Research on Food Security, for the Development and Adoption of Diet Related NCD Policy Interventions

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Abstract

The objectives of this project are;

1) to carry out an evidence based study on the impact of food (in)security on diet related non-communicable diseases in Pakistan and

2) to develop and propose policy options as part of an effective multi-sectoral and multi-dimensional policy framework.

The study involves formulation of options for policies and interventions targeting food security (accessibility, availability and affordability of healthy food) and involving stakeholders from various Government ministries / offices, traders, FMCG manufacturers and corporate sector representatives.
# List of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>CPRSD</td>
<td>Center for Policy, Research &amp; Sustainable Development</td>
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<tr>
<td>DALY</td>
<td>Disability Adjusted Life Years</td>
</tr>
<tr>
<td>EMR</td>
<td>Eastern Mediterranean Region</td>
</tr>
<tr>
<td>FAO</td>
<td>Food &amp; Agriculture Organization</td>
</tr>
<tr>
<td>FMCG</td>
<td>Fast Moving Consumer Goods</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NCD</td>
<td>Non Communicable Disease</td>
</tr>
<tr>
<td>PACO</td>
<td>Pakistan Agriculture Census Organization</td>
</tr>
<tr>
<td>PBS</td>
<td>Pakistan Bureau of Statistics</td>
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<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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1 The Research Problem

Unhealthy Diet is one of the major lifestyle factors related to development of NCDs. Nearly 80% of NCD deaths occur in low and middle-income countries. The NCD epidemic is thwarting poverty reduction efforts (World Health Organization 2010).

As people transition from subsistence to urban livelihoods, those who in the past produced their own food are now almost completely reliant on purchased food. This has changed access and availability of healthy and unhealthy foods. Unhealthy eating patterns are thus rising, particularly in low resource settings and among marginalized women and children. (PJ 2008)

Fruit and vegetables are important components of a healthy diet, along with other high-fibre foods. According to the World Health Report 2002, low fruit and vegetable intake causes about 31% of heart disease and 11% of stroke worldwide. (World Health Organization 2002)

1.1 NCDs in Pakistan

In Pakistan the total number of estimated yearly NCD death rate is 379,800 among males and 301,200 among females. NCDs are estimated to account for 46% of all deaths. (Alwan, et al. 2011)

Existing population based morbidity data on NCDs in Pakistan show that one in three adults suffers from high blood pressure. The prevalence of diabetes is reported at 10% whereas 40% men and 12.5% women use tobacco in one form or the other. In addition, estimates indicate that there are one million severely mentally ill and over million individuals with neurotic mental illnesses within the country. (Nishtar September 2004)

Beyond the risk factors, there are major socioeconomic determinants that cause NCDs. These lie outside the domain of the health sector. Underlying social, economic, cultural and political determinants of health such as those related to rapid globalization and trade liberalization, uncontrolled urbanization, improved communication and technology, and population ageing need to be clearly
understood so that appropriate policy and programme interventions can be initiated. (World Health Organization 2007)

In Pakistan, “the high food prices has also led to an adverse impact on health and nutrition in various ways: i) poorer food consumption increases malnutrition, which in turn heightens susceptibility to disease; both may lead to higher mortality rates; ii) greater workload (to increase income) negatively influences care and feeding practices, resulting in poorer health and nutrition status; iii) reduced expenditures on health lead to less adequate treatment of disease and higher morbidity and mortality rates.” (The UN Interagency Assessment Mission 2008)

Pakistan is also facing significant burden of non-communicable diseases, unlike other developing countries. The major non-communicable health issues are injuries, cardiovascular diseases, Diabetes, Hypertension, psychological disorders, geriatric problems etc. The burden of non-communicable group of diseases is 44%, indicating that Pakistan is facing double burden of diseases, where communicable diseases are not fully controlled, while non-communicable diseases are emerging as a major problem. (Regional Health Systems Observatory- EMRO n.d.)

The direct medical costs associated with noncommunicable diseases are staggering, while hidden costs such as informal care and lost productivity may be even higher. In Pakistan, the national income projected to be lost due to heart disease, stroke and diabetes in 2015 is estimated at US$1.2 billion (World Health Organization 2005).

1.2 Pakistan’s response to NCDs.

The National Health Policy initially developed in 1997 emphasized the importance of NCDs. In 2003, the country was the first developing countries to develop an integrated national plan of action, which addressed the four major NCDs with common risk factors along with injuries and mental health: The National Action Plan for the Prevention and Control of Non-communicable disease and Health Promotion in Pakistan. Both the policy and plan could not be implemented due to the change in government. In 2009, the MOH proposed the establishment of a National Commission for Prevention of NCDs, with public and private partnerships and volunteerism as its driving force. The process of
creating the Commission has come under legal question and has been halted. 
(The World Bank 2011)
2 Background and Objectives

In 2004 Pakistan adopted a “National Action Plan for Prevention and Control of Non-Communicable Diseases and Health Promotion” in collaboration with WHO, which addresses the burdens of Non Communicable Diseases (NCDs) on a national policy level. The action plan horizontally integrates NCD prevention with existing public health and social welfare infrastructure. (National Action Plan for Prevention and Control of Non-Communicable Diseases and Health Promotion in Pakistan 2004). This policy framework and resulting action plan addresses the risk factors and subsequent reforms to the health sector but lacks policies and interventions related to education, production, farming and trade sectors which control the food security aspects of NCD prevention.

The table below further highlights that Pakistan has the highest number of deaths among its neighbouring countries with an annual death toll of 380,000 deaths per year.

<table>
<thead>
<tr>
<th>Country</th>
<th>Region</th>
<th>Total NCD deaths (‘000s)</th>
<th>NCD deaths under age 70 (percent of all NCD deaths)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>Pakistan</td>
<td>EMR</td>
<td>379.8</td>
<td>301.2</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>EMR</td>
<td>75.8</td>
<td>50.8</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>SEAR</td>
<td>313.3</td>
<td>285.5</td>
</tr>
<tr>
<td>Iran</td>
<td>EMR</td>
<td>163.5</td>
<td>118.2</td>
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Furthermore, there has been a very strong evidence emanating from various sectors that highlights the lack of awareness as well as the lack of policy and subsequent efforts to curb the spread of non-communicable diseases due to lack of access to healthy diets among low and middle income groups. The reasons include factors such as high prices of healthy foods (fruit & vegetables), lack of awareness about the relationships of unhealthy food consumption & non-communicable diseases and especially lack of policies to increase the availability of healthy foods to low and middle income groups.

