prevalence of anaemia and calcium deficiency were over 50%. Two in five non-pregnant

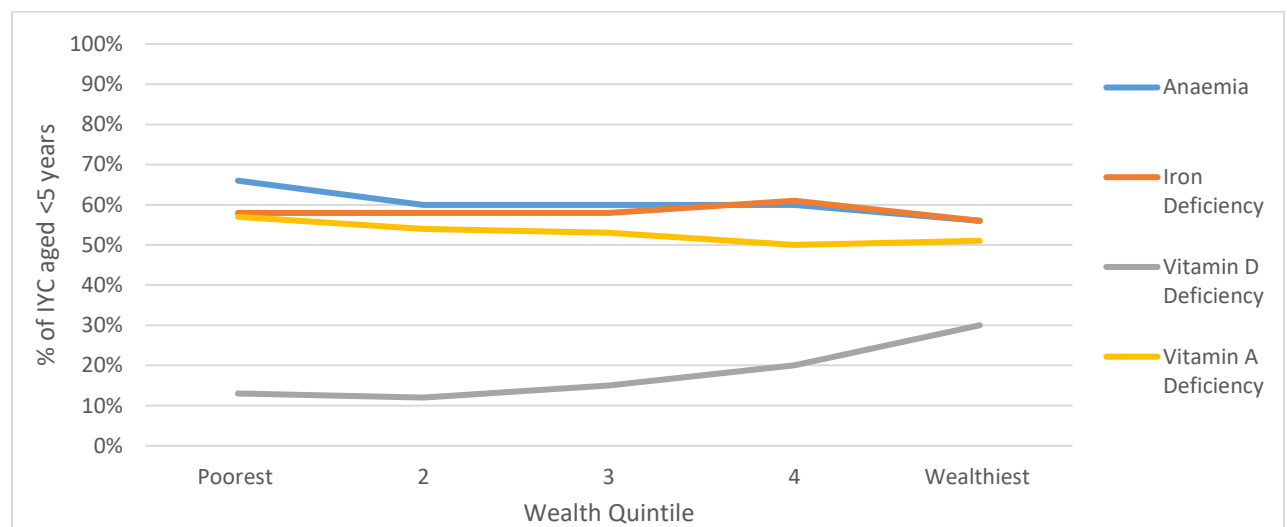
women and half of pregnant women were affected by zinc and vitamin A deficiencies and one in five non-pregnant and one in four pregnant women had iron deficiency anaemia (Government of Pakistan & UNICEF Pakistan 2011). As with young children, the prevalence of individual micronutrient deficiencies was similar amongst women living in urban and rural areas. An exception was the prevalence of vitamin D deficiency, which was 14 percentage points higher for non-pregnant women and 12.5 points higher for pregnant women in urban areas compared to rural areas, a similar finding to that discussed above for young children (Government of Pakistan & UNICEF Pakistan 2011). This may point to differences in sun exposure (essential for Vitamin D production in the skin) between urban and rural women in Pakistan due to clothing preferences and other factors, however further investigation would be required (Iqbal & Khan 2010). Also, the prevalence of vitamin A deficiency was slightly higher for rural women; 10.2 percentage points for non-pregnant and 6.3 points for pregnant rural women (Government of Pakistan & UNICEF Pakistan 2011).

Figure 26: Prevalence of micronutrient deficiencies for pregnant and non-pregnant mothers in Pakistan by area, (NNS 2011)



A secondary analysis of the NNS 2011 and MICS datasets for Punjab, conducted by UNICEF, found that there were no significant differences in the prevalence of micronutrient deficiencies for young children across wealth quintiles (Figure 27) (Blankenship 2016b; Government of Pakistan & UNICEF Pakistan 2011; Bureau of Statistics. Planning & Development Department. Government of the Punjab 2014). One exception was the prevalence of vitamin D deficiency; which increased with wealth quintile, an interesting finding given that prevalence was also higher amongst urban populations who generally have higher incomes than rural areas (Government of Pakistan & UNICEF Pakistan 2011). This may indicate a particular lifestyle risk for vitamin D deficiency among more affluent, urban populations. A potential explanation could be differences in routine sun exposure as a result of work and living arrangements as well as clothing practices, yet further research is required (Iqbal & Khan 2010).

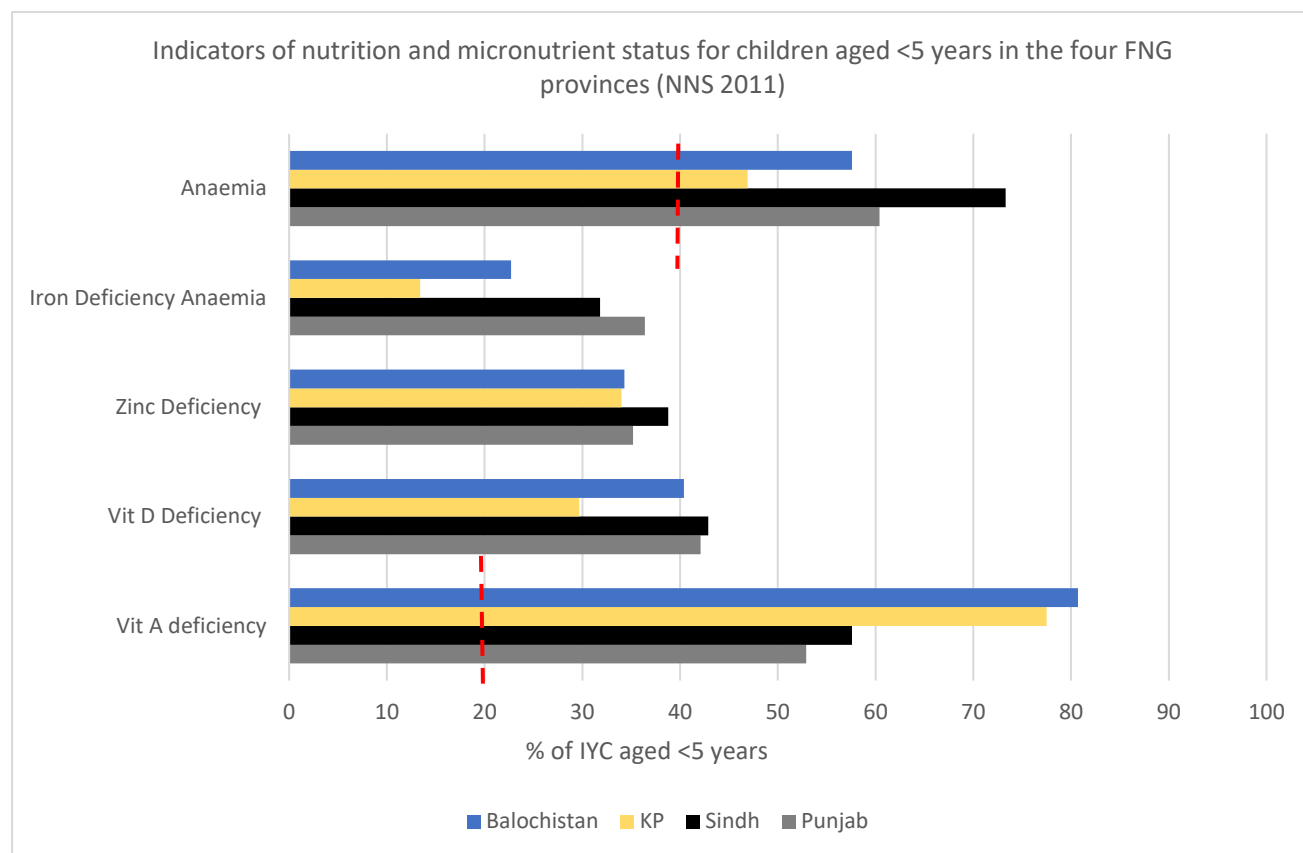
Figure 27: Prevalence of micronutrient deficiencies for young children by wealth quintile in Punjab Province (NNS 2011 and Blankenship 2016)



Prevalence of deficiencies for some micronutrients did differ between provinces, potentially indicative of regional differences in access to and use of nutritious foods as well as regional diet preferences. As shown in Figures 28-29, there was lower prevalence of anaemia for women and children in KP compared to other provinces, yet higher prevalence of vitamin A deficiency. Conversely, prevalence of vitamin A deficiency was lowest in Sindh and Punjab yet vitamin D deficiency, especially among women, was more prevalent (Government of Pakistan & UNICEF Pakistan 2011). Punjab and Sindh have large urban populations and high rates of urbanisation and, compared to other areas of the country, a greater proportion of inhabitants in higher wealth quintiles (Jan et al. 2008; Pakistan Bureau of Statistics. Government of Pakistan 2015).

Regardless, the provincial results still indicate an overall high prevalence of micronutrient deficiencies for young children and women, suggestive of very poor nutrient intake and absorption and universally poor diets across Pakistan.

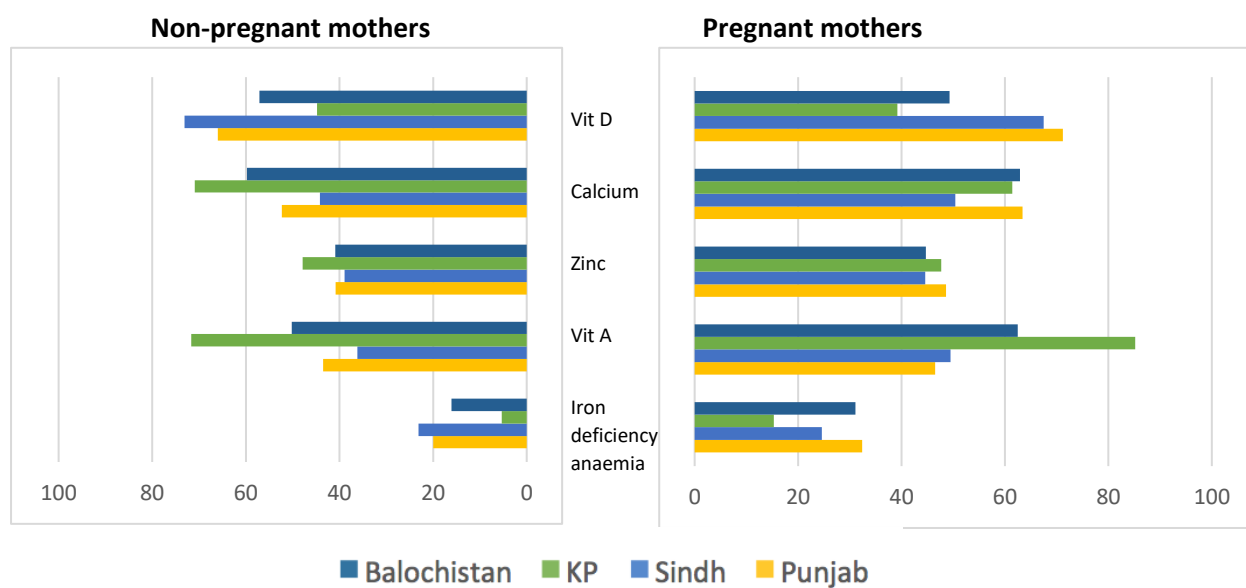
Figure 28: Indicators of micronutrient status for children aged <5 years in Balochistan, KP, Punjab and Sindh Provinces (NNS 2011)



¹ WHO cut-offs for evaluating the public health significance of micronutrient malnutrition

http://www.who.int/nutrition/publications/micronutrients/GFF_Part_2_en.pdf?ua=1

Figure 29: Prevalence of micronutrient deficiencies for pregnant and non-pregnant mothers by province (NNS 2011)



4.e Quantity and quality of dietary intake is a problem

High prevalence of stunting, wasting and micronutrient deficiencies reflect issues with nutrient intake as well as sanitation and disease prevalence (UNICEF 1990). In the case of Pakistan, the contribution of poor sanitation to the high prevalence of malnutrition is well documented, however poor dietary quality, as well as quantity, play important roles as well (MQSUN 2013; Zaidi et al. 2013; Bhutta et(Raju & D'Souza 2017) al. 2013).

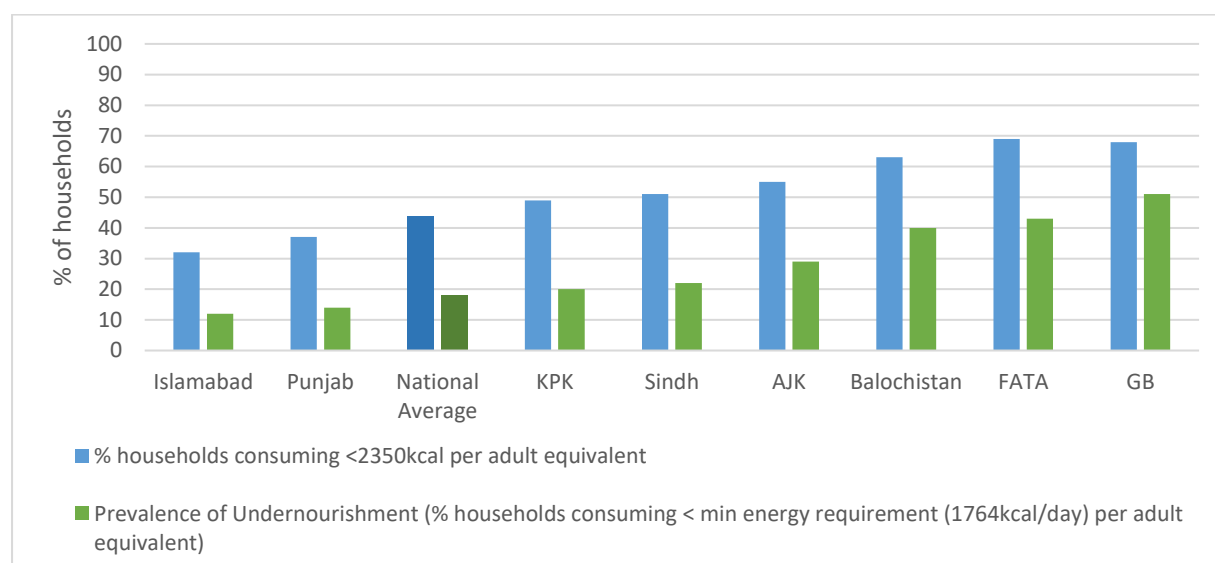
The results presented above showing universally high prevalence of micronutrient deficiencies suggest that dietary quality is also poor across different segments of the population. Available secondary data shows inadequate energy intake and extremely poor dietary diversity at the household level as well as for key vulnerable target groups across the country. These poor figures are attributable to poor economic access to nutritious foods, as detailed in the next section, as well as inadequate dietary practices, as described below.

- Energy Intake

o Household- level energy intake

As per the 2016 State of Food Security in Pakistan report, 44% of the population consumes less than the threshold of 2350kcal/day and 18% less than minimum dietary energy requirements of 1764kcal/day (Figure 30) (MNFSR 2016). These rates were highest in Balochistan province and FATA and GB territories where up to 69% of the population consumed less than the threshold and 51% less than minimum energy requirements (MNFSR 2016). Unsurprisingly, based on the favourable conditions afforded by food production and costs, climate and market access (data presented in the next section), inadequate energy consumption was lowest in Punjab province, after Islamabad territory (MNFSR 2016).

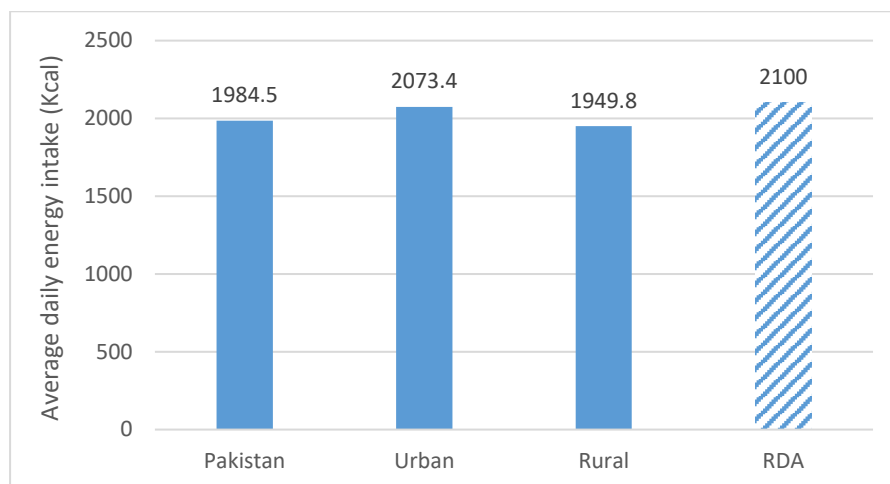
Figure 30: Percentage of households with inadequate energy intake based on caloric consumption below threshold and below minimum energy requirements (MNFSR 2016)



o Individual Energy Intake

In the dietary intake data collected as part of the 2011 NNS, energy intake for children aged 0-23 months and their mothers was inadequate, especially in rural areas (Government of Pakistan & UNICEF Pakistan 2011). As shown in Figure 31, the average energy intake of women was 1984.5 kcal, or 94.5% of the RDA. The average energy intake of IYC from complementary foods was much further below the recommended levels for infants and young children also (Government of Pakistan & UNICEF Pakistan 2011). These data suggest that many women and a significant number of IYC are likely not consuming enough food to meet their energy needs for growth, lactation and pregnancy.

Figure 31: Average daily energy intake (kcal) of mothers nationally and in urban and rural areas compared to recommended dietary allowance (RDA) (Government of Pakistan & UNICEF Pakistan 2011)



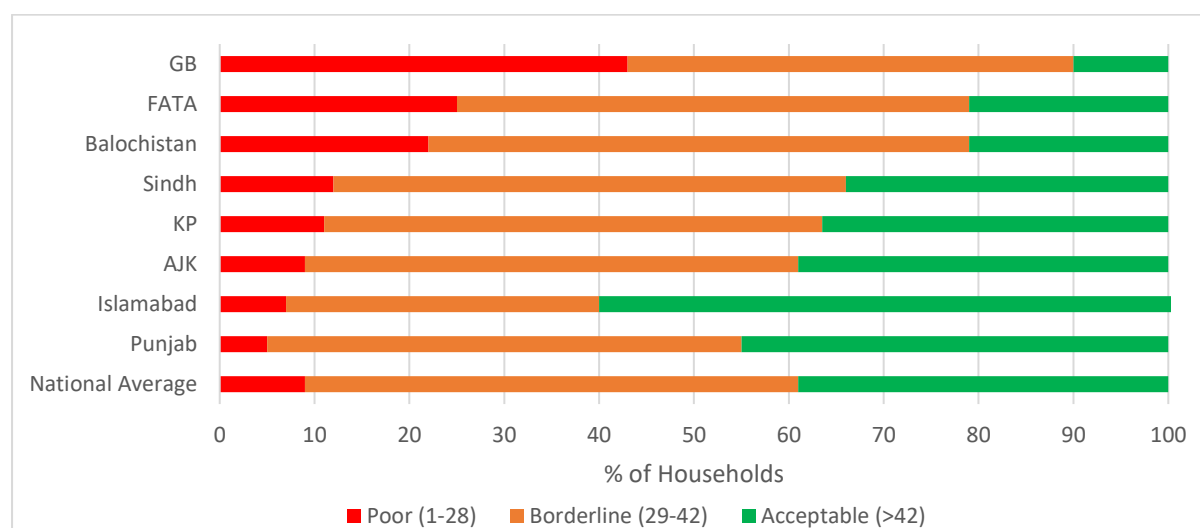
- Dietary Diversity

o Household-level Food Consumption Score and Dietary Diversity

As per the 2016 'State of Food Security in Pakistan' report, less than two out of five households (39%) had an adequate food consumption score (FCS), meaning dietary diversity and frequency are substandard overall (Figure 32) (MNFSR 2016). The FCS combines the diversity and frequency of intake of various food groups (the number of days each food group is consumed) weighted by the relative nutritional importance of different food groups. One in 10 (9%) households had a 'poor' FCS and more than half (52%) were borderline, meaning they are vulnerable and could slip in to the 'poor' group if their situation deteriorates (MNFSR 2016). Poor FCS was most prevalent in Gilgit Baltistan (43%), followed by FATA (25%) and Balochistan (22%) (Figure 32). More than three in five (68%) households in the highest wealth quintile had an acceptable FCS compared to only one in five (22%) in the poorest quintile. FCS also differed by area; almost half (47%) of urban households had an acceptable FCS compared to just over a third (37%) of rural households (MNFSR 2016).

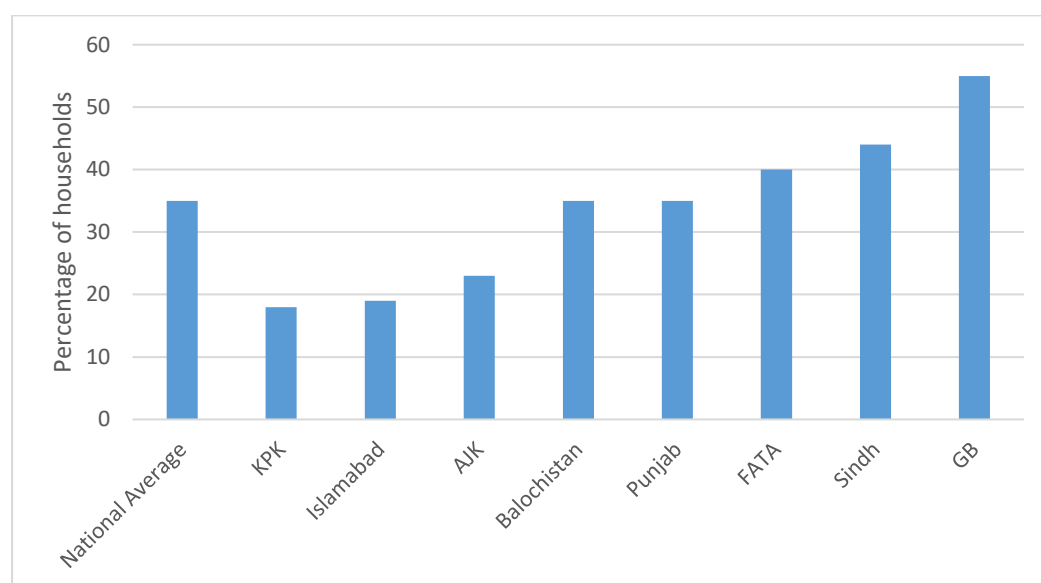
2016)

Figure 32: Food Consumption Score by Province/Territory and Nationally (MNFSR 2016)



As per the 2016 State of Food Security study, over a third (35%) of households in Pakistan consume non-diverse diets (Figure 33) (MNFSR 2016). The proportion of households with low dietary diversity (reportedly consuming foods from less than 5 food groups over a 7 day period) was highest in GB and Sindh at 55% and 44% respectively and lowest in KP at 18%.

Figure 33: Percentage of households with low dietary diversity (consumption from <5 food groups) by province or territory (MNFSR 2016)



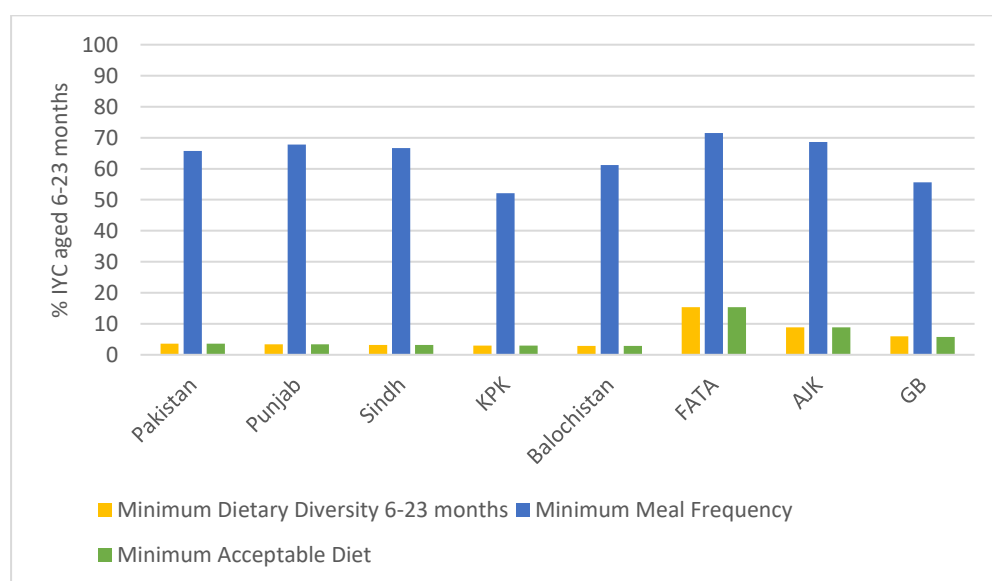
o Individual dietary diversity

Nationally only 3% of IYC diets meet minimum dietary diversity, according to the 2011 NNS (Government of Pakistan & UNICEF Pakistan 2011). The percentage was slightly higher in urban areas (6.2%) compared to rural areas (2.4%). Minimum meal frequency (MMF)⁶ was met for over half of IYC surveyed as part of the NNS; overall 66% mothers provided foods to their children at a minimally acceptable meal frequency, with slightly higher practice in urban areas. However, due to the low diversity, only 3.6% of children met the requirements for a minimum acceptable diet (MAD)⁷, as shown in Figure 34. These dramatically low dietary diversity figures across Pakistan highlight severe issues with household-level dietary diversity and food access in general and IYCF practices in particular, especially in terms of ensuring that available household food is also shared with IYC.

⁶ MMF = proportion of breastfed and non-breastfed 6-23mo IYC who receive solid, semi-solid, or soft foods the minimum number of times or more (twice for breastfed 6-8mo, 3 times for breastfed 9-23mo and 4 times for non-breastfed children 6-23mo)

⁷ool

Figure 34: Percentage of IYC aged 6-23 months for which minimum dietary diversity, meal frequency and minimum acceptable diet were met in the 2011 NNS (Government of Pakistan & UNICEF Pakistan 2011)



- Nutrient consumption and food purchasing
 - o Household-level intake

Household consumption data from a 7-day recall indicate that the majority of households in Pakistan are not consuming adequate amounts of vitamin A and iron and many are not consuming enough zinc or protein (Figure 35) (MNFSR 2016). Whilst households in rural areas reported slightly more staple food purchase or production, there was little difference overall in general food expenditure on a national level as per the last HIES (Figure 36). Conversely, food expenditure by wealth quintile revealed stark differences; poorer households consume a greater proportion of staples and less animal source foods (Figure 37 and Figure 38) (MNFSR 2016). The absolute amount of money spent on food overall also differed by wealth group. As such, spending 7.3% of total expenditure of the highest wealth quintile would result in a much greater total expenditure amount than 11.3% of expenditure for the lowest quintile. Monthly per-capita food expenditure was 1650 in the lowest wealth group nationally (from 1,488PKR in Balochistan to 1817PKR in Punjab) and 33,035 in the highest wealth group (24,297 in Punjab to 45,610 in KP) (Pakistan Bureau of Statistics. Government of Pakistan 2015). Total expenditure was also higher in urban areas compared to rural areas, as shown in Appendix 13.

As per the HIES results fruit and vegetable consumption was low, accounting for only 12.5% of household food expenditure overall (Pakistan Bureau of Statistics. Government of Pakistan 2015). Annual per-capita consumption of animal-source foods, especially milk, has increased dramatically in the last 15 years, yet actual consumption likely differs by economic access (Pakistan Bureau of Statistics. Government of Pakistan 2015; FAO 2003).

Figure 35: Prevalence of households likely to have inadequate intake of Vitamin A, Iron, Zinc and Protein based on reported food consumption (MNFSR 2016)

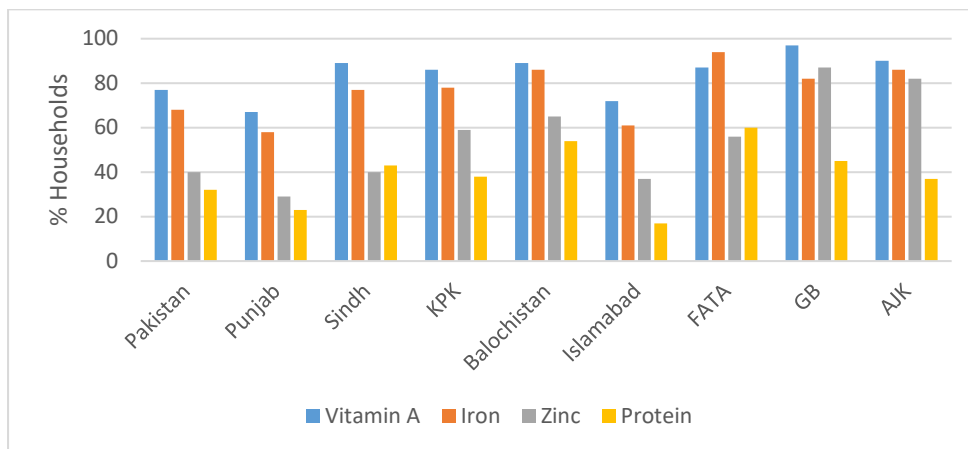
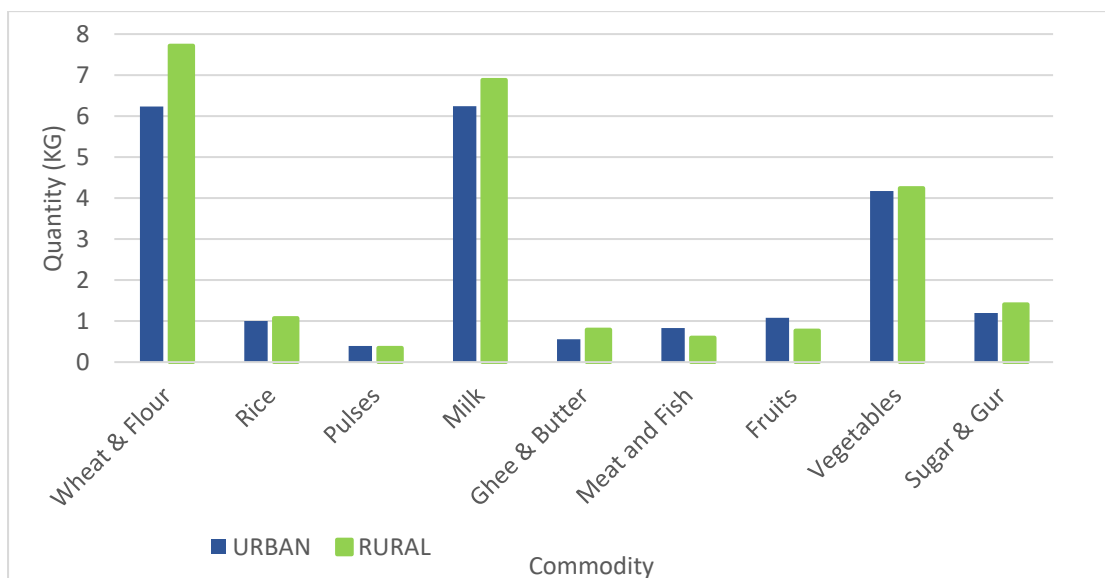


Figure 36: Per capita monthly consumption of major food items by area as per the 2014 HIES (Pakistan Bureau of Statistics. Government of Pakistan 2015)



households

Figure 37: Percentage of monthly expenditure on major food items by commodity for households in the LOWEST Wealth quintile (HIES 2014) (Pakistan Bureau of Statistics. Government of Pakistan 2015)

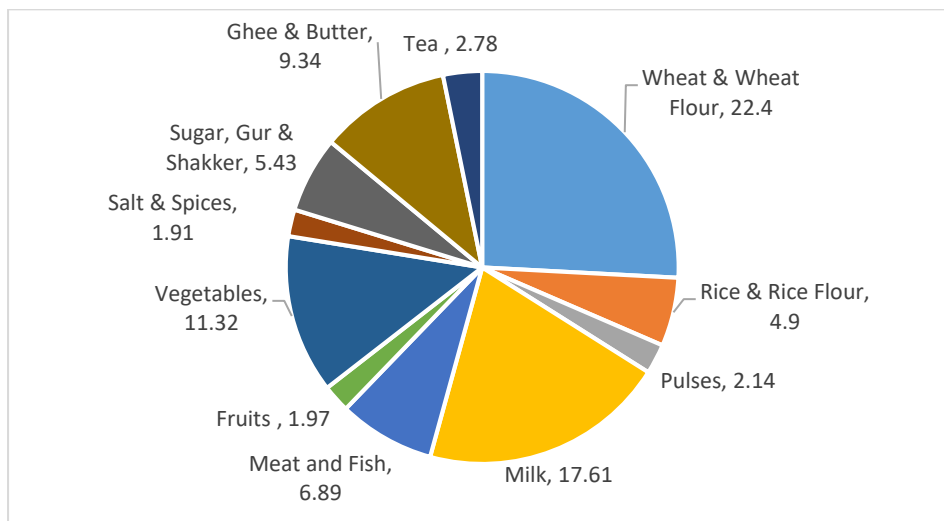
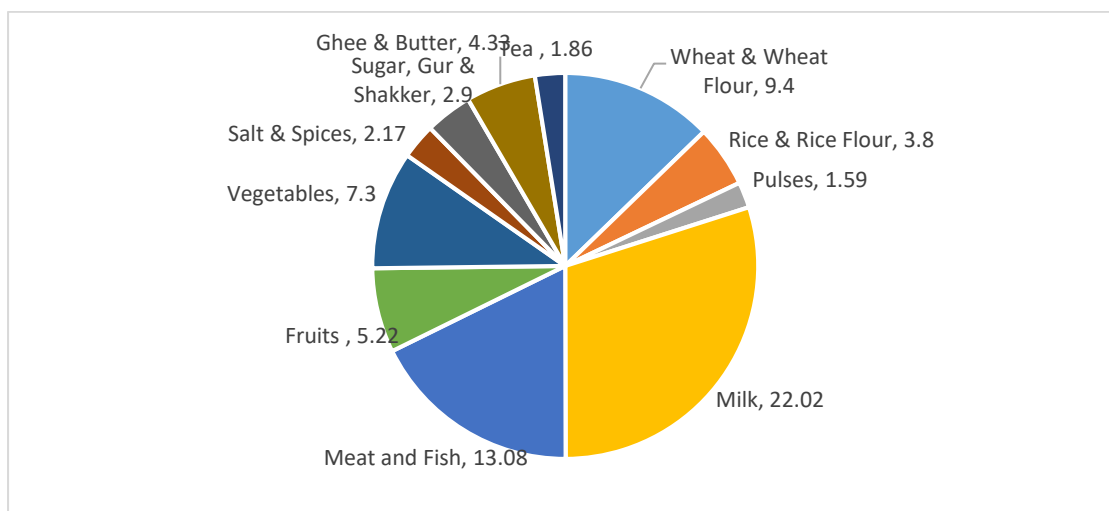


Figure 38: Percentage of monthly expenditure on major food items by commodity for households in the HIGHEST Wealth quintile (HIES 2014) (Pakistan Bureau of Statistics. Government of Pakistan 2015)



○ Individual nutrient intake and dietary practices

■ Infants and Young Children

Overall, IYC diets and feeding practices in Pakistan are inadequate across the country. IYC diets are low in energy and complete proteins and lacking in micronutrients and rates of exclusive and continued breastfeeding are poor. As per the last DHS, just over half (56%) of children age 0-23 months are breastfed appropriately for their age (i.e., exclusive breastfeeding for children age 0-5 months and continued breastfeeding along with complementary foods for children age 6-23 months) (NIPS 2013).

