UNIVERSITY OF SÃO PAULO

FACULTY OF PHILOSOPHY, LETTERS AND HUMAN SCIENCES

DEPARTMENT OF GEOGRAPHY

GRADUATE PROGRAM IN PHYSICAL GEOGRAPHY

–

Doctorate Final Thesis

ANALYSIS OF THE DECREASING FOOD SECURITY SITUATION AND IMPACT ON HOUSEHOLD IN PAKISTAN

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São Paulo

August / 2023

ENTREGA DO EXEMPLAR CORRIGIDO DA DISSERTAÇÃO/TESE

Termo de Anuência do (a) orientador (a)

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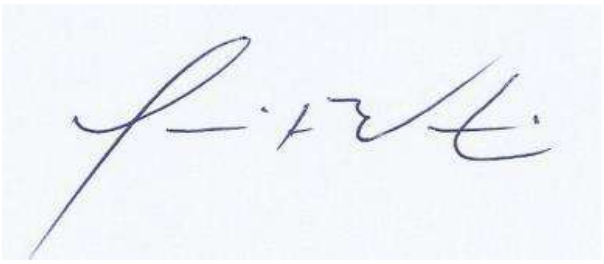
Data da defesa: 22/08/2023

Nome do Prof. (a) orientador (a): Prof, Dr Luis Antonio Bittar Venturi

Nos termos da legislação vigente, declaro **ESTAR CIENTE** do conteúdo deste **EXEMPLAR CORRIGIDO** elaborado em atenção às sugestões dos membros da comissão Julgadora na sessão de defesa do trabalho, manifestando-me **plenamente favorável** ao seu encaminhamento ao Sistema Janus e publicação no **Portal Digital de Teses da USP**.

São Paulo, 13/09/2023



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(Assinatura do (a) orientador (a)

ANALYSIS OF THE DECREASING FOOD SECURITY SITUATION AND IMPACT ON HOUSEHOLD IN PAKISTAN

Doctoral Final Thesis submitted to the Physical Geography Graduate Programme (University of São Paulo), as a partial requirement to obtain the title of Doctor of Sciences (Physical Geography).

Concentration area: Physical Geography
Advisor: Prof. Dr. Luis Antonio Bittar Venturi

São Paulo
August / 2023

Resumo

A segurança alimentar é uma questão crítica em países em desenvolvimento, como o Paquistão. O Paquistão é auto-suficiente em importantes culturas alimentares, ocupando o 8º lugar na produção de trigo, o 10º lugar na produção de arroz e o 11º lugar na produção de milho. Apesar de ocupar a 78ª posição mundial em termos de segurança alimentar, cerca de 43% da população, principalmente mulheres, ainda enfrenta insegurança alimentar devido ao acesso limitado aos alimentos. Além disso, 15% das crianças menores de 5 anos sofrem de desnutrição aguda, enquanto 44% apresentam atraso no crescimento. Esta pesquisa tem como objetivo explicar por que a segurança alimentar está em declínio no Paquistão, com base em duas hipóteses. A primeira hipótese propõe que a instabilidade política e os fatores econômicos afetem a produção de alimentos e, consequentemente, dificultem o acesso aos alimentos. A segunda hipótese diz respeito a aspectos sociais, considerando que a educação e a estrutura familiar afetam a renda e, consequentemente, o acesso aos alimentos. Por meio de análises comparativas e integradas das variáveis e seus respectivos indicadores, utilizamos técnicas de amostragem aleatória para coletar dados de domicílios por meio de questionários, entrevistas, observações e discussões em grupo. Analisamos dados de fontes secundárias, como revistas, livros e departamentos relevantes. Métodos estatísticos, como tabulação de dados (distribuições de frequência e distribuições percentuais), foram utilizados para analisar os dados. Os resultados da pesquisa mostram que a primeira hipótese não indica que a instabilidade política no Paquistão teve um impacto negativo significativo na produção de alimentos. No entanto, teve um forte impacto na inflação, o que, por sua vez, afetou o acesso aos alimentos. As pressões inflacionárias afetaram negativamente a renda das famílias no Paquistão, tornando mais difícil para elas adquirirem alimentos. A segunda hipótese comprovou que a educação e a estrutura familiar são fatores importantes que afetam a renda e o acesso aos alimentos. Enfrentar a pobreza e melhorar o acesso à educação, especialmente em áreas rurais, pode ajudar a melhorar os níveis de renda e a segurança alimentar para populações vulneráveis.

Palavras-chave: Segurança alimentar, Instabilidade política, Educação, Estrutura familiar, fator identificador, classificação de fatores, Paquistão.

Abstract

Food security is a critical issue in developing countries, such as Pakistan. Pakistan in major food crops self-sufficient By Ranked, 8th in wheat production, 10th in rice, 11th maize production. Despite being ranked 78th in the world in terms of food security, around 43% of the population, mostly women, still face food insecurity due to limited access to food. Furthermore, 15% of children under the age of 5 suffer from acute malnutrition, while 44% are stunted. This research aims to explain why food security is declining in Pakistan, based on two hypotheses. The first hypothesis proposes that political instability and economic factors would affects food production and consequently hindering access to food. The second hypothesis concerns to social aspects considering that education, family structure, would affect income and consequently food access. Through comparative and integrated analysis of the variables and its respective indicators, we used Random sampling techniques to collect data from households through questionnaires, interviews, observations, and focus group discussions. We analysed data from secondary sources such as journals, books, and relevant departments. Statistical methods such as data tabulation (frequency distributions and percent distributions) were used to analyse the data. The research findings the first hypothesis didn't show that political instability in Pakistan had a significant negative impact on food production. However, it had a strong impact on inflation, which in turn affected food access. The inflationary pressures negatively affected the income of families in Pakistan, making it more difficult for them to afford food. The second hypothesis prove that, education and family structure are important factors that affect income and food access. Addressing poverty and improving access to education, particularly in rural areas, could help to improve income levels and food security for vulnerable populations.

Key Words: Food security, Political instability, Education, Family structure, identifying factor, factor ranking, Pakistan.

SUMMARY

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LIST OF ACRONYMS

1. ADB: Asian Development Bank
2. AGI: Agricultural Guidance Index
3. AOI: Agricultural Orientation Index
4. BSP: Bauru of Statistic Pakistan
5. CPI: Consumer Price Index
6. DESA: Dietary Energy Supply Adequacy
7. ESP: Economic Survey of Pakistan
8. FAO: Food and Agriculture Organization of the United Nations
9. FATA: Federally Administered Tribal Area
10. FCS: Food Consumption Score
11. GHI: Global Hunger Index
12. GFSI: Global Food Security Index
13. HDI: Human Development Index
14. HH: Head of Household
15. HIES: Household Integrated Economic Survey
16. ILO: International Labour Organization
17. IPM: Integrated Pest Technique
18. LHW: Lady Health Worker
19. LPI: Legatum Prosperity Index
20. NNS: National Nutrition Survey
21. OCHA: Office for the Coordination of Humanitarian Affairs (part of the United Nations)
22. ONU: Organização das Nações Unidas
23. PMI: Purchasing Managers Index
24. PML(N): Pakistan Muslim League (Nawaz)
25. PPP: Pakistan People Party
26. PSLM: Pakistan Social and Living Standard Measurement
27. SAFANSI: South Asia Food and Nutrition Security Initiative
28. SDPI: Sustainable Development Policy Institute
29. UN: United Nations
30. USAID: United State Aid

1 INTRODUCTION

1.1 Contextualisation

Food security means the provision and access to nutritious and culturally acceptable food for every member of the family for a healthy life, obtained through socially acceptable means. Food security is not only about having enough food, but it is also about having access to safe, nutritious, and affordable food.

Food security can be threatened by various factors, including climate change, conflict, poverty, and inequalities. In many countries, women and children are particularly vulnerable to food insecurity, as they often have limited access to resources and decision-making power. Therefore, food insecurity is becoming a global risk that's is threatening almost every country in the world.