Therefore a detailed study, addressing the gaps highlighted in the current national policy framework and action plan, need to be carried out. This study by CPRSD aims to address those gaps, and to propose multi-sectoral and multi-
dimensional policies and interventions targeting food security (accessibility, availability and affordability of healthy food) and involving stakeholders from various Government ministries / offices, traders, FMCG manufacturers and corporate sector representatives.

2.1 Scoping Exercise

In order to narrow down the scope of this study, a scoping exercise was carried to identify key areas of diet related NCD policies / interventions that should be priorities for action in Pakistan. The input of key stakeholders / policymakers was sought to identify 2-3 key areas and the specific knowledge gaps that need to be addressed. The findings from this first stage provides the scope for the ensuing study.

Some of the questions that were used to stimulate discussions during the scoping and consultation exercise were;

- What types of food (healthy or unhealthy) are available / affordable, and at what quality and price?
- How accessible / affordable are healthy versus unhealthy food options? Are both equally accessible to the low & middle income groups?
- How does advertising/marketing affect healthy and unhealthy food consumption, especially in low & middle income households? – Are there any marketing campaigns that target healthy food consumption, especially among children?
- What proportion of household food budgets are spent on high-density, low-nutrient foods compared to fruit & vegetables, particularly in low & middle income households?
- What are the effects of fruit and vegetables’ export on their pricing and affordability for the low and middle income groups?
- What are the existing frameworks / interventions in place to educate low & middle income groups and children on the relationships between unhealthy diets and NCDs?
- What are the existing policy frameworks / interventions in place to promote or increase the availability of healthy foods by way of increased production or by control of their prices?
The following issues were also put forth to the stakeholders to provide a starting point in the selection of key issue areas that need focussed attention for policy formulation:

- What tax policies and incentives increase /decrease availability and consumption of healthy foods?
- How to identify future opportunities to support agriculture and food systems that encourage healthy consumption while balancing economic, development, and health agendas?
- How to Increase the availability of healthy foods (fruit, vegetables, fish) in local markets instead of exporting and how to improve their affordability, especially among the low and middle income groups?
- How to induce traders / farmers to grow / import fruit and vegetables not produced / available locally, but are low calorie and rich in nutrients?
- How to establish agricultural policies consistent with the promotion of healthier diets?
- What interventions can be carried out in the education sector to increase healthy eating and their consequences of unhealthy diets?
- What is FMCG producers’ role in the promotion of healthy diets, effects on eating patterns, and how can they be influenced in NCD prevention?
- What are the effects of socio-cultural patterns on change in consumption of healthy foods such as fruit and vegetables?
- What programs / polices need to be implemented at social / cultural level to discourage/ inform about diet related risks especially amongst women and children?

2.2 Scoping outcomes

After the thorough scoping exercise, the following two areas were identified by the stakeholders as two of the most important areas for diet related NCD study to be carried out;

1- What is the availability and affordability of healthy foods (Fruit and vegetables) especially to the low and middle income groups and what policy measures can be taken to increase the availability and consumption of healthy foods.
2- What are the factors affecting availability and affordability of healthy foods (Fruit and Vegetables) in Pakistan, and what policy measures or interventions can be carried out to improve the availability / affordability especially to the low and middle income groups.

Specifically, the analysis addresses the following objectives:

1) Describe household-level fruit and vegetable consumption patterns in Pakistan across various income groups, urban and rural areas, and compare with consumption patterns in other low and middle income countries as well as with prescribed international standards.

2) Analyse the determinants of the demand for fruit and vegetables in Pakistan focusing on the role of economic and demographic characteristics.

This analysis provides crucial information to develop the resulting policy framework which aims to suggest nationwide actionable strategies to improve provision of healthy food / diet for NCD prevention in Pakistan. Effective programmes and policies are urgently needed to influence consumption behaviour and foster fruit and vegetable intake. The success of these initiatives will depend on how effectively they can address the main constraints to consumption especially among the low and middle income groups.

Furthermore, a number of the following issues are also addressed in the finalized policy framework;

- Recommendations on ways to work with the agricultural and economic sectors internationally, nationally, and locally to increase the availability of fruit, vegetables and other healthier foods at affordable prices.
- Proposes ways to encourage corporate sector in playing their social responsibility role by working with schools & under-privileged communities for the promotion / provision of healthy diets and prevention of NCD.
- Stress upon federal & provincial ministries / government bodies to impart education and to create awareness at grass root level for the prevention of NCD and promotion of healthy diets especially amongst women and children.
3 Methodology

3.1 Stage 1:

In the first stage, a project scoping exercise was carried out in which relevant questions were posed to the key stakeholders who are involved in diet related NCD policy making. Their input was sought in identifying 2 key areas (from the posed questions as well as from any new questions) and based upon their identified key areas, a targeted scope for the ensuing study was framed. This exercise was carried out using non-structured interviews with the key stakeholders of the project, where relevant questions / issues, highlighted in section 2.1 above, were posed to them.

3.2 Stage 2:

The second stage entailed a detailed desktop review / evidence synthesis exercise based upon the outputs from stage one. This stage also included qualitative interviews & FGDs with key policymakers, informants & subject experts in order to further validate the evidence generated.

Based upon the feedback from the interviews and FGDs the data was analysed and correlated with desktop review. Preliminary findings were combined and presented to the key stakeholders in the first roundtable discussion. The feedback from the participants was sought during and after the roundtable.

Consequently the study was further refined / validated and a modified version of the report was prepared. The finalized study results were again disseminated among the key stakeholders before the second roundtable.