While breastmilk is the primary liquid fed to infants <6 months, in general the recommended practice of breastfeeding exclusively for the first six months of life is not being practiced; only half of

infants are given only breastmilk in the 1st month, dropping to 15% by the 5th month (Figure 40). From 1983 to 2008, the prevalence of any breastfeeding at 6 months of age decreased from 96% to 37%. Complementation of breast milk with other liquids or foods starts at an early age. Contrary to the recommendation of exclusive breastfeeding, 17% of children < 6 months are given plain water, 28% other milk, and 10% complementary foods in addition to breast milk (3% of children age 0-1 month, 5% of children age 2-3 months, and 19% of children age 4-5 months). Further, in the last DHS, 34% of infants less than age 6 months were found to be fed using a bottle, 7 percentage points higher than in 2006-07 (NIPS 2013). Provision of formula and other milk was found to displace breastmilk in infant diets (NIPS 2013). Feeding frequency, of breastmilk and other foods or liquids if applicable, of infants aged <6mo was found to be inadequate, with little evidence to demonstrate on demand feeding (infants receiving ~6.7 breast milk or other feeds, compared to the recommended number of 8+ feeds in a 24 hour-period) (NIPS 2013).

42% of children under age 2 are bottle fed. Almost all (85%) non-breastfed children had acceptable feeding frequency in the last DHS, compared to only half of children who continued to receive breastmilk (55%). Mothers of breastfed babies continue to rely on breastmilk as the major source of intake for children <2 years. This was especially the case for poorer families; only 55% of IYC from the lowest wealth quintile met minimum meal frequency compared to 69% of those from the highest quintile, indicating that there may also be economic barriers to providing complementary food (NIPS 2013). Further, IYC aged 6-11 months were less likely to receive minimum meal frequency (51.9 percent) than children 12-23 months of age (74 percent) (NIPS 2013).

Although children age 6-8 months should start to receive solid/semisolid foods in addition to breastmilk, 45% of children in this age group are not being given complementary foods. Four out of five children (81%) are still breastfed at age 1, and half (56%) until age 2 (Figure 41). Once initiated, the quality of complementary diets in Pakistan is universally poor, indicating a strong influence of socio-cultural beliefs and preferences. Most diets are based on starchy foods, lentils and milk and <20% of IYC receive meat, eggs, fruit or vegetables according to the NNS (Government of Pakistan & UNICEF Pakistan 2011). There is also very high consumption of nutrient-poor foods (biscuits, sweets, and tea) (Figure 40).

The average daily consumption of cereals, pulses, eggs and meat by IYC shown in Figure 39 suggests variation in preferences, practices and food access by province. On average, consumption of wheat, rice and pulses was equal in Punjab. IYC diets in Sindh and Balochistan diets included similar wheat and rice consumption to Punjab but the average amount of pulses consumed was higher. IYC diets in KPK had more pulses but less wheat. Consumption of pulses, eggs and meat by IYC was higher in urban areas and consumption of meat was significantly higher in Balochistan than other provinces (Government of Pakistan & UNICEF Pakistan 2011). Consumption of fruit and vegetables by IYC was also higher in urban areas compared to rural areas and there was a higher average vegetable consumption by IYC in Balochistan than in other provinces. The high average intake of tea (>50g per day) by IYC in Balochistan is suggestive of high consumption practices, which could mean that mineral absorption, especially of iron, is compromised in this province (Government of Pakistan & UNICEF Pakistan 2011).

There are regional variations in beliefs around hot/cold properties of foods, affecting dietary decisions for IYCF. An analysis of qualitative studies focusing on current practices, influences, barriers to improving practices and opportunities for improvement found that behaviours of concern were preponderance of pre-lacteal feeds, discarding of colostrum, early weaning and inappropriate

timing and type of complementary foods. Key influencers were low maternal education, poor receipt/quality of nutrition promotion through health services and strong religious and community beliefs. This study highlighted the importance of education for women and their families before birth, around time of birth and sustained support and education leading into the post-natal period as well as greater support for health services to provide nutrition education (UNICEF 2016; Karim Chagan et al. 2016; Badruddin et al. 1997; Smj 2010; Asim et al. 2014; Asim et al. 2015).

0-23mo

Figure 39: Overall food consumption by food types as a percentage of the total amount (weight) of food consumed for 0-23mo children by province or territory based on 24hr recall from NNS 2011(Government of Pakistan & UNICEF Pakistan 2011)

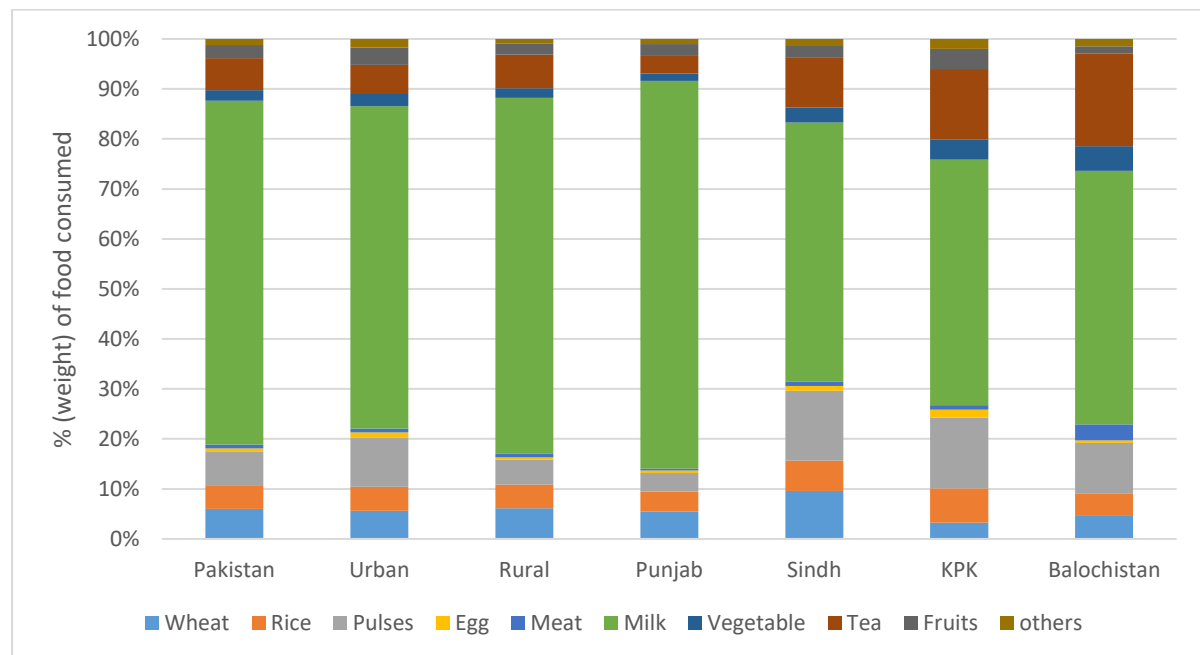


Figure 40: Infant feeding practices by age in months Pakistan (DHS 2012-13) (NIPS 2013)

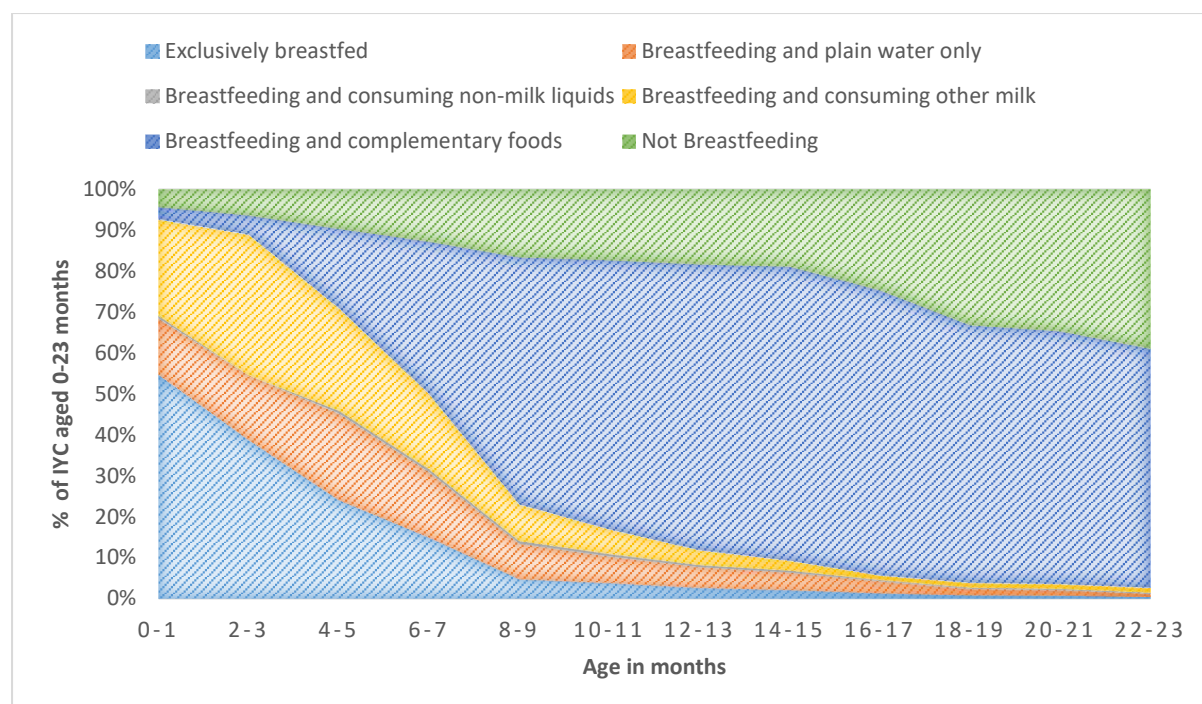


Figure 41: IYCF Practices by region and area (NNS 2011) (Government of Pakistan & UNICEF Pakistan 2011)

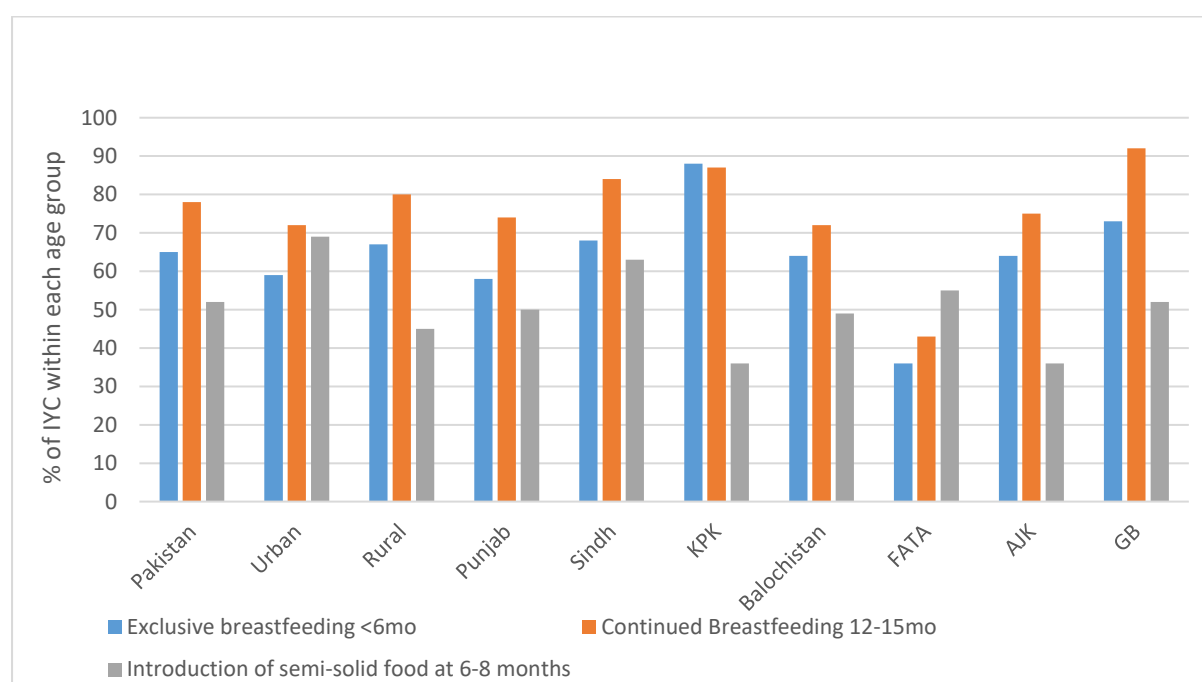
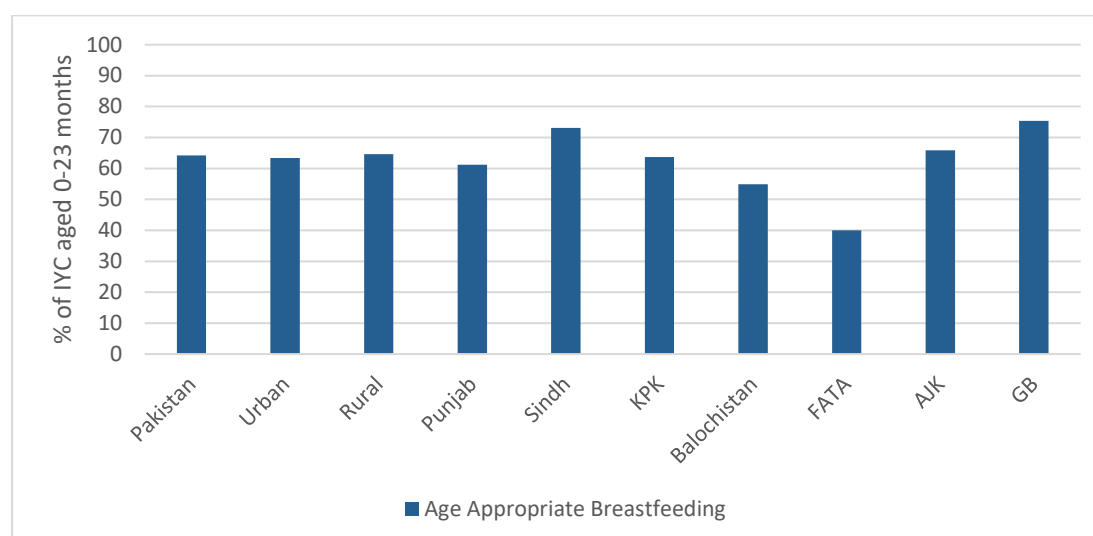


Figure 42: Percentage of IYC aged 0-23 months receiving age appropriate breastfeeding (NNS 2011) (Government of Pakistan & UNICEF Pakistan 2011)



■ Women and adolescent girls

In general there is a poor understanding of dietary intake and preferences for women and adolescent girls in Pakistan. In addition to lacking energy, the 2011 NNS also found that maternal diets are low in micronutrient content, including calcium and vitamin C (Government of Pakistan & UNICEF Pakistan 2011). Based on intake reported in the NNS, average consumption of animal source foods for mothers of IYC was higher in urban areas than rural areas and milk consumption was highest in Punjab (Figure 43). Further, mothers reported high levels of tea consumption across all provinces, meaning significant anti-nutrient intake (Figure 44). Further data on staple food and fruit and vegetable consumption are suggestive of low dietary diversity and poor consumption of nutrient dense foods across all provinces (Figure 45 and Figure 46), which aligns with the data on household dietary diversity presented above.

Figure 43: Average consumption (grams per day) of meat, eggs and milk by mothers by area (NNS 2011)

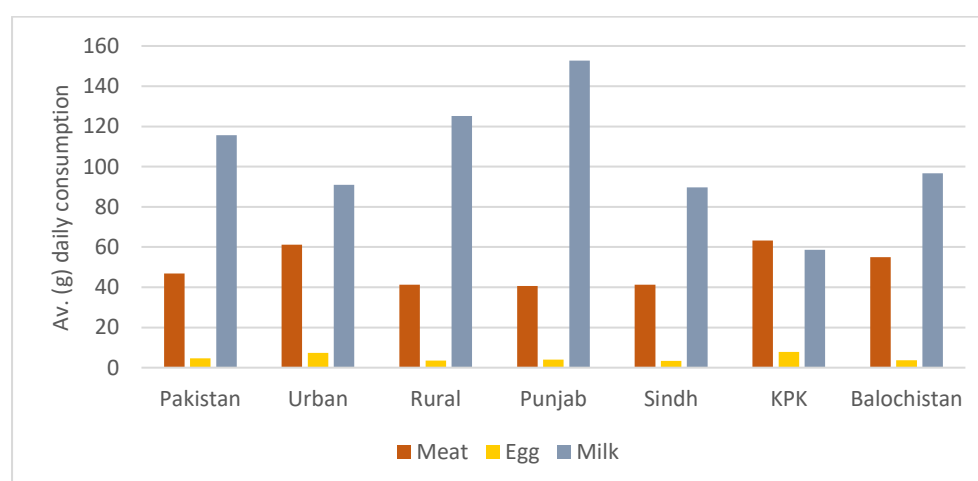


Figure 44: Average consumption (mL per day) of tea by area by mothers (NNS 2011)

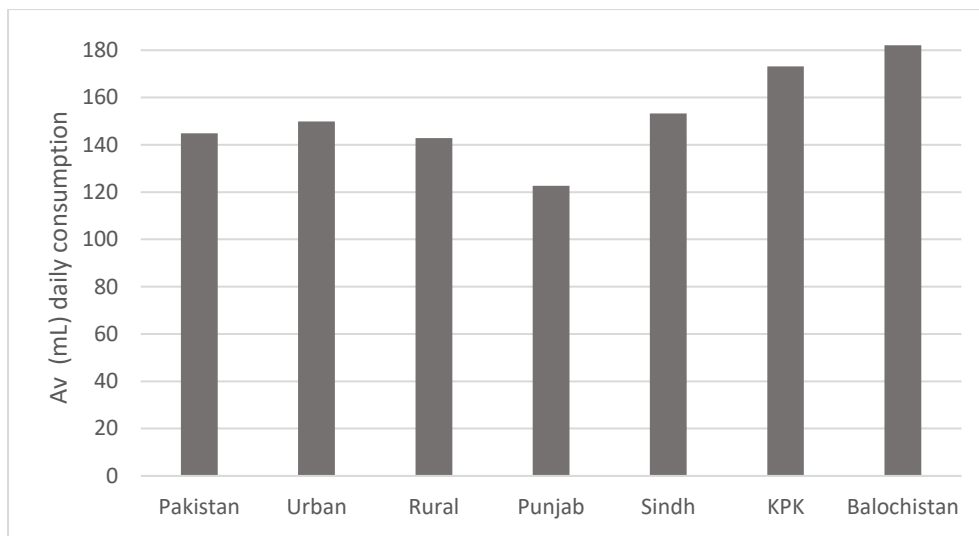


Figure 45: Average consumption (grams per day) of wheat, pulse, tubers/roots and rice by mothers by area (NNS 2011)

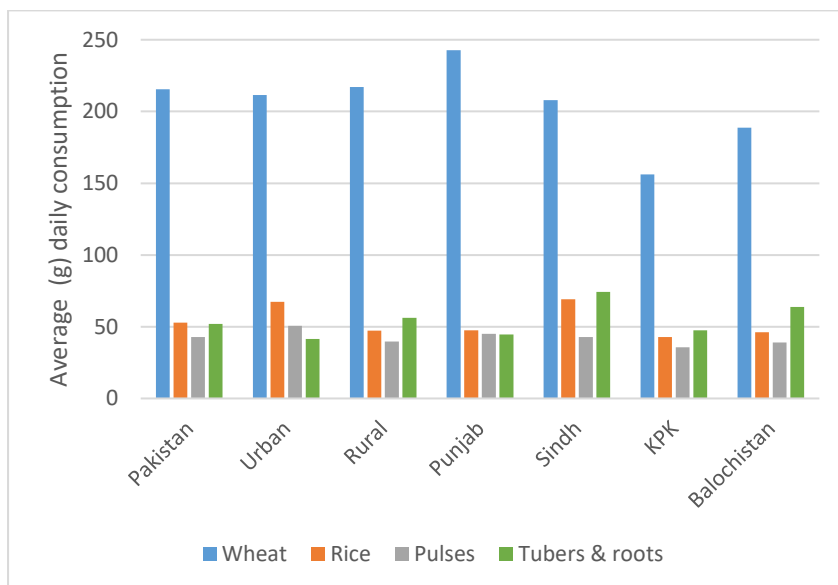
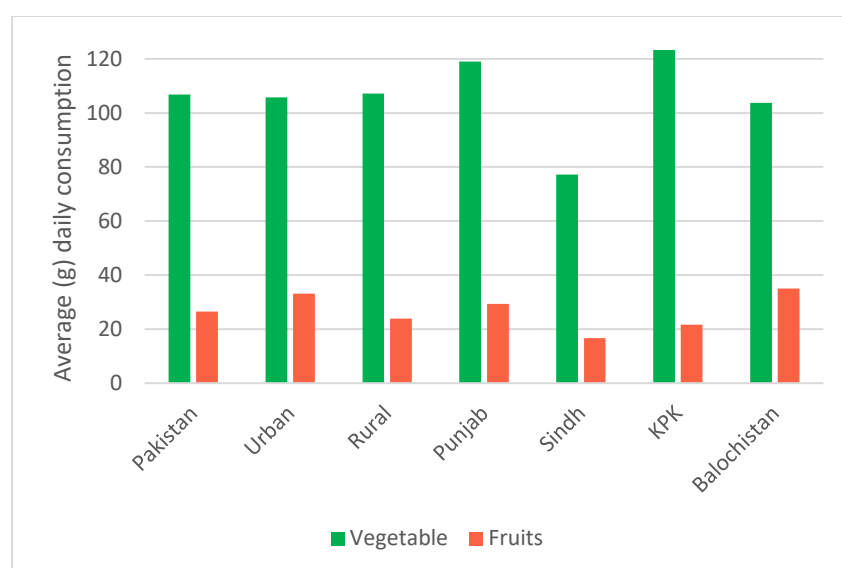


Figure 46: Average consumption (grams per day) of fruit and vegetables by mothers by area (NNS 2011)



High rates of food insecurity means that women and girls have few options regarding dietary choices; during focus group discussions held as part of the 2011 NNS, women shared that they had little choice regarding what they could eat and that making do with whatever food was available was often the key factor in dietary decisions (Government of Pakistan & UNICEF Pakistan 2011).

In some areas women and girls may be disadvantaged by customs dictating intra-household food distribution; some small qualitative studies report that men should be served first given that they do more physical work and earn a wage for the family. *Health care providers unanimously reported in the NNS that males are given preference, contributing to nutrient deficiencies and illnesses such as anaemia for women and that girls are either not given proper diets or do not eat well as they are busy tending to children or working* (Government of Pakistan & UNICEF Pakistan 2011). Conversely, there are reports that young girls are given preference in AJK and Karachi as they are future mothers who require extra nutrients and that in some areas, during food shortages children's diets are prioritised. A summary of the qualitative literature on dietary practices reviewed is provided in Appendix 4.

Data Gaps

The secondary data analysis of the FNG revealed significant gaps in data on current food and nutrient intake of the key target groups for this activity; 0-23mo children, adolescent girls, pregnant women and lactating women. Whilst a number of small studies in Pakistan have explored knowledge, attitudes, practices regarding exclusive breastfeeding, there is a recognised gap in the literature regarding other IYCF practices; timing of complementary feeding, foods given, preparations, frequency and quantity of feeding and intra-household distribution of foods, especially special complementary foods, both in quantitative and qualitative terms, i.e. what are reasons for practices to be as they are (UNICEF 2016). Further, little is known regarding decision making processes, influencing factors and barriers to improved practices, as well as social, cultural, seasonal and geographic variation of these practices. Specifically, diets of women, especially mothers, and

adolescent girls are poorly represented in the literature. Further, very few studies focus on dietary intake, preferences and decision making and

These data gaps are understandable given the intensity of resources and capacity required for such studies and the significant size and diversity of Pakistan. However, tailored interventions to improve IYCF and dietary practices for women and girls require such data in order to respond appropriately to the context. Primary research into current intake, dietary practices, reasons for these practices and barriers to improving these practices would be greatly beneficial for exploring the extent to which improvements to nutrient intake could be achieved using food-based approaches and behaviour change – and guide the development of such interventions.

Particular thematic research gaps raised by UNICEF (2016) in a review of IYCF practices include:

- Perceived role and involvement of men in IYCF
- IYCF in special circumstances (e.g. HIV)
- Advanced nutritional surveys on complementary feeding
- Duration of EBF and timing for introduction of complementary feeding
- IYCF practices in particular geographic areas (ICT, GB, AJK and recent conditions in Punjab)

4.f Food access and nutrition challenges in Pakistan are compounded by rapid population growth and urbanization and natural and man-made shocks

- Population distribution

Pakistan is the world's 36th largest country by area but the 6th largest by population size (CIA 2017) (CIA 2017). Over 90% of people live in the four provinces of Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan, however population distribution is not proportional to land distribution. Balochistan province makes up two fifths of the country's land mass but accounts for only 7% of the population, whilst Punjab province holds almost three-fifths of the population in just one fifth of the landmass (Figure 47 and Figure 48).