Ensuring food security requires a multi-faceted approach, involving policies and programs that address the root causes of food insecurity. This includes investing in sustainable agriculture, improving infrastructure and markets for food distribution, promoting nutrition education, and addressing inequalities in access to resources and decision-making power. According to Mike Davis in 'Holocaust Colonial,' the Indian Famine during 1896-1897 there was a severe famine in many areas that catastrophic events marked by widespread food scarcity, hunger, and high mortality rates. Both famines were preceded by debilitating droughts, which led to crop failures and food shortages, laying the cause for famine conditions. A key source of evidence, the Meteorological Office of India's 1900 report, emphasized that the severity of the rainfall deficit in 1899, underlining its pivotal role in contributing to the famine. India typically receives a mean average rainfall of 45 inches (1,100 mm). However, in previous famine years, the rainfall deficit had not exceeded 5 inches (130 mm). Furthermore, large-scale crop failures extended to various regions of India, exacerbating food shortages and disrupting inter-regional trade, making it challenging to stabilize food prices. These famines highlighted the critical importance of reliable rainfall and robust agricultural production in ensuring food security for the population. (Davis, M. 2001). The consequences were dire, with staggering mortality rates. In the Bombay Presidency alone, an estimated 462,000 lives were lost, and in the Deccan Plateau, approximately 166,000 people succumbed to the famine's effects. Notably, within the Presidency, the famine of 1899–1900 recorded the highest mortality rate, at 37.9 deaths per

1000, among all famines and scarcities occurring between 1876–77 and 1918–19. According to 1908 estimate from The Imperial Gazetteer of India attributed the death of around one million people to starvation or related diseases in British-administered districts. Additionally, the severe shortage of fodder led to the tragic loss of millions of cattle. While estimates of the total death toll vary, they range from one million to as high as 4.5 million deaths (Davis, M. 2001). It is a powerful issue that it can threaten domestic law and order situations (MUSTAFA, 1996). Therefore, food should not be considered a common commodity. In fact, it is a powerful political/policy instrument that guides the political and economic decisions of nations (OMOLE, 1996). In addition, it is argued that the right to easy access to food is more important to household (especially those suffering from food insecurity) than any other basic human right, including education, health and political and social participation (MUSTAFA, 1996). Therefore, it can be included in the development indicators (OYAKHILOME, 1996). Since the World Food Summit, 1996), almost all countries in the world has attached greater importance to the issue of food insecurity. Despite this emphasis, the problem continues to exist with an increasing pace. Food security and economic growth mutually reinforce each other in the development process (TIMMER, 2004**).** Weak economy makes a state unable to produce the necessary food and do not have the resources or cannot afford to buy food in the international market to meet the demand and supply (PINSTRUP-ANDERSEN, 2009). . Food security is, therefore, essential to national security, which is usually ignored (FULLBROOK, 2010). Food unsafety is a growing problem, with the phenomenal rise in food prices in the second half of the 20th century, especially in the developing countries like Pakistan.

Today, more than 900 million people, approximately 12% of the total worldwide population, are malnourished. Developing countries like in Asia and Africa are more affected than developed countries, with 92% of undernourished individuals residing there. Specifically, over 88% of these individuals are in Sub-Saharan Africa (239 million) and Asia and the Pacific (578 million). In South Asia alone, 337 million people affected from malnourishment, accounting for 35% of the global undernourished population (FAO, 2010, 2013). Where these numbers have increased in India and Pakistan in recent years, despite the economic growth seen in these countries (YAMAMOTO, *et al*, 2014). About one out of ten families are still unable to assure secure their food, despite the fact that the public and private sectors have provided substantial assistance to poor families to meet their food needs (NORD *et al*. 2005). According to Nord *et al.*, 2005), about three million children still live in very low food security households. This region also remains vulnerable to various natural disasters and economic crises such as the event of 2010 flood in Pakistan. The sharp rise in global food prices

since 2007 illustrates the sensitivity, especially for the development without food security for all population is an illusion for the poor (FAO, 2010).

There are many aspects of food security, from global, regional, national, local and domestic to individual level. The determinants of food security vary at different levels, from global to regional and national to domestic and individual, because food security is considered a multidimensional phenomenon that includes climate change, civil conflict, natural disasters and social norms,(World Bank, 2001) identified three key factors that affect food insecurity, which is food availability, food access and food consumption. Food availability means greater availability of food through production. Access to food means reduction in poverty, but availability is not enough and poor families should be able to afford it. Food consumption means food containing all the essential nutrients (DOPPLER, 2002). All of these components are influenced by physical, economic, political and other conditions within communities and even within households, and are often destabilised by shocks such as natural disasters and conflicts(FAROOQ, 2010). Geografia da Fome" (The Geography of Hunger) is a book written by Josué de Castro, a Brazilian physician, geographer, and writer. The book explores the issue of hunger and malnutrition in various parts of the world, with a particular focus on Latin America and Africa. According to his book "Geografia da Fome" is that hunger and malnutrition are not solely the result of natural factors like food scarcity or climate but are often the consequence of social, economic, and political factors. De Castro argued that hunger is a preventable and man-made tragedy that can be addressed through equitable distribution of resources, improved agricultural practices, and social policies that prioritize food security and nutrition. De Castro's work emphasized the need for international cooperation and concerted efforts to combat hunger and poverty on a global scale. His insights have had a lasting impact on the fields of nutrition, public health, and development, contributing to a greater awareness of the complex causes of hunger and the importance of addressing them at both local and global levels. (De Castro, J., & Branco, J. C. (1952), (De Castro, J. 2022).
Sub-Saharan Africa is facing a significant challenge in feeding its growing population. Approximately 90% of the rural population relies on agriculture as their main source of livelihood. Unfortunately, they lack viable solutions to address the issue of food insecurity. This problem primarily stems from low productivity in the agricultural sector and various agro-environmental challenges, including conflicts and unrest. Since 1996, respectively, reducing hunger and tackling food insecurity have been key priorities on the agenda of the World Food Summit and international development (RUKUNI, 2002). Regarding development and poverty reduction, food security has been a significant part of the global discourse (VINK, 2012). Therefore, the concept of food security was focusing on food availability (GLOPOLIS, 2013). Due to the projected increase in the global population from 7 to 9

billion in 2021, the demand for food among vulnerable populations is also expected to rise (RAYFUSE & WEISFELT, 2012). With rapid growth of population in developing countries, pressure on governments is increasing to feed the increasing population (PATEL, *et al.*, 2015). Pakistan the world largest grain producers despite this many people go to bed hungry, hence south Asia is one of the world food insecure region. (ASGHAR, & MUHAMMAD, 2013).

Pakistan's food security has declined since the 2000s, due to a succession of Political instability, conflicts and economic crises. This has a cumulative effect on Pakistan's food security and will dramatically increase food poverty and inflation. The government of Pakistan also requires an understanding of food security dimensions and future challenges for agricultural growth and food security; and also the impact of the agricultural policy on food supply and income in the poor, vulnerable rural areas (AHMAD & FAROOQ, 2010). The data of 2018 about food insecurity in Pakistan show the 77 million, nearly half the country's total population were going hungry, the 45 million malnourished and the 36% of the total population subsisting below the poverty line may seem staggering. Yet unless action is taken immediately, these figures could appear modest by comparison in several decades' time. Ninety-five of Pakistan's 121 districts, according to the WFP, faced hunger and malnutrition-related disease. Predictably, this widespread food insecurity triggered civil unrest in many urban areas. Media reports declared that "hunger in Pakistan is no longer a silent killer" and told tragic stories of poor men and women jumping in front of trains, setting themselves on fire and murdering their children because of their inability to provide food for their families (WFP, 2020). Eliminating poverty and achieving food security are prerequisites for economic development.