The second roundtable was used as a resolution platform to highlight and promote the outcomes of the study, whereby the key stakeholders and policymakers resolved to promote fruit and vegetable consumption in Pakistan as a key variable in decreasing the burden of non-communicable diseases in Pakistan. The attendees further highlighted their commitment in informing policy outcomes related to improving access to fruit and vegetable for low and middle income households in Pakistan.

The roundtable discussions were attended by representatives of Ministry of Food Agriculture & Livestock (1), Ministry of Health (1), Islamabad Chamber of
Commerce (1), Fruit & Vegetable Wholesale Market Association(2), and Civil Society Organization (2).

3.3 Data Collection & Analysis

3.3.1 FGDs & and Qualitative Interviews

Along with the research of the available literature, this study used a participatory research framework where the researchers utilized focus group discussions and semi-structured interviews as a qualitative method of data collection.

In this study the semi-structured interview schedule was initially developed in the pilot study and further shaped by informal interviews with the key informants interviewed. It was then utilized to facilitate group discussion in the focus groups.

Two focus groups, ranging from 8 to 10 participants, each lasting about 90 minutes, were conducted. The participants in the FGDs were representing the following:

- Ministry of Food Agriculture and Livestock – 2
- Ministry of Commerce - 2
- Ministry of Health – 1
- Ministry of Education - 2
- Regional Fruit and Vegetable Markets – 5
- Non Profit / Civil Society Organizations – 5
- FMCG Manufacturers – 1

The focus group discussions were guided by the issues evolved during stage 1 of the study, as well as by the data gathered through the desk review.

During the focus group discussions, the sessions were captured via audio recording and on flip chart paper. The associate researcher also recorded field notes.

The focus groups were later transcribed from audio recordings and then entered as text and coded using MS Word software. Text data and discussion notes were carefully read by the lead researcher and associate researcher and systematically analyzed to identify recurrent themes both within and across groups.
The data was categorized according to themes and care was taken to ensure that all responses were included that were important to the focus of discussion / key informant interviews / literature review. Missing data was also identified at this juncture for exploration at subsequent focus group meetings and further literature review.

After each focus group session, researchers read all transcripts individually and then at a group meeting of the research team, convened to discuss themes and patterns.

3.3.2 Literature Review

A comprehensive review of the available literature was carried out in order to determine to what extent the existing policies and interventions in Pakistan, take into consideration the importance of healthy food (fruit & vegetables), as well as the for the increased availability of these to the low and middle income groups.

The intended literature for review for this research were studies that contained research availability and consumption of fruit and vegetables in Pakistan. Also, the studies (that contained information on healthy and unhealthy food consumption and their effects on NCDs) by various neighbouring countries as well as from throughout the world were included in the review.

The desktop review data for this study was collected through two sources of information: Experimental literature and Contextual Literature.

Evidence from Pakistan (and internationally) relevant to the scope of the study was retrieved from peer reviewed journals, government reports, reports printed or published online by civil society, policy reports, books, book chapters, news articles, material presented at conferences, newspapers and material under review. The search and retrieval of the evidence involved use of on-line and library databases, publications published by provincial and federal governments in Pakistan, key contacts in the government departments, economic and food experts, and by other non-government organizations with relation to Pakistan. The literature related to availability and use of healthy foods was included in the study. As there is a dearth of research studies in Pakistan, the collection of data took a lot longer than anticipated and the volume of data that was found was not very high.
Contextual Literature consists of literature that is related to fruit & vegetables and NCDs in Pakistan but has a wider scope and does not directly meet the inclusion criteria. Information on diversity, gender and health, healthcare and NCDs, gender-specific, programming and policy was collected in order to provide context to any recommendations arising from this review. A full search of the literature included examining peer-reviewed journals, government reports, and books related to Pakistan. The literature under review was not only be limited specifically to governmental publications but also included publications from civil society in Pakistan, to international NGOs, universities, research institutes, food security related institutes, studies carried out at the health centres, newspapers, scientific journals etc.

While grey literature was used to supplement the peer-reviewed research, there is still a lack of information on effective healthy food and NCD interventions, especially from Pakistan.

Experts in the field were contacted for corroboration of the data findings and for references to studies not identified by the database search process.

Consumption of fruit and vegetables:

Data on fruit and vegetable consumption was derived from Government of Pakistan’s statistical department (Pakistan Bureau of Statistics) as well as through various other government & non-government sources and databases.

Fruit commonly found all across the country were apples, mango, citrus (oranges / tangerine), banana, peach, pear, guava, pomegranate, cherries, strawberries etc. The list of vegetables include Onion, tomatoes, carrots, cabbage, cauliflower, bitter gourd, bell pepper, garlic. Canned and dried fruit and vegetables were included in their respective fruit and vegetable categories, but jams and marmalades were excluded from the fruit group.

Expenditure quintile

The total per capita expenditure (including the value of home consumption) was used as a measure of household well-being. The households were divided into five equal groups to illustrate differences across income (expenditure) groups.

Budget shares

Food budget shares and total expenditure budget shares were computed. Food budget shares are defined as the percentage of the food budget of a household
that is allocated to specific commodities (in this case fruit and vegetables). Total expenditure budget shares are the percentage of the total budget of a household that is allocated to the commodities of interest. Budget shares were computed for fruit, vegetables, and fruit and vegetables combined.

**Household demographic Characters (Area of residence)**

The analyses used the definitions of urban and rural areas to look at differences between urban and rural areas in fruit and vegetable consumption patterns and income elasticities.
4 Study Outputs

This study examines the pattern of fruit and vegetable consumption and the relationships with socio-demographic characteristics of urban and rural population in Pakistan, and inadequate consumption of fruit and vegetables. This low consumption pattern, particularly fruit consumption, in these Asian populations was also demonstrated in the World Health Survey.

The main goal of the analysis is to provide information to help guide future policy initiatives to promote and facilitate greater consumption of fruit and vegetables in Pakistan. Effective programmes and policies are urgently needed to influence consumption behaviour and foster fruit and vegetable intake. The success of such initiatives will depend on how effectively the main constraints to consumption among the poor are addressed.

According to WHO, public policies in sectors such as trade, taxation, education, agriculture, urban development, nutrition, food and pharmaceutical production should be developed rather than by just making changes in health policy alone.