Figure 47: Population distribution by region, Pakistan 2012-13

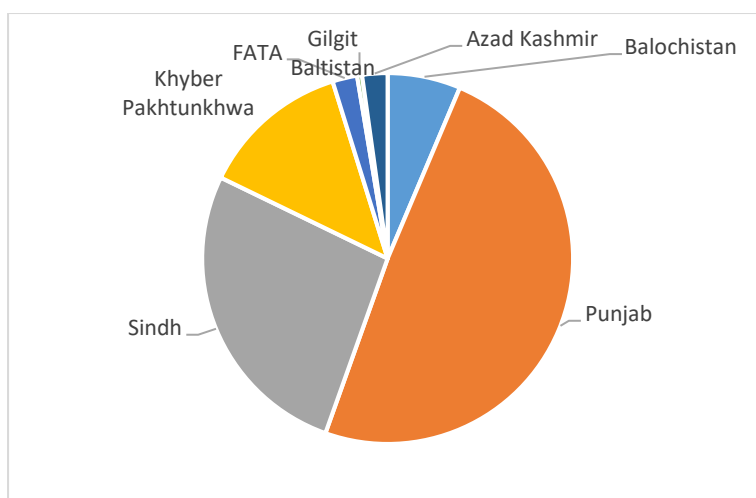
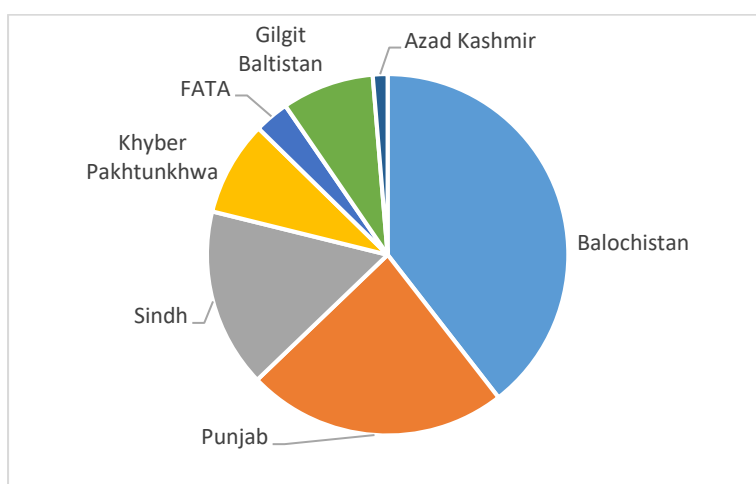


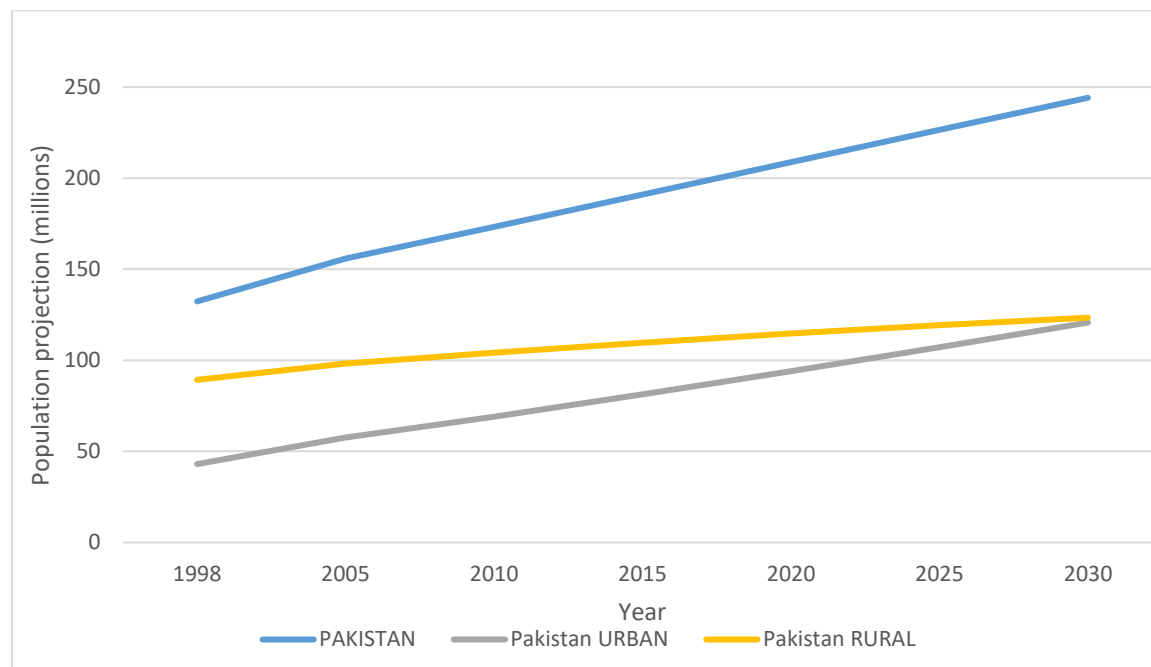
Figure 48: Land Mass distribution by region, Pakistan



- Population Growth

From 2015-50 half of the world's population growth is expected to come from just 9 countries; India, Nigeria, Pakistan, DRC, Ethiopia, Tanzania, USA, Indonesia and Uganda (United Nations Department of Economic and Social Affairs. Population Division 2015). Pakistan's population increased from 37.5 million in 1950 to nearly 189 million in 2015 and is set to grow to almost 310 million by 2050 (United Nations Department of Economic and Social Affairs. Population Division 2015). In the same 2015-50 time period, the average total fertility rate (TFR) in Pakistan is expected to fall from 3.72 to 2.31 children per woman nationally yet the decrease in total fertility is unlikely to be experienced equally and TFR remains high in poorer, rural populations (United Nations Department of Economic and Social Affairs. Population Division 2015). There is an urgent need to consider the challenges associated with a growing population in Pakistan, especially in overcrowded, urban areas.

Figure 49: Projected Population (millions) in Pakistan 1998-2030 (Jan et al. 2008)



- Rapid Urbanisation

As shown in Figure 49, the population growth rate of Pakistan is not equal across urban and rural areas. Pakistan is currently urbanising at an annual rate of 3%, the fastest in South Asia; in 2014, 38% of the population was living in urban areas, but by 2025 this will have grown to 50% (Jan et al. 2008; Kugelman 2014; Kadir et al. 2016). The population of Karachi alone reportedly grew by 80% between 2000 and 2010, the largest population increase of any city in the world (Kotkin & Cox 2013). Following predicted trends, Karachi's population will increase from 13 million to 19 million from 2014-2025 and Lahore's from 7-10 million (Kugelman 2014). Further, the number of Pakistani cities with populations between 0.5-1 million will have risen from 2 (in 2000) to 11 in 2025 (Kugelman 2014).

Urbanisation is both promising and problematic; whilst it could boost the economy by providing employment opportunities from small and medium enterprises and high growth areas (such as

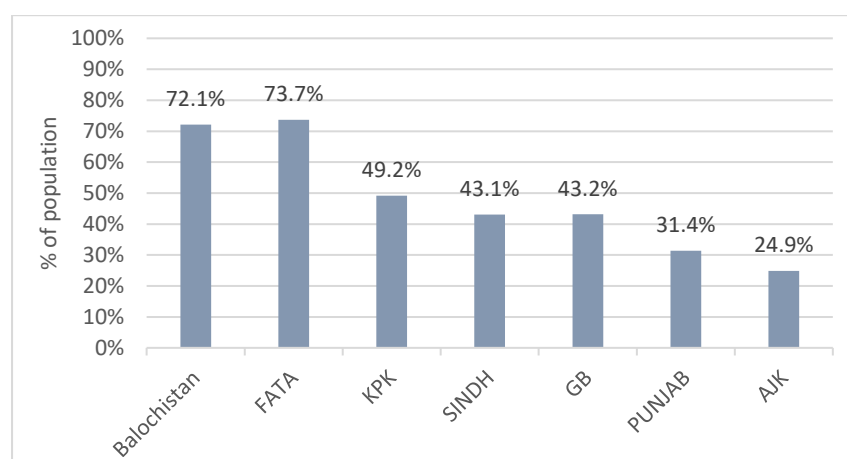
technology), it places immense burden on basic services in urban centres and cities (housing, transport, education, healthcare, water) and an already stressed labour market (Kedir et al. 2016). Whilst economic, demographic and health surveys tend to conclude that conditions in rural areas are worse in terms of poverty and nutrition outcomes, sampling methods and access issues mean that it is not possible to examine data for urban slums in isolation and that it is likely that the magnitude of issues in urban slums is underestimated. Given the rapid rate of urbanisation and the magnitude of predicted population growth, there is a need to focus on measuring, understanding and addressing nutrition in urban slums across Pakistan.

- Poverty, assets and land ownership

Two in every five households (39%) in the country were found to be experiencing multidimensional poverty in 2016 (Ministry Planning Development and Reform 2016). The percentage of people living in multidimensional poverty has reduced substantially in the past decade however reductions in the intensity⁸ of poverty experienced have been only marginal.

There were significant regional disparities in poverty experienced, with over half of rural Pakistanis identified as being multi-dimensionally poor (54.6%) compared to only one in 10 urban Pakistanis (9.4%) (Ministry Planning Development and Reform 2016). Further disparities were found across provinces; the poverty headcount ranged from 31.4% in Punjab to 71% in Balochistan Province (Figure 50) (Ministry Planning Development and Reform 2016). As such, it can be expected that in these areas of higher poverty, access to nutritious diets is strongly hampered by income limitations in addition to food prices and physical access.

Figure 50: Multidimensional poverty (poverty headcount) in Pakistan by region 2014-15 (MPDR 2016)



Unequal land distribution and access is a manifestation of poverty. Rural households are more likely to have productive assets such as agricultural land or farm animals, compared to their urban counterparts, yet as per the last DHS, only 40% of rural households in Pakistan reportedly owned agricultural land (NIPS 2013). Poverty is highest among the landless in Pakistan and, as per 2010 estimates, less than 1% of households owned more than 2 hectares of land (Giampaoli & Aggarwal 2010). Land ownership has been found to have a significant positive impact on agricultural

⁸ Intensity of poverty captures the number and severity of deprivations that the population experiences in terms of health, education and living standards. Used to explain the number of deprivations which poor households typically contend with at the same time (Ministry Planning Development and Reform 2016).

productivity, as well as positive outcomes for women’s empowerment in rural areas of Pakistan (Kousar et al. 2016).

World Bank estimates suggest almost half (45%) of agricultural land in Rural Pakistan is controlled by less than 2% of households (World Bank 2009). Large-scale farmers benefit from subsidies not enjoyed by smallholder producers and profit from agricultural growth and diversity to a much greater extent, whilst small landholders focus their limited production on staple foods (World Bank 2009).

These conditions severely constrain agricultural competitiveness and livelihood opportunities for the rural poor, negatively impacting income generation opportunities and economic access to nutritious foods; rural households spend a greater percentage of their income on purchasing food, as shown in Figure 51 and Figure 52 (Pakistan Bureau of Statistics. Government of Pakistan 2015; NIPS 2013). Moreover, poor access to cultivable land means that access to nutritious foods via own-production is less likely for poor rural populations.

Figure 51: Percentage of Monthly Consumption Expenditure spent on Food & Non Alcoholic Beverages across two HIES surveys (Pakistan Bureau of Statistics. Government of Pakistan 2015)

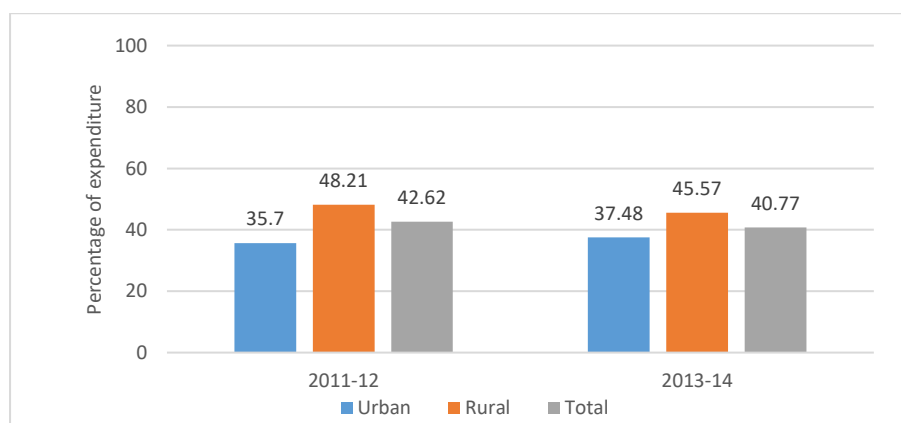
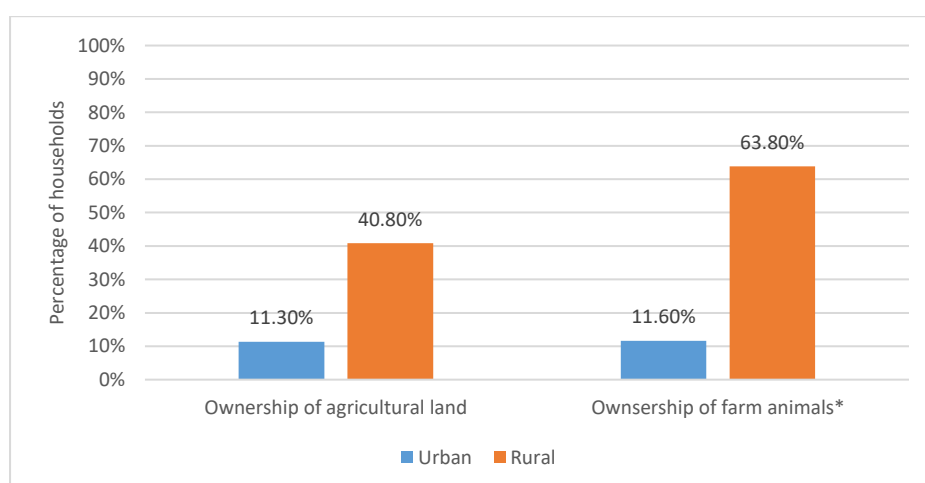


Figure 52: Access to agricultural resources by area (NIPS 2013)



- Climatic, geographic and seasonal influences on food production

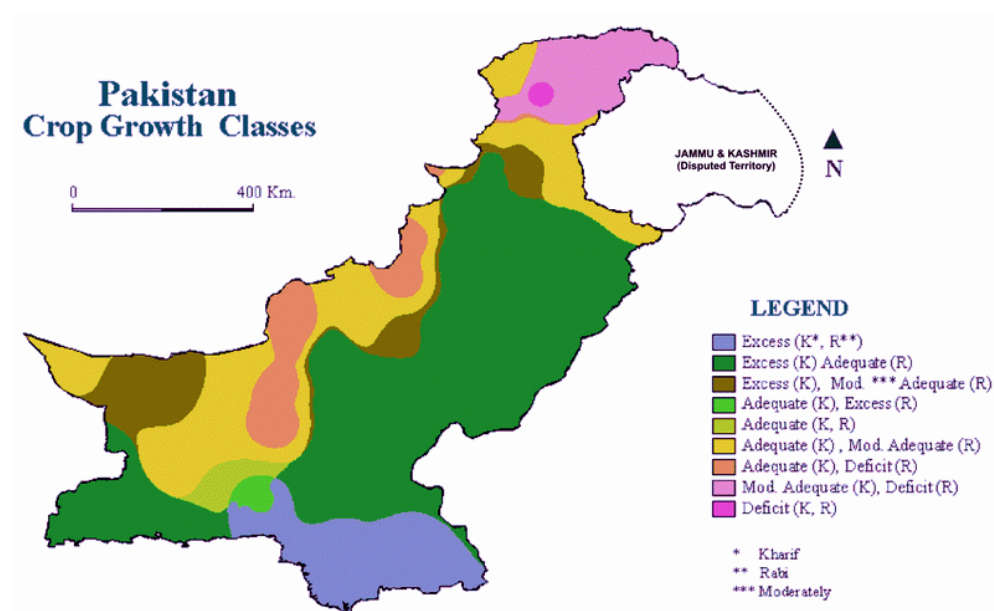
Both across and within provinces in Pakistan, conditions differ enormously in terms of climate, geography, agricultural production and food and nutrition security, as shown in Appendix 5. The country is primarily arid, with vast deserts and uncultivable rugged mountainous areas. Fertile rain- and canal-fed tracts of land stretching through the Punjab and Sindh plains constitute the main agricultural areas of Pakistan (Peel et al. 2007; FAO 2004). Crop production and type varies greatly across the country and is highly susceptible to changes in temperature, precipitation, floods and other climatic conditions (FAO 2016).

The existence and timing of lean periods vary across Pakistan but are greatly tied to the timing of wheat and rice harvests and production yields. Production varies across the two main crop seasons of Kharif and Rabi, with deficits more likely during the Rabi period (Figure 53). As shown on the map in Figure 54, excess production rarely occurs across both seasons and is limited to a few areas in the centre, rain-fed areas and southern coastal zone only, with the most favourable conditions for areas within Punjab and Sindh provinces. Market prices of some commodities (wheat, poultry, eggs, pulses) tend to vary seasonally whilst milk and meat remain stable across the year (WFP 2015; WFP 2016b; FAO 2016).

Figure 53: Characteristics and timing of main crop seasons in Pakistan (WFP 2016, FAO 2016)

	Kharif Season	Rabi Season
Main crops	Rice , sugarcane, cotton, maize, pulses (moong, mash), millet and sorghum	Wheat , gram lentil, tobacco, rapeseed, barley, mustard
Planting	May – June	Oct – Dec
Harvest	Oct – Dec	Apr – May

Figure 54: Pakistan crop growth classes and seasonality of adequacy, excess and deficits (PARC 2016)



- Food Production

The agricultural sector makes up 22% of Pakistan's GDP and 68% of the rural labour force (42% of total labour force) (World Bank 2009). In addition to the main staple crops of rice and wheat, groundnuts, maize, sugarcane and pulses are commonly grown across Pakistan. The overwhelming majority of wheat (77%) and rice (51%) production occurs in Punjab, followed by Sindh (Figure 57 and Figure 58) (WFP 2016b).

Overall the country produces sufficient food to feed the population, even exporting some cereal, fruit and livestock (WFP 2015; WFP 2016b; FAO 2016; Pakistan Agriculture Information System 2016; MNFSR 2016). Pakistan has enjoyed strong cereal crop production in recent years (Figure 55); with above average wheat, rice and maize production predicted for 2017 (FAO 2017). Despite this, production in rain-fed areas of KP and Balochistan provinces are expected to be greatly affected by recent dry spells (FAO 2017). Livestock production, especially poultry, has increased as demand for meat and other animal products appears to grow (FAO 2003; Krebs et al. 2011) (Figure 56). Likewise, milk production in Pakistan has risen by 36 percent over the past 10 years yet this is largely a result of increases in animal population rather than productivity and processing practices are inadequate, also presenting concerns for food safety (FAO 2011). Animal production in general, including the animal feed sector remains susceptible to threats from environmental degradation and climate change (FAO 2003; FAO 2010; FAO 2016). In terms of total output, livestock production is highest Punjab and Sindh where there are higher populations and generally better agricultural conditions and agricultural production (FAO 2003).

Whilst Pakistan is a productive, agricultural country, there is substantial room for improvement in terms of yield sustainability, particularly concerning climate change and the growing, increasingly urban population, hence greater food needs and lower provision of agricultural workforce. Further, as the CotD analysis demonstrates, high food production levels in Pakistan does not automatically guarantee good access to nutritious foods for all.

Figure 55: Pakistan cereal crop production (tonnes) 2015-2017, compared to 2011-15 average (FAO 2017)

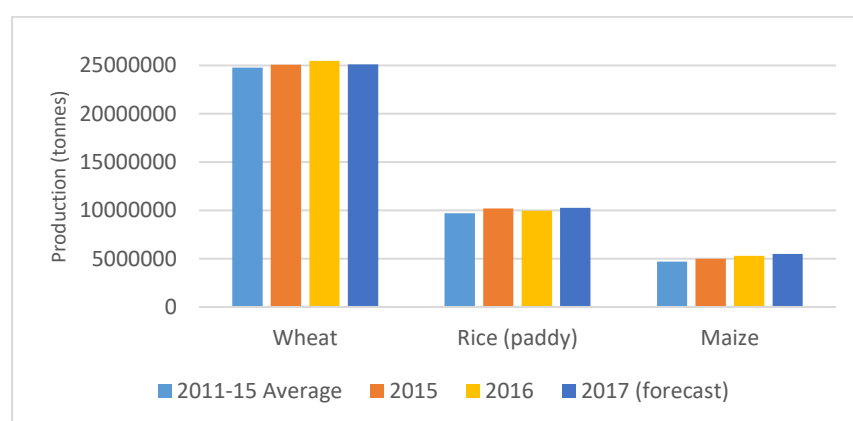


Figure 56: Trends in livestock populations, Pakistan, 1990-2015 (FAO 2003)

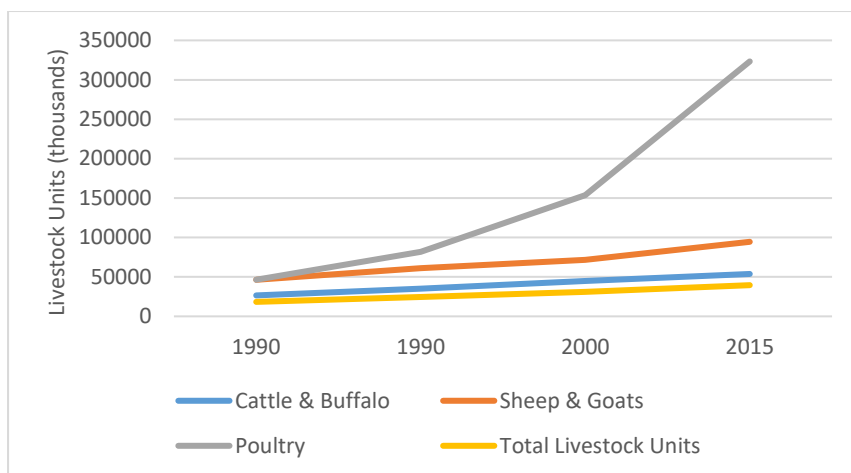


Figure 57: Wheat production by province (%) (WFP 2015)

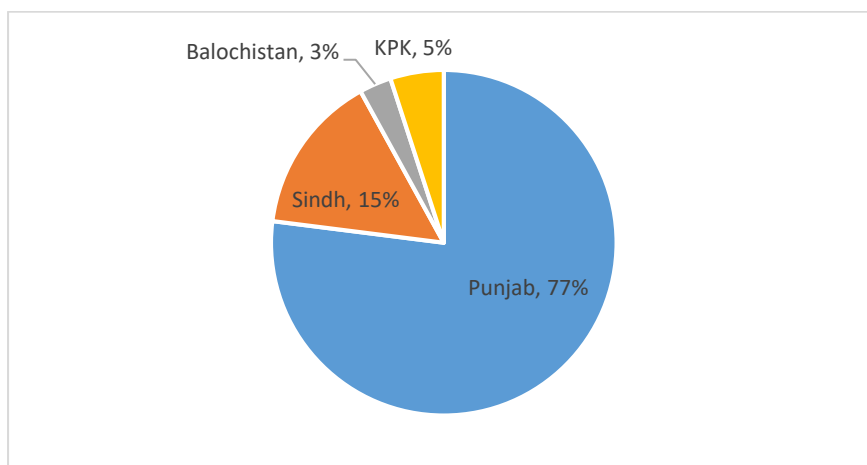
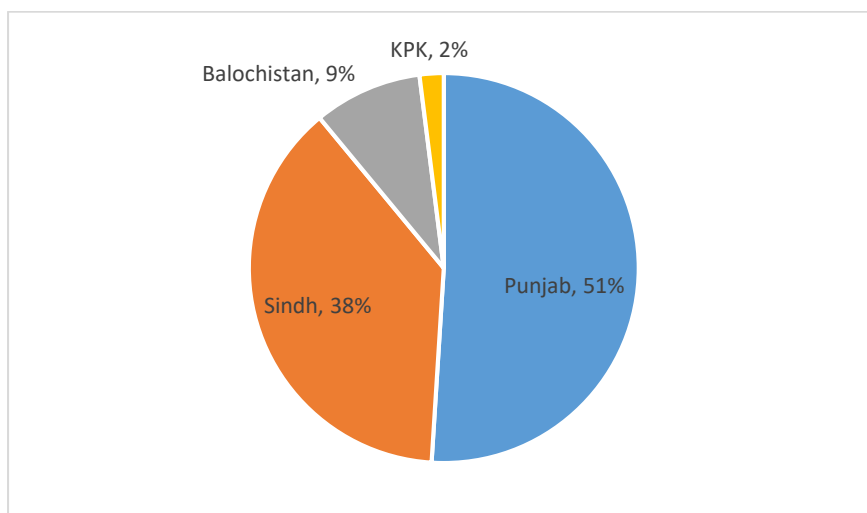


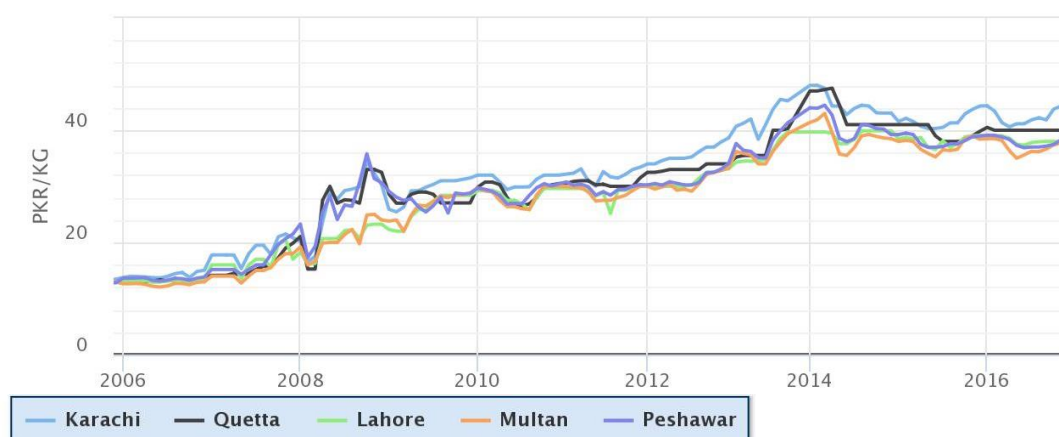
Figure 58: Rice production by province (%) (WFP 2015)



- Food prices

Staple food prices have dropped in Pakistan in recent years, yet prices of other nutritious foods are climbing and there is significant variation across the country. Wheat prices remained below 2015 levels as a result of a bumper crop (Figure 59) (WFP 2015; WFP 2016b; FAO 2016). A downward trend in rice prices of up to 9% was also recorded (WFP 2015; WFP 2016b; FAO 2016). Unlike staples, the prices of many nutrient-dense foods, such as pulses, have increased significantly in recent years (WFP 2016). In general, food prices have remained lowest in Punjab due to more favourable production and food availability conditions.

Figure 59: Monthly wheat flour prices for five markets in Pakistan 2006-16 (WFP VAM 2017)



- Market Access

Food access is also determined by location and infrastructure, and access to markets, services and transport in Pakistan is largely unequal. Linkages to services and markets has improved greatly for many over recent decades but more investment is needed to ensure that rural and remote areas are not left behind (Kedir et al. 2016). The map in Figure 60 displays travel times to urban centres spatially, which can be used as a proxy for market access. Travel times to urban centers are longest in Northern and South-Western areas of the country, especially within Balochistan, KP, GB and AJK. The rural areas of these provinces and territories have small, remote communities that are likely to have poor access to infrastructure and markets. Conversely, in Sindh and Punjab there is greater urbanisation, infrastructure and larger populations, meaning that even for those in rural locations, travel time to urban centres and hence market access, is more favourable (Kedir et al. 2016).

The population breakdown in the amount of time taken to travel to a city of 500,000 or for each province is also presented below in Figure 61. By using population as the unit of analysis as opposed to location, a slightly different picture is presented. Overall people in Punjab have the highest access to urban centres and hence markets, with the majority of the population living in areas that can access urban centres in less than 3 hours. Likewise, in Sindh almost 4 out of 5 people can access urban centres in less than 3 hours. Balochistan still has the lowest access with over 5 hours travel time for over half of the population whilst in KP access was <5 hours for most in the population, even though spatially, much of the northern part of the province has extremely poor access. This could indicate greater levels of urbanisation for KP province and suggest that whilst there are areas of the country with incredibly low market access, the population density in these areas is low (Kedir et al. 2016).

Figure 60: Travel time to nearest city of at least 500,000 people in 2010 (taking into account road quality, transport options, railroads, rivers, land use etc.) (Kedir et al, 2016)

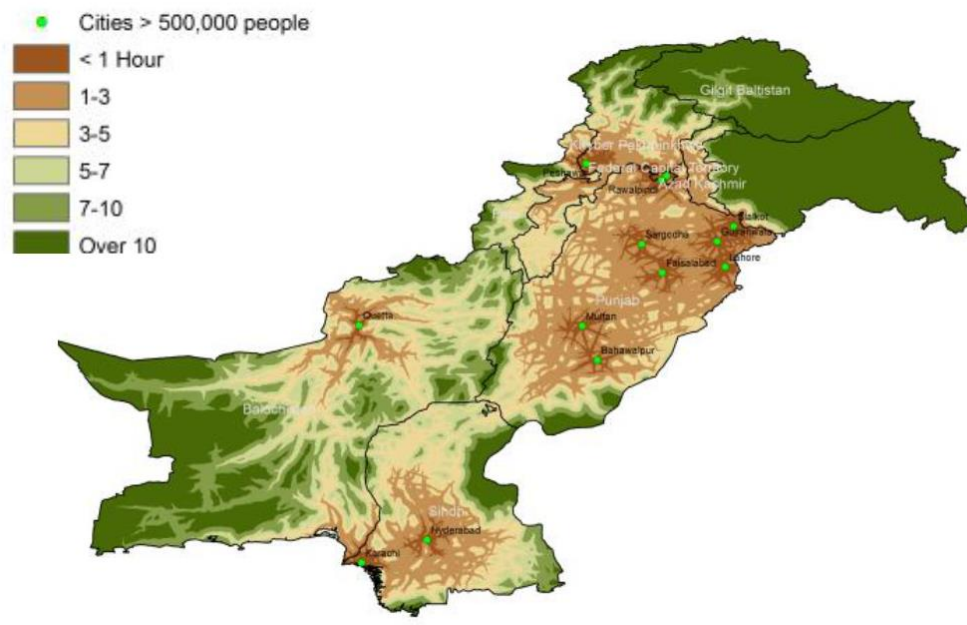
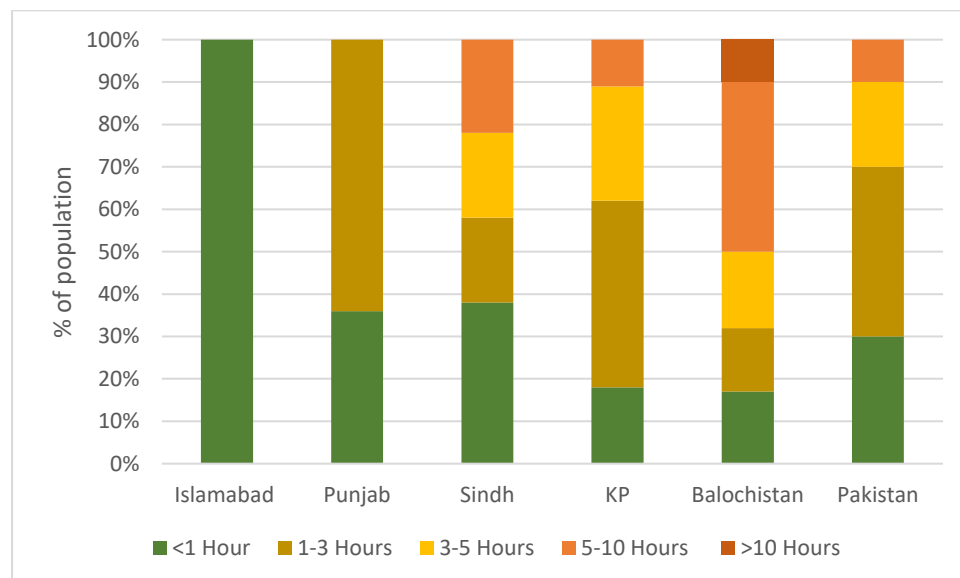


Figure 61: Percentage of Population connected to a city with a population of at least 500,000 in 2010



- Shocks and climate change

Pakistan faces the triple challenge of political fragility, complex security issues and high vulnerability to natural disasters, all of which compound food security and nutrition. The security situation in large parts of the country is fragile. Ongoing conflict in neighbouring Afghanistan, refugee and IDP populations, increasing local and international terrorism attacks, insurgency in the North and

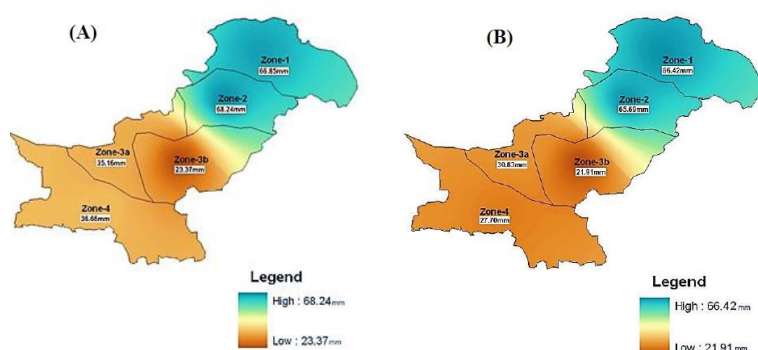
growing militancy in Southern Punjab and Balochistan affect the policy environment and distribution of key health and social services.