Pakistan is a developing country of south Asia with an average per capita income of $ 1,260 in 2020 year (BSP, 2021). Its economy is mainly dependent on agriculture, which contributes around 21 % in the economy of Pakistan and employs 45 % of its workforce. For the improvement of the agriculture sector, the government of Pakistan introduced various modern and scientific methods and techniques. The agriculture sector directly or indirectly connected to other sector of economy like textile industry of Pakistan heavily depends on agriculture sectors for the supply of raw material like cotton, which is one of the largest industrial sub-sectors. More than 63 % of the country's population lives in rural areas and are directly or indirectly dependent on subsistence agriculture. Presently, Pakistan is the fifth populous country in the world having an estimated population of 207.77 million and has the world's second-largest Muslim Population. Pakistan is the 33rd-largest country by area, spanning 881,913 square kilometers (340,509 square miles).with an economic growth rate of 2%. Out of the total population, about 75.58 million are living in urban areas while132.19 million in rural areas in 2017. The percentage of rural population decrease from

63.77% to 63.56% during one year period, while that of the urban Population increased from 36.23% to 36.44% by 2017. Pakistan has made great progress in the food supply since its independence in 1947. This is proved by the FAO's (2011a) statistics for the year 2008 that shows that Pakistan is one of the world's leading manufacturers of a wide range of agricultural products. Despite this, 26% population is undernourished (FAO, 2013). The prospective vision of Pakistan 2025 is a Pakistan where ''*all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life*" (ESP, 2020).

According to Global Food Security Index (GFSI), Pakistan ranked 80th out of 113 countries on the 2020 Global Food Security Index, followed by almost all South Asian countries except Bangladesh and many African countries. This means that Pakistan scored extremely low on all indicators or drivers of food insecurity from food availability, accessibility, quality and safety to natural resources and flexibility the GFSI was ranked on the index. The Global Hunger Index (GHI), which takes into account the proportion of the undernourished population, the frequency of infant mortality, increasing growth and the proportion of children's weight to height, ranks Pakistan 88th out of 132 countries surveyed last year (DAWN, July 5th, 2021).

Table 01 Global Food Security Index

Country Name	Global Ranking	Score
Finland	1st	85.3
Ireland	2nd	83.8
UK	6th	78.5
USA	11th	77.5
Portugal	19th	75.7
Russia	24th	73.7
Uruguay	30	71.4
Brazil	50	64.1
India	71st	56.2
Pakistan	**80**	**52.3**

Source: Global Food Security Index 2020

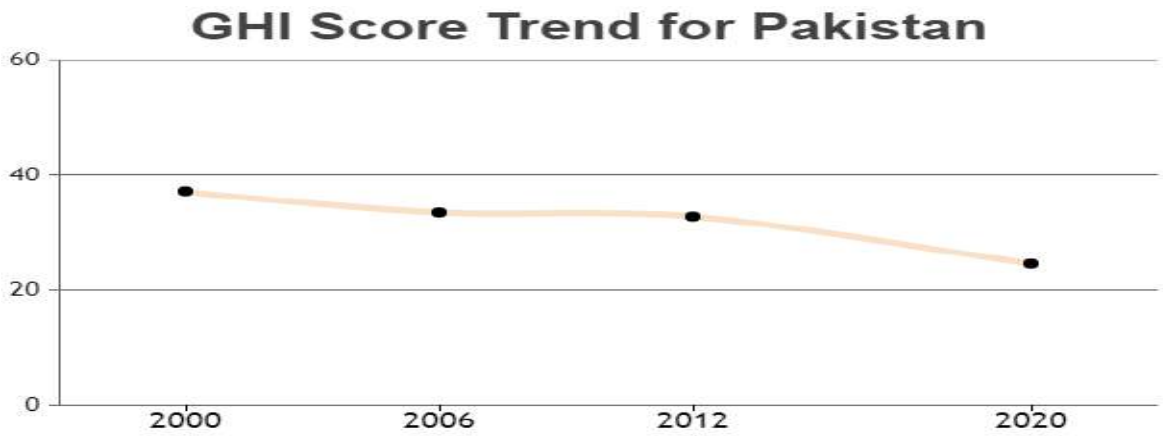
According to the World Food Program, (FAO, 2015) about 43% of Pakistanis suffer from food insecurity. Out of this number, 18% people severely lack access to food. According to the Sustainable Development Institute (SDPI) policy report, food security conditions were inadequate in 45% of the districts (54 out of 120). About half of the population, 48.6%, do not always have access to adequate food for an active and healthy life (SDPI, 2010).

According to the report of SDPI, the conditions of food security were inadequate in 45% districts (i.e.; 54 out of 120). Almost half of population 48.6%doesn't have access to sufficient food for active and healthy life at all times.

According to the Human Development Index (HDI), Pakistan was ranked 154th out of 189 countries and territories in 2019. The HDI value for Pakistan in that year was 0.557, which is lower than the Asia average value of 0.607 and the world average value of 0.711 (BAUMANN, F. (2021). This categorizes the country as having a medium level of human development. SDPI divided Food security in Pakistan into four categories (a) Extremely insecure, (b) insecure, (c) Border Limit and (d) Reasonably Secure (SDPI, 2010). The results of the SDPI report show that the food security situation in Pakistan has worsened since 2003, nationally and domestically. The number of food insecure districts in Pakistan was 38, against 102 in 2009, which clearly shows the food insecurity situation in the country. Better agricultural production is needed for food security, which will make agricultural systems less sensitive to climate change (SDPI, 2009). Food insecurity has affected Pakistan for last decade (2008-2018) years. Many historical and important factors are responsible for this, such as the war on terror, military operations in residential areas, catastrophic floods that destroyed infrastructure and crops, and the recent earthquake.

In the 2020 Global Hunger Index, Pakistan ranks 88th out of 107 countries with enough data to calculate GHI scores in 2020. With a score of 24.6, Pakistan has a severe level of hunger. The score of GHI decrease from 37.2 to 24.6 during the period 2000 to 2020, but the situation remains the same, as Pakistan is still in the category of 'serious'.

Graph 01: Global Hunger Index of Pakistan



Source: Global Hunger Index 2020

In 2017, Pakistan experienced a significant achievement as it became a food surplus country and a major producer of wheat and rice. However, despite the positive growth in food production, around 43% of the Pakistani population still faces food insecurity and struggles with malnutrition. Disturbingly, 44% of children under the age of 5 in Pakistan suffer from stunting, which indicates chronic malnutrition, while 15% experience acute malnutrition (WFP & USAID, 2018).

Female and childhood malnutrition rates in the Islamic Republic of Pakistan are among the highest in the world. This is due to poverty and low income, particularly women affected by inadequate and imbalance diet by less access of food. Pakistan′s household average spends 50.8% of monthly income for buying food due to its high prices. According to (SHAHID, I., & VENTURI, L. A. B. (2022) the effects of climate changes like (due to 2010 flood) and population displacement (due to militant operation) exacerbate the situation (WFP, 2018). Pakistan divided by Provincial data, the Punjab have 32%of children living in households who have food insecurity without hunger and 42% of children living in households who have food insecurity with hunger respectively (SAFANSI, 2018). A weak economy can make a state incapable of producing an adequate amount of food and lacking the necessary resources or affordability to fulfil the demand and supply through international trade (PINSTRUP-ANDERSEN, 2009). Consequently, ensuring food security becomes crucial for national security, a dimension that is frequently overlooked (FULLBROOK, 2010). Additionally, the problem of food safety is escalating, particularly in developing countries like Pakistan, as evidenced by the significant surge in food prices during the latter half of the 20th century (FULLBROOK, 2010). In order to achieve a food security and agricultural growth in Pakistan, the government of Pakistan has to adopt a comprehensive approach in the direction of increasing the productivity of all foods, not just

to focus upon only wheat -based food security. In addition, the farmers should be able to adopt the new agricultural techniques and should be able to finance the higher cost of inputs, and diversify their livelihoods through optimal farming. According to National Nutrition Survey (2011), about 58.4% of households in Ex Federally Administered Tribal Areas (FATA) were shown to be food insecure, with 27.4% food insecure without hunger, while 8.4% were shown to be food insecure with moderate hunger, and 5.8% as food insecure with severe hunger. Food security is indeed a major issue in Khyber Pakhtunkhwa (KPK) as the province is not producing enough amounts to meet food demand and is importing food from other provinces with subsidies. Emphasis is placed on increasing the production of different crops, and modern tools and technologies are adopted to bridge the gap between food and supply (THE NATION, 2017).