4.1 Study of Fruit & Vegetables Consumption in Pakistan and its effects on NCDs

Fruit and vegetables are an important component of a healthy diet and, if consumed daily in sufficient amounts, could help prevent major diseases such as CVDs and certain cancers. According to The World Health Report 2002, low fruit and vegetable intake is estimated to cause about 31% of ischemic heart disease and 11% of stroke worldwide. Overall it is estimated that up to 2.7 million lives could potentially be saved each year if fruit and vegetable consumption was sufficiently increased. (Pomerleau, Lock and Knai 2005) : (FAO Joint Workshop, 2004)

Furthermore, approximately 16 million (1.0%) DALYs and 1.7 million (2.8%) of deaths worldwide are attributable to low fruit and vegetable consumption. Adequate consumption of fruit and vegetables reduces the risk for cardiovascular diseases, stomach cancer and colorectal cancer (World Health Organization (WHO) 2003). Results from the Global Burden of Disease Project for the year 2000 showed that up to 2.7 million deaths worldwide, and 1.8% of the total global disease burden may be attributed to inadequate levels of fruit
and vegetable consumption. Increasing individual fruit and vegetable intake could reduce the burden of ischaemic heart disease by 31% and ischaemic stroke by 19%. For stomach, oesophageal, lung and colorectal cancer the potential estimated reductions were 19%. 20%. 12% and 2% respectively. (Pomerleau, Lock and Knai 2005).

Although other factors such as high consumption of salt and widespread use of transfats is also a cause of concern but according to the stakeholders the key area of particular concern regarding unhealthy diet in the Pakistan is low intake of fruit and vegetables. Which is also highlighted by the fact that in the EMR region, approximately 80% of the population does not eat sufficient quantities of fruit and vegetables and half a million deaths in the EMR region are attributed to low intake of fruit and vegetables. (World Health Organization 2011). According to (Pomerleau, Lock and Knai 2005) : (Department of Health and Ageing - Australia 2008), there is increasing scientific evidence that consumption of fruit and vegetables decreases the risk of several chronic diseases and has created a firm basis for policy initiatives.

The recommendation thus adds to the already strong case for the health benefits to be gained from the consumption of fruit and vegetables and paves the way for concrete action advocating increased consumption of these commodities.

4.1.1 Definition of Low Fruit and Vegetable Consumption

In 2002. an expert consultation (for the World Health Organization (WHO) and the Food and Agriculture Organization (FAO)) assessed the strength of the evidence for the relationship between fruit and vegetable intake and health. The experts concluded that a daily intake of fresh fruit and vegetables in an "adequate quantity" is needed to reduce these disease risks. They defined an "adequate quantity* as being at least 400 to 500 grams per day (g/d). This amount is generally considered to be equivalent to five servings of 80g of fruit and/or vegetables (which is the internationally recognized standard serving size). However, there is clear variation in the understanding of serving size. Current international recommendations thus propose the intake of a minimum of 400g of fruit and vegetables per person per day (excluding potatoes and other starchy tubers).
In spite of the growing body of evidence highlighting the protective effect of fruit and vegetables, their intakes are still grossly inadequate both in developed and developing countries. The survey data and availability statistics from FAO suggest that the total supply of fruit and vegetables is far below the intake minimum target in many countries, especially in Asia, Africa and in Eastern and Central Europe.

Nationally representative data on fruit and vegetable consumption in 21 countries — most of which are from the developed world — show that average intakes reach the WHO / FAO minimum recommended level of 400 g per capita per day (or 146 kg per year) in only three countries (Israel, Italy and Spain) (IARC 2003).

The highest prevalence of low fruit and vegetable consumption in the Eastern Mediterranean Region (EMR) is in Pakistan with 99.2% males and 99.3% females NOT getting the requisite fruit and vegetables.
4.2 Consumption Patterns of Fruit & Vegetables in Pakistan

The data collected from Pakistan Bureau of Statistics as well as from Pakistan Agriculture Census Organization (both of which collect, validate and publish national statistical data), highlights various factors regarding the affordability and consumption of fruit and vegetables by various income groups. In most of the cases the outcomes correlate with those seen in other parts of the world and documented through various other studies. Several of these studies are referenced in the following sections to highlight these uniformities.

Standard economic models of household behaviour suggest that income, price, and consumer preferences are the main determinants of food consumption patterns. Box 1 summarizes the research findings concerning the importance of these factors in influencing fruit and vegetable consumption.

However, the vast majority of consumers are unaware of the health benefits of consuming fruit and vegetables in abundance, even in developed countries. According to studies, although the main factors affecting consumption are related to affordability and relatively higher prices of fruit and vegetables (as compared to high calorie unhealthy foods), other important factors included taste & preferences, and having developed the habit of eating these products during childhood. According to another study, several demographic factors such as female gender, age, education and non-smoking

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**Box - 1**

**Summary of findings regarding fruit and vegetable consumption patterns and their determinants in Pakistan**

- The consumption of fruit and vegetables in Pakistan 28 kg to 88 kg ranges per person per year, which is far below the recommended 146 kg per person per year.
- The share of the total budget allocated to fruit and vegetable consumption ranges from 4% to 6%. The food budget share ranges from 40% to 60%.
- The demand for fruit and vegetables rises with increasing income, although at a slower rate than income.
- The income elasticities for fruit and vegetables range from 0.60 to 0.97 and are generally higher for fruit than vegetables.
- Fruit and vegetable consumption among urban households is consistently greater than that of rural households. The urban advantage, however, seems to be related to differences in income rather than city life itself.
status are also associated with greater fruit and vegetable intake (Subar AF, et al. 1995). Another review, also focusing on developed countries, highlights the importance of several non-economic factors in determining fruit and vegetable consumption choices: these include sensory appeal, familiarity and habit, social desirability, personal and food ideology, convenience and media & advertising (Pollard, Kirk and Cade 2002) : (Kanungsukkasem, et al. 2009)

In Pakistan, the prevalence of low fruit and vegetable consumption ranges from 99.2% for men to 99.3% for women. (Hall, Moore and Harper 2009)

4.2.1 Socioeconomic differences in fruit and vegetable consumption

The data shows very distinct socioeconomic differentials in consumption of fruit and vegetables with steady increases in consumption as income increases. However, the largest increase is found between the top two income quintiles. The magnitude of the differences between the lowest and highest income quintiles is more than 7 fold. Consumption of fruit and vegetables among the poorest income quintiles is very low in the country (only 28 kg per capita per year for fruit and vegetables combined, and a measly 5.8 kg per capita per year for fruit only).