The country has also felt the effects of a range of devastating natural disasters in recent years, including floods, earthquakes, landslides and droughts. Such disasters lead to damage to infrastructure and habitat, loss of livelihoods, increased food and nutrition insecurity, and trauma of displacement, which add to nutrition challenges, both in the short and long term. The floods in 2010 alone affected close to 20 million people, displaced almost 8 million, destroyed or damaged 1.9 million houses and ruined 6.2 million acres of crops (Government of Pakistan & UNICEF Pakistan 2011; UNFPA 2013). The impact of such crises is particularly severe for the most vulnerable groups.

The Government of Pakistan has shown its strong commitment to disaster management by signing the Hyogo Framework for Action 2005 and creating a disaster management framework. The need for additional efforts has been raised by UN partners however to enhance disaster risk management capacities and institutional linkages for an effective multi-hazard response, including preparedness, mitigation, recovery and coordination (UNFPA 2013).

Pakistan also faces considerable vulnerability to climate change and environmental degradation, the burden of which also falls disproportionately upon the poor due to loss of livelihoods. Analysis of annual rainfall patterns at sentinel sites since 1976 suggests the south of Pakistan in particular is becoming drier, posing challenges for agricultural production (Figure 62) (Salma et al. 2012). These environmental challenges are compounded by natural resource management problems such as insufficient water and solid waste management, loss of forest cover and land degradation. The Government has made encouraging progress in approving environmental legislation and building capacities to address environmental challenges. Additional efforts are needed to promote climate change adaptation through institutional strengthening and policy adjustments, as the climate change and environmental challenges are likely to accelerate with population and economic growth and rising energy demands. Renewable energy strategies also need to be promoted and public policies and measures need strengthening to engage civil society and build stronger public- private partnerships (UNFPA 2013).

Figure 62: Country-wide analysis of the mean annual rainfall, showing a change towards drier conditions from A) 1976-1990 and B) 1991-2005 (Salma et al. 2012)



On average, 1 in 5 households were affected by a 'shock' in the three years preceding the 2016 MNFSR food security survey, with the highest proportion in KP and FATA and lowest in ICT and Punjab (Figure 63) (MNFSR 2016). The main shocks experienced were floods, price hikes,

earthquakes and drought (Figure 64). The impact of these shocks were most felt in areas where experience of poverty is also high, underlining the need for resilience-improvement and appropriate emergency response mechanisms (MNFSR 2016).

When faced by shocks, over a third (37%) of households reportedly apply negative coping strategies, which increase vulnerability to future shocks (Figure 65) (MNFSR 2016). The negative strategies most commonly applied include decreasing dietary quality or quantity as well as borrowing and, in some cases, selling assets (Figure 66). Reported use of negative coping strategies was highest in FATA, KPK and Sindh (Figure 66).

Figure 63: Percentage of HHs that experienced shock during last three years (MNFSR 2016)

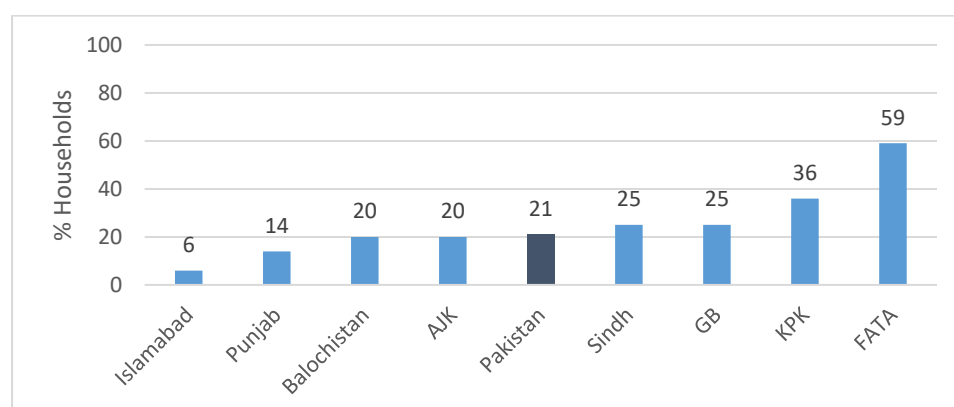


Figure 64: Main two shocks experienced by households in each province/region 2012-16 (MNFSR 2016)

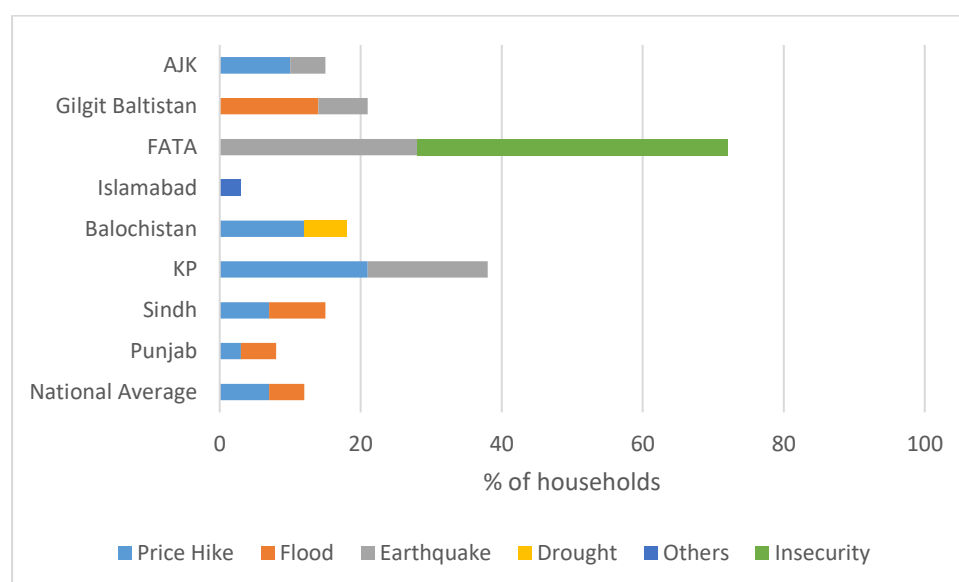


Figure 65: Percentage of households that adopted food-based coping strategies in the 7 days prior to data collection (MNFSR 2016)

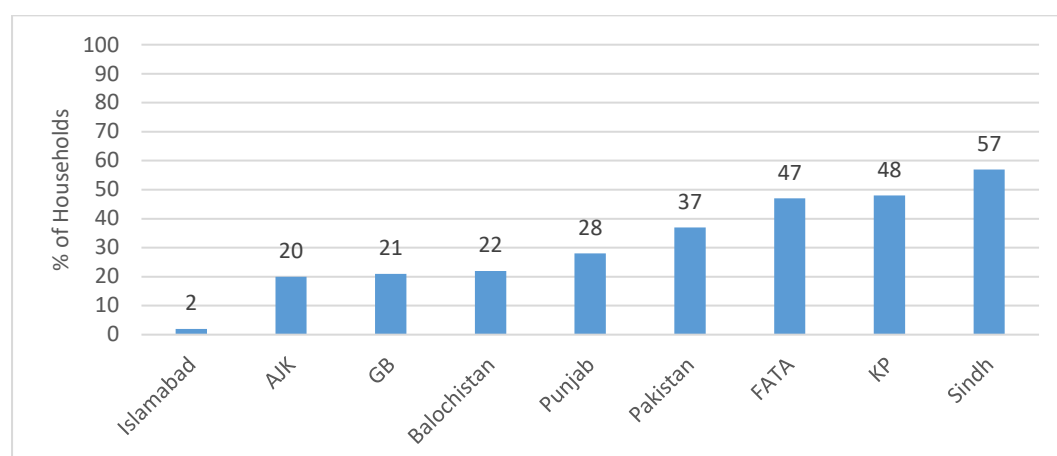
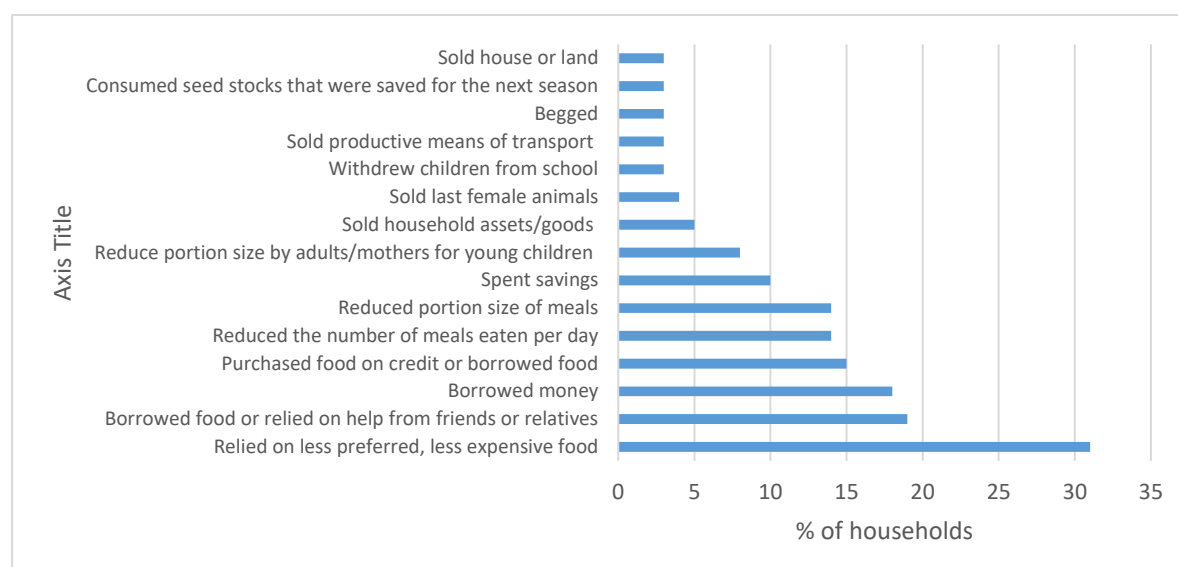


Figure 66: Percentage of households that adopted different coping strategies on confronting food shortages (MNFSR 2016)



4.g Continued promotion of strong and consistent multi-sectoral policy and action on nutrition is required

The political and policy environment in Pakistan is increasingly conducive to change for improved nutrition. However, greater multi-sectoral collaboration, integrated strategies and better understanding from stakeholders is needed. According to the 2013 Nutrition Political Economy analysis by AKU and IDS, nutrition has historically received little attention in Pakistan and has lacked multi-sectoral and multi-governmental commitment and coordination (Zaidi, Bhutta, et al. 2013). The authors further explain that as nutrition is yet to become a strongly political issue and gain traction as an election theme, it suffers from a lack of high-level executive or cabinet interest as an issue (Zaidi, Bhutta, et al. 2013). The 2010 floods drew national and international attention to the scale of malnutrition in Pakistan however the response was largely reactive and failed to extend substantially beyond provision of therapeutic services for severe acutely malnourished children (Government of

Pakistan & UNICEF Pakistan 2011; Zaidi, Bhutta, et al. 2013). Significant progress has been made over recent years to raise awareness of nutrition issues and strengthen governance, however. Pakistan joined the Scaling up Nutrition (SUN) movement in 2013 and through its positioning within the MDPR, the secretariat has been integral in embedding nutrition within the Pakistan *Vision 2025*⁹ and the development of the Pakistan Multi-sectoral Nutrition Strategy (Planning Commission Ministry of Planning Development & Reform 2014). Despite this, greater capacity is still needed to address the severe nutrition challenges that Pakistan is facing.

Pakistan policy experts at IDS have also discussed nutrition in a post devolution context; in 2010 with the parliamentary passing of the 18th amendment, 17 ministries¹⁰ were devolved from the federal to provincial governments (Zaidi, Mohmand, et al. 2013). This brought both opportunities and challenges; whilst it is now easier for provincial governments to develop context-specific responses to nutrition issues and for funding bodies to directly access implementers, there remains a strong need for alignment of key policy points between provinces and with the federal government and for federal policies to also have implications for actions at the provincial level (Zaidi, Mohmand, et al. 2013).

Government-appointed provincial-level SUN Steering Committees and SUN Secretariats are at different stages of operationalisation (SUN Pakistan 2015b). While support is being provided at a national level for the provincial SUN networks, further actions to develop and position these networks for recognised multi-sectoral leadership is critical so that they have the support and capacity to consider and respond to the impacts of policies and legislation from other sectors as well as direct policy and programming in the nutrition field (SUN Pakistan 2015b). At present the planning ministries of these provinces are at varying points in terms of progress towards developing, refining and implementing multi-sectoral nutrition strategies and support is being provided by the SUN network and development partners. All four provinces have now also approved laws regarding inappropriate promotion of bottle feeding and packaging of breast milk substitutes, however support is needed for better cooperation and implementation (SUN Pakistan 2015a; SUN Pakistan 2014; Shekar et al. 2016; Scaling Up Nutrition 2014).

A key area of for multi-sectoral policy action at both the provincial and national level with the potential to impact nutrition is fortification. Unfortunately, regulatory frameworks, laws and enforcement mechanisms for food fortification and ensuring food quality are weak. Fortification legislation currently occurs at the provincial level and, as shown in Table 1, there is significant variance in the level of regulation in place (Pakistan Food Fortification Study Team 2014; Shevchuk & Ghauri 2015). Wheat fortification is encouraged but mandatory in Punjab province only (Shevchuk & Ghauri 2015; GAIN 2016). Salt iodisation has reduced iodine deficiency in recent years, however coverage varies greatly between and within provinces (Pakistan Food Fortification Study Team 2014). The enforcement of standards and policies falls to a number of different agencies in different provinces and districts and there is limited capacity for monitoring and testing. The National

⁹ Vision 2025 is Pakistan's long-term development blueprint, aiming towards achievement of the MDGs and SDGs by 2030. The document sets out 25 goals in accordance to the 7 pillars, of which nutrition is a main component of two; 1) People first: developing social and human capital and empowering women and 4) Security: energy, water and food security (Planning Commission Ministry of Planning Development & Reform 2014)

¹⁰ Key ministries related to nutrition that were devolved included Health, Education, Food, Agriculture, Women's Development and Social Welfare (Zaidi, Mohmand, et al. 2013)

Fortification Alliance (NFA), which enjoys good government, NGO and private sector representation, was reconstituted in 2013 and provincial Fortification Alliances were launched in 2016. Strong policy guidance for the sector is expected from an upcoming fortification scoping study. However, strong collaboration across provincial and national governments will be required to enact recommendations in an effective way. Further, harmonisation of fortification standards is recommended across provinces to facilitate private sector cooperation and compliance (Shevchuk & Ghauri 2015). Lastly, current taxation and tariffs on premix means that adopting fortification guidelines could mean a significant increase in cost to supplier or consumer. Government support and regulation of retail prices of commodities could assist in making fortified commodities more available and affordable (Shevchuk & Ghauri 2015).

Table 1: Summary on fortification regulatory situation in Pakistan

Area	Laws regulating food quality	Enforcement Authority	Wheat flour fortification	Edible Oil & Ghee	Salt fortification	Special fortified foods
Punjab	Punjab Food Authority Act 2011 Pure Food Rules 2007	Punjab Food Authority or Provincial Health and Food Departments under Punjab Food Authority	Mandatory (iron and folic acid) from Oct 2015 (Punjab accounts for 70% of wheat flour production)	Mandatory (Vitamin A) (Pure Food Rules 1965) and according to PSQCA standards: (33,000 iu per kg)	Officially voluntary (PSQCA standards) however district by-law amendments to Punjab Pure Food Rules have made mandatory in most districts	No national standards as yet, however, WFP has specific standards for Wawa Mum and Maamta, LNS products for 6-23 month-old children and PLW
KPK	2014 Food Safety Authority Act Pure Food Rules 1965	Provincial Health Department/ Food Safety Authority	Voluntary (PSQCA standards) 'Approved' content of micronutrients in Atta as per NFA is 20mg/kg Sodium Iron EDTA and 1.3mg/kg of Vitamin B9 (Folic Acid)	PUNJAB: aiming to mandate fortification with vitamins A and D	Officially voluntary (PSQCA standards) however iodisation now mandated through amendments to pure food rules	
Balochistan	1960 Pure Food Ordinance Pure Food Rules 1965	Provincial Health Department			Compulsory Iodization of Salt Act in 2013, prohibits manufacture, processing or import of edible salt with an iodine content of less than 30ppm	
Sindh		Provincial Health Department				

(Pakistan Food Fortification Study Team 2014; Shevchuk & Ghauri 2015; WFP 2016d; WFP 2016c; Jelensperger 2016).

Pakistan is delivering a number of health, education and social protection programs through extensive networks across the country. Such networks could be leveraged, alongside efforts to strengthen and scale-up these programs where necessary, to build-in nutrition-sensitive actions

(Raju & D’Souza 2017; Olney et al. 2012; Planning Commission Ministry of Planning Development & Reform 2014).

With some improvements, the Lady Health Worker (LHW) programme has great potential for utilising existing community structures to reach the most needy and hard to reach and to improve nutrition (Government of Pakistan & UNICEF Pakistan 2011; Salam et al. 2014; Fabrizio et al. 2014; Olney et al. 2012; Raju & D’Souza 2017). In addition to delivery of health services, including supplementation, LHW services could be a suitable entry point for context-specific, targeted SBCC messaging and education. Meeting the unmet need for family planning, especially for adolescent girls, would also require greater effort to improve and extend LHW and other health services to the most hard to reach (NIPS 2013; Salam et al. 2014).





Poverty alleviation social safety programmes have potential for reaching those facing food and nutrition insecurity yet use of poverty scorecards to assess eligibility could mean that not all nutritionally vulnerable households are reached. There is also room for improvement in terms of nutrition-sensitive targeting and programming in social protection programmes such as the Benazir Income Support Programme (BISP), which have potential for reaching the food and nutrition insecure with nutrition-sensitive targeting and programming such as combined packages that include nutritious local or commercial foods or vouchers for nutritious foods as well as cash transfers (Government of Pakistan 2016; Raju & D’Souza 2017; MQSUN 2015).

Meanwhile, school feeding programmes in Pakistan have failed to reach scale and sustainability, yet could be a possible entry point for nutrition, such as through the delivery of fortified special foods, supplements for adolescent girls, school meals and home grown school feeding¹¹ (WFP 2016a; Uppal 2005; IFPRI et al. 2017; Salam et al. 2014; WFP 2015).

The experience and causes of malnutrition differ across provinces and districts within Pakistan, as displayed below in Table 2 and context-specific solutions will be required.

¹¹ In the broadest sense, home-grown school feeding (HGSF) is a school feeding programme that provides food produced and purchased within a country (ideally in the local area) to the extent possible

Table 2: Summary of key provincial nutrition and food security indicators burden and underlying causes and context (Zaidi 2013; Zaidi, Mohmand, et al. 2013)

Province	Key nutrition and Food Security Indicators	Burden	Underlying causes
Punjab 	<ul style="list-style-type: none"> 37% households consuming <2,350 Kcal per adult equivalent per day 14% prevalence undernourishment 50% borderline FCS, 5% poor 39% IYC Stunted (very high) 14% wasted (high) 	Punjab accounts for much of the undernutrition burden of Pakistan due to the large population size. Over half of children are stunted in southern districts	Punjab is the major food producing region of Pakistan and there is generally surplus food production yet undernutrition levels and household food insecurity are higher than expected and most (69%) households do not have access to cultivable land and the profits of production are not enjoyed by all. Regardless there is less undernourishment, staple dependence and low energy intake compared to the national average
Sindh 	<ul style="list-style-type: none"> 51% households consuming <2,350 Kcal per adult equivalent per day 22% prevalence undernourishment 54% borderline FCS, 12% poor 50% IYC stunting and 18% wasting (both very high) 	Whilst Sindh is the second most secure province in terms of food resources, it has the highest rates of food insecurity and undernutrition	2nd major food producing region. Susceptible to flooding. Eastern Sindh highly drought prone. Entrenched power structures, as manifested by a comparatively higher level of landlessness (most (68%) households do not have access to cultivable land) and poverty (30% of households in poorest quintile and lowest average monthly household income) and compounded by insufficient access to social sector services in disadvantaged districts. 37% of households had trouble meeting food needs in previous month and high percentage of women uneducated (66%)
KP 	<ul style="list-style-type: none"> 49% households consuming <2,350 Kcal per adult equivalent per day 20% undernourishment prevalence 52% borderline FCS, 11% poor 48% IYC stunting and 17% wasting (both very high) 	Whilst KPK faces issues of insecurity, violence, conflict and social exclusion of women, it is not food insecure. The province has a more equitable distribution of land and greater crop diversification	1 in 4 households deriving >60% of dietary energy from staples, compared to national average of 17% Hosting largest population of displaced from FATA and many Afghan refugees. Deficiency in in situ food production > a third of households experienced shock compared to the national average of 21% 75% women uneducated
Balochistan 	<ul style="list-style-type: none"> 63% households consuming <2,350 Kcal per adult equivalent per day 40% prevalence undernourishment 57% borderline FCS, <u>22% poor</u> 52% IYC stunting, 16% wasting (VH) 	Balochistan has very high undernutrition prevalence and the context is characterised by tough challenges	Extremely high food insecurity, lack of water access, inadequate outreach of social sector services and a patriarchal tribal power structure. Currently suffering from very high levels of conflict and insecurity and environmental threats. Many natural disasters in recent years (floods, drought and earthquakes). High reliance on agriculture yet production below needs; 1/3 households unable to meet food needs in previous month. Access to WASH facilities very poor and 66% of women uneducated. Markets are not well integrated

5. Cost Optimisation and Intervention Modelling

Cost Optimisation

Highlights:

The ability of optimised diets based on locally available foods to meet nutrient needs for chosen target groups was assessed primarily using Cost of the Diet (CotD) analysis, with secondary data on seasonal food availability and expenditure and household composition representing urban and rural households across the four provinces from the 2013-2014 Pakistan Household Integrated Economic Survey (HIES).

For average households in each area, CotD modelled lowest cost diets to meet requirements for energy, protein, fat and 13 micronutrients, with at least one serving per day of the local staple, atta wheat flour (Staple Adjusted Nutritious Diet or SNUT).

- ➔ It was possible to model a lowest-cost SNUT diet that met household nutrient needs using local foods in rural and urban areas of all four provinces, which means that food availability is not a barrier to consuming a nutritious diet.
 - **Provincial differences:** the daily cost of meeting the nutrient needs of key target groups was highest in Balochistan province
 - **Seasonality:** The daily cost of the SNUT was higher in summer than winter, for all provinces
 - **Urban/Rural differences:** SNUT diet costs were higher in Urban areas in KP, Sindh and Punjab and in Rural areas in Balochistan
- ➔ The diet of the adolescent girl was the most expensive within the household, due to the increased needs for essential nutrients during this life cycle period.
- ➔ A nutritious diet would be unaffordable to the majority of households; percentage unaffordability ranged from 65% of households in Punjab to 83% of households in Balochistan (as presented in Figure 5) and there was a correlation (0.902) between non-affordability and stunting prevalence
- ➔ The main limiting nutrients, i.e. for which the software had difficulty meeting requirements of key target groups for, were those largely derived from animal source foods; calcium, iron and vitamin B12.

5.1 Cost Optimisation

As explained in section 4.a, a CotD analysis was carried out at the rural and urban level using food availability and cost data from summer and winter seasons in Punjab, Sindh, KP and Balochistan.

5.1.A Content of modelled diets

The CotD software was able to model a diet that met the nutrient requirements of all household members in all provinces, whilst including a daily portion of atta wheat flour¹². A range of 6-9 different foods in each province (and breastmilk for the child under 2 years of age) were selected in

¹² For all household members except for the child under 2

the diet as the cheapest source of nutrients, as shown in Table 3. In addition to the staple (atta flour) the software identified a number of different foods as rich, relatively inexpensive sources of nutrients, including milk or buttermilk, eggs, various pulses, millet flour, vegetable ghee, vegetables, including pumpkin, carrot and okra, and fruit (guava).

Table 3: Foods Selected by the Cost of Diet Software for the Staple-Adjusted Nutritious diet in each Province by urban and rural area

Food groups	Foods Selected for SNUT diet	Punjab		Sindh		KP		Balochistan	
		Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Grains	Ata, sada, (Wheat flour)	X	X	X	X	X	X	X	X
	Millet, pearl flour				X	X	X	X	X
Legumes	Chola (Bengal Gram)	X	X	X	X	X	X	X	X
	Cholar Dal (split Bengal gram)	X	X	X	X	X	X	X	X
	Mungkalai (Green gram)		X	X					
Meat, Eggs and Dairy	Murgir dim (Egg, chicken)		X	X	X	X	X	X	X
	Milk (full cream)	X	X			X			X
	Buttermilk	X		X	X	X	X	X	X
Fruit and Vegetables	Pumpkin	X	X	X	X	X	X	X	X
	Peyara (guava green)		X	X	X		X		X
	Dheros (Okra, raw)	X	X	X	X	X			
	Gajor (carrot)	X			X				
	Bottle Gourd				X				
Fats	Bonoshpati Ghee (vegetable)	X	X	X	X	X	X	X	
Breast milk	Breast milk	X	X	X	X	X	X	X	X

5.1.B Cost of modelled diets

As different household sizes and compositions were used for each province, it is not possible to compare household-level SNUT costs across provinces however Table 4 compares SNUT costs for individual household members in key target groups. Individual results for all provinces are provided in Appendix 6.

On average, the daily costs of meeting individual nutrient needs were highest in Balochistan and lowest in Punjab. The cost of the SNUT was higher during summer for all provinces and higher in urban areas in KP, Sindh and Punjab and rural areas in Balochistan. For 12-23mo old children, the cost of the SNUT ranged from 19-24 PKR in summer (rural Sindh and rural Balochistan respectively) and 15-19 PKR in winter (rural KP and urban Balochistan/Sindh). The SNUT diets of adolescent girls were much more expensive at 142-169 PKR during summer (rural Sindh/Punjab and rural Balochistan) and 117-128 PKR over winter (urban Punjab and urban Balochistan). For lactating women, SNUT costs ranged from 80-102 in summer (urban Punjab and rural Balochistan) and 63-91 in winter (rural Punjab and urban Sindh).

Table 4: Daily cost (PKR) of the staple-adjusted nutritious diet for key target groups in each province by urban/rural area and season

Target Group	Season	Sindh		Balochistan		Punjab		KP	
		Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
12-23 month-old child	Summer	18	22	24	20	21	22	19	21
	Winter	16	19	16	19	16	18	15	17
	<i>Average</i>	<i>18.8</i>		<i>19.8</i>		<i>19.3</i>		<i>18.0</i>	
Adolescent girl	Summer	142	153	169	149	142	145	147	144
	Winter	119	123	122	128	118	117	119	121
	<i>Average</i>	<i>134.3</i>		<i>142.0</i>		<i>130.5</i>		<i>132.8</i>	
Lactating Woman	Summer	90	102	102	94	93	80	90	91
	Winter	79	91	70	78	63	75	73	83
	<i>Average</i>	<i>90.5</i>		<i>86.0</i>		<i>77.8</i>		<i>84.3</i>	

As an example, Figure 67 below displays the daily cost of the SNUT diet for households in rural and urban Sindh Province in summer and winter, broken down by the cost to meet the nutrient needs of each individual within the household. Figure 68 further shows the percentage of the overall household SNUT cost attributed to the diet of each individual within the average household in Sindh Province. For all provinces, the diet of the adolescent girl was the most expensive within the household, due to the increased needs for essential nutrients during this life cycle period. Adolescence is also a period of rapid growth and development, during which girls in particular have specific nutrient needs due to menarche. The cost of diets for lactating women was the second highest. As well as her own nutrient requirements, a lactating woman has high energy and essential micronutrient requirements, needed to produce quality breastmilk that can provide a child with the nutrients required for health, growth and development. These results underline the importance of providing nutrient-dense foods for these target groups.

Although the cost of the SNUT diets for children aged 12-23 months is not very high in comparison to the other household members, meeting nutrient needs using the local foods that were selected for this target group would still be difficult as nutrient-dense, fresh foods, such as buttermilk, milk, eggs and vegetables were needed regularly in small amounts. This would require households to be able to produce such foods or access markets on a regular basis and for sustainable and safe availability of these foods, or alternative nutrient-dense foods, to be provided. Furthermore, these foods would not only be sourced to feed to the young child.

Figure 67: Daily cost (PKR) of the Staple-Adjusted Nutritious Diet (SNUT) by family member in Urban and Rural Sindh by season

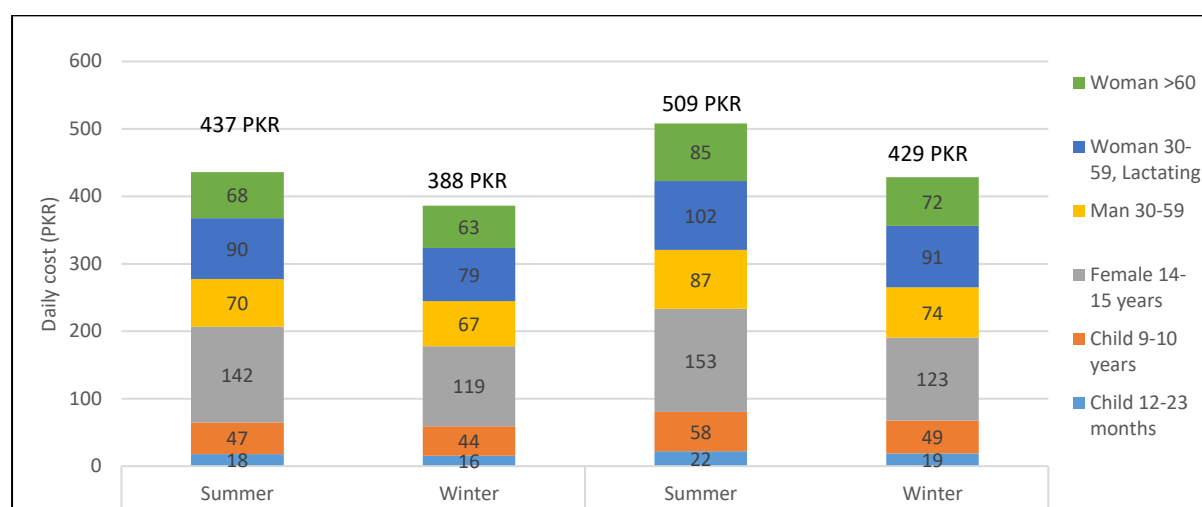
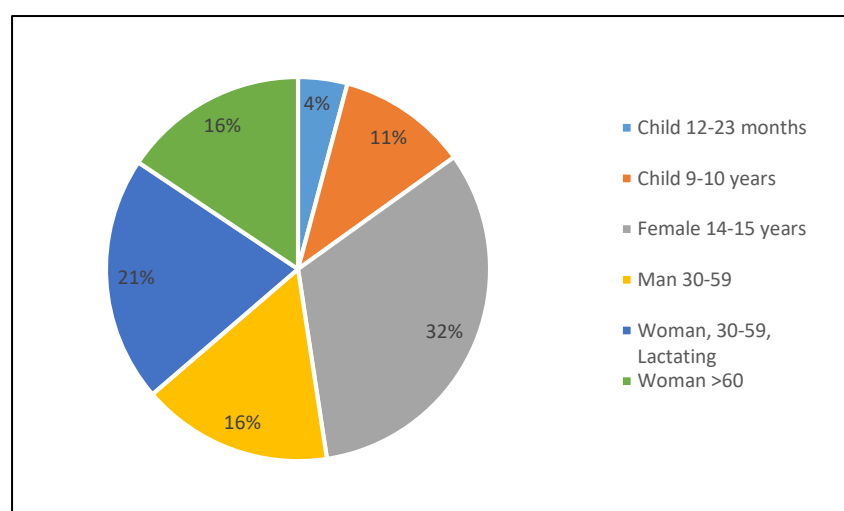


Figure 68: Cost of the SNUT by household member as a percentage of overall household SNUT cost for Sindh (seasonal and regional average)

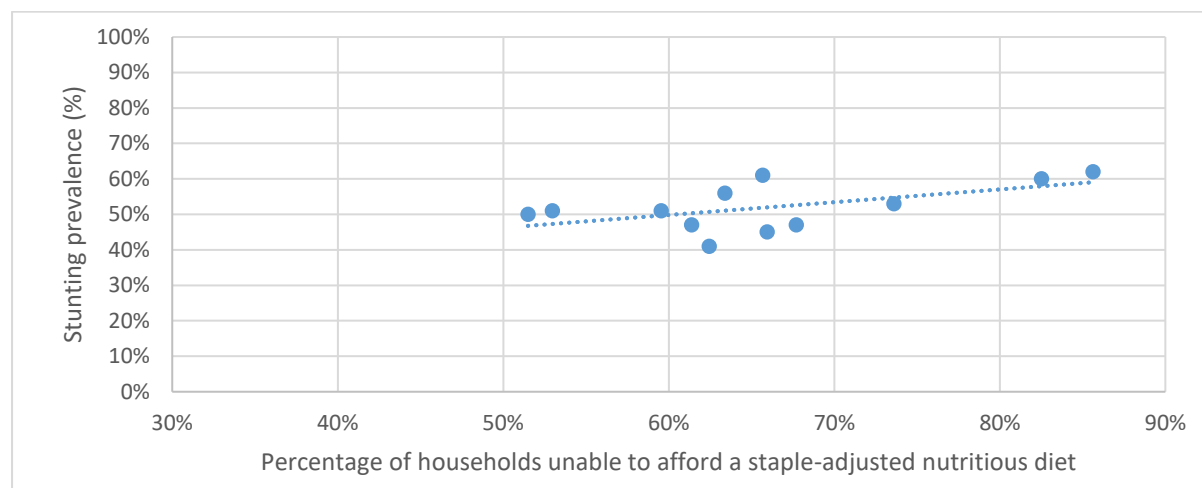


5.1.C Affordability of modelled diets

As presented in section 4.a, a nutritious diet would be unaffordable to the majority of households in Pakistan. The percentage of households unable to afford the SNUT based on reported food expenditure in the HIES was 59.6% in Punjab, 66.7% in KP, 66.9% in Sindh and 79.7% in Balochistan. A further 6% of households in Punjab, 0.7% in KP, 3.9% in Sindh and 3.7% in Balochistan would be unable to afford a diet that would meet energy requirements only (Figure 5) (Ministry of Planning, Development & Reform Planning Commission 2016).