1.2 Justification

Food security is a critical issue with significant implications for individuals, communities, and nations. There are several reasons why food security is essential,

1) Humanitarian reasons: Access to adequate and nutritious food is a basic human right. Food security ensures that individuals and communities have access to the food they need to live healthy and productive lives.

2) Economic reasons: Food security is crucial for economic development. It ensures that individuals and communities have the energy and nutrition they need to work productively and contribute to their economies.

3) Environmental reasons: Sustainable food production and consumption practices are necessary to protect natural resources such as water, land, and biodiversity. Food security policies and programs can promote sustainable agriculture and protect ecosystems.

4) Social reasons: Food security is linked to social stability and cohesion. Hunger and malnutrition can cause social unrest and political instability, while food security promotes social harmony and community development. Overall, food security is essential for promoting human development, economic growth, environmental sustainability, and social stability.

Globally many researchers have examined the factors affecting food security in various countries worldwide, including Zimbabwe (MANGO *et al.*, 2014), Nigeria (TITUS and ADETOKUNBO, 2007), Ghana (ZEREYESUS *et al.*, 2016), Brazil (FLEKER-KANTOR and WOOD, 2012), and

Bangladesh (ALI, NOOR, and ALAM, 2016). In the context of Pakistan, several studies have been conducted by AHMAD and FAROOQ (2010), KIRBY *et al.* (2017), SULERI (2009), MAHMOOD, SHAHID *et al.* (2014), and KHAN, AZID, and TOOSEF (2012). However, most of these studies either cover the entire country (ZHOU *et al*., 2019) or focus on specific provinces, such as Punjab (BASHIR *et al*., 2013). The majority of these studies on food security primarily emphasize economic and production-related factors, while some also consider political issues as explanatory factors (AHMAD, 2009; HUSSAIN and AKRAM, 2008; MW CHUGHTAI, 2015).

All these arguments are valuable and were duly considered in this research. However, none focus on family structure as a variable that can affect food security. Here, we aim to fill this gap, by bringing new variables to explain food security such as family structure, without neglecting/forgetting those already accepted mentioned (political and economic) factors. Policy makers in Pakistan when make food security policies so they only focus on the production side to meet national food demand and never been seen as an access issue as well as the social dimensions of food insecurity. Unfortunately, food security has not remained the part of the national policy it's only used for a political slogan.

1.3 Objective and hypothesis

This research aims to explain why food security has been decreasing in Pakistan in the period of 10 years (2009-2018)

The study was oriented by two main hypotheses.

1) The first one is related to **political and economic** factors in a relation through which political instability would affect food *production* and consequently, *regular food offer*.

2) The second hypothesis concerns to **social aspects**, considering that *education* and *family structure* may affect *income* and, consequently, regular access to food (accessibility).

2 CONCEPTUAL BASE

2.1 The concept of *food security*

Food security can be defined as the state in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. This definition was developed by the (FAO, 2010) of the United Nations and has been widely adopted by international organizations, governments, and researchers.

The four components of food security are availability, access, utilization, and stability. Availability refers to the sufficient production, distribution, and supply of food, while access refers to the ability of people to obtain food through means such as income, markets, and social safety nets. Utilization refers to the proper consumption and absorption of food, and stability refers to the ability of food systems to withstand shocks such as droughts, conflicts, or economic crises, (FAO, 2010).

Food insecurity, on the other hand, is the lack of access to sufficient, safe, and nutritious food. It can be caused by a combination of factors, including poverty, conflict, environmental degradation, and climate change. Food insecurity can lead to malnutrition, which can have serious consequences for health, cognitive development, and economic productivity.

In Pakistan, food security has been a major challenge due to a combination of factors, including poverty, population growth, environmental degradation, and political instability. According to a report by the Global Hunger Index, Pakistan ranks 94 out of 107 countries in terms of food security. The report highlights the need for increased investments in agriculture, social protection, and nutrition programs to improve food security in the country. The term food security refers to the access of adequate amount of food for meeting dietary energy needs that implies as much as self-sufficiency in food is required domestically (PINSTRUP-ANDERSEN, 2009). . This definition encompasses five fundamental aspects: availability, access, stability, nutritional status and preferences of food availability is achieved when sufficient quantities of food are consistently available to all individuals. Sources of such food supply could be household's own production (harvesting), other domestic output, commercial imports or food assistance (FAROOQ, 2010). The access refers to the capacity to buy and/or acquire appropriate nutritious food by the households and the individuals (TIMMER, C. P, 2000). Therefore, both availability and access are inseparable (PINSTRUP-ANDERSEN, 2009). Stability refers to consistent supply of nutritious food at the national level as well as stability in access

to food at the household and individual levels (JACOBS, K., & SUMNER, D. A. (2002). Stability requires better management of domestic production, food markets integration and rational use of buffer stocks and trade (JACOBS, K., & SUMNER, D. A. (2002).

Food insecurity, on the other hand, is uncertain or limited access to nutritious and safe food (ANDERSON, 1990; FAO, 2006). It exists when people do not have adequate physical, social or economic access to food (FAO, 2009). In terms of severity, it is termed as less severe and severe, suggesting that less severe food insecurity is associated with reduced quality and variety of food intake (TARASUK, 2001), while severe food insecurity is caused by insufficient food intake to meet energy needs of the diet (FAO, 2010). Both forms are thought to be associated with a series of adverse psychological, developmental and health outcomes, especially in children (ALAIMO *et al*, 2001). Food security is multidimensional and is a major challenge for policy makers to accurately measure and target policies. However, food security means "permanent and reliable access to food suitable for an active and healthy life" (COLEMAN, JENSEN *et al*., 2011).

2.2 The concept of *Food insecurity*

The initial focus, reflecting the 1974 concerns globally, declining world food supplies and massive food shortages triggered a response from the international community that focused on increasing domestic agricultural production and building international food reserves. In World Food Summit 1974 Food security was defined as: "The availability of adequate global food supply of staple foods to sustain the ever-expanding food consumption at all times and to meet fluctuations in production and prices'' (WFS, 1974).

In 1983, FAO expanded its concept to provide access to available supplies for vulnerable populations, which means that the balance between supply and demand in the food security equation must be balanced: "Ensure that all people, at all times, have physical and economic access to the basic food they need."

the United Nations in 1996 expanded its food security concept as "Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life".(FAO. 2006).

With the realisation that hunger has more to do with inequality in distribution of quality of seeds, and agriculture new techniques that increasing food production was only part of the solution, the concept of food security is no longer just a matter of availability nutrition (national or even local) for the more complex issue of access (in family or individual level). At the family and individual level, the concept of proper nutrition is considered in both quantitative terms (i.e. calorie completeness) and in other qualitative forms conditions (meaning diversity, security and cultural acceptance). Similarly, household food security depends not only on the availability of an adequate and sustainable food supply, but also on the means by which families get the food they need. The sustainability of the household food supply depends on the family's ability to buy food regularly through the transfer of income, production and/or an adequate food supply, despite unforeseen crises (ARMAR-KLEMESU, 2000).

2.3 The concept of *food vulnerability*

Vulnerability is a concept fundamental to the theoretical and practical dimensions of disasters, and is defined in terms of the following three critical dimensions as below.

1. Vulnerability to an outcome
2. From a variety of risk factors
3. Because of an inability to manage that risk

Vulnerable to food insecurity are those who are able to maintain an acceptable level of food security today, and may be at risk of becoming food insecure in future.

In the broader academic literature, vulnerability is a term that has implications for many disciplines. Disaster management literature generally links vulnerability to natural hazards (ALWANG, 2001), while human geography and the human ecology are related to climate change risk (DOLAN, *et al*, 2006). Food insecurity and poverty, as well as the literature on social risk management, define vulnerabilities in terms of future negative effects on well-being (HALEY, 2001), DURKIN, A. (2015), (HOL HOLZMAN and JORGENSEN 2000), WORLD BANK 2000). Others describe vulnerability in terms of the level of risk and its ability to recover and respond. Thus, vulnerability reflects not only the measurement of risk associated with physical, social and economic aspects, but also the ability to cope with various hazards and shocks (CHAMBERS 1989), (HARVEY, *et al,*2014). Accordingly, there are two vulnerability components: the external side referring to the structural elements that determine the susceptibility and the risk of exposure. (MOSER 1998), (TURNER, *et al*, 2003); CHAMBERS, 1989), while the inner side is concerned with the ability of households to respond to

and deal with stressors and the actions needed to overcome them (BOHLE, 2002), (HART 2009), CHAMBERS, 1989). In the context of food insecurity, weakness is defined as the probability that food will fall below the poverty line or remain for a certain period of time (CAPALDO *et at*, 2010), (LOVENDAL *et al*, 2004), (LØVENDAL & KNOWLES, 2005).