Examples from India. Mali and Pakistan reveal intakes of 100 g per capita per day or lower, compared to 300 g in Australia, several European countries and the United States of America: and 400 g in Israel. Italy and Spain (Pollack 2001)

4.2.1.1 Expenditure by income quintile on all Food Items

When it comes to spending on all food items, people in Pakistan belonging to the lowest income quintile (low income group) spend almost 60% of their monthly income on Food items, while the second quintile (lower middle income group)
spends about 57% on food items. On the other hand the 5th quintile (high income group) spends comparably much lesser amount of about 39% on buying food items. According to key informants and economic experts, this highlights that any change in price in food items will lead to a bigger impact on the low and lower middle income groups as compared to the richer income groups.

4.2.1.2 Consumption of Fruit & Vegetables by various Income Groups

The study of fruit & vegetable consumption data highlights the inability of people to achieve the recommended levels of fruit and vegetable intake. The Figure-2 depicts the yearly intake (in kg/capita) of fruit and vegetable intake by various income levels in Pakistan. Although the top income quintiles have markedly higher average consumption of fruit and vegetables than the lowest ones, even the higher income group does not meet the WHO FAO minimum recommended levels of 400g per day. or 146 kg per capita per year. The highest income group consumes only 88.63 kg per capita per year for fruit & vegetables combined. The lowest income group consumes a measly 28.12 kg per capita per year of fruit and vegetables.

According to a study of yearly per capita fruit and vegetable intake in 33 countries, the poorest quintile had the highest prevalence of low fruit and vegetable consumption (81.6%), and the richest quintile had the lowest prevalence (73.4%) (Hall, Moore and Harper 2009), whereas all the income quintiles in Pakistan fail to reach the suggested consumption levels.
4.2.1.3 **Expenditure by income groups on Fruit & Vegetables**

According to the ICP\(^1\) data, the budget share allocated to fruit and vegetables represents 10-25% of the food budget of most countries. The average budget share declines from 20% among the low-income countries to 18% in middle-income countries and 15% in high-income countries. The spending on fruit and vegetables in Pakistan is between 9-10% of the total food budget, which when compared to the other low and middle income countries is still on a much lower side. The following table highlights budget share allocation to fruit and vegetable in various other low and middle income countries (Seale, Regmi and Bernstein 2003).

<table>
<thead>
<tr>
<th>Country</th>
<th>Country Group</th>
<th>Spending on F&amp;Vs as % of the total food budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sri Lanka</td>
<td>Low Income</td>
<td>26%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Low Income</td>
<td>24%</td>
</tr>
<tr>
<td>Syria</td>
<td>Low Income</td>
<td>28%</td>
</tr>
<tr>
<td>Egypt</td>
<td>Middle Income</td>
<td>14%</td>
</tr>
<tr>
<td>Turkey</td>
<td>Middle Income</td>
<td>24%</td>
</tr>
<tr>
<td>Iran</td>
<td>Middle Income</td>
<td>18%</td>
</tr>
</tbody>
</table>

\(^1\) The ICP is a large project carried out by the World Bank to gather comparable data on prices, the composition of demand, income, and poverty for a large set of countries.
The graph in Figure-3 highlights the monthly household income by various income quintiles and their monthly expenditure on fruit and vegetables. According to the data, the low income group (1st quintile) of people spend only about 77 rupees per month per capita on fruit and vegetables (16 rupees on fruit only). The consumers from the 2nd quintile or the lower middle income group spend about 104 rupees on fruit and vegetables (25 rupees on fruit only). This consumption spending figure increases to about 250 rupees per capita per month for a person belonging to the high income group or the 5th quintile. As can be seen from the graph that this increase in consumption spending is almost linear for the lowest 4 income quintiles. This coincides with a study carried out by (Ruel, Minot and Smith 2005) to measure patterns and determinants of fruit and vegetable consumption in Sub Saharan Africa, in which the data showed socioeconomic differentials in consumption of fruit and vegetables with steady increases in consumption as income increases.

However, when we chart the consumption patterns of fruit and vegetables individually, somewhat different patterns emerge. As is evident from the graph in Figure-4, the average per capita consumption expenditure on vegetables only, by the low income group (1st quintile) was about 76 rupees per month, whereas for the low middle income group, it was about 104 rupees per month. This figure increase almost in a linear pattern to 169 rupees per month for the 4th income quintile.

Although vegetable consumption increases at a steeper rate among the various income quintiles, the fruit consumption is much less common and is lost less variable across different quintiles.

Not surprisingly, average consumption (in kg per capita per year) is lower for fruit than vegetables in Pakistan (as in most other countries) and so is the average value of consumption. With wide variations between countries, the value of vegetable

![MONTHLY PER CAPITA CONSUMPTION Graph](image)
consumption is between twofold and eleven fold higher than that of fruit in the sub-Saharan countries studied, however in Pakistan the this value is between two fold to five fold.

The socioeconomic gradients for fruit is much larger than for vegetables. Thus, it may be deducted that rising incomes in Pakistan result in increases in fruit consumption but at a lower rate than the vegetables.

Furthermore, according to studies, higher income is not only associated with an increase in the volume of fruit and vegetables consumed, but also with an increase in the diversity of fruit and vegetables. For example. 1993 household survey data from Viet Nam shows that the average number of distinct fruit and vegetables consumed rises from 4.5 out of 10 in the lowest income quintile to 6.9 in the highest income quintile (Minot 2002).