Household non-affordability of the SNUT was positively correlated with stunting rates in the 2016 CotD study (Figure 69) (Ministry of Planning, Development & Reform Planning Commission 2016). This highlights further that the high cost of modelled diets that meet nutrient requirements, and poor household economic access to this diet, are likely to be key contributing factors to the high stunting prevalence in Pakistan.

Figure 69: Relationship between household non-affordability of the staple-adjusted nutritious diet and the prevalence of stunting for IYC<5 years by province (urban and rural) (Ministry of Planning, Development & Reform Planning Commission 2016)



(Correlation = 0.902)

5.1.D Limiting Nutrients

In the CotD analysis, all nutrient requirements could be met by the modelled diets, meaning there were no major issues of food availability, however a number of limiting nutrients were identified in, as shown in Table 5. Limiting nutrients are defined as nutrients for which requirements would be difficult to meet for specific target groups using local foods. In this case, the software models enough nutritious foods to meet the requirement but the percentage adequacy met does not exceed 100% as this would be outside of energy constraints, as well as adding significant cost to the minimised diet. Calcium and iron were limiting nutrient for all three key target groups, as shown in Table 5 and Appendix 7. Vitamin B12 and vitamin A were also limiting nutrients for the 12-23mo child and Lactating Women target groups. Other common limiting nutrients were vitamin C and Thiamine (vitamin B1). With the exception of vitamin C, the limiting nutrients identified are all found in high quantities in animal source foods such as meat, fish, eggs and dairy, which are also good sources of high quality protein. These foods were more expensive and availability was lower according to the HCES the food lists, compared to staple grains and pulses, indicating that accessing such nutrient-dense foods could be difficult for households in those areas.

Table 5: Overview of limiting nutrients identified for key target groups in the four provinces of Pakistan

Target group	Sindh ¹	Balochistan ¹	KP ¹	Punjab ¹
Child 12-23 months	Calcium Iron Vit B12 Vit A Vit C Vit B5	Calcium Iron Vit B1 Vit B12 Vit A Vit C	Calcium Iron Vit B1 Vit B12 Vit A Vit C	Calcium Iron Vit B1 Vit B12 Vit A
Adolescent girl	Calcium Iron	Calcium Iron	Calcium Iron	Calcium Iron Vit A Vit C
Lactating Women	Calcium Iron Vit A Vit C Vit B12 Vit B5	Calcium Iron Vit A Vit C Vit B12 Vit B5	Calcium Iron Vit A Vit C Vit B12 Vit B5	Calcium Iron Vit A Vit C Vit B12 Vit B5

¹Limiting nutrients averaged across areas and seasons within in season. The full list of limiting nutrients for urban/rural areas and each season is provided in Appendix 7.

5.2 Intervention Modelling

Highlights:

A number of interventions targeting individuals and households, with the objective of increasing access to nutritious diets were identified using the secondary data analysis and stakeholder consultations. These interventions, along with alternative entry points and transfer modalities (highlighting the need to strengthen links between food systems and social protection and health systems) were modelled using the CotD software, as detailed in the methods section. The different strategies to improve the availability of and access to nutritious foods included:

- Improved availability of and access to local nutritious foods, using vouchers that can be spent on markets ('market vouchers') or agricultural interventions
- Fortification of staple foods
- Specialised nutritious foods (SNFs) and home fortificants
- Micronutrient supplementation
- Cash transfers, based on BISP amounts, to increase purchasing power

Modelling was conducted for each province in urban and rural areas for summer and winter.

- There were no significant differences between modelling results by season
- Fresh food vouchers (providing animal source foods and vegetables) were the most effective to reduce the cost to meet nutrient needs for adolescent girls.
- Specialized Nutritious Foods were the most effective to reduce the cost to meet nutrient needs for children 6-23 months and pregnant and lactating women
- **Staple food fortification** is useful but not enough to meet needs of key vulnerable groups
- **Cash transfers** further contribute to improving affordability of nutritious diets for the **households**, and would need to be accompanied by effective demand creation strategies to stimulate that the money is spent on nutritious foods

No single intervention was enough to significantly reduce the cost of a nutritious diet. The most effective interventions at the individual target group level were then combined into household packages, which were further tested with different cash transfer amounts. The results show that a combined household package of targeted interventions including **SNFs and local nutritious foods, plus a cash transfer**, has the greatest impact on improving the affordability of a nutritious diet at the household level across provinces. These results demonstrate the possible benefits that could be gained by increasing household nutrient access via a package of interventions across multiple entry points.

It is worth noting that the modelled nutritious diets (SNUT) are theoretical in nature and a certain degree of behaviour change would be required in addition to the provision of greater access in order for necessary food choices and dietary practices to become a reality. The results of this modelling demonstrate the possible impact of different interventions on diet costs and affordability to the households. The modelling does not take into account the costs to service providers and funders in terms of implementation. This consideration, as well as feasibility of implementation and local acceptability are elements to be taken into account during the province- and national-level FNG workshops.

5.2.A Interventions

Based on stakeholder consultation, facilitated by the SUN core group, as well as the analysis of secondary data detailed above, possible interventions to reduce the cost or increase the affordability of nutritious diets in Pakistan were identified. The interventions listed included those directly aimed at key target groups in the population¹³ and those for entire households.

In addition to nutrition specific or sensitive interventions, a number of possible entry points and transfer modalities for each intervention were also identified. Table 6 displays the interventions that were modelled for each target group, the entry point/s for which these were envisaged and the modalities with which the intervention could be delivered. The nutrient content and details of modelled products and commodities are also provided in Appendix 9.

Each intervention was modelled individually across intended target groups for all provinces, urban/rural areas and season to assess the potential impact on the cost of a nutritious diet for the individual. The most effective interventions were then combined to form household packages, which were assessed for improvements in overall affordability of a nutritious diet at the household level. Cash transfers (different amounts) were then modelled with and without these packages to assess the extent to which they could further improve nutritious diet affordability.

Table 6: Interventions to be modelled in CotD for Pakistan

Intervention type	Intervention	Target Group	Transfer Modality	Potential Entry Points
Promotion of exclusive breastfeeding until 6mo of age and appropriate continued breastfeeding thereafter	Social and Behaviour Change Communication for breastfeeding promotion	PLW	Cannot test in CotD but critical due to identified poor breastfeeding practices	Health Education
		Child under 2		
Different types of complementary foods (fortified and unfortified) or specialised nutritious foods (SNF) made available through the market and/or social safety nets (in kind/vouchers)	Wawamum ¹⁴	Child under 2	In Kind Vouchers (covering full price) Market Price ¹⁵	Health Market Social Protection
	Wheat Soya Blend (Super Cereal+)	Child under 2		
		PLW		
		Adolescent Girl		
	Maamta ¹⁶	PLW		
		Adolescent Girl		
Increased availability of local nutritious (unfortified)	Local nutritious foods identified by CotD analysis	Child under 2	Vouchers (covering full price) Homestead food production	Market Agriculture
		PLW		
		Adolescent Girl		
Micronutrient Supplementation	Multiple Micronutrient Powder	Child under 2	In kind	Health
	Iron and Folic Acid	PLW		
	Multiple Micronutrient Tablet	Adolescent Girl		
		PLW		

¹³ Such as children aged less than two years, school-aged children, adolescent girls and pregnant and lactating women.

¹⁴ Wawamum is a fortified, chickpea-based medium quantity lipid-based nutrient supplement (MQ-LNS) developed by WFP and processed locally in Pakistan. Nutrient specifications are provided in Appendix 9

¹⁵ Market Price estimated using full cost recovery figures for each commodity from UN agencies

¹⁶ Maamta is a Lipid-based nutrient supplement (LNS) developed for Pregnant and Lactating Women in Pakistan by WFP and also produced locally. Specifications are provided in Appendix 9

Fortification of staple foods	Fortified wheat as per current government standards	Entire Household	Market price and reduced prices	Market
	Fortified wheat flour as per WHO standards			
Increased availability of biofortified foods	Biofortified Maize (to reflect current USAID funded CIMMYT activities)	Entire Household	Market price and reduced prices Homestead food production	Market Agriculture
	PARC, CGIAR, CIMMYT and HarvestPlus Biofortified Wheat ¹⁷			
Social Safety Nets - Conditional cash transfers for Vulnerable Households	Cash transfers for households of 1000 rupees per month per family (2008 BISP), 1200 rupees (2013 BISP), 1500 rupees (2014 BISP onwards) 1650 rupees (proposed increase) and 2000 rupees ¹⁸	Entire Household	Cash transfer	Social Protection
	Combined cash transfer and nutrition intervention packages	Entire Household	Conditional cash transfers with in-kind or vouchers	Social Protection Market Health Agriculture

5.2.A Interventions tailored at specific target groups

Children in the complementary feeding period of 6-23 months

The nutrient requirements of a child aged 12-23 months were selected to represent the needs of children aged 6-23 months who are breastfed and receive complementary foods.

As shown in Figure 70, the most effective interventions in terms of reducing the daily cost of a nutritious diet were provision of a daily serving of SNFs (Super Cereal+ or Wawamum) at no cost, either using a voucher or in-kind transfer. These interventions reduced the cost of a nutritious diet for a child by up to 76%, from an average of 18.8 PKR to 4.5 and 6.3 PKR respectively. When these products were also modelled at a full cost, simulating market availability, there was a 24% decrease diet cost for SC+ (from 18.8 to 14.2PKR) but only a 2% decrease using Wawamum (18.5PKR). The provision of MNP only reduced diet costs by 8% and there was little difference between in-kind and market-price (4% decrease) interventions. This is likely as the standard MNP formulation does not include calcium, a limiting nutrient identified for this target group in all areas. Voucher provision of nutritious local foods, such as vegetables, milk, meat and eggs was also modelled¹⁹ and the most effective combination was vegetables and milk. Further, as per Figure 71, market availability of fortified flour, using either WHO or government standards, was not an effective intervention for this specific target group. This is due to the fact that fortified flour, in the portion size consumed by the child, does not provide enough of the main limiting nutrients, and therefore, does not contribute to reducing the cost for a nutritious diet for this target group.

¹⁷ (Baloch et al. 2015; Harvest Plus 2014).

¹⁸ (Government of Pakistan 2016).

¹⁹ For a full list of modelling results see Appendix 10.

Figure 70: Impact (province average) of selected interventions on the **daily cost** (PKR) of a nutritious diet for 12-23mo children using in-kind, voucher and market price transfer modalities

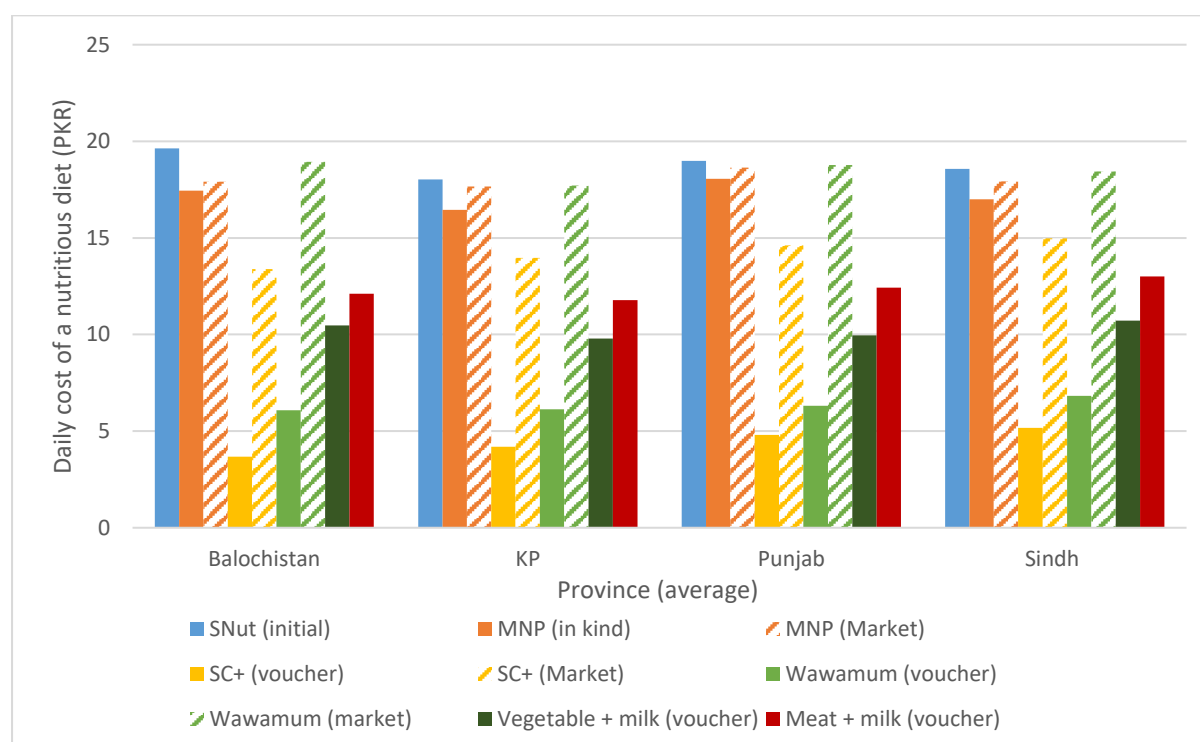
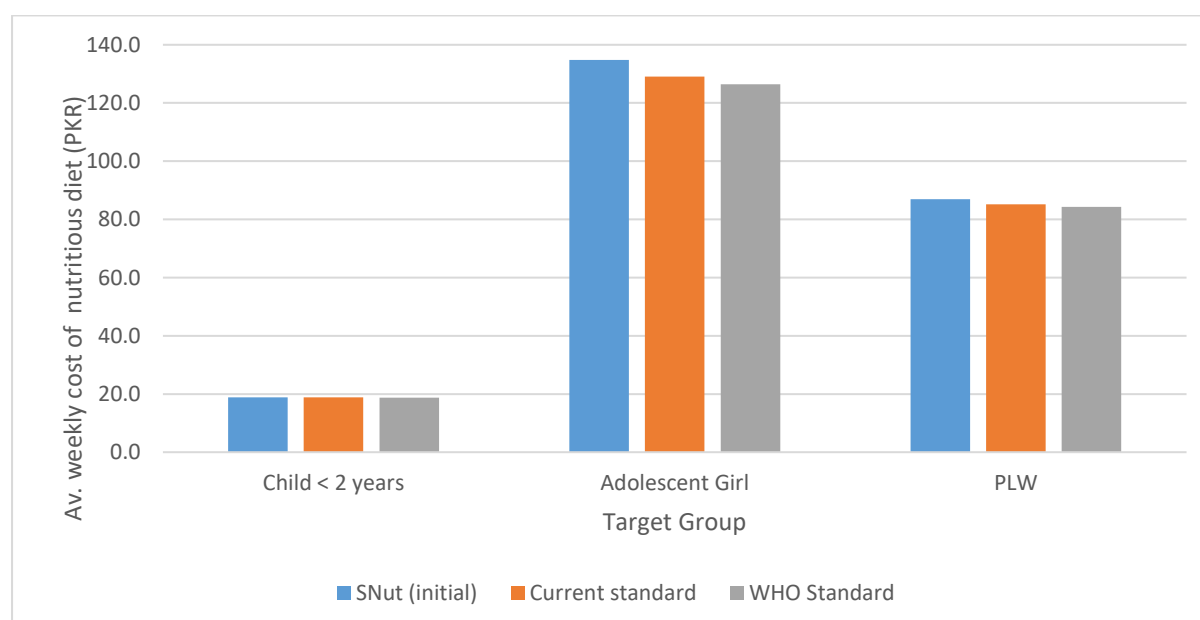


Figure 71: Impact on weekly diet cost (PKR) (province average) of making fortified wheat flour using current fortification standards or WHO standards available on the local market for key target groups



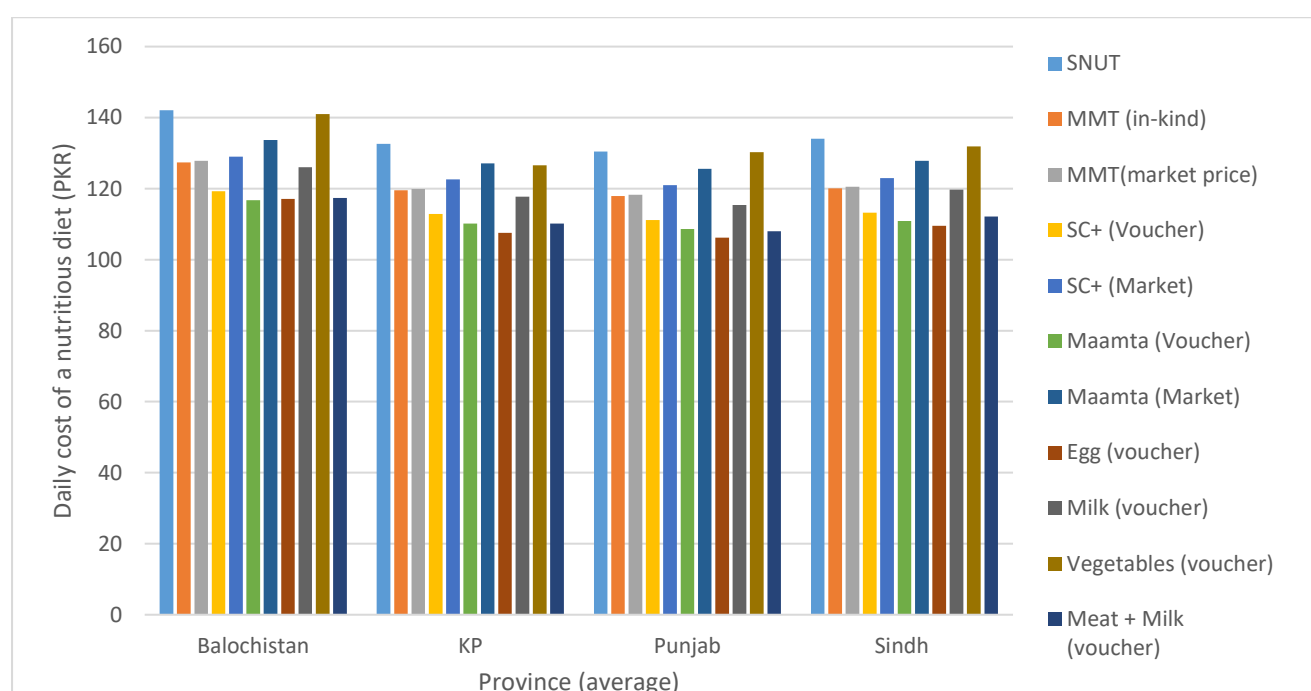
Adolescent Girls

The nutrient requirements of a 14-15 year old female were used in the modelling to represent the 'adolescent girl' target group. As shown in Figure 72, the most effective intervention for this target group was the provision of nutritious animal-source foods via vouchers or another transfer modality. Vouchers for daily servings of eggs or meat and milk could reduce the cost of a nutritious diet by up to 18.5%; from 135 PKR on average to 110 and 112 PKR respectively.

Provision of SNFs at no-cost, either in-kind or by voucher, was also an effective strategy, reducing the diet cost by up to 17%; to 114 PKR using SC+ and 112 PKR using Maamta. Ensuring market availability of these foods at full cost could reduce diet cost but not substantially. MMTs reduced diet costs by only 10%, with further reduction possibly limited by the relatively high cost of foods containing nutrients not provided by the MMT, such as calcium.

As shown above in Figure 71, making wheat flour fortified as per current standards, available on the local market could reduce diet cost by an average of 4.3%. Increasing the fortification level to the WHO standards would be slightly more effective for this target group, reducing diet cost by 6.2%. As such, it is likely that flour fortification would need to be combined with other interventions to have a meaningful impact on diet cost and meeting nutrient intake requirements for this target group.

Figure 72: Impact (province average) of selected interventions on the daily cost (PKR) of a nutritious diet for Adolescent Girls using in-kind, voucher and market price modalities



Pregnant and Lactating Women

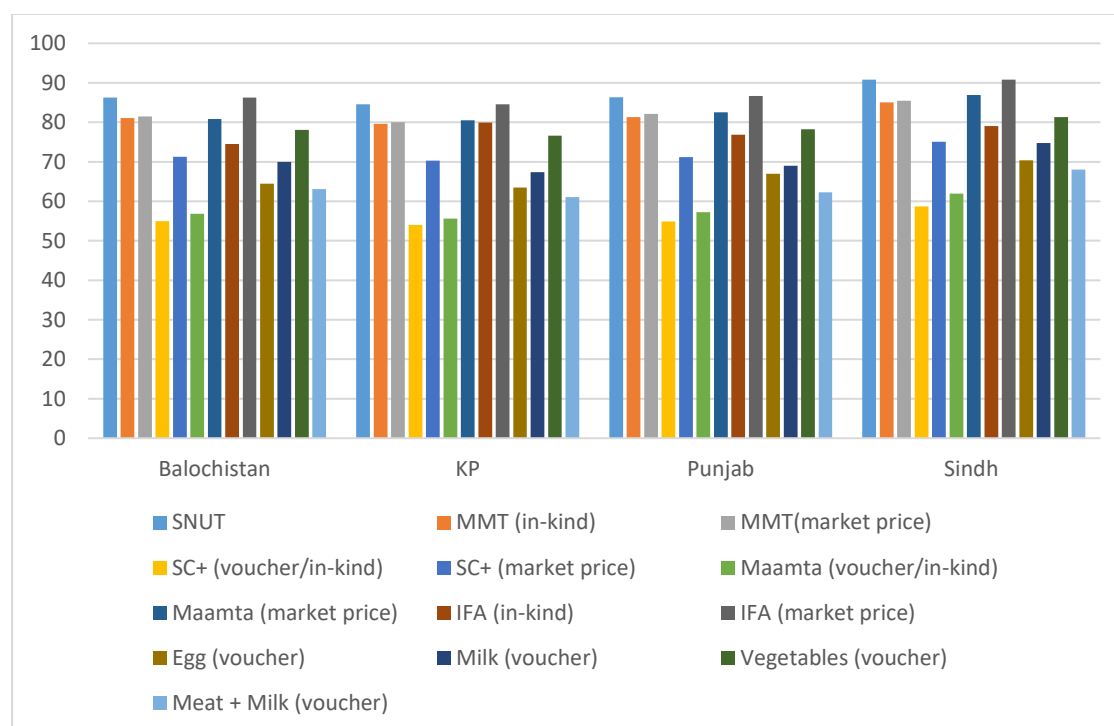
The nutrient requirements of a lactating adult woman were modelled to represent the increased nutrient and energy requirements of PLW.

As shown in Figure 73, the most effective intervention for this target group was provision (in-kind or via vouchers) of SNF, which reduced the daily diet cost by up to 36%; from 87 PKR to 55.5 PKR using SC+ and 58 PKR using Maamta. Simply making these foods available on the local market at full price could also reduce diet cost by an average of 17.5% using SC+ and 5% using Maamta. As seen in the other target groups, the impact on diet cost from the provision of MMTs was limited (6% reduction on average) due to the remaining expense of providing calcium in the diet.

Use of vouchers or other modalities to increase access to local nutritious foods could also be beneficial to this target group, providing animal source foods such as egg, milk, meat or a combination of these, could reduce diet costs by up to 27% on average.

As per Figure 71 above, making fortified flour available on the local market would have a limited impact (2-3%) on reducing diet cost for PLW, likely given the high cost of meeting the increased nutrient requirements during this life stage. As such, flour fortification would need to be combined with other targeted interventions aimed at this group.

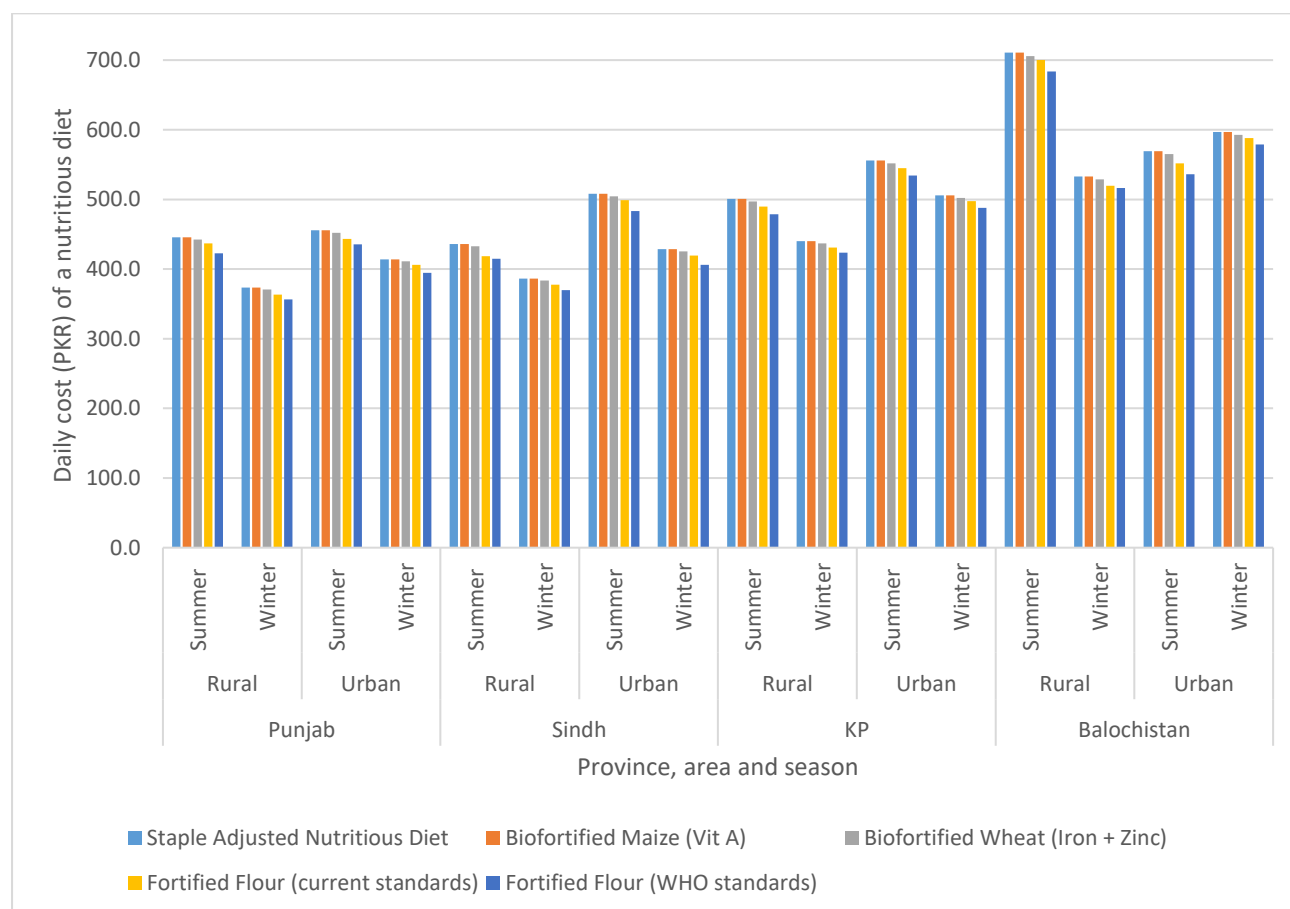
Figure 73: Impact (province average) of selected interventions on the daily cost (PKR) of a nutritious diet for Lactating Women using in-kind, voucher and market price modalities



Household-level interventions

The impact on the overall cost of a nutritious diet for households of making biofortified and fortified staples available on the local market are displayed in Figure 74 by urban/rural province area and season. Biofortified maize with vitamin A had no impact on overall household cost, likely as there were more cost-effective sources of vitamin A available on the local market and because other staples provided more favourable nutrient profiles/lower costs. The biofortified wheat modelled reduced household diet cost by an average of 1%. It is likely that no further reduction was shown because the linear programming models favoured more nutrient dense foods. The introduction of fortified wheat flour using current and WHO standards to the local market (at market price) led to an average decrease of diet cost of 2.2% and 4.3% respectively. It is likely that further reductions in cost were not shown as modelled diets were still required to include other, more nutrient-dense and costly foods to meet the nutrient requirements of household needs. As such, testing these interventions in combinations with other targeted interventions may result in a greater impact on household diet costs. Nevertheless, the modelled diets assume that an optimal selection is made, which would require substantial behaviour change, whereas for wheat flour fortification, practices would not have to change much, if at all. As such, fortifying flour is a way to improve nutrient intake that requires minimal behaviour change.

Figure 74: Impact on overall daily household diet cost (PKR) of making biofortified maize and wheat and fortified wheat flour using current fortification standards or WHO standards available on the local market by province, area and season



5.2.B Modelling of household-level intervention packages

Food-based interventions

Individual interventions were not enough to significantly lower the cost of a nutritious household diet and reduce non-affordability. Therefore, the most effective interventions (in terms of reducing diet cost) for individual target groups were combined into four alternative household packages to compare their likely impact at the household level on overall cost and affordability of nutritious diets. The different household-level packages modelled are detailed in Table 7 below.