3 METHODOLOGY, TECHNIQUES AND DATA BASE

3.1 Geographical analysis

Methodologically, this research was oriented by the geographical analysis, i. e., an integrated and evaluative analysis of some natural and social variables in a period of time and a specific place. The period of study is from 2009 to 2018 and the study area is the territory of Pakistan. The variables we considered (Political stability, production, stability of food offer, education, family structure and income) would support two main hypotheses: that food security would be affected by political instability and social aspects. Therefore, we also adopted the hypothetic-deductive method (Karl Popper), through which we conducted the research to verify the hypotheses searching their corroboration.

3.2 Techniques and data base

Concerning the first and second variables, we obtained data through comparatively studies of different agriculture policies of Pakistan (2009-2018) because inconsistency of policies is one of the major issues which affect economy as well as agriculture in Pakistan. We collected these policies and data from Ministry of National Food Security & Research (http://www.mnfsr.gov.pk/frmdetail.aspx) Bauru of statistic Pakistan (https://www.pbs.gov.pk/), Directorate of Agriculture Peshawar (https://agrires.kp.gov.pk/) and Finance Department of Pakistan (http://www.finance.gov.pk/). For the second variable availability of crops we collected data from Directorate of Agriculture Extension (https://agriext.kp.gov.pk), Revenue & Estate Department KPK (https://www.revenue.kp.gov.pk/), Population department (https://www.pbs.gov.pk), Finance Division Pakistan (https://www.finance.gov.pk/survey_2020-21). From the above mention department we collected data regarding the prices of food for last few years and then compared these data on annual basis, so as to know about the decrease or increase of prices in the selected years. Food accessibility and stability is an important factor, which is concerned to the department of agriculture. From this department we obtained different types of crops (wheat, maize, rice, sugarcane etc) annual production yield per hectare. The obtained data proved that why the production of crops increases or decreases and the causes which are responsible for its changes. After collecting, these data was organised in the form of charts and tables and maps.

The concerning variables related to social aspects, we obtained these data from various departments which is pertaining with education like independent monitoring unit, (http://kpimu.gov.pk) Khyber

Pakhtoonkhwa (KPK) Pakistan, Ministry of Education, Pakistan,(http://www.mofept.gov.pk), Population department(https://www.pbs.gov.pk), bureau of statistic Pakistan and District education offices of Khyber Pakhtoonkhwa (KPK) Pakistan, Population Department(https://www.pbs.gov.pk), Population Census reports of 2008 to 2018 and Bureau of Statistics Khyber Pakhtunkhwa KPK Pakistan (https://kpbos.gov.pk), Pakistan Meteorological Department(https://www.pmd.gov.pk). After collecting data, this variable, show the influence of income on food security in Pakistan. These data was also organised in maps, charts and tables. Additionally, we made use of surveys to obtain primary data about household income and expenditure, food security.

We used primary and secondary data in this research so for primary data we used a questioner, which required and collected from the field. Main source of the data for this research is primary and secondary data and has been collected from the field, as we show subsequently.

We used also for analysis on both primary and secondary data,

1st hypothesis: Political and economic aspects

1st variable: Political instability

For this variable, we made a comparatively study of different agriculture policies and political history (instability and stability) of Pakistan (2008-2018). Because in Pakistan every government has its own policies, so this study will analyse the policies of Pakistan People Party (2008-2013) and Pakistan Muslim League (Nawaz group) (2013-2018) governments and their impacts on Pakistan's economy. Inconsistency of policies is one of the major issues which affect economy as well as agriculture in Pakistan. We collected these policies and data from Statistic Department of Pakistan (https://www.pbs.gov.pk/), Directorate of Agriculture Peshawar (https://agrires.kp.gov.pk/)and Finance Department of Pakistan (http://www.finance.gov.pk/).

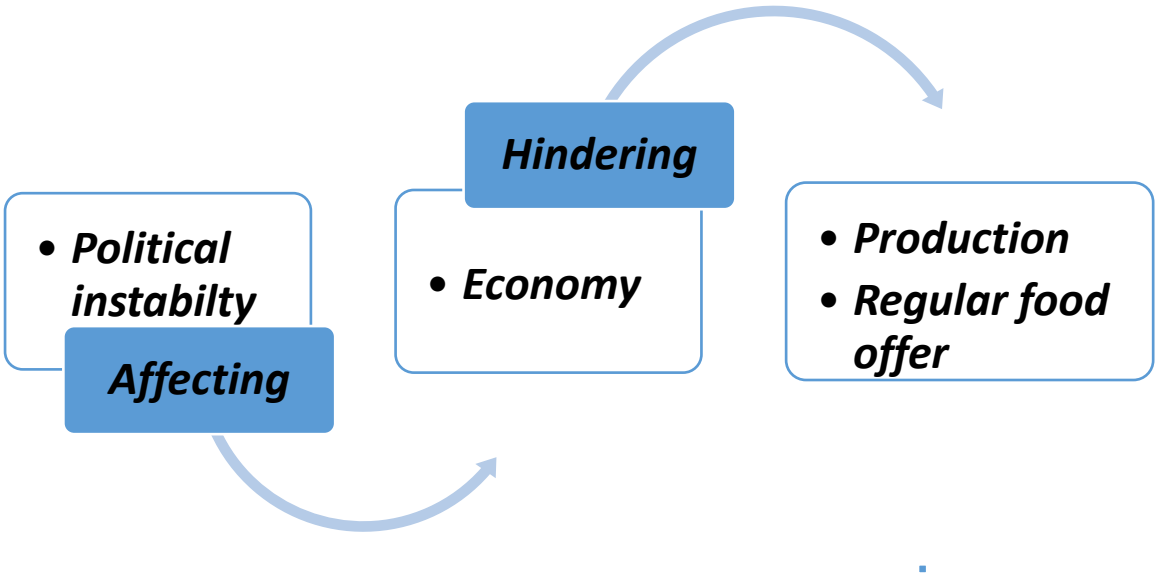
2nd variable: Production

For this variable, we collected area-wise production data of major crops from 2008 to 2018 in selected provinces of Pakistan. The data were obtained from the Agriculture, Finance, and Bureau of Statistic Departments of Pakistan (https://www.pbs.gov.pk/). By analysing this data, we aim to determine the factors responsible for the changes in crop production and understand why it increases or decreases.

Additionally, we obtained data from the Revenue & Estate Department KPK (https://www.revenue.kp.gov.pk/), the Population Department (https://www.pbs.gov.pk), and the Directorate of Agriculture Extension (https://agriext.kp.gov.pk). These departments provided information on the prices of food over the past few years. We compared this data on an annual basis to identify any fluctuations or trends in prices during the selected years.

Food accessibility and stability are crucial factors addressed by the Department of Agriculture (https://agriext.kp.gov.pk). To assess food availability, we collected data from this department on the annual production yield per hectare for various types of crops, including wheat, maize, rice, barley, beans, cereals, and sugarcane.

Figure 01: Scheme of the first hypothesis and its two variables.



2nd hypothesis: social aspects

1st variable: Education

We obtained data for this variable from various departments related to Education, including the Independent Monitoring Unit Khyber Pakhtunkhwa (http://kpimu.gov.pk), the Ministry of Education Pakistan (http://www.mofept.gov.pk), the Population Department (https://www.pbs.gov.pk), the Bureau of Statistics Pakistan (https://www.pbs.gov.pk), and the District Education Offices of Khyber Pakhtunkhwa. This data will help clarify the positive and negative impacts of Education on food security. By accessing information from these departments, we aim to analyse the relationship between education and food security. The Independent Monitoring Unit Khyber Pakhtunkhwa, Ministry of Education Pakistan, and District Education Offices of Khyber Pakhtunkhwa provide insights into the educational landscape and policies. The Population Department and Bureau of Statistics Pakistan offer demographic and statistical data necessary for understanding the population's characteristics and trends. Through this comprehensive data collection, we can examine how education influences food security positively or negatively. By assessing the data from these departments, we can gain a deeper understanding of the interplay between education and food security.