4.2.2 Income elasticities of demand for fruit and vegetables

The income elasticity of demand for fruit and vegetables indicates the percentage increase in the demand of fruit and vegetables with an increase in income of a household. There are few studies that highlight the income elasticities of fruit and vegetables in various countries and regions of the world. According to one study of these elasticities in 10 Sub-Saharan African countries all income elasticities of demand for fruit and vegetables combined are lower than one. and values range between 0.60 and 0.97. This indicates that a 10 % increase in income is associated with a 6~10 % increase in the percentage of total budget allocated to fruit and vegetables. This finding suggests that fruit and vegetables are "necessities" in the economic sense that, as income glows, spending on fruit and vegetables also grows, but at a somewhat slower pace. The estimated income elasticities for fruit are greater than the elasticities for vegetables in most of the countries where income elasticities for fruit are close to or greater than one. For instance, in Ethiopia, which has a high income elasticity for fruit, a 10 % increase in income is likely to lead to a 6 % increase in the demand for vegetables and a 21 % increase in the demand for fruit. (Rule, Minot and Smith 2005)

In Pakistan, the income elasticity for fruit and vegetables range between 0.93 to 1.06 for the low and middle income quintiles, however, for the high income quintile, this elasticity is 56%. The income elasticities for fruit only is much higher and ranges between 1.21 to 1.53, which means that as income
increases, the demand for fruit is likely to increase faster than the demand for vegetables.

According to ICP the income elasticity of fruit and vegetables is 0.60-0.70 in most low-income countries, 0.30-0.44 in most middle-income countries, and 0.20-0.37 in high-income countries. Thus, rises in income are associated with greater increases in the demand for fruit and vegetables in poorer compared to wealthier countries; and income increases are generally associated with larger increases in the demand for fruit than for vegetables (as suggested by the larger income elasticities of demand for fruit than for vegetables).

4.2.3 Urban/rural differences in fruit and vegetable consumption patterns

The diets of people living in the urban areas are generally more diverse than those of people living in the rural areas (Ruel and Garrett 2003); (Smith, Ruel and Ndiaye 2003); (Regmi and Dyck 2001); (Kanungsukkasem, et al. 2009). It is believed that this is due to a combination of factors including the availability of a wider variety of foods in urban markets, the availability of storage facilities, changes in lifestyles and cultural patterns, and the need for convenience leading to the purchase of more processed foods. This section confirms that fruit and vegetable consumption is generally higher in urban areas compared to rural areas of Pakistan.

4.2.3.1 Expenditure on Food Items by Urban/Rural Population

The inequality between rural and urban populations is depicted by the difference in spending on food items by the rural and urban populations. On average the people in the urban areas of Pakistan spend about 41% of their income on food items while their counterparts in the rural areas spend...
55% on the same item group. According to experts, it shows that any increase in price of food items will have a more adverse effect on the purchasing power of the residents of the rural areas than the ones from urban areas.

4.2.3.2 Expenditure on Fruit & Vegetables by Urban/Rural Population

Area of residence also shows consistent patterns of association with fruit and vegetable demand, when compared to international studies. Urban areas are associated with a significantly larger budget allocated to fruit and vegetables in as compared to the rural areas. As can be seen from Figure-6, the residents of urban areas spend significantly larger amount (168 rupees per capita per month) compared to their rural counterparts (137 rupees per capita per month) on fruit and vegetables combined. Another important fact to note is that both the rural and urban populations spend approximately the same amount (99.65 and 94.29 respectively) on vegetables, however the difference in monthly per capita expenditure on fruit is considerably larger, with rural population spending 68.36 as compared to 42.9 by the urban population.

The reason attributed by informants is that the urban areas probably have a wider selection of fruit as well as higher disposable income combined with more knowledge about the benefits of diet rich in fruit, which could result in greater demand.

4.2.4 Household size and composition

According to various international studies household size is negatively associated with the demand for fruit and vegetables in the majority of countries i.e. larger households allocate a lower share of their budget to fruit and
vegetable purchases. The negative association between household size and demand is also found in Pakistan, where an average household size of 8.05 has the lowest consumption of fruit and vegetables while the smallest average household size (4.92) is related to the highest amount of fruit and vegetable consumption. This phenomenon is attributed to the fact that larger size of household reduces the per capita amount that is available for procurement of food items.
4.3 Determinants of the Demand for Healthy Food.

Economic models, anecdotal evidence and previous research show that household income, supply factors, psychological factors, education and awareness are the key determinants for the demand, choice and ultimate consumption of healthy food. The following subheadings highlight these such factors based upon the current knowledge and evidence in Pakistan.

Summary of current knowledge regarding factors that influence fruit and vegetable consumption patterns

- The prevalence of low fruit and vegetable is 99.2% in Pakistan.
- Fruit and vegetable consumption rises with increase in income.
- Anecdotal evidence suggests that the seasonal availability of many fruit and vegetables also limits their consumption.
- Research in industrialized countries suggests that psychosocial factors, health and nutrition awareness and knowledge, and formal education all play an important role in determining fruit and vegetable consumption.
- Promotion of home production of fruit and vegetables is one potential strategy to increase their consumption at the household level.
- Other studies suggest that male- and female-headed households often behave differently relative to food consumption. The effect of gender relations on fruit and vegetable consumption remains under-researched in Pakistan.

4.3.1 Household income

The demand for fruit and vegetables increases with increasing income, (See Figure 2). This implies that at low-income levels, the demand for fruit and vegetables is small. According to economic experts, this is mainly due to the reason that low-income households must prioritize the fulfilment of their basic energy requirements to avoid hunger, and that fruit and vegetables tend to be an expensive source of energy, therefore the consumers belonging to lower income groups tend to shift their consumption towards food rich in calorie and high in fat. Furthermore, low-income families spend a higher percentage of their income on food when compared to wealthier families.

Research has also shown that low-income families select a different “market basket” of foods than wealthier families, including lower-quality meats, less fish
and seafood, and less fruit and vegetables (Drewnowski A 2004). Also, in order to feed their families, poorer quality foods may prove more economical for low income populations. Consequently, people with higher income, are more likely to incorporate more fruit in their diet (Kanungsukkasem, et al. 2009) : (Padilla 2001)

The fact that fruit and vegetables are an expensive source of energy is an important constraint for poor households, it is clear that fruit and vegetable consumption will be quite limited at these income levels. It is not surprising that where household income is near subsistence level, large quantities of grains and starchy staples and few fruit and vegetables are consumed.