Table 7: Household-level intervention packages modelled for Pakistan

No.	6-23mo children	Adolescent girls	PLW	Household
1.	SNF - In-kind Super Cereal + (60 g daily)	Nutritious local foods - Voucher Eggs (2) and vegetables (300g) daily	Nutritious local foods - Voucher Eggs (2) and vegetables (350g) daily	
2.	SNF - In-kind Wawamum (50g sachet daily)	SNF - In-kind Maamta (50g portion daily)	SNF - In-kind Maamta (75g portion daily)	
3.	SNF – Subsidised cost Market availability of Super Cereal+ (60 g daily)			Fortification – Market Cost Market availability of Fortified Wheat Flour (WHO standards)
4.	SNF - In-kind Super Cereal + (60 g daily)	SNF - In-kind Maamta (50g portion daily) Nutr local foods - Voucher Eggs (2) and vegetables (300g) daily	SNF - In-kind Maamta (75g portion daily) Nutr local foods - Voucher Eggs (2) and vegetables (350g) daily	

The impact of each of the four packages on the cost and affordability of nutritious household-level diets are displayed in Figure 75 and Figure 76 below. The most effective package at lowering diet cost and reducing the percentage of households unable to afford a nutritious diet was **package 4**, which included: SNF for children in the complementary feeding stage and a combination of SNF and local nutritious food vouchers for adolescent girls and PLW. This package reduced the cost of a nutritious diet for the household by an average of 25% and the percentage non affordability by an average of 38%.

The second most effective package of interventions (**package 1**) included SNF for children in the complementary feeding stage and local nutritious food vouchers for adolescent girls and PLW. This package could reduce household diet cost by an average of 16%, and non-affordability by 25%.

The intervention packages had the greatest impact in KP province, where the percentage of non-affordability was reduced by 45% with the introduction of package 1. In Balochistan, where initial non-affordability was highest at 81%, the intervention packages had the lowest impact, with package 1 only reducing non-affordability by 23.4%. This limited impact in Balochistan is likely due to a combination of the poor overall market access and availability of nutritious foods in the province, the high prices of these foods and high poverty.

Figure 75: Impact on overall daily household diet cost (PKR) of intervention packages by province

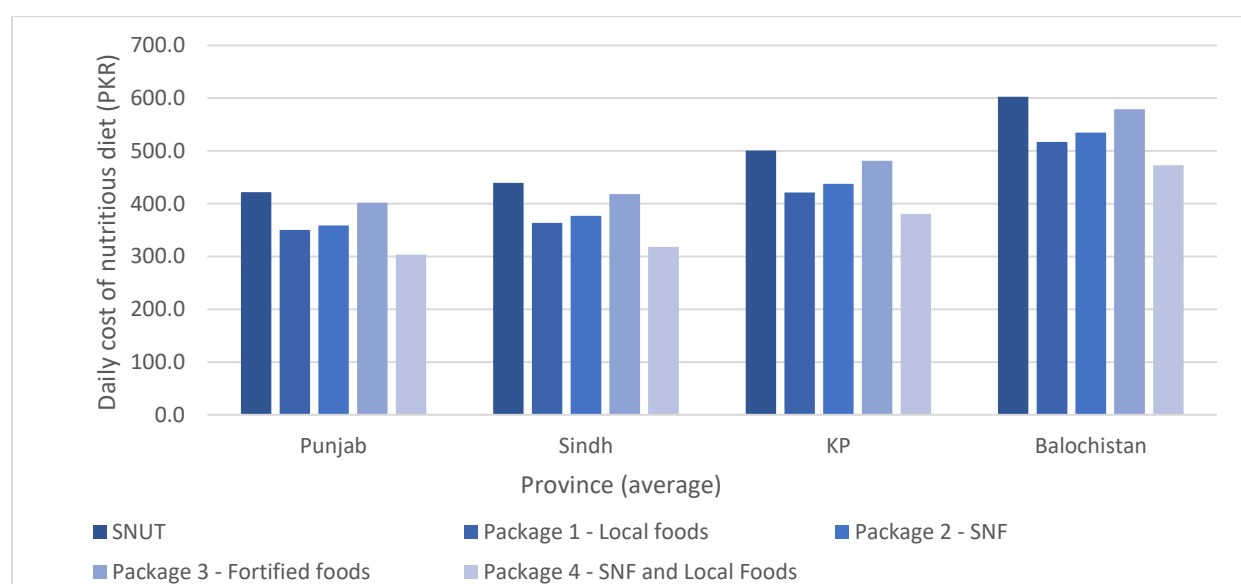
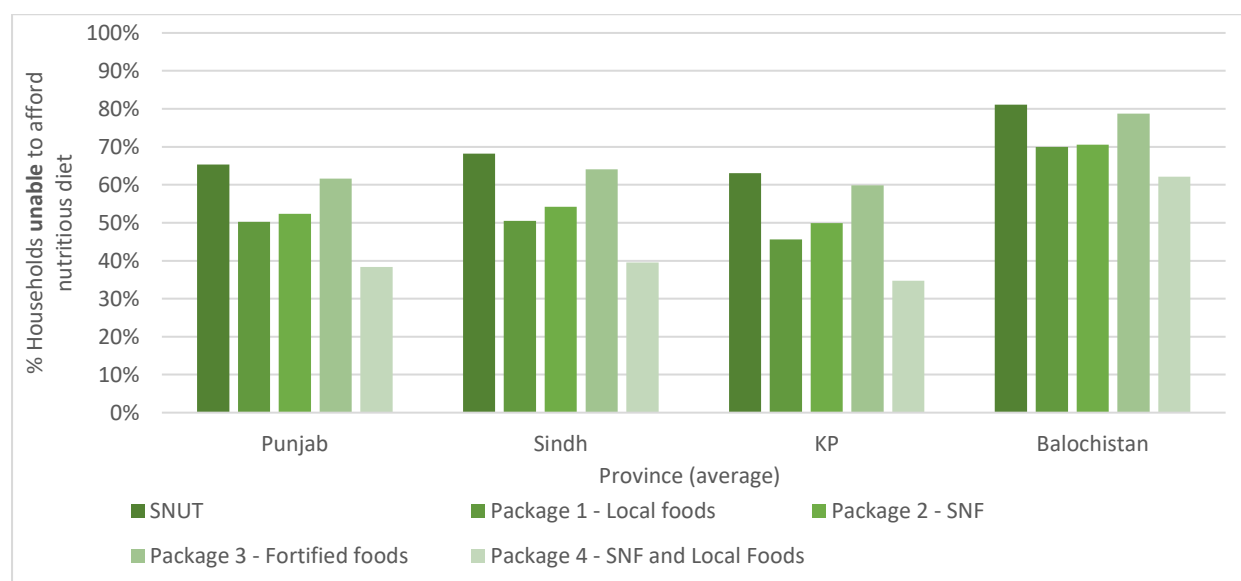


Figure 76: Impact of intervention packages on overall percentage of households that could not afford a nutritious diet by province



Cash-based transfers

A range of different monthly cash transfer amounts, including the current BISP monthly (1500 PKR) amount as well as possible increments, were modelled in addition to the intervention packages detailed above. BISP targets the most vulnerable households across Pakistan via the application of a poverty scorecard (Government of Pakistan 2016). The additional amounts modelled, 1650 PKR and 2000 PKR per month, were based on increases under consideration and to explore the level of investment necessary to reduce poverty and ensure access to nutritious diets.

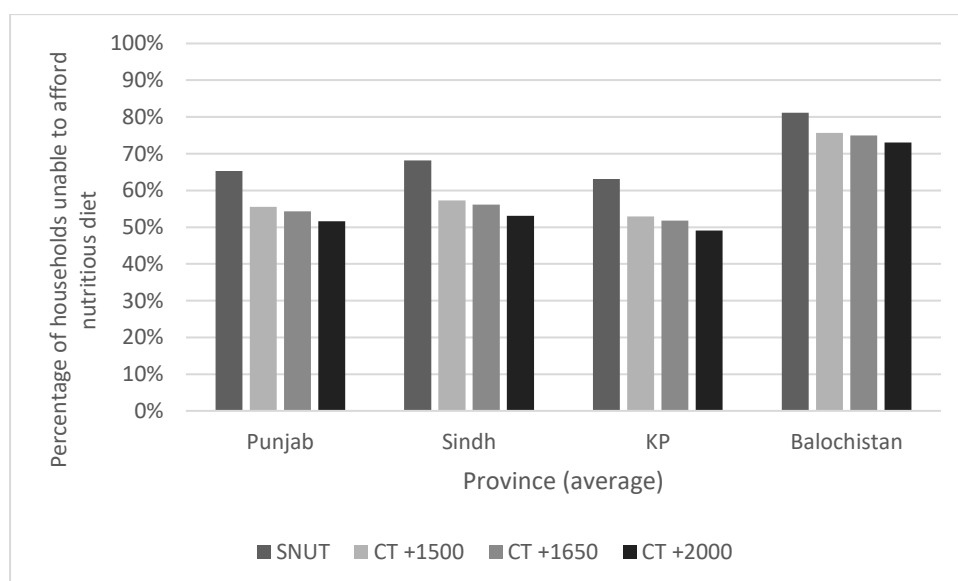
Note on modelling cash transfers:

The intervention modelling in CotD for FNG is based on the assumption that if a diet cost is within the level deemed 'affordable', based on current food expenditure, local households would be able to access a nutritious diet. It is understood that there are a range of external factors that could also influence this access, many of which are outlined in the secondary data analysis section, including individual choices and beliefs. It is important to keep in mind that the following assumptions are made when modelling cash transfer interventions with CotD as part of the FNG analysis and further formative research and programming may be required to ensure availability, access and uptake of nutritious diets:

- 100% of cash transfer is spent on food
- 100% of cash transfer spent on **NUTRITIOUS** foods
- Nutritious foods are available for purchase or produced locally and households have access to local markets or own production to obtain these foods.

Figure 77 shows the impact that the three cash transfer values had on the affordability of a nutritious diet (SNUT). The impact on % non-affordability of different monthly CT amounts in each rural and urban province area by season is displayed in Appendix 11. On average, the current BISP transfer of 1500 PKR per month could reduce overall non-affordability by 14 percentage points, an increase to the considered amount of 1650 PKR could reduce non-affordability by 15 percentage points and a further increase to 2000 PKR per month could reduce non-affordability by 19 percentage points. Similar to the intervention modelling results above, the cash transfers alone had the greatest impact on reducing percentage non-affordability in KP province (16-22.3 percentage points reduction) and the least impact (7-10 percentage points) in Balochistan, due to poor food access and availability in this Province, as mentioned above .

Figure 77: Impact of different monthly cash transfer (CT) amounts on overall percentage of households that could not afford a nutritious diet by province (without other interventions)



Figures 78-79 display the impact of combining the different household-level intervention packages with alternative cash transfer amounts on overall household non-affordability of a nutritious diet by province. The complete results by rural and urban province areas and season are presented in Appendix 10. These findings show that combining household packages of targeted food-based nutrition interventions with cash transfers could lead to significant reductions in the proportion of the population unable to access nutritious diets. Adding the current BISP cash transfer amount of 1500 PKR per month to package 4 (the most effective package) further reduced non-affordability by 31.4% on average; from 44% with the package only, to 30% with the package and the 1500 PKR transfer. Increasing the CT amount to 1650 or 2000 PKR reduced average non affordability further to 29% and 26% respectively. As expected based on the package modelling results, the impact of the combined household interventions and CT packages were greatest in KP province, but had a lower impact in Balochistan, likely due to the high baseline non-affordability (i.e. the gap that needs to be closed is large).

Figure 78: Impact of different Intervention Packages with monthly cash transfer (CT) amounts on overall percentage of households that could not afford a nutritious diet in Punjab Province

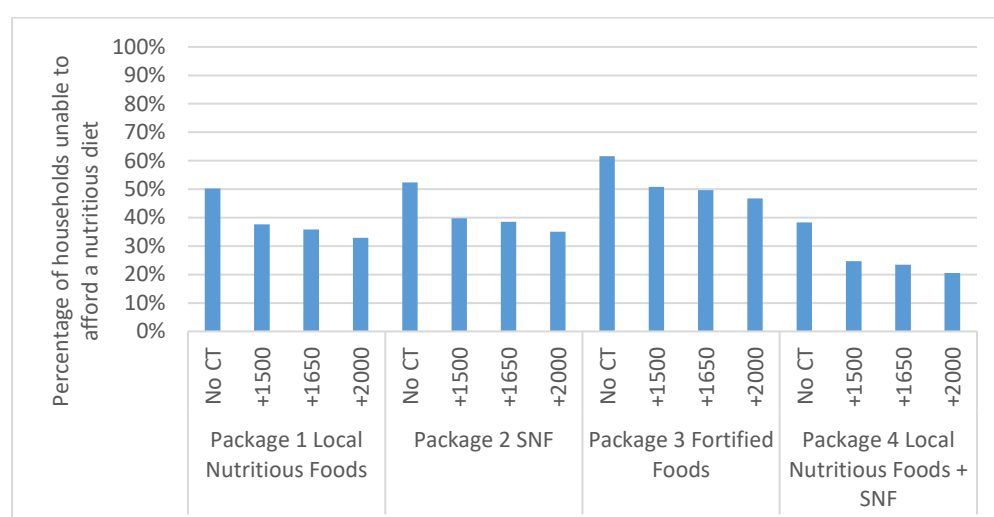


Figure 79: Impact of different Intervention Packages with monthly cash transfer (CT) amounts on overall percentage of households that could not afford a nutritious diet in Sindh Province

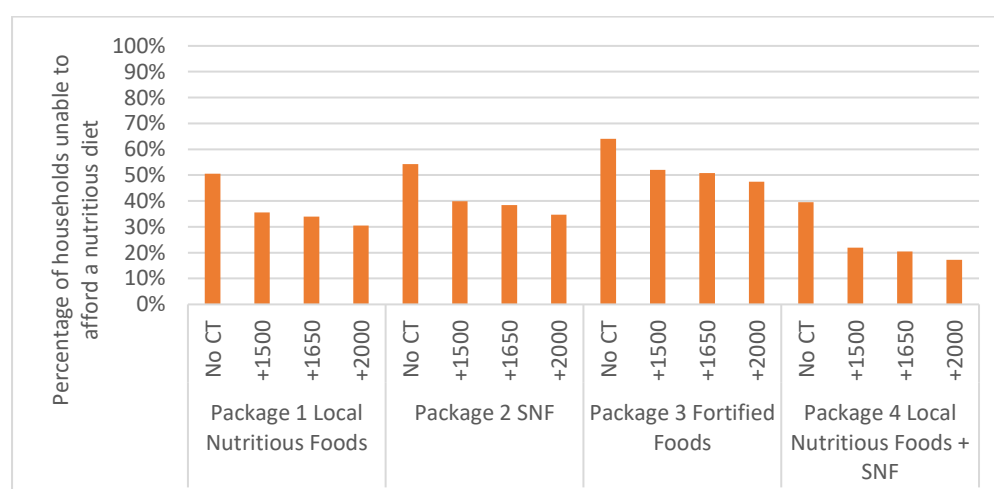
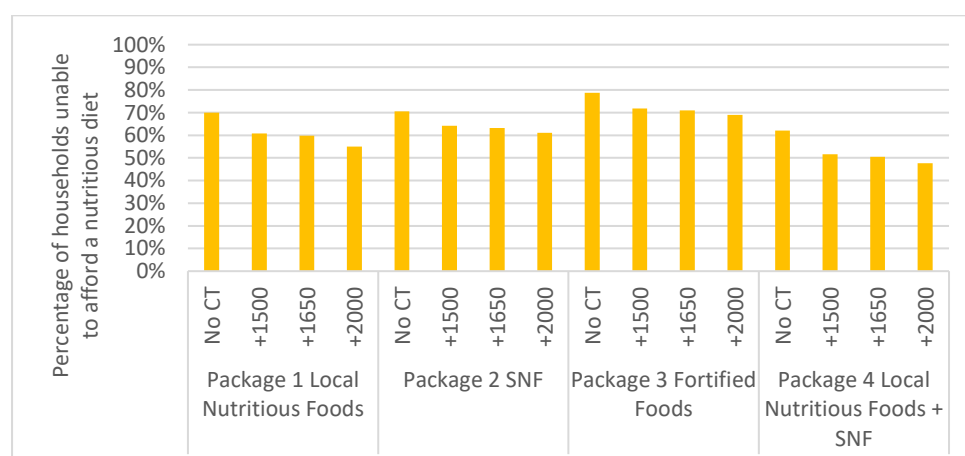


Figure 80: Impact of different Intervention Packages with monthly cash transfer (CT) amounts on overall percentage of households that could not afford a nutritious diet in KP Province



Figure 81: Impact of different Intervention Packages with monthly cash transfer (CT) amounts on overall percentage of households that could not afford a nutritious diet in Balochistan Province



6. Prioritisation of interventions and activities based on province- and national-level workshops

The findings from the FNG analysis, including the secondary data analysis and intervention modelling using CotD, highlighted the significant and multi-faceted nutrition challenges facing Pakistan. The results showed that economic access to nutritious foods, as well as poor dietary practices, are contributing to the significant levels of malnutrition across the country. This situation is further compounded by issues of intense population growth, poverty, rapid urbanisation and high susceptibility to shocks, especially in vulnerable areas. Whilst some progress has been made in recent years, especially by the national SUN network, to raise awareness of and respond to Pakistan's nutrition crisis, much support is still needed for greater collaboration and harmonisation across provincial and national governments and different sectors, actions to strengthen and build the nutrition sensitivity of existing programmes and delivery platforms, and creation of greater capacity to respond to nutrition issues.

During the provincial and national-level FNG workshops, as described above, the health, education, social protection, agriculture, media and food fortification sectors were represented by participants from government, SUN Core Group members, NGOs, the UN and academia. These stakeholders converged to review and discuss the FNG findings and, together, identify and agree upon prioritised interventions and activities to improve access to nutritious diets and improve nutrition overall.

The list of prioritised interventions identified, which reflect the views of individual provinces as well as Islamabad-based representatives, form the main outcome of the FNG process and represent the results of the analysis as much as the context-specific insights, knowledge and understanding brought to these discussions by the stakeholders themselves.

The prioritised interventions, as well as key activities to take place in the short-term, medium-term and long-term are detailed by sector in Table 8. The results of the five workshops have been consolidated given that there was significant similarity in the actions prioritised, however provincial and national workshops where respective intervention were identified are noted in Table 8.

Table 8: Interventions and activities prioritised by stakeholders during the province- and national-level FNG workshops

StoSec	Interventions	Activities (including short, medium and long-term)	Entry points	Modalities	Target Group ¹					Workshop ²				
					IYC	PL	AG	SC	HH	S	B	P	K	N
Health and Nutrition	Promotion & facilitation of improved IYCF practices via BCC	<ol style="list-style-type: none"> 1. Incorporation of evidence-based IYCF promotion in provincial PC-1s²⁰ for allocation of budgets 2. Formative research to understand current knowledge, practices and barriers to appropriate IYCF 3. Provision of in-service training for health workforce capacity building 4. IYCF counselling through existing health services 5. Multimedia BCC campaign to promote good IYCF Practices and other practices, including WASH 6. Evidence-based and context-specific behaviour change communication 	<ul style="list-style-type: none"> - Existing services including LHW - Markets - Private sector - Media 	<ul style="list-style-type: none"> - In-kind transfers and vouchers - BCC counselling 	X					X	X	X	X	X
	Promotion & support of improved IYCF practices via access to nutritious foods	<ol style="list-style-type: none"> 1. Incorporation of evidence-based IYCF promotion in provincial PC-1s for allocation of budgets 2. Formative research to understand current knowledge, practices and barriers to appropriate IYCF 3. Provision of natural nutritious foods and SNFs 4. Review of evidence and lessons learnt 			X					X	X		X	X
	Improved provision of family planning services	<ol style="list-style-type: none"> 1. Improved provision of family planning, focussing on increasing coverage and uptake, especially for adolescent girls 	<ul style="list-style-type: none"> - Existing services inc. LHW 	<ul style="list-style-type: none"> - In-kind provision 		X	X			X	X			
	Commercialisation of Specialised Complementary foods and export of commercialised SNF	<ol style="list-style-type: none"> 1. Revision and improvement of formulations and processing based on global evidence 2. Revision of standards and legislation 3. Build SNF production capacity of private sector 4. Increase access to safe, specialised nutritious foods for women and children 5. Marketing and demand creation activities 6. Incorporation into essential drug/food list 7. Continued processing and Export of SNF (Revenue generation) 	<ul style="list-style-type: none"> - Market and private sector - Health and Nutrition sectors 	<ul style="list-style-type: none"> - Market availability - Vouchers and discounts 	X	X	X			X			X	X

²⁰ In Pakistan, a PC-1 is a document that is developed to lay out the description, objectives, justification and details for a particular proposed government project/activity that includes cost estimates.

Fortification	Development/ harmonisation of fortification legislation and standards	<div>1. Advocacy for legislation and investment at national and provincial levels</div> <div>2. Development of overarching national guidance/ legislation for fortification</div> <div>3. Harmonisation of standards at provincial level in accordance with the national standards for uniformity and ease of implementation</div> <div>4. Mandatory legislation for fortification of wheat flour, salt and ghee/oil at provincial levels</div>	Health Education Media Industry PSQCA Food Department Markets	N/A										X	X	X
	Monitoring & enforcement of legislation	<div>1. Strengthen capacity of Provincial Fortification Alliances to plan and implement fortification program</div> <div>2. Development of provincial strategy and implementation framework for monitoring and enforcement</div> <div>3. Support for district-level monitoring and enforcement of legislation (capacity building and financial support)</div> <div>4. Capacity building for laboratory services</div> <div>5. Strengthen enforcement mechanism through capacity and infrastructure development</div> <div>6. Ensure financial sustainability through long term resource allocation and decrease dependence on donor funding</div>									X	X	X	X		
	Building technical capacity of industry	<div>1. Development of provincial strategy and implementation framework for fortification</div> <div>2. Provision of technical capacity building and quality control for industry via training and supervision</div> <div>3. Provision of premix, hardware and technical support for small-scale millers (chakis) to fortify at community-level</div> <div>4. Strengthen capacity for manufacturing of fortification equipment and premix at local level for sustainability (premix not currently produced locally and must be imported)</div>									X	X	X	X		
	Increasing demand for fortified staples	<div>1. Community-based awareness campaigns</div> <div>2. Media campaigns targeting consumers</div>						X		X	X	X				

	Increasing access for fortified staples	<ol style="list-style-type: none"> 1. Government subsidies for fortificant imports, to reduce price of fortified staples 2. Exemption of duties and taxes on import of micro-feeders and relevant lab equipment 3. Increased market availability of fortified staples 4. Increased economic access to fortified staples 		Market vouchers & discounts	X	X	X	X	X			X	X
Social Protection	Incorporation of nutrition-sensitive activities into existing social-protection	<ol style="list-style-type: none"> 1. Development of multi-sectoral working teams for nutrition-sensitive social protection 2. Review of the existing programs/research to evaluate the impact of the CCT linked to nutrition (REFANI, Oxford Policy Management Study on social protection programs in Pakistan (Sindh, Punjab), existing humanitarian programs in Sindh) and Social protection programs to be shock responsive (Linkages with the National Disaster Management Authority (NDMA) 3. Piloting of conditional cash transfers including mix of cash, vouchers for locally-available nutritious foods and in-kind provision of specialised nutritious foods for key target groups 4. Implementation of social protection programmes based on evidence from pilots 5. Incorporation of evidence-based behaviour change as part of nutrition sensitive social protection 6. Development of guidelines for implementation of Social Protection programs linked to nutrition outcome & subsequent advocacy for further government support for social protection 7. Harmonization of different social protection programs 	Existing programs (i.e. BISP) Markets Education (school attendance)	Cash transfers Vouchers In-kind provision BCC	X	X	X	X	X	X	X	X	X
Education	Incorporation of nutrition education in to school curriculum	<ol style="list-style-type: none"> 1. Development of nutrition curriculum 2. Training for teachers for curriculum delivery 3. Delivery of classroom-based nutrition education 4. Linkages with other relevant areas, i.e. WASH 	- Primary and secondary schools - Parent groups - Tertiary education facilities				X	X	X			X	X
	Incorporation of nutrition in to university health syllabuses	<ol style="list-style-type: none"> 1. Inclusion of nutrition subjects in existing tertiary health degrees <i>in the short term</i> 2. Establishment of nutrition as compulsory component of tertiary health degrees <i>in the long term</i> 							X			X	X

¹IYC= Infants and young children, PLW = Pregnant and Lactating women, AG = Adolescent girls, SC= School children, HH= Household

²S=Sindh, B=Balochistan, P=Punjab, K=KP, N=National

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10. Appendix

Appendix 1: Blank data mapping template developed for Pakistan FNG analysis

Document details			Secondary Data Category									Provinces								Territories									
Folder	Citation	Description	Background/context	Malnutrition Characteristics	Enabling Environment	Availability of nutritious foods	Access to nutritious foods	Nutrient intake	Local practices	Cost optimization	Nationally representative Data available	Sindh		Balochistan		KP		Punjab		ICT		FATA		AJK		GB			
												Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
1. National Surveys																													
2. Policy (Import and tariff restrictions)																													
3. Programmes and Interventions																													
4. Quantitative Studies																													
5. Qualitative studies																													
6. Country background and context																													
7. Monitoring data																													

Food prices

In order to calculate the cost of a nutritious diet, it was necessary to establish the cost of 100g of food items available to households. The values of 58 food items (or groups of foods) were calculated based on the households' reported consumption of purchased foods and food expenditure (over a period of either a month or fourteen days) in the HIES. Foods that had been grouped were entered into the software as individual foods; for example, a single value for consumption and expenditure was recorded in the HIES for radish, turnip and carrot – the average calculated value for this group was applied to each food, therefore applying the same price per 100g to all three food items. Thus, a total of 78 foods were added to the software food list (Ministry of Planning, Development & Reform Planning Commission 2016).

Consumption of food items expressed in litres was converted to grams using specific gravity reference values. Items expressed as the number of units consumed (e.g. number of eggs) were converted to a weight value using reference average weights for a single unit (e.g. average weight of a single egg). The average food prices for each item were calculated for all 28 divisions, as well as the averages for urban and rural areas (within each division). Average prices were also calculated at provincial level, also disaggregating by urban and rural area. Seasonal prices were also calculated based upon the date of the survey; surveyed households that were interviewed between October and February fell in the Winter season, whereas households interviewed between March and September fell in the Summer season. (Ministry of Planning, Development & Reform Planning Commission 2016).

Food composition tables

Nutritional information per 100g of 3,580 foods and supplements is an embedded component of the CotD software. The database comprises of food composition Tables from nine countries; of these, this study selected foods primarily from the India and Bangladesh Tables, although also utilized the USDA, Egypt, Kenya, Mexico, Senegal, and Generic CotD food composition Tables. The foods were selected based on the most appropriate food item and its composition. A list of the foods from the HIES and the corresponding foods from the CotD database is available in the MDPR and WFP CotD report.

Household size and composition

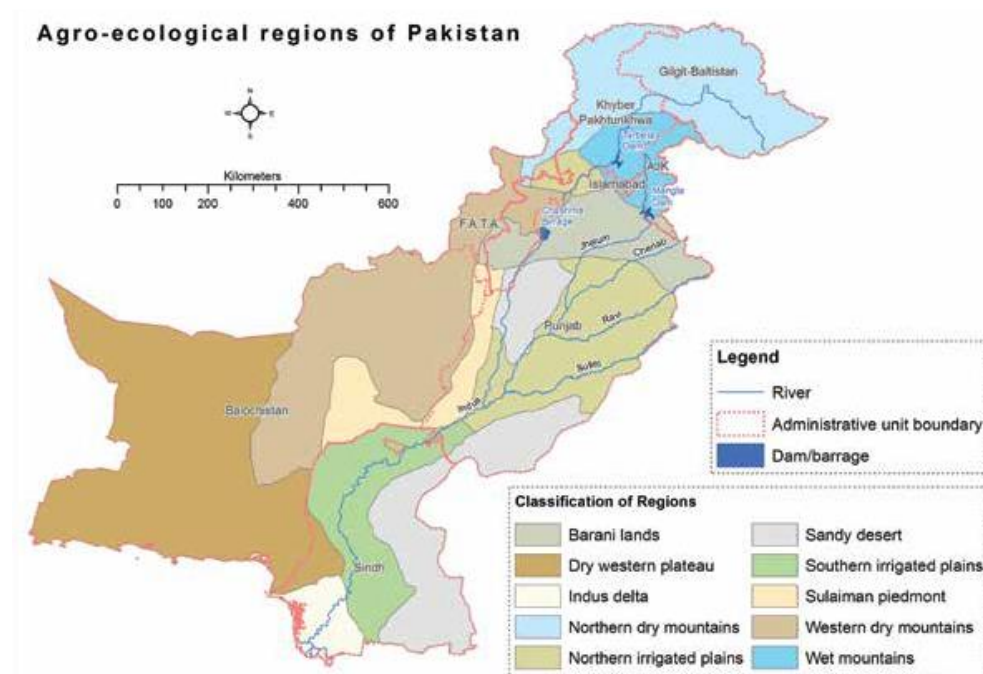
Average household size was calculated for each division and province for both rural and urban areas. The household composition was based on a combination of individuals whose energy requirement was equivalent to (or closest to the value of) $N \times 2,350$ kilocalories (where N is the average household size). An average consumption of 2,350 kilocalories per day was used as it represents the energy requirement for a normal healthy life prescribed by the Ministry of Planning, Development and Reforms. Details of the household composition used for each household is provided in Appendix 3.