2nd variable: family structure

We collected data regarding family structure from the Department of Population (https://www.pbs.gov.pk), Population Census reports (https://www.pbs.gov.pk) from 2008 to 2018, and the Bureau of Statistics | Khyber Pakhtunkhwa (https://kpbos.gov.pk). This variable aims to explore the impacts of family structure on food accessibility and stability.

In Pakistan, the majority of families live in a combined form, where only a few members are responsible for earning their livelihood, while others primarily act as consumers. This trend significantly affects family earnings and consequently impacts the food security of families in the study area. We obtained data from the Population Census Organisation, including information on household composition, age-sex distribution of the household population, marital status, educational attainment, and housing characteristics. These data help us understand the various aspects of family structure and its potential implications for food security. By analysing the collected data, we can

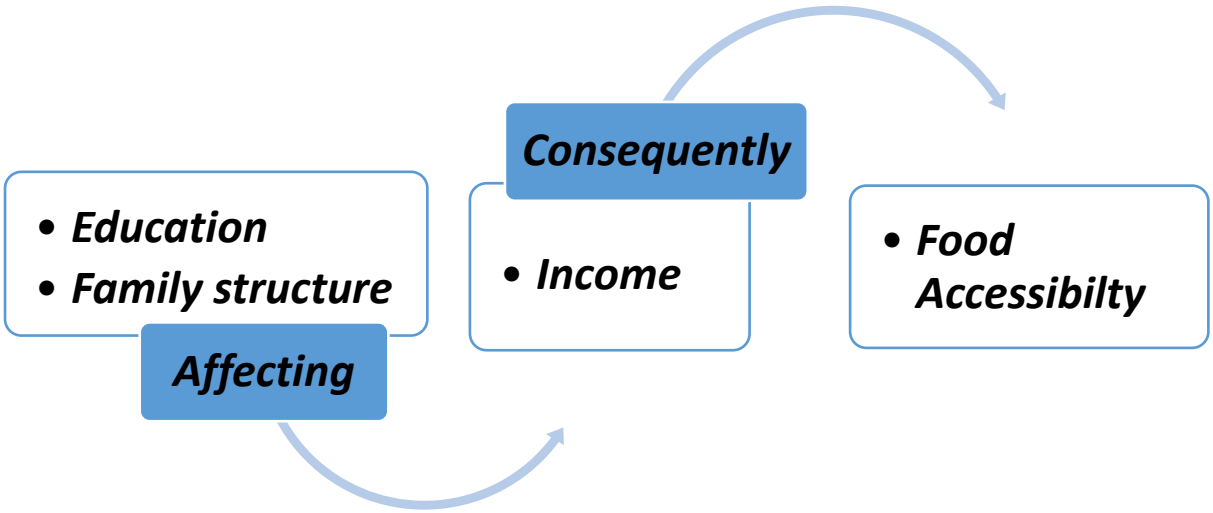
examine how family structure influences the availability and stability of food. The information obtained from the Department of Population, Population Census reports, provides valuable insights into the relationship between family structure and food security in the study area.

3rd variable: income

We collected data related to income from various sources, including the Pakistan Bureau of Statistics (https://www.pbs.gov.pk/), the World Inequality Database (https://wid.world), and the State Bank of Pakistan (https://www.sbp.org.pk). This variable aims to examine the influence of income on food security in Pakistan.

The collected data was analysed using statistical methods such as data tabulation. Data tabulation, Frequency distribution, a type of data tabulation, provides a tabular representation of a survey dataset by listing qualitative or quantitative values that a variable takes, along with the corresponding frequencies and percent distributions. This method helps to understand the occurrence and distribution of different income levels within the dataset. Descriptive statistics will also be utilized to describe the basic features of the data in the research. These statistics provide simple summaries about the sample and its measures. Along with simple graphical analysis, descriptive statistics form the foundation of almost every quantitative analysis of data. They are calculated to showcase the fundamental properties of all the variables in this study. By employing these analytical techniques to the collected income data, we can gain insights into the relationship between income and food security in Pakistan. The data collected from the Pakistan Bureau of Statistics, World Inequality Database, and the State Bank of Pakistan contribute to the robustness of the analysis.

Figure 02: Scheme of the second hypothesis and its three variables.



"Education and Family structure affecting on income while income consequently effects on food access"

4 RESULTS AND DISCUSSION

4.1 First hypothesis: political and economic aspects

This first hypothesis was based on two variables: Political instability and production. Before showing results about the variables, though, we decided to show a general panorama of the political situation in Pakistan that can impact on food security.

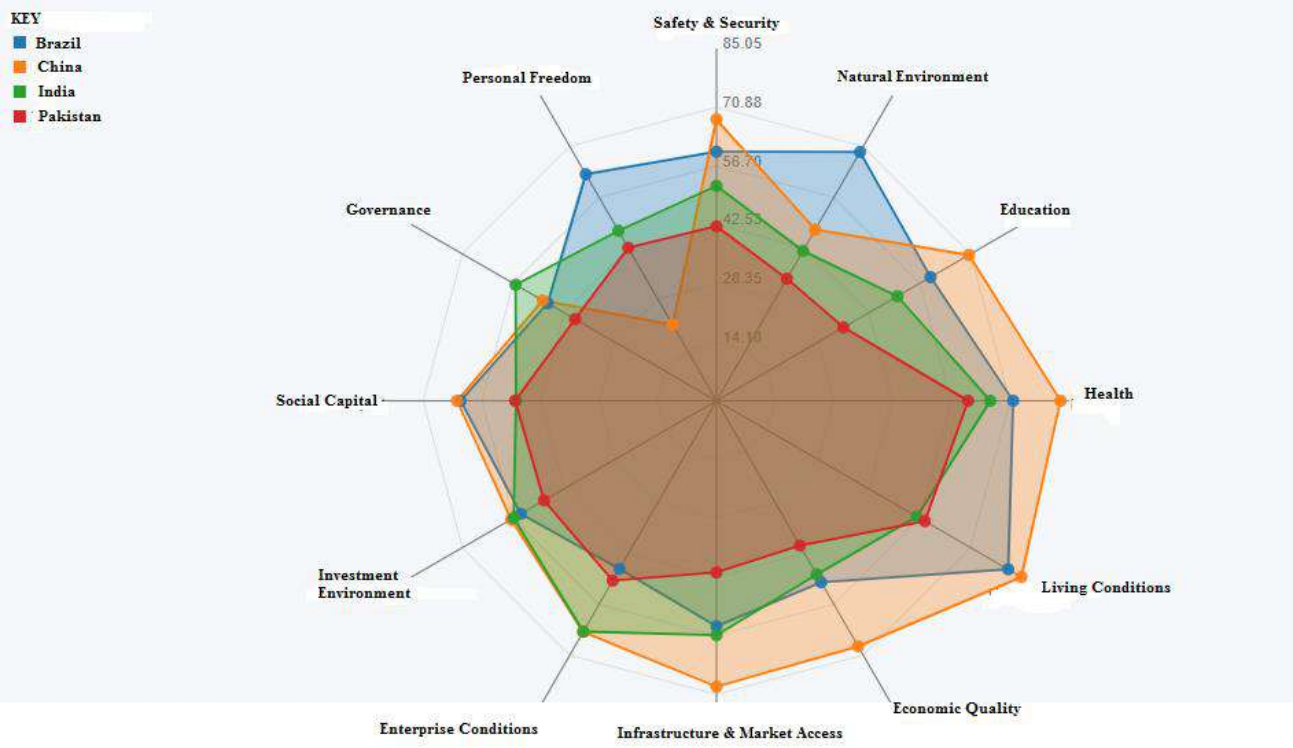
4.1.1 Political instability in Pakistan 2008-18

Pakistan has experienced significant political instability between 2008 and 2018, which has had a negative impact on food security in the country. Political instability in Pakistan has been characterised by several factors, including weak governance, corruption, violent conflicts, and terrorism. We discuss some of the impacts of political instability on food security in Pakistan during 2008-18. Political instability has led to a decrease in crops production due to various reasons, including disruptions to supply chains, a lack of investment in the sector, and the displacement of farmers due to conflicts. Another impacts have increased in food prices: 1) the decline in agricultural production has led to an increase in food prices, making it difficult for the poor to access sufficient food. The increase in food prices has also contributed to a rise in inflation, further exacerbating food insecurity. 2) Furthermore Political instability in Pakistan has led to the displacement of many people, particularly in conflict-affected areas. The displacement of people has disrupted their livelihoods and access to food, leading to increased food insecurity. 3) Limited access to humanitarian assistance: Political instability has made it difficult for humanitarian organisations to deliver aid to those in need, particularly in conflict-affected areas. This has further exacerbated food insecurity among vulnerable populations. Political instability has also led to social instability, which has had a negative impact on food security. Social instability has led to a breakdown in traditional support systems, making it difficult for vulnerable populations to access food.