The most common coping strategy both in urban as well as rural areas is to rely on less preferred and less expensive food. The second most adopted strategy is limiting the portion of a meal. All these negative coping strategies lead to chronic food insecurity in the area. (Suleri 2009)

4.3.2 Seasonal Availability

The production and availability of many of the common vegetables (onions, tomatoes etc.) in Pakistan is year round, whereas many of the vegetables and all of the fruit production is mostly seasonal. Given the perishability of fruit & vegetables, and the dearth of technologies to extend the harvest period or to facilitate storage thus limit the availability of fruit and vegetables in Pakistan (as in many other developing countries). The gap in off-seasonal availability is thus filled with imported fruit and vegetables. The data shows that market price of imported vegetable is somewhat higher than locally produced versions. The imported fruit, on the other hand, is much more expensive (sometimes at double the cost) than the locally produced fruit, adds a fruit and vegetable marketing expert.

There is a very limited data available to draw up conclusions about seasonal availability and the pricing / availability trends of fruit and vegetables throughout the various markets of Pakistan, however, most of the economic and marketing experts agree that lack of better food preserving technology as well as processing methods is the directly related to higher consumer prices of vegetables and especially fruit.

In addition, local markets in rural areas are more restricted in the variety of fruit and vegetables available for purchase.
Since the majority of fruit and vegetables have short growing seasons, processing and preserving techniques can be used to make produce last longer. To extend the availability of fruit and vegetables, FAO recommends employing small-scale processing methods such as drying, chemical preservation and heat processing shortly after fruit and vegetables has been harvested.

Development and promotion of local food preservation and processing facilities is also important and such initiatives should involve both the private sector, local producer and consumer co-operatives (Nandi and Bhattacharjee 2005).

4.3.3 Trade & Taxation

Trade has made many foods accessible throughout the year for the rich while the poor have seen their options limited as large quantities of hitherto locally available healthy foods may be targeted for export.

According to anecdotal evidence, over the last many years the demand for Pakistani fruit has been increasing while the production has remained stagnant, therefore the better quality of fruit is processed and exported, which leads to increase in local prices and thus leading to their availability and affordability for only the higher income groups, while the low and middle income group deem fruit as luxury items. Furthermore, lack of credit to small farmers, lack of coordination among supply-chain stakeholders and high number & income margin of middlemen are also the reasons for high cost and stagnant production levels of fruit and vegetables.

4.3.4 Cultural Factors

Very little is known about how consumer preferences regarding fruit and vegetables affect consumption in low-income countries, and even in Pakistan. However there are distinct patterns of increase in consumption of both healthy and unhealthy foods, albeit for a short duration, during the annual events such as the month of Ramadan and during the Eid holidays. During the month of Ramadan people are fasting and certain types of food items are commonly enjoyed at the time of breaking the fast in the evening. The demand and consumption of fruit is increased, leading to increase in price as well. Also, during the month, the demand for cooking oil is increased by about 20%, since it is used for frying and cooking added one informant.
In addition to extended use of edible oil, sugar and sugary products are also considered to be in demand during Eid holidays and other festivities. Sweets prepared with sugar and oil are very commonly consumed in large quantities during weddings and other festivities.

However a whole study can be dedicated to the consumption and demand factors of healthy and unhealthy food consumption affected by cultural factors.

4.3.5 Advertising and Promotion

Once again very little data or few studies are available to highlight the effect of advertising and promotion on consumption of healthy / unhealthy foods in Pakistan as well as in the neighbouring and lower income countries.

However, there were a few factors that highlight the general trend of advertising towards promotion of unhealthy foods and a lack of promotion of healthy foods / fruit & vegetables. According to a study (GALLUP Pakistan 2010), among the top 10 advertising on TV and print media, the two highest categories related to food items are beverages/ soft drinks and biscuits. While none of the TV and Print media advertisements targeted the promotion of healthy food items including fruit and vegetables, or any derivative thereof.

While, in some developed countries, including Australia, the UK and the USA, fruit and vegetable promotion initiatives have been established for several years. (FAO Joint Workshop 2004)

4.3.6 Education

The relationship between formal (school / college going) educational status of the household and consumption patterns of fruit and vegetables is not very well documented in Pakistan, but it is established quite well that people with higher level of education tend to have more knowledge of nutritional benefits of healthy food and thus consume higher quantity of fruit and vegetables.

However the specific education about nutritional benefits of fruit and vegetables and a healthy diet should be imparted as part of the curriculum in schools, especially in primary and middle level of education institutions. Several studies, including ones from Iran and Thailand have shown positive effects of having nutritional education in primary and middle schools, leading to an increase in understanding of importance of fruit and vegetables. (FAO Joint Workshop 2004)
4.3.7 Age and Gender Based Determinants

The World Bank data highlights that the prevalence of low fruit and vegetable consumption is 99.3% for women in Pakistan. However, no specific studies are available to characterize in detail, the fruit and vegetable production and consumption patterns of females, or on various age groups, in Pakistan.

In terms of the effects of education of Women on nutrition status, one study highlights that with the increase in the education level of the mothers, the nutrition level of their children improved as well. (Aga Khan University, Pakistan 2011)

However there are a few international studies that can inform the policy making in Pakistan as well. The FAO Government of Bangladesh, UNDP Integrated Horticulture and Nutrition Development Project (IHNDP) is a case of mobilizing women in increasing the production and consumption of micronutrient rich vegetables and fruit and in increasing the diversity of the diet in rural areas of Bangladesh. As part of the food based strategy, the implemented activities included involvement of women farmers throughout the total food chain, and ranged from production in the group garden and individual home stead garden, including procurement from local markets, to processing domestically in preparation of meals to consumption within the home. Based on the average yield of horticultural produce the available yield per household was noted to have increased. (Nandi and Bhattacharjee 2005)

Furthermore, not much evidence was found relating to the consumption patterns of fruit and vegetables among various age groups in Pakistan. However, previous findings (Blanck HM, et al. 2008) : (Tamers SL, et al. 2009) from high-income countries, such as the U.S. and France, showed that prevalence of low fruit and vegetable consumption decreased with age.
5 Project Outcomes

At the second roundtable meeting, the study activities and outcomes were discussed. Participants were of the unanimous opinion on the need and importance of the programme and felt that this would in a big way add to the ongoing efforts. Several areas requiring further strengthening were identified, including a need to make the modules more generic and country specific and addition of issues related to non-health sectors using local and country specific data etc.