Appendix 3: Household composition used for FNG CotD Modelling

Province	HH size (# mem bers)	Child <2 years	School aged child				Older children and Adolescents			Adole scent Girl	Adult Man	Lactating Woman	Elderly Woman
		12-23 month old	6-7 year old	8-9 year old	9-10 year old	10-11 year old	12-13 year old	13-14 year old	14-15 year old	14-15 year old FEMALE	30-59 yo, 55kg, Vig active	30-59yo lactating, 50 kg, vig active	60+ yo, 50kg, vig active
PUNJAB													
Rural	6	x	x							x	x	x	x
Urban	6	x	x							x	x	x	x
SINDH													
Rural	6	x			x					x	x	x	x
Urban	6	x			x					x	x	x	x
KPK													
Rural	7	x			x	x				x	x	x	x
Urban	7	x			x	x				x	x	x	x
BALOCHISTAN													
Rural	8	x		x		x	x			x	x	x	x
Urban	8	x		x		x	x			x	x	x	x
NATIONAL AVERAGE													
Average	7	x	x	x						x	x	x	x

Appendix Table 1: Household composition used for CotD Modelling as part of 2017 FNG

Appendix 5: Production and climate variation across agro-ecological zones of Pakistan



Appendix Figure 1: Agro ecological zones in Pakistan (Rasul et al. 2014; Salma et al. 2012)

Appendix Table 2: Characteristics of agro ecological zones in Pakistan ((Rasul et al. 2014; Salma et al. 2012)

Agro-ecological Zone	KPK	Punjab	Balochistan	Sindh	Description of climate	Average temp Summer	Average temp Winter	Mean monthly rainfall Summer	Mean monthly rainfall Winter
Northern Dry Mountains	x				High mountains covered with snow	1-7°C	1-7°C	10-29mm summer, 50-100mm spring	25-75mm
Northern Irrigated Plains		x			Semi-arid subtropical continental climate	39.5°C	6.2°C	108mm in East to 75mm in southwest	14-22mm per month
Southern Irrigated Plains				x	Arid subtropical and continental climate with hot summers and mild winters	40-45°C	19-20°C	16-20mm	<1mm
Barani Lands	x	x			Semi-arid, hot summers, cold winters with short dry season in early summer	38°C	3-6°C	200mm	36-50mm
Sulaiman Piedmont		x	x		Sub-tropical continental, arid and hot	40°C	5.7-7.6°C	21-38mm	13mm
Wet Mountains	x				Humid in East, with mild summers and cold winters Subhumid Mediterranean climate in West with dry summers and rainfall in spring & winter only	35°C		236mm	116mm
Dry western Plateau			x		Arid (desert) tropical climate with constant dry season	38-44°C	3-6°C in north and 11.5-15°C coast	2-4mm average, 36mm south east	Dry
Sandy Desert		x		x	Arid (desert) subtropical with very hot summers and mild winters	39-41°C	7°C	32mm (north) - 46mm south	<1mm
Western Dry Mountains			x		Mainly semi-arid highland with mild summers and cold winters. Rainfall and snowfall in winter	30-39°C	-3°C to +7.7°C	5-15mm	45-95mm
Indus Delta				x	Arid tropical marine with moderately hot summers and very mild winters	34-45°C	19-20°C	75mm	<5mm

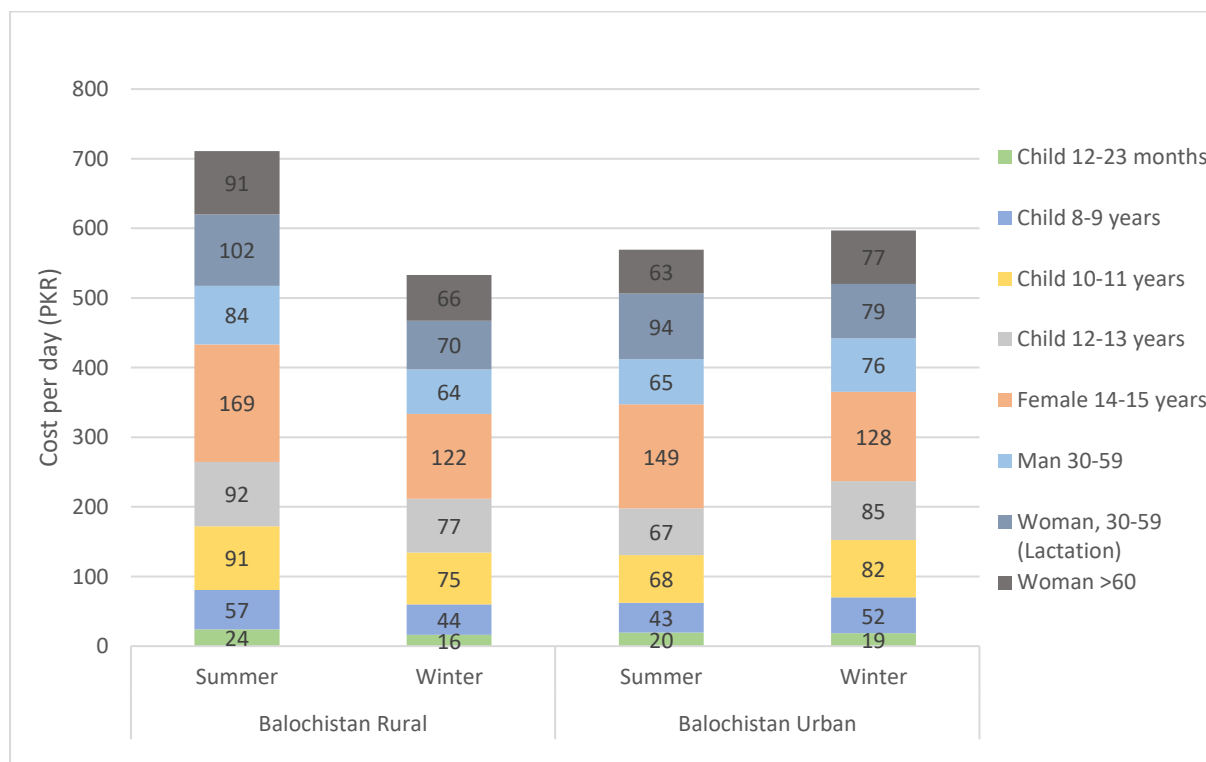
Appendix Table 3: Production type and land use by agro ecological zone in Pakistan (Rasul et al 2014; Salma et al. 2012)

Zone	Districts	Production
Northern Dry Mountains	Gilgit, Baltistan, Chitral, Dir and areas of Swat valley, Karakorum Mountains and spurs of Hindukush border	Maize, wheat, rice, finger millet, barley, buckwheat and a number of temperate fruits and nuts.
Northern Irrigated Plains	Most of the Punjab area in addition to Peshawar and Mardan in KPK	A. This is the major agricultural production area with a number of crops like wheat, maize, rice, sugarcane, barley, cotton and many minor crops. The orchards of citrus and mango are important while in NWFP areas, pear, plums, tobacco and groundnut are also grown. B. Main crops are sugarcane, maize, tobacco, wheat and clover. Sugar beet is recent introduction in the area. Considerable area is under fruit orchards of pears and plums. Some areas in the northern part are dry where wheat, millet, chickpea and groundnut are grown.
Southern Irrigated Plains	Hyderabad, Badin, Tharparker, Sangher, Dadu, Khairpur, Larkana, Nawabshah, Jacobabad, Sukkar, Rahim Yar Khan, Sibi and Shikarpur	Canal irrigated agriculture predominant land. Cotton, wheat, mustard, sugarcane and clover main crops on the left bank of the Indus. Rice, wheat, chickpea and clover on right bank. In areas with little water, sorghum is grown.

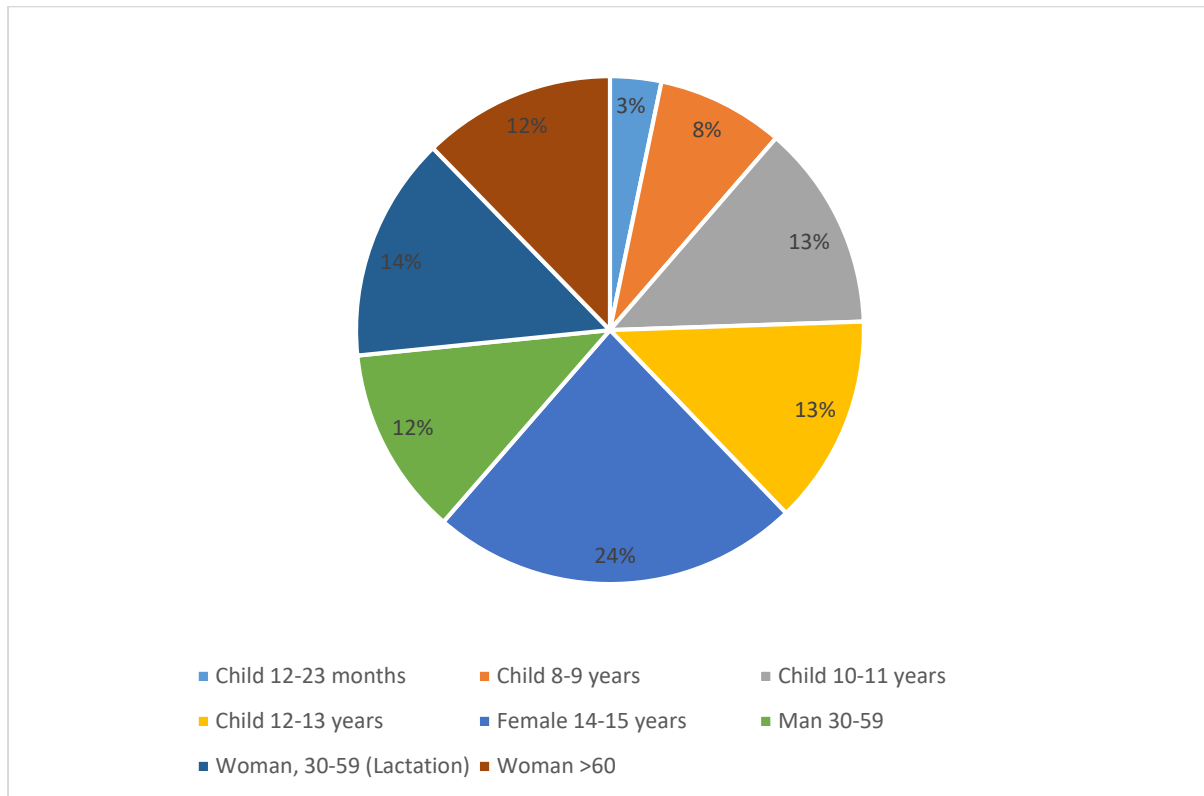
Barani Lands	D.I. Khan, Bannu, Mianwali, Attock, Abbottabad, Rawalpindi, Jhelum, Gujrat, Gujranwala and Sialkot	Gullied land; wheat, rice, maize, millet, sorghum, oilseeds pulses and fodder grown
Sulaiman Piedmont	Piedmont plains of the Sulaiman Range, sloping towards the Indus River	Torrent-watered cultivation main land use; wheat, sorghum, millets and chickpeas. Rice grown in narrow strip at junction of piedmont and river plains.
Wet Mountains	This region comprises of areas from Rawalpindi, Murree, Hazara and Mansehra	Approx. 25% of area under rainfed cultivation; maize, wheat and rice main crops in addition to apple, plum, peach and apricots
Dry western Plateau	Karachi, Dadu, Makran, Kharan, Chagai and Lasbella	Fruits, vegetables and wheat grown wherever water available from springs or kareezs. Sorghum, millet, castor bean also grown
Sandy Desert	Part A: Tharparker, Khairpur, Nawabshah, Sanghar, Rahim Yar Khan, Bahawalpur and BahawalNagar, Thar and Cholistan desert Part B: Sandy deserts from Muzaffarabad, Mianwali and Sargodha	Part A: Main land use grazing but guar, millet and castor also grown. In south-eastern part of region, where rainfall permits, wheat is an important crop Part B: (Northern part of region with 300 to 350 mm rainfall) Mainly used for chickpea cultivation. Some area under canal irrigation for cotton, sugarcane, guar, millet and wheat production
Western Dry Mountains	This area lies to the south of SafedKoh and to the west of Indus including districts of Kohat, Bannu, Tribal Areas, Zhob, Loralai, Kalat, Sibi, Quetta and Kacchi	Wheat, maize, alfalfa and temperate fruits
Indus Delta	Thatta, Badin and Hyderabad	Irrigated cultivation to grow rice, sugarcane, pulses, banana and some other fruits

Appendix 6. Costs of a Staple Adjusted Nutritious Diet by individual household member for each province, by season and urban/rural area

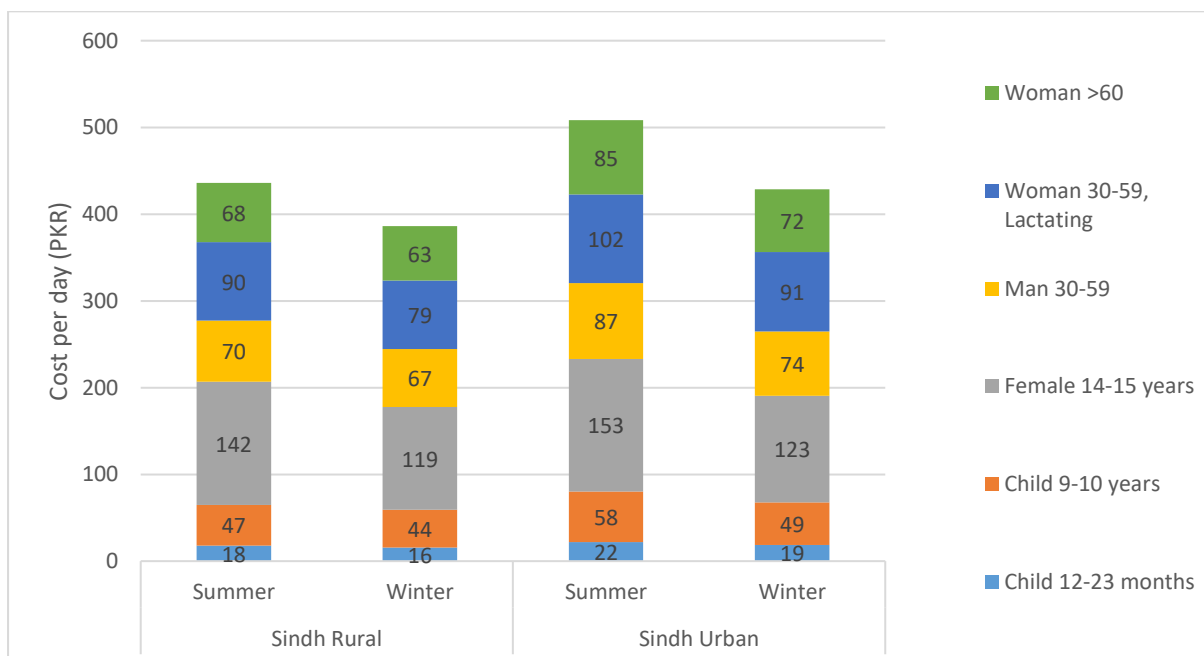
*Appendix Figure 2: Daily cost of the Staple Adjusted Nutritious diet by family member in **BALUCHISTAN PROVINCE***



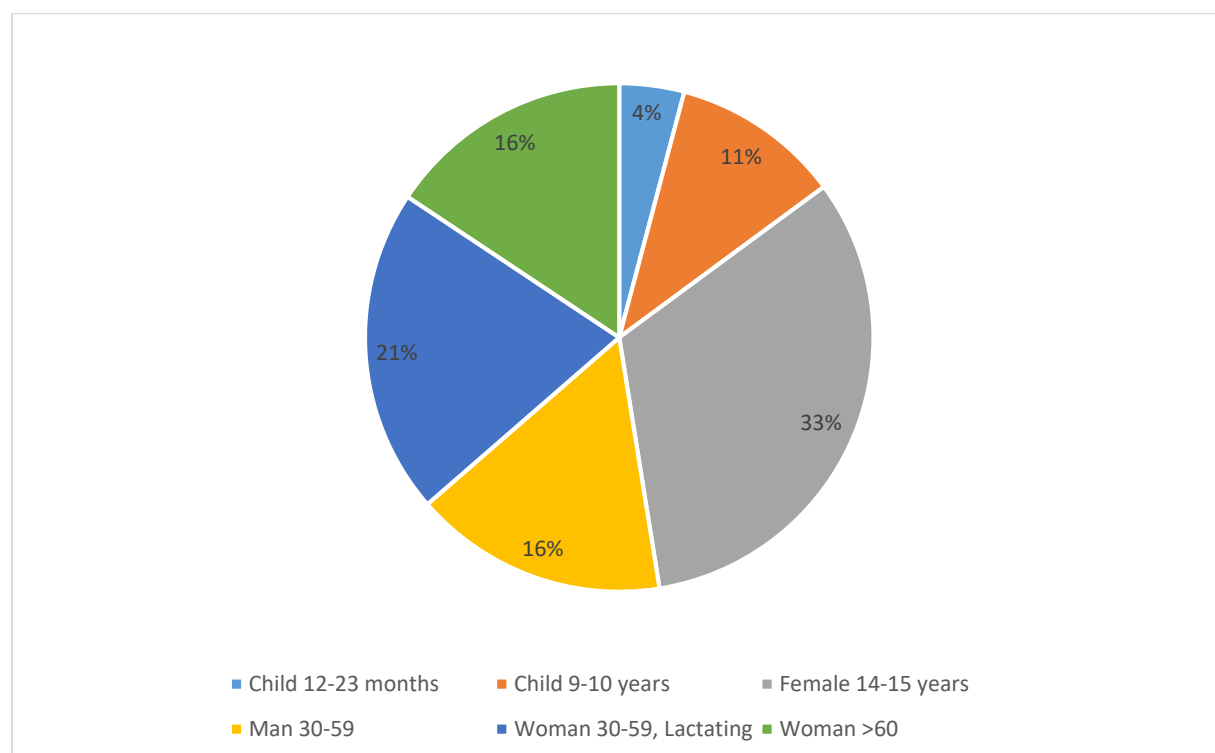
Appendix Figure 3: Average (by season and urban/rural location) cost of a staple-adjusted nutritious diet as a percentage of total household diet cost by family member in **BALUCHISTAN PROVINCE**



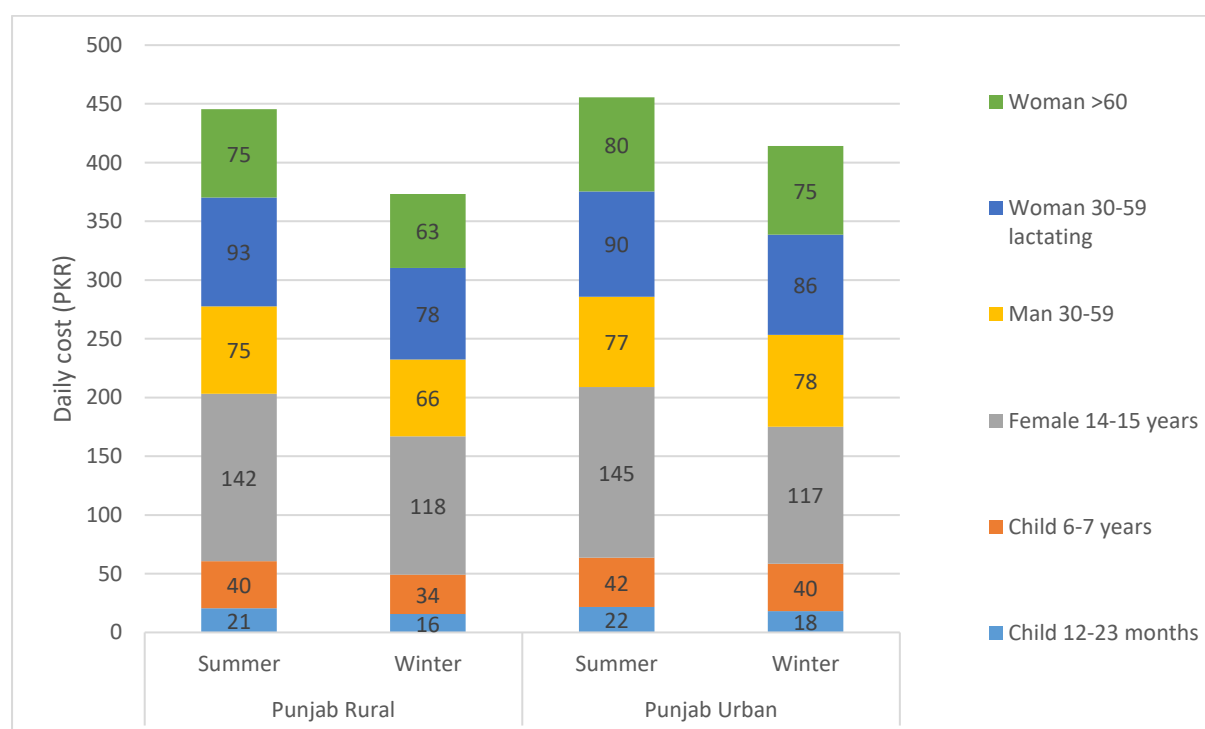
Appendix Figure 4: Daily cost of the Staple Adjusted Nutritious diet by family member in **SINDH PROVINCE**



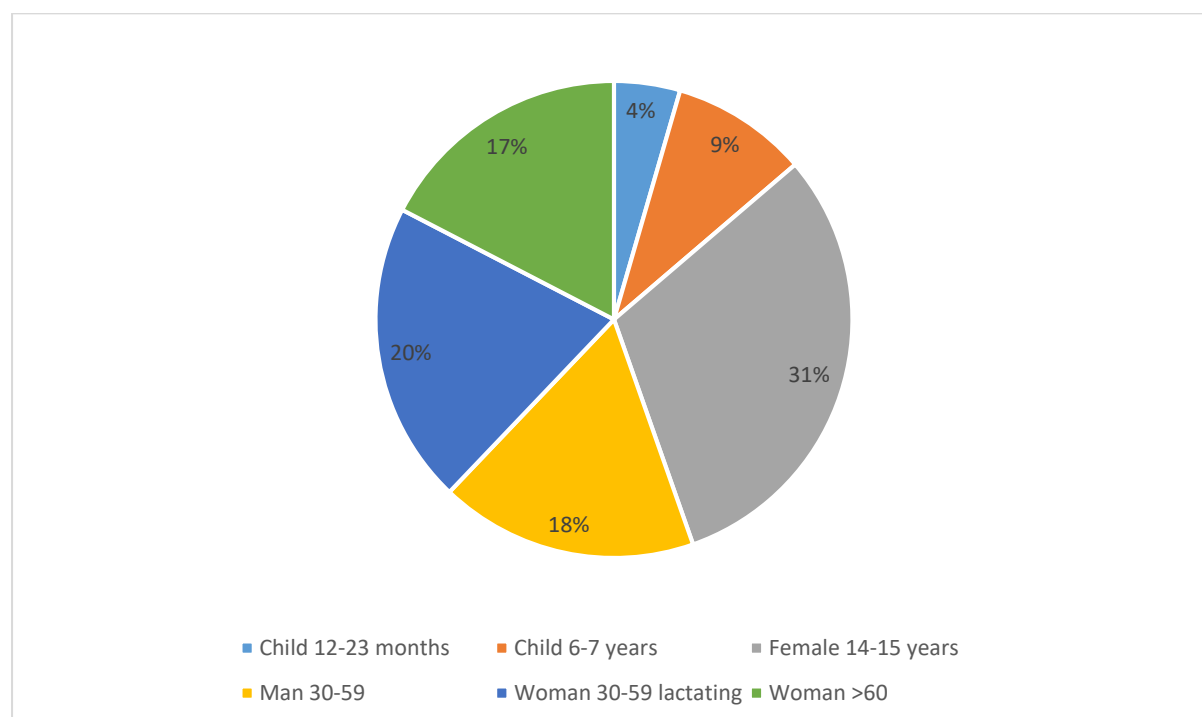
Appendix Figure 5: Average (by season and urban/rural location) cost of a staple-adjusted nutritious diet as a percentage of total household diet cost by family member in **SINDH PROVINCE**



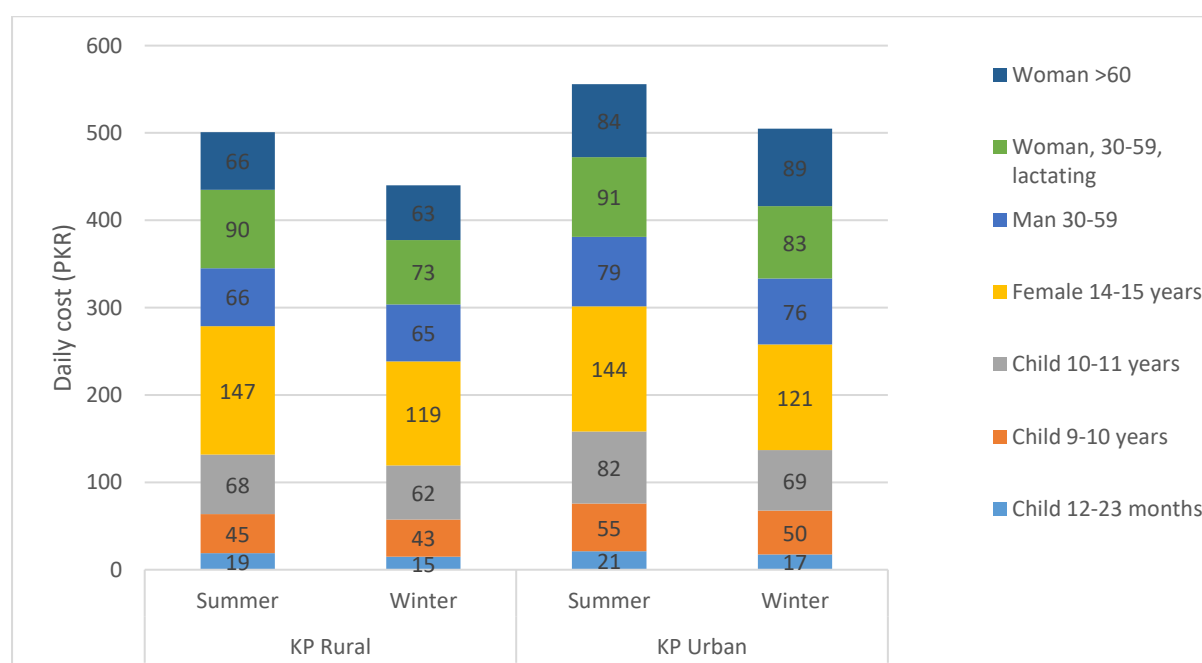
Appendix Figure 6: Daily cost of the Staple Adjusted Nutritious diet by family member in **PUNJAB PROVINCE**



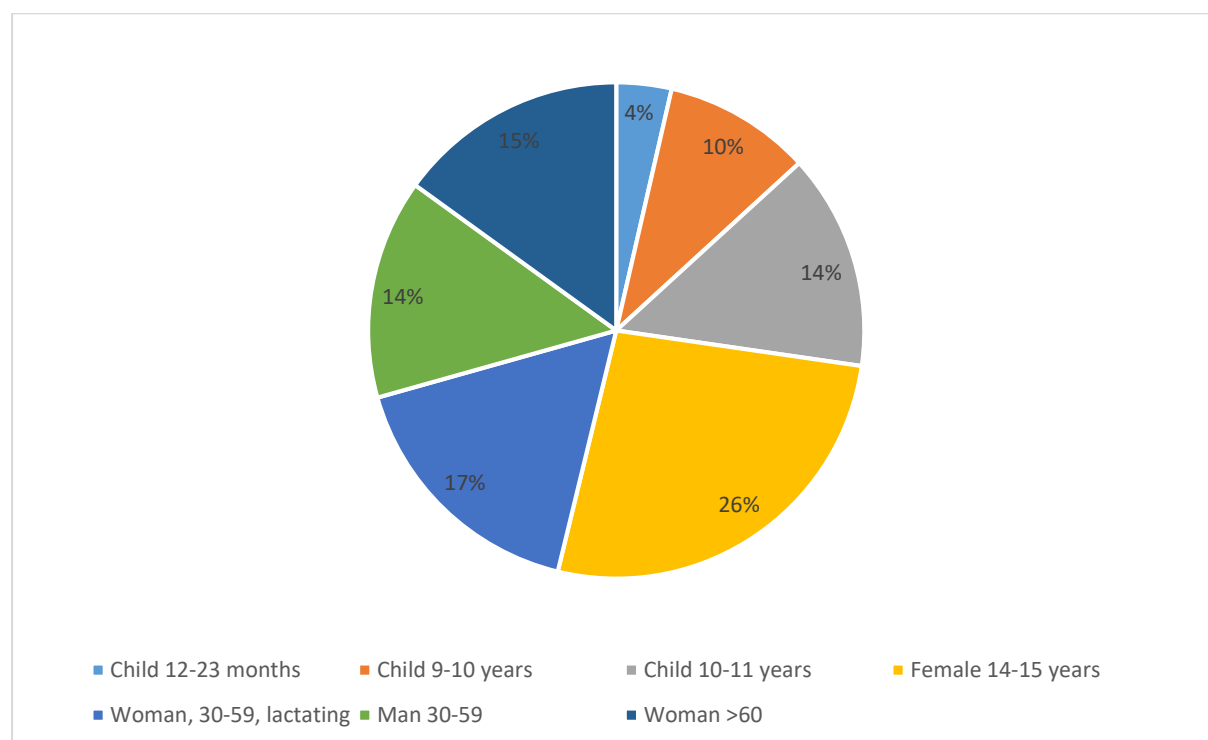
Appendix Figure 7: Average (by season and urban/rural location) cost of a staple-adjusted nutritious diet as a percentage of total household diet cost by family member in **PUNJAB PROVINCE**



Appendix Figure 8: Daily cost of the Staple Adjusted Nutritious diet by family member in **KP PROVINCE**



Appendix Figure 9: Average (by season and urban/rural location) cost of a staple-adjusted nutritious diet as a percentage of total household diet cost by family member in **KP PROVINCE**



Appendix 7: Limiting nutrients identified in the Cost of the Diet analysis

Appendix Table 4: Limiting nutrients identified for all target groups across all provinces, areas and seasons

Province	Target Group	Area	Season	Calcium	Vit A	Vit C	Vit Bx	Vit Bx2	Iron	Zinc	Vit B5	No. limiting nutrients
Sindh	12-23 mo Children	Rural	Summer	X	X			X	X			4
			Winter	X					X		X	3
		Urban	Summer	X	X	X			X			4
			Winter	X				X	X			3
	Adolescent Girls	Rural	Summer	X					X			2
			Winter	X					X			2
		Urban	Summer	X					X			2
			Winter	X					X			2
	Lactating Women	Rural	Summer	X	X	X		X	X		X	6
			Winter	X				X	X		X	4
		Urban	Summer	X	X	X		X	X			5
			Winter	X				X	X			3
Balochistan	12-23 mo Children	Rural	Summer	X	X	X			X			4
			Winter	X				X	X			3
		Urban	Summer	X	X	X			X			4
			Winter	X			X	X	X			4
	Adolescent Girls	Rural	Summer	X					X			2
			Winter	X					X			2
		Urban	Summer	X					X			2
			Winter	X					X			2
	Lactating Women	Rural	Summer	X	X	X		X	X		X	6
			Winter	X				X	X			3
		Urban	Summer	X	X	X		X	X		X	6
			Winter	X				X	X		X	4
KP	12-23 mo Children	Rural	Summer	X	X	X			X			4
			Winter	X			X	X	X			4
		Urban	Summer	X	X			X	X			4
			Winter	X			X	X	X			4
	Adolescent Girls	Rural	Summer	X					X			2
			Winter	X					X			2
		Urban	Summer	X					X			2
			Winter	X					X			2
	Lactating Women	Rural	Summer	X	X	X		X	X		X	6
			Winter	X				X	X		X	4
		Urban	Summer	X	X	X		X	X			5
			Winter	X				X	X		X	4
Punjab	12-23 mo Children	Rural	Summer	X	X				X			3
			Winter	X			X	X	X			4
		Urban	Summer	X	X	X			X			4
			Winter	X			X	X	X			4
	Adolescent Girls	Rural	Summer	X					X			2
			Winter	X					X			2
		Urban	Summer	X	X	X			X			4
			Winter	X					X			2
	Lactating Women	Rural	Summer	X	X	X		X	X			5
			Winter	X				X	X		X	4
		Urban	Summer	X	X	X		X	X		X	6
			Winter	X				X	X			3

Appendix 8: List of secondary data sources reviewed for the Pakistan FNG Analysis

Appendix Table 5: Secondary data sources (articles, datasets, reports, presentations and briefs) collated and reviewed as part of the Pakistan FNG