According to World Bank the average value for Pakistan political stability risk ranked during (1996-2020) period was -2.11 points with a minimum of -2.81 points in 2011 and a maximum of -1.1 points in 2000. The latest value from 2020 is -1.85 points while in comparison, the world average in 2020 based on 194 countries is -0.07 points. Which shown that in Pakistan political situation is not good and it’s weak as compared to developed countries in the world.

According to LPI, 2023, Pakistan is 136th in the overall Prosperity Index rankings out of 167th countries in the world wide. Which shown the political instability is worse which directly effects on production of food crops, and access to food.

Figure: 03 Political instability ranking of Pakistan.



Source: LPI, 2023

Based on the figure, Pakistan's position is comparatively worse compared to other countries. Data points that appear further away from the center on the spider chart represent better performance, while points closer to the center indicate poorer performance.

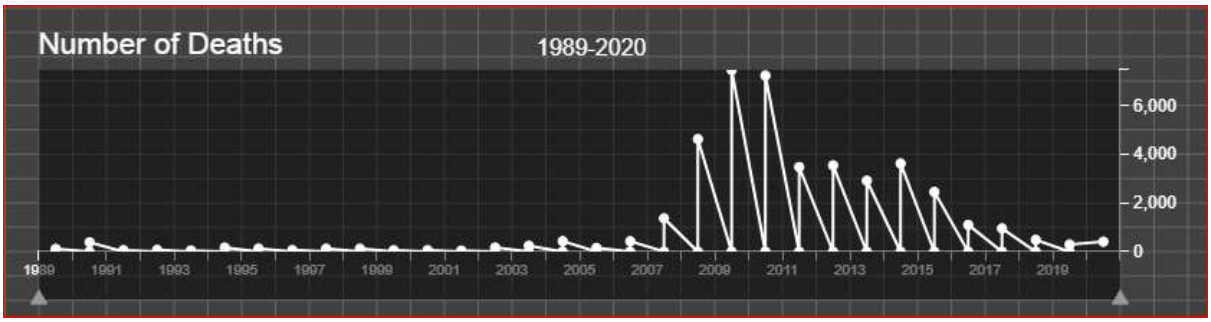
Political instability directly and indirectly effects on food security in Pakistan. Many ideological links between food insecurity and political instability can be related to Pakistan. Existing researches such as (BELLEMARE, M. F. 2015), (LAGI, M., BERTRAND, K. Z., & BAR-YAM, 2011). These researcher suggested that rising food prices and disruptions in food availability are associated with social unrest in societies that are relatively poor and have significant inequalities in the event of political transition or group dominance over power. Along with it, state capacity and public service delivery also matters a lot. Clientelism concepts and corruption in government also cause inflation and disruption in policies. In these situations, protests caused by rising food prices can be politicized and represent a vehicle for opposition to governments. In societies that suffer from unrest and instability the prices rise for food and can become a "lightning rod" for widespread complaints. Global

Food Security, according to the US National Intelligence Council, says that declining food security will almost certainly contribute to social disruptions and political instability. Food Insecurity and Violent Conflict, an article released by the WFP, analyses the link between food insecurity and conflict. They are both political and violent. Food insecurity, especially when food prices rise, increases the risk of democratic disorder, civil war, protests, corruption and sectarian conflicts. Now a day's Pakistan face this violent conflict due to high prices.

According to the Statistics from the Uppsala Conflict Data Program show that Pakistan continues to suffer from low and sometimes high intensity armed conflicts. Since 1990, UCDP has recorded 42,777 deaths from political violence in Pakistan (including 34,537 deaths from state violence, 3,861 deaths from non-state violence, and 4,379 deaths from unilateral violence).

INDICATES AN UPSURGE OF POLITICAL VIOLENCE SINCE 2007 TO 2020.

Figure 04: Total number of Deaths due to Political Violence 2007-2020 in Pakistan



Source: Uppsala Conflict Data Program

Based on Figure 03, it can be observed that there is a correlation between political instability and Crops production in Pakistan. The data shows a decrease in wheat production during certain years characterized by political instability, as well as an increase in production during a relatively stable period. Specifically, in 2009-10, wheat production experienced a decrease of 0.7%. This decline coincided with a period of political instability, indicating a possible negative impact on agricultural productivity. Similarly, in 2011-12, wheat production saw a significant decrease of 6.9%, aligning with a period of political instability during that time. Furthermore, in 2014-15, wheat production declined by 3.4%. Again, this decrease occurred during a period marked by political instability, further supporting the notion that political instability can have adverse effects on agricultural production. On the other hand, the data shows that in 2016-17, wheat production increased by 4.1%. This increase coincided with a relatively stable period, providing evidence that political stability can positively impact agricultural production.

These findings demonstrate a clear relationship between political instability and crops production in Pakistan. When political instability is prevalent, it tends to have a negative impact on agricultural productivity, leading to decreased production. Conversely, periods of relative political stability can contribute to increased agricultural production.

The statistics from the Uppsala Conflict Data Program (UCDP) highlight the ongoing presence of armed conflicts in Pakistan, ranging from low to high intensity. These conflicts have had a significant impact on various aspects of the country, including food insecurity.

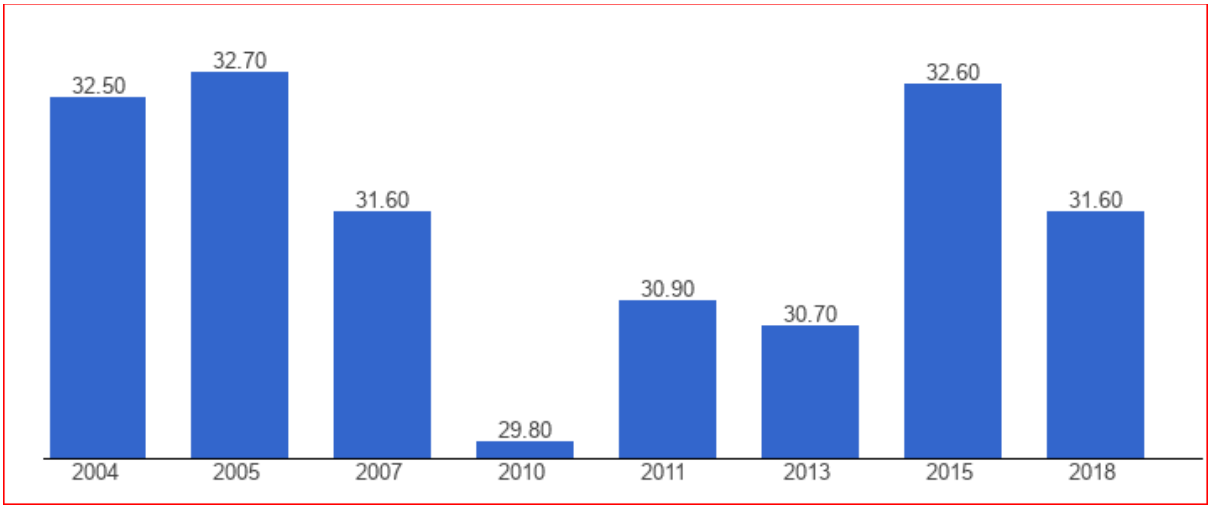
Armed conflicts disrupt agricultural activities, damage infrastructure, and displace populations, leading to adverse consequences for food production and accessibility. The resulting instability and insecurity can hinder farmers' ability to cultivate crops, disrupt supply chains, and limit access to markets for both producers and consumers.