These included finalising tools for measuring physical activity, developing guidelines for promoting physical activity, developing a framework for policies on meals and physical activity in schools, promoting fruit and vegetable production and consumption and reducing salt content in processed foods. Guidance on marketing healthy and unhealthy food and drink to children, developing guidelines on public-private partnerships, policy development and monitoring frameworks and working with the Ministry of Health were among other initiatives implemented at the global level.

The major conclusion arrived at were:

1) There is a growing recognition that NCDs represent a major public health problem in Pakistan and requires a comprehensive public health response integrating multi-sectoral strategies for health promotion and disease prevention.

2) Several developing countries have demonstrated high levels of commitment and are making considerable progress in addressing the prevention and control of NCDs. This progress needs to be taken up in Pakistan. The National Action Plan needs to be reinvigorated and government sector and various stakeholders should realize its importance and work towards restarting the program.

3) Ministry of Food Agriculture and Livestock should promote incentives and mechanism to increase the production and enhance the storage capabilities in order to increase the affordability and availability of fruit and vegetables to such a level that it is affordable to the lower and middle income groups as well as available to both urban and rural markets.
4) A daily intake of at least 400 g of fruit and vegetables, within the context of ensuring a better general dietary pattern as a population goal, was reconfirmed as an appropriate basic message.

5) Fruit and vegetable intake initiatives should be integrated into national inter-sectoral food and nutrition policies.

6) Initiatives should emphasize replacing unhealthy foods with fruit and vegetables, rather than simply adding fruit and vegetables to the existing diet.

7) Messages about fruit and vegetable consumption need to be integrated into food-based dietary guidelines, to be country-specific and culturally relevant, and coordinated with other messages about healthy diets.

8) Food-based dietary guidelines should be developed and properly disseminated to consumers. However, this is not yet being done at a national scale in Pakistan and for more than a few products. Adequate nutritional information through product labelling is also necessary to help consumers make the right food choices. Nutrition labels have been shown to encourage more healthy diets, among people who read the labels.

9) The reduction in marketing of foods and beverages high in salt, fats and sugar to children is also a cost-effective action to reduce NCDs. Strong evidence links television advertising to children, food knowledge, preferences, purchase requests and consumption patterns. Therefore, advertising and promotion led by the FMCGs and Government Sector should target promotion of healthy foods, especially fruit and vegetables to the consumers and especially to the children.

10) Improved collaboration between the Ministry of Health and Ministry of Education for effective implementation of policies in school settings and development of primary school curriculum standards for health education with focus on healthy diet and physical activity.

Multiple studies confirm that NCD prevention and control should be an integrated, coordinated, multi-sectoral action with inputs and participation from all sections of society. The role of policy-makers and programme managers is pivotal since they were key agents of change through their position in influencing political leadership and by introducing vision and focus and bringing resources to health programmes. In this context this study highlights the importance of enabling and empowering policy-makers and programme
managers. The study aims to bring to the attention of policy-makers from health and other sectors (such as education, food and agriculture, urban and rural development, revenue and finance) contributing to fight against NCDs. This would equip policy-makers and programme managers at the national and sub-national levels with updated knowledge and enhanced skills required for introduction of evidence-based public health interventions and facilitate development of new and/or revision of existing national and sub-national policies, strategies and programmes for integrated prevention and control of NCDs using improved intake of.
6 Conclusion and Recommendations

While much is being learnt about the promotion of fruit and vegetables through reviews such as this one, it is difficult to generalize many of the review's findings to lower income populations as that of Pakistan, since the great majority of studies were carried out in industrialized countries and in particular in Europe and the United States. Not only are the cultural and socioeconomic contexts very different but also nutrition priorities in developing countries are still mainly focused on the control of micronutrient deficiencies. Fruit and vegetable promoting programmes in these countries are mainly developed as food-based strategies to alleviate these shortages, compared to the focus of fruit and vegetable programmes in developed countries, which generally aim to reduce obesity and noncommunicable disease risks.

Further studies are required to assess the effect of advertising and promotion on the intake of healthy and unhealthy foods and how these tools can be used to improve the dietary intake of healthy foods as well as to discourage unhealthy foods especially to children.

The studies from Pakistan involving stakeholders from the Government sector should take into account any planned changes in the Government during the course of the studies. Near the end of this study, the national and provincial parliamentary elections of Pakistan were held, which made it much more difficult to get participation by the stakeholders from the government sector. We would recommend to have a risk assessment section in the Project proposal as well, where risks as well as mitigation techniques can be enumerated, that may be encountered during the course of the study.
7 **Keywords:**

The following keywords were used for search purposes:

fruit; vegetables; inadequate consumption; risk factors surveillance; non-communicable diseases; INDEPTH; WHO STEPS [(diet* OR food habit*) AND (fruit* OR vegetable*)]: with intervention*, evaluation*, health promotion*, health education*, health knowledge, health behaviour (and “behaviour”), health practice, counselling (and “counselling”), Pakistan, EMR, cost effectiveness, economic evaluation, decision-analysis.

The following databases were used for research

 Academic Search Complete, AGRICOLA, Business Source Premier, CAB Abstracts, Econlit, ERIC, Fuente Academica, Google Scholar, MEDLINE, eBook Collection, Public Affairs Index, SocINDEX, TOC Premier, Refworks
8 Bibliography


Aga Khan University, Pakistan. *Pakistan National Nutritional Survey*. Pakistan Medical Research Council (PMRC), 2011.


Regional Health Systems Observatory- EMRO. “Health Systems Profile-Pakistan.” n.d.


UNESCAP. “Promoting Healthier Diets and Physical Activity to Prevent Non-Communicable Diseases.” n.d.