1	Pakistan Bureau of Statistics. Government of Pakistan. HOUSEHOLD INTEGRATED ECONOMIC SURVEY (HIES) Statistics Division Pakistan Bureau of Statistics. Gov Pakistan Stat Div Pakistan Bur Stat Islam. 2013;35.
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3	Government of Pakistan & UNICEF Pakistan. National Nutrition Survey Pakistan 2011. 2011; Available from: https://www.humanitarianresponse.info/system/files/documents/files/59_National Nutrition Survey-2011.pdf
4	Pakistan Bureau of Statistics. Government of Pakistan. PSLM 2014-15 Pakistan Social and Living Standards Measurement Survey. Islamabad; 2015.
5	United Nations Department of Economic and Social Affairs. Population Division. World population prospects: The 2015 Revision, Key findings and Advance Tables [Internet]. 2015. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21798940
6	WHO/UNICEF, 2015. Progress on Sanitation and Drinking Water: 2015 Update and MDG Assessment, New York. Available at: https://www.unicef.org/publications/index_82419.html .
7	IFPRI. 2015 Nutrition Country Profile: Pakistan. Global Nutrition Report. 2015.
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15	PSQCA, 2003b. Pakistan Standard Specification for Biscuits (Excluding Wafer Biscuits) (2nd Rev.).
16	PSQCA, 2008. PAKISTAN STANDARD SPECIFICATION FOR IODIZED FOOD GRADE SALT.
17	PSQCA, 1996. SPECIFICATION FOR WHEAT.
18	WFP Technical Specifications of Wawa Mum
19	WFP Technical Specifications of Maamta
20	USDA Foreign Agricultural Service, 2011. Pakistan Food and Agricultural Import Regulations and Standards - Narrative FAIRS Country Report.
21	Pakistan Food Fortification Study Team. Pakistan Food Fortification Scoping Study. Islamabad; 2014.
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Appendix 9: Nutrient specifications and modelling details for special nutritious foods tested in the CotD Software

	Fortified Wheat Flour (Government Standards)	Fortified Wheat Flour (WHO Standards)	Wawamum	Rice Soya Blend	Maamta	MMT	MNP	Iron and Folic Acid
Energy (Kcal)	347	347	510	410	510			
Protein (g)	10.61	10.61	13.5	16	11			
Fat Total (g)	1.64	1.64	31	9	26			
Vit A Equiv Retinol (mcg)	0	0	550	1038	1050	80000	40000	
Vit C (mg)	0	0	60	90	90	7000	3000	
B1 - Thiamin (mg)	0.13	0.13	1	0.2	1.5	140	50	
B2 - Riboflavin (mg)	0.05	0.05	2.1	1.4	2.6	140	50	
Niacin (mg)	3.97	3.97	13	8	16	1800	600	
Vit. B6 (mg)	0.1	0.1	1.8	1	1.8	190	50	
Folate Equivalent (mcg)	0	0	330	110	300	66667	15000	
Folic Acid (mcg)	20.15	20.1			300			400
Vit. B12 (mcg)	0	0.0008	2.7	2	2.7	260	90	
Pantothenic Acid*	1.13	1.13	4	1.6 (mg)	4.9			
Calcium (mg)	12.79	12.79	535	362	534			
Iron (mg)	4.8	5.3	10	4	10	3000	1000	300
Magnesium (mg)	57.89	57.89	150		150			
Zinc (mg)	1.55	4.55	11	5	11		410	
Carbohydrates (g)	70.34	70.34			0			

Dietary Fiber Total (g)	4.42	4.42			0	
Phytate (mg)	0	0			0	
Copper*	0.19	0.19			1.4	200 56
Phosphorous (mg)	140	140	450	280	450	
Potassium (mg)	210.27	210.27	900	140	900	
Manganese*	0	0	1.2		1.2	
Sodium (mg)	9.83	9.83			270	
Portion SIZES and FREQUENCY modelled						
12-23mo children		50g per day	60g per day			1g sachet, 3-4 x per week
PLW			120g	75g per day	1g per day	1g per day
Adolescent girls			120g	50g per day	1g per day	1g per day

Appendix 10: Results of intervention modelling for individual target groups by province, season and area

Appendix Table 6: Results of intervention modelling on the daily cost of a nutritious diet (PKR) for 12-23mo child household members across summer and winter for rural and urban locations in all provinces

	Area	Season	Base line SNUT	Specialised Nutritious Foods									Fortified Wheat Flour		Local Nutritious Foods													
				MNP (3-4x1g)			Super Cereal Plus (60g)			Wawamum (50g)			Current standard WHO Standard	Lentil	Egg	Buttermilk	Milk	Pumpkin	Carrot	Spinach	Beef	Fish	Buttermilk+ Pumpkin	Beef+ Buttermilk	Beef+ Milk	Fish+ Buttermilk	Milk+ Buttermilk	
				No Cost	Half Cost	Market Cost	No Cost	Half Cost	Market Cost	No Cost	Half Cost	Market Cost																Market Cost
Balochistan	Rural	Summer	24.08	21.3	21.9	22.9	4.3	9.2	14.1	7.2	15.6	22.2	24.1	24.1	21.3	21.2	16.6	17.2	19.3	22.1	n/a	23.1	23.6	12.7	15.2	15.9	16.1	16.1
		Winter	16.35	17.0	16.1	16.2	2.7	7.6	12.2	4.8	12.0	16.1	16.4	16.4	13.7	15.9	10.4	10.5	16.6	18.3	13.9	15.6	15.5	8.0	8.8	8.9	9.9	16.1
	Urban	Summer	19.56	12.4	13.2	14.0	3.7	8.6	13.5	7.1	15.6	19.5	19.6	19.6	16.7	14.4	16.2	16.5	15.7	17.3	n/a	18.0	19.1	12.5	14.6	14.5	15.7	15.7
		Winter	18.56	19.1	18.5	18.6	3.9	8.8	13.6	5.3	13.1	18.0	18.6	18.6	15.8	17.8	10.6	10.8	18.1	19.6	16.0	17.4	17.2	8.7	9.8	10.2	10.1	15.7
KP	Rural	Summer	18.77	14.4	15.2	16.0	3.9	8.8	13.7	6.5	15.0	18.8	18.8	18.8	16.2	15.3	14.5	14.9	15.4	17.3	n/a	17.6	18.3	11.4	13.3	13.5	14.1	14.1
		Winter	14.82	15.0	15.7	16.4	3.7	8.7	13.5	5.3	13.8	14.8	14.8	14.8	12.6	14.1	10.2	10.2	14.3	14.8	12.2	14.4	14.5	7.6	9.4	9.5	9.8	9.8
	Urban	Summer	21.06	19.2	19.8	20.6	4.0	8.9	13.8	6.2	14.5	19.8	21.1	21.1	18.7	18.7	13.9	14.1	17.5	19.5	n/a	19.4	19.3	10.8	12.8	13.1	13.5	13.5
		Winter	17.46	17.3	17.4	17.6	5.1	10.0	14.9	6.5	14.5	17.5	17.8	17.5	15.2	16.2	12.2	11.8	16.2	16.9	14.7	16.6	16.5	9.4	11.6	11.3	11.7	11.7
Punjab	Rural	Summer	20.52	19.0	19.6	20.1	5.3	10.2	15.1	7.0	15.1	20.5	20.5	20.5	18.2	18.7	14.3	14.1	17.2	19.0	n/a	19.8	20.2	11.4	13.7	13.4	13.9	13.9
		Winter	15.6	15.5	15.6	15.6	4.2	9.1	14.0	5.8	13.8	15.6	15.6	15.6	13.3	14.6	11.3	11.2	14.5	15.4	12.5	15.2	15.2	8.2	10.6	10.5	10.9	10.9
	Urban	Summer	21.57	19.9	20.2	20.9	4.6	9.5	14.4	6.3	14.8	21.0	21.6	21.6	19.2	19.5	14.3	14.5	17.3	19.3	n/a	20.9	21.2	10.8	13.6	13.7	14.0	14.0
		Winter	18.25	17.9	17.7	17.9	5.2	10.1	15.0	6.2	14.6	17.9	18.2	18.2	16.0	16.8	12.3	11.7	16.8	17.5	15.4	16.9	16.8	9.4	11.8	11.2	11.9	11.9
Sindh	Rural	Summer	17.98	15.1	15.9	16.5	4.5	9.4	14.3	6.6	14.6	18.0	18.0	18.0	15.7	15.0	13.9	14.2	15.0	16.6	n/a	16.7	17.5	11.3	12.6	12.7	13.4	13.4
		Winter	15.54	15.3	15.4	15.5	4.5	9.4	14.3	6.1	14.0	15.5	15.5	15.5	13.2	14.5	11.6	11.5	14.7	15.6	12.7	15.1	15.1	8.7	10.8	10.6	11.2	11.2
	Urban	Summer	21.96	19.6	20.1	21.0	5.8	10.7	15.6	7.5	15.6	21.5	21.9	21.8	19.6	19.3	15.9	15.4	17.8	19.1	n/a	21.3	21.4	12.1	15.2	14.2	15.4	15.4
		Winter	18.83	18.0	18.5	18.6	5.9	10.8	15.7	7.2	15.7	18.8	18.6	18.5	16.3	17.2	14.2	13.5	17.1	17.8	15.5	18.1	18.8	10.8	13.4	12.9	13.7	13.7

Appendix Table 7: Results of intervention modelling on the daily cost of a nutritious diet (PKR) for Adolescent Girl household members across summer (S) and winter (W) for rural (R) and urban (U) locations in all provinces

Province ₁	Area	Season	No Intervention (SNUT)	Specialised Nutritious Foods and Supplements									Fortification			Locally-available Nutritious Foods										
				MMT (1gx1 per week)	MMT (1gx1 per week)	MMT (1gx1 per week)	Super Cereal Plus	Super Cereal Plus	Super Cereal Plus	Maamta (50g)	Maamta (50g)	Maamta (50g)	Fortified Wheat Flour	Fortified Wheat Flour	Lentil	Egg	Buttermilk	Milk	Pumpkin	Carrot	Spinach	Beef	Fish	Beef+Butter milk	Beef+Milk	
				No Cost	Half Cost	Market Cost	No Cost	Half Cost	Market Cost	No Cost	Half Cost	Market Cost	Market Cost	Market Cost	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher
B	R	S	168.6	155.6	155.7	155.9	139.1	144.0	148.9	139.8	148.3	156.7	163.8	161.6	161.2	143.7	148.7	145.9	153.4	166.4	0.0	161.7	167.8	141.5	138.9	
B	R	W	122.3	109.3	109.5	109.7	106.9	111.8	116.7	101.9	110.4	118.9	116.7	113.9	115.1	96.9	108.4	109.2	136.5	148.1	115.7	114.2	121.7	100.3	101.1	
B	U	S	149.1	129.0	129.1	129.3	120.2	125.1	130.0	120.0	128.5	137.0	139.0	134.7	141.5	125.2	139.9	136.9	131.0	154.7	0.0	135.8	148.9	126.6	126.1	
B	U	W	128.4	115.8	116.0	116.2	110.8	115.7	120.6	105.2	113.7	122.2	122.7	120.1	120.8	102.6	110.3	112.1	143.3	155.8	121.5	119.8	127.9	101.8	103.6	
K	R	S	147.1	133.4	133.6	133.8	123.7	128.6	133.5	123.4	131.9	140.4	141.9	139.6	140.3	122.0	135.6	132.7	134.8	147.1	0.0	139.7	146.5	128.2	125.2	
K	R	W	119.1	105.9	106.0	106.2	103.9	108.8	113.7	98.8	107.3	115.7	113.3	110.5	112.6	93.4	105.5	106.1	119.1	119.1	112.0	111.0	118.6	97.4	98.0	
K	U	S	143.5	131.2	131.4	131.6	118.8	123.7	128.6	118.6	127.1	135.5	139.0	136.8	137.3	119.7	128.6	125.2	131.7	143.5	0.0	137.0	142.8	122.2	118.3	
K	U	W	120.8	107.5	107.7	107.9	105.0	109.9	114.8	99.9	108.4	116.8	115.0	112.2	114.4	95.1	106.3	107.1	120.8	120.8	113.2	112.7	120.4	98.2	99.0	
P	R	S	142.3	130.2	130.4	130.6	119.6	124.5	129.4	119.3	127.8	136.3	138.0	135.8	136.0	118.6	129.1	125.9	130.8	141.3	0.0	136.0	141.6	122.7	118.9	
P	R	W	117.7	104.3	104.5	104.7	102.9	107.8	112.7	97.8	106.3	114.8	112.0	109.2	111.4	91.8	105.4	105.4	128.8	140.3	109.3	110.0	117.3	97.4	97.4	
P	U	S	145.3	133.5	133.7	133.9	120.4	125.3	130.2	121.0	129.5	137.9	141.0	138.9	138.9	122.9	128.8	126.6	132.4	143.5	0.0	139.2	144.7	122.3	120.0	
P	U	W	116.7	103.6	103.7	103.9	101.8	106.7	111.6	96.5	105.0	113.4	111.0	108.2	110.5	91.4	103.3	103.6	129.2	140.7	108.8	108.8	116.4	95.5	95.7	
S	R	S	142.0	126.9	127.1	127.3	117.4	122.3	127.2	117.3	125.8	134.2	134.7	132.5	135.8	117.9	130.8	128.7	128.4	143.1	0.0	132.5	141.4	121.3	121.1	
S	R	W	118.8	105.6	105.8	106.0	104.2	109.1	114.0	99.5	108.0	116.5	113.2	110.4	112.3	93.0	107.3	107.4	129.8	142.0	110.9	110.7	118.2	99.3	99.3	
S	U	S	152.8	138.3	138.5	138.7	124.4	129.3	134.2	124.5	133.0	141.5	146.5	143.9	146.4	129.8	136.4	133.2	136.9	152.7	0.0	144.2	152.3	127.8	126.3	
S	U	W	122.6	109.7	109.9	110.1	106.9	111.8	116.7	102.4	110.9	119.4	117.1	114.4	115.7	97.5	109.5	109.6	132.5	145.3	113.5	114.8	122.6	101.7	101.8	

₁ B= Balochistan

K = KPK

P=Punjab

S = Sindh

Appendix Table 8: Results of intervention modelling on the daily cost of a nutritious diet (PKR) for Lactating Women household members across summer (S) and winter (W) for rural (R) and urban (U) locations in all provinces

Province ¹	Area	Season	No Intervention (SNUT)	Special Nutritious Foods and Supplements										Fort.				Locally-available Nutritious Foods											
				MMT (1gx1	MMT (1gx1	MMT (1gx1	Super Cereal	Super Cereal	Super Cereal	Maamt a (75g)	Maamt a (75g)	Maamt a (75g)	Iron (300mg)	Iron (300mg)	Iron (300mg)	Fortifie d	Fortifie d	Bengal Gram	Egg	Butter milk	Milk	Pumpki n	Carrot	Beef	Fish	Beef+B uttermi	Beef+ Milk	Fish+B uttermi	Fish+M ilk
				No Cost	Half Cost	Market Cost	No Cost	Half Cost	Market Cost	No Cost	Half Cost	Market Cost	No Cost	Half Cost	Market Cost	Market Cost	Market Cost	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher	Voucher
B	R	S	102.5	95.8	96.0	96.2	61.1	69.2	77.4	64.7	77.5	90.2	86.8	102.5	102.5	99.9	98.7	94.0	80.8	87.8	79.9	87.5	96.2	96.6	97.5	80.5	73.1	86.0	78.1
B	R	W	69.7	65.1	65.3	65.5	48.2	56.4	64.6	47.6	60.4	68.6	65.3	69.7	69.7	68.5	67.8	61.6	48.6	63.7	59.5	69.5	73.1	62.7	59.5	56.2	51.9	58.1	54.1
B	U	S	94.4	87.3	87.5	87.7	59.9	68.1	76.2	64.5	77.3	89.9	67.5	94.4	94.4	92.0	90.7	85.9	71.7	86.8	79.3	79.7	86.4	89.2	91.4	80.6	72.8	85.8	77.6
B	U	W	78.5	76.2	76.4	76.6	50.6	58.7	66.9	50.6	63.4	74.6	78.5	78.5	78.5	78.5	78.5	72.5	56.6	65.6	61.3	75.6	79.0	72.4	64.7	58.7	54.5	58.9	54.9
K	R	S	89.7	83.4	83.6	83.8	56.4	64.6	72.8	59.6	72.3	85.0	89.7	89.7	89.7	87.7	86.7	82.0	68.2	80.1	73.5	77.8	84.4	83.9	84.9	73.4	67.1	78.8	71.7
K	R	W	73.5	70.1	70.3	70.5	48.8	57.0	65.1	48.9	61.6	72.6	68.5	73.5	73.5	72.8	72.4	68.3	53.6	63.6	59.3	70.0	72.1	67.6	62.0	57.0	52.8	56.7	52.7
K	U	S	91.1	84.7	84.9	85.0	54.2	62.4	70.6	56.8	69.5	82.2	82.1	91.1	91.1	89.3	88.4	84.0	69.1	76.1	69.8	79.4	86.2	84.6	82.1	69.6	63.9	74.7	68.1
K	U	W	83.9	80.3	80.5	80.7	56.5	64.6	72.8	57.4	70.1	82.3	79.7	83.9	83.9	84.6	82.5	77.4	63.2	71.4	67.1	79.6	81.6	77.3	70.4	64.8	60.4	63.7	67.1
P	R	S	92.5	84.9	85.1	85.3	57.1	65.3	73.4	61.1	73.9	86.5	78.1	92.5	92.5	87.9	86.7	85.3	73.5	84.0	77.1	81.0	86.5	85.6	85.3	76.6	69.7	81.0	77.1
P	R	W	77.8	73.5	73.7	73.9	51.9	60.0	68.2	52.2	64.9	77.1	68.8	77.8	77.8	76.6	75.9	71.7	58.4	67.1	62.4	73.5	76.2	71.5	66.6	60.7	56.0	59.8	62.4
P	U	S	89.7	84.9	85.0	86.8	54.6	62.7	70.9	58.4	71.1	83.8	79.0	89.0	90.9	88.3	87.7	82.6	72.8	78.3	70.6	77.7	82.9	84.5	85.9	63.6	64.5	76.5	68.8
P	U	W	85.5	82.0	82.2	82.4	55.9	64.1	72.3	57.3	70.1	82.8	81.4	85.5	85.5	84.2	83.6	78.7	63.2	70.4	65.8	80.8	82.7	78.9	71.5	71.7	59.0	63.0	58.6
S	R	S	90.4	83.2	83.4	83.6	56.9	65.1	73.2	61.0	73.7	86.2	73.3	90.4	90.4	88.3	87.3	83.5	68.0	81.5	74.0	77.3	82.6	84.0	83.5	74.8	68.2	79.6	72.1
S	R	W	79.1	74.7	74.9	75.1	54.6	62.7	70.9	55.1	67.9	78.8	69.9	79.1	79.1	77.8	77.1	73.0	59.8	70.4	66.0	75.2	77.8	72.7	68.1	63.6	59.2	63.1	58.9
S	U	S	102.4	95.7	95.9	96.1	61.0	69.2	77.3	67.3	80.1	92.7	92.9	102.4	102.4	99.1	98.0	95.1	83.2	91.3	83.3	86.2	91.6	96.0	94.4	84.3	76.3	88.6	80.7
S	U	W	91.4	86.7	86.9	87.1	62.5	70.7	78.8	64.5	77.2	89.9	80.2	91.4	91.4	88.2	86.5	83.5	70.5	80.2	75.8	86.5	88.5	84.5	91.4	72.9	68.4	73.0	68.7

¹B= Balochistan

K = KPK

P=Punjab

S = Sindh

Appendix 11: Impact on the cost (PKR) and affordability of nutritious diets of **household** intervention packages by province, area and season

Appendix Table 9: Impact on overall daily household diet cost (PKR) of intervention packages by province, area and season

Province	Area	Season	SNUT (no intervention)	Package 1	Package 2	Package 3	Package 4
Punjab	Rural	Summer	445.6	372	378	422	325
		Winter	373.4	308	318	357	261
	Urban	Summer	455.7	380	385	435	329
		Winter	414.1	341	354	394	299
Sindh	Rural	Summer	435.9	357	370	415	313
		Winter	386.3	318	334	370	277
	Urban	Summer	508.2	425	435	483	372
		Winter	428.6	355	370	406	311
KP	Rural	Summer	501.0	415	435	479	374
		Winter	440.0	368	385	424	331
	Urban	Summer	555.9	470	482	534	426
		Winter	505.8	431	447	488	392
Balochistan	Rural	Summer	711.0	614	628	684	560
		Winter	532.8	459	479	516	419
	Urban	Summer	569.4	474	498	536	433
		Winter	597.0	520	533	579	480

Appendix Table 10: Impact of intervention packages on overall percentage of households that could not afford a nutritious diet by province, urban/rural area and season

PROVINCE	AREA ¹	SEASON ²	Cash Transfers Only				Package 1 (Local Foods) + Cash transfers				Package 2 (SNF) + Cash transfers				Package 3 (Fortified Foods) + Cash transfers				Package 4 (SNF + Local Foods) + Cash transfers			
			Initial SNUT only	+1500	+1650	+2000	Pack 1 Only	+1500	+1650	+2000	Pack 2 only	+1500	+1650	+2000	Pack 3 only	+1500	+1650	+2000	Pack 4 only	+1500	+1650	+2000
Punjab	R	S	73.8%	65.6%	64.7%	62.6%	61.1%	49.1%	45.9%	43.9%	62.2%	50.7%	49.3%	44.5%	70.3%	61.4%	60.5%	57.8%	50.0%	35.4%	34.2%	31.1%
		W	61.4%	49.6%	48.0%	44.4%	44.4%	30.8%	29.5%	26.0%	47.7%	33.6%	32.3%	29.2%	57.7%	44.3%	42.7%	39.3%	31.6%	17.4%	16.1%	13.1%
	U	S	66.5%	57.9%	56.9%	54.5%	52.5%	40.3%	39.0%	36.0%	53.4%	41.5%	40.2%	37.2%	63.1%	53.7%	52.6%	50.2%	39.9%	27.0%	25.7%	22.2%
		W	59.6%	49.0%	47.8%	44.8%	42.9%	30.2%	28.9%	25.8%	46.2%	33.4%	32.1%	29.1%	55.4%	44.0%	42.7%	39.7%	32.0%	19.1%	17.9%	15.5%
Sindh	R	S	80.4%	71.6%	70.6%	67.5%	63.6%	47.8%	45.9%	41.5%	67.6%	52.3%	50.8%	46.6%	76.7%	66.1%	64.6%	61.1%	49.8%	30.7%	28.7%	24.2%
		W	71.5%	57.3%	55.8%	52.2%	51.3%	32.5%	30.6%	26.0%	56.3%	38.7%	36.8%	32.3%	67.4%	52.2%	50.6%	46.3%	35.9%	17.3%	15.8%	12.2%
	U	S	67.8%	59.3%	58.3%	55.9%	52.4%	40.0%	38.8%	35.9%	54.5%	42.7%	41.4%	38.5%	64.1%	54.8%	53.8%	51.5%	49.1%	26.4%	25.1%	22.2%
		W	53.1%	41.0%	40.0%	36.8%	34.8%	22.0%	20.7%	18.4%	38.5%	25.8%	24.6%	21.5%	48.1%	35.2%	34.0%	31.1%	23.3%	13.2%	12.3%	10.0%
KP	R	S	65.4%	56.0%	54.8%	52.1%	46.8%	32.7%	31.2%	27.8%	52.0%	38.8%	37.3%	33.8%	63.6%	50.7%	49.5%	46.3%	35.4%	20.9%	19.6%	17.1%
		W	53.2%	40.3%	38.8%	35.4%	33.6%	19.4%	18.4%	16.0%	38.7%	24.1%	22.7%	19.5%	49.3%	35.4%	33.9%	30.5%	22.7%	11.8%	10.8%	9.1%
	U	S	70.5%	62.6%	61.8%	59.9%	55.6%	43.7%	42.3%	39.2%	58.1%	46.8%	45.4%	42.3%	67.2%	58.8%	57.7%	55.2%	44.9%	31.7%	30.4%	27.2%
		W	63.3%	52.6%	51.6%	48.8%	46.4%	33.2%	31.8%	28.7%	50.7%	37.5%	36.2%	33.2%	59.5%	48.5%	47.2%	44.0%	35.9%	22.5%	21.1%	18.1%
Balochistan	R	S	90.3%	89.3%	88.9%	87.9%	85.4%	81.4%	81.0%	70.1%	86.5%	82.5%	82.1%	81.2%	90.1%	87.1%	86.7%	85.7%	81.0%	74.1%	73.3%	71.1%
		W	77.7%	69.7%	68.5%	65.9%	63.9%	52.4%	51.2%	48.2%	68.6%	57.1%	55.9%	53.2%	75.1%	65.8%	64.7%	62.0%	54.5%	41.6%	40.2%	36.2%
	U	S	76.5%	70.2%	69.2%	66.7%	60.4%	49.7%	48.5%	45.8%	65.5%	54.8%	53.7%	51.3%	72.2%	63.1%	62.0%	59.5%	51.3%	39.7%	38.5%	35.5%
		W	80.0%	73.7%	73.1%	71.6%	70.2%	59.6%	58.5%	56.0%	61.8%	62.3%	61.2%	58.7%	77.7%	71.4%	70.8%	68.8%	61.6%	51.0%	49.9%	47.1%

¹R=Rural, U=Urban, ²S=Summer, W=Winter

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11th April, 2017- Islamabad

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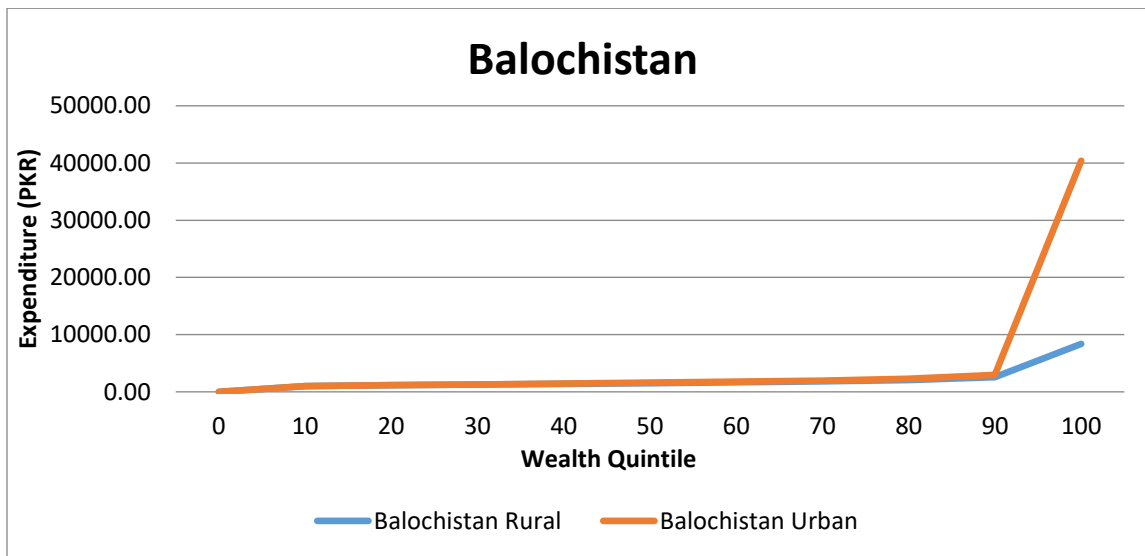
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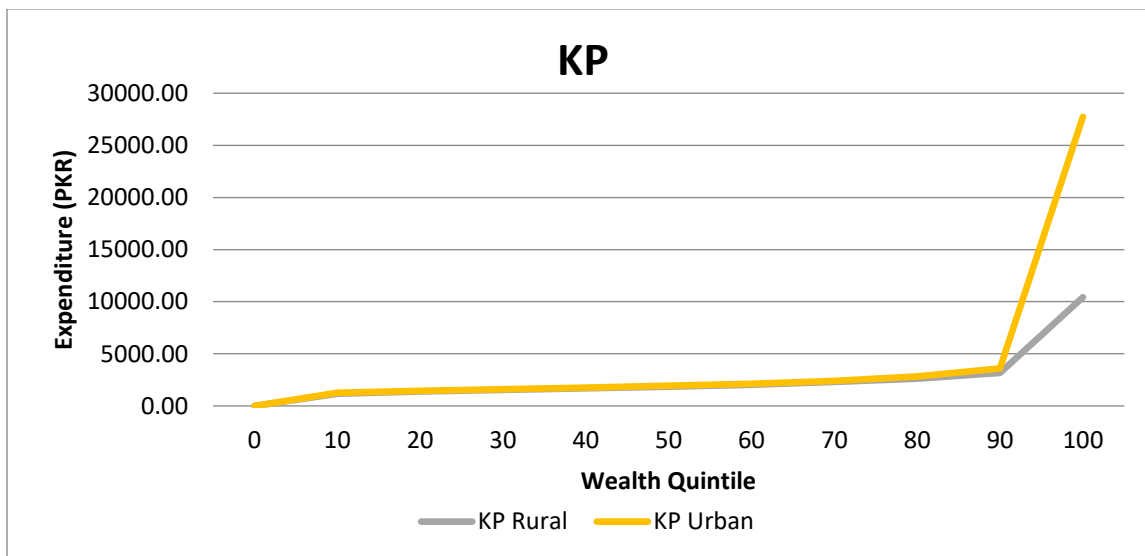
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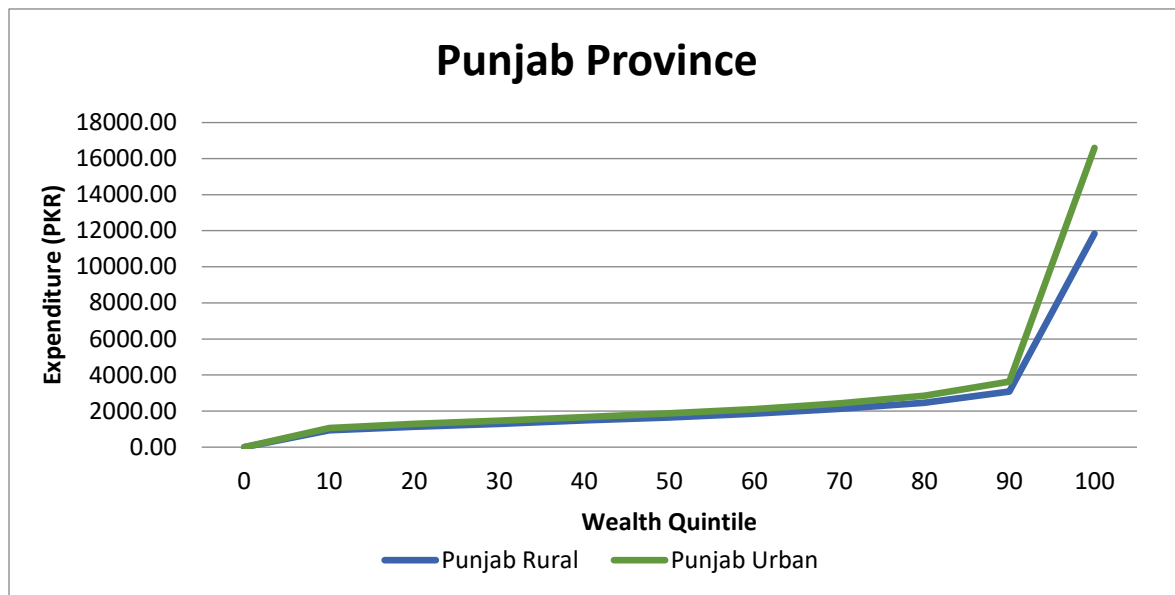
Appendix Figure 10: Monthly per capita food expenditure, by wealth quintile and area for Balochistan Province



Appendix Figure 11: Monthly per capita food expenditure, by wealth quintile and area for KP Province



Appendix Figure 12: Monthly per capita food expenditure, by wealth quintile and area for Punjab Province



Appendix Figure 13: Monthly per capita food expenditure, by wealth quintile and area for Sindh Province