Furthermore, armed conflicts often lead to population displacement and the creation of internally displaced persons (IDPs) and refugees. These vulnerable populations face challenges in accessing food, as they are forced to leave their homes and livelihoods behind, often relying on humanitarian aid for survival. The UCDP statistics reveal a significant number of deaths resulting from political violence in Pakistan. Such violence can further exacerbate food insecurity by creating an atmosphere of fear and instability, impeding economic development, and hindering investments in agriculture and food systems.

Structural conditions seem to exist for instability in the country. For example, the World Bank's scale of social and economic inequality – the GiNi-coefficient – suggests a relatively high level of inequality, without significant improvement.

According to The Global Economy this measure of inequality, where a higher number indicates higher inequality, Pakistan’s scores were: in 2007: 31.60, in 2010: 29.80, in 2011: 30.90, in 2013: 30.70, in 2015: 32.60 and 2018: 31.60.

Graph:02 PAKISTAN GINI COEFFICIENT, (2008-18)



Source: The global economy.com

There is also evidence of a significant historical trend in the number of people living in urban areas, which has been associated with instability in different environments. According to the Statista.com and World Bank data, between 2008 and 2018, the percentage of Pakistan's population living in urban centers increased from 34.59% to 37.16%. It is also worth noting that there is evidence that the urban population – more prone to instability – was relatively more affected by the increase in food prices in 2008-18.

Between 2005 and 2015, Pakistan experienced 19 serious incidents of unrest – riots, demonstrations, major protests – where complaints about food prices were specifically identified, but not necessarily the only factor involved, (E.Newman, 2020). It is based on a survey of 297 incidents of unrest related to food price complaints in 79 countries between 2005 and 2015.In this survey, Pakistan ranks second only to India in terms of the absolute number of food (which has experienced 80 events) and in terms of per capita ratio, it ranks Pakistan as one of the countries where food protests are relatively High level. According to one analyst, "Rising food prices could lead to a level of instability that could be critical to maintaining national security. Given Pakistan's strategic geopolitical importance and its persistently weak governance.

When a country's political conditions are uncertain, the government adopts expansionist policies to remain in power and those policies are detrimental to the country's economy. Political instability increases government loans and therefore creates a situation of exclusion. Tax payments are also very poor in Pakistan due to government negligence and corruption, so they create inflation in the country to pay and complete the projects. Due to increase in money supply, the inflation rate increases and

these conditions lead to a reduction in economic growth. Thus, political instability, public debt and inflation are interconnected and affect economic growth. Due to weak government economic agents their corruption enhances, which causes high inflation rate and high debt rate. Corruption is the leakage of public revenue and to meet the public expenditures the government indulged in seignior age. Weak economy resists in food availability and stability. The table 04 shows that the production of food is decreasing due to weather condition, bad quality of seeds, lack of proper knowledge, rapid increasing population and lack of government interest in agriculture sector. Agriculture is considered to be the backbone of Pakistan's economy, which depends on its main crops. There are big gaps between acquired production and actual production output, which suffers due to the lack of appropriate technology, use of inputs at inappropriate times, unavailability of water and land use, and inadequate education on pesticides control, which not only put negative effects on production, but they also significantly reduce the quantity of products. Farmers mainly use synthetic chemicals to control insect pests, but these are used recklessly.

It's due to environmental impact like dry spell which started from September and continued till the harvesting of the maize crop, so due to these changes the level of production is down/dropped.

4.1.2 Production of Crops (Wheat, Rice, Maize)

According to the UNICEF 2018 National Health and Nutrition Survey of Pakistan is self-sufficient in major staples – By Ranked, 8th in wheat production, 10th in rice, 5th in sugarcane production. Despite this, 43% of households People are food insecure in the country. We focused on production of grains wheat, rice and maize. Pakistan is the 16th weakest country affected by climate change and different parts of Pakistan are facing various threats, while in political instability its ranking is 136th out 167 countries in the world.(LPI, 2023).

The northern part (Ex-FATA) of the country faces Political issue such as Militants operation against terrorists and also climate changes such as landslides and floods. Coastal areas are subject to cyclones and floods. Floods are also a major threat in central Pakistan, while southern Punjab, Sind and Baluchistan are subject to drought.

Although all these adversities, food production in Pakistan presents stability or a slightly grow (wheat, Maize and Rice) in the considered period, as shown in the following table and graph:

Table 02: Production of Crops effected by conflicts in Pakistan (2008-2018)

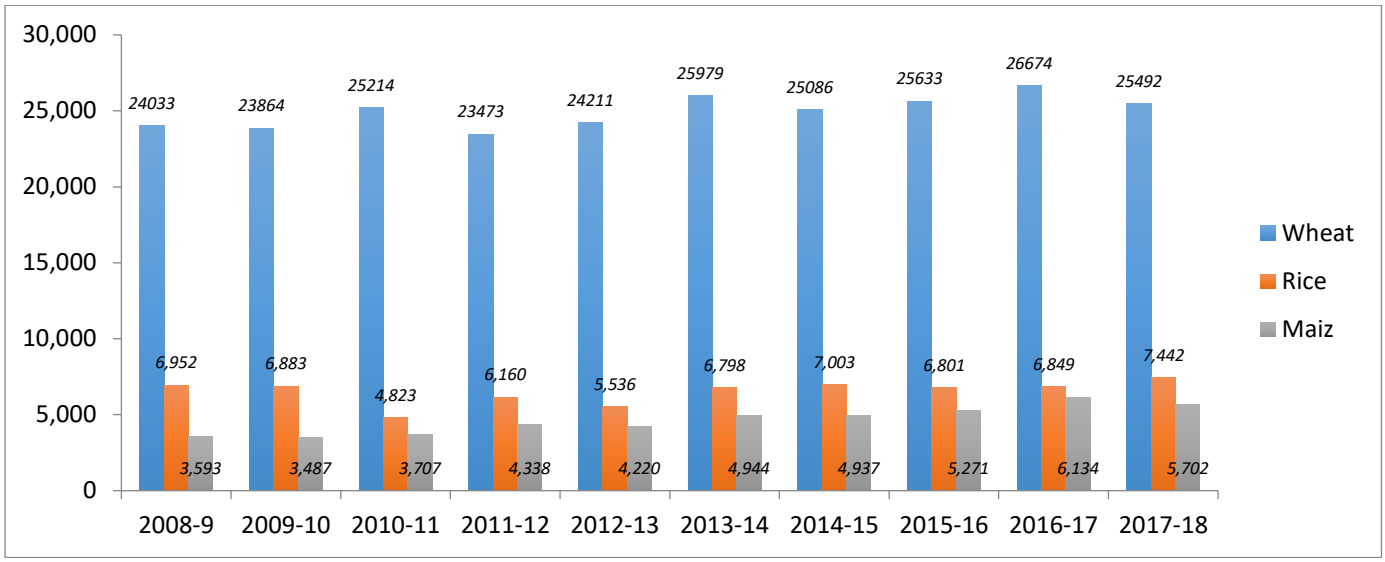
(Tonnes)

Years	Wheat	Maize	Rice	Year of Conflicts
2008-09	24,033	3,593	6,952	Militant operation In swat, bajaur
	(14.7)	(-0.3)	(25.0)	
2009-10	23,864	3,487	6,883	Flooding in 2010
	(-0.7)	(-3.0)	(-1.0)	
2010-11	25,214	3,707	4,823	Flooding in 2010
	(5.6)	(5.2)	(-26.0)	
2011-12	23,473	4,338	6,160	Militant Operation
	(-6.9)	(17.0)	(27.7)	
2012-13	24,211	4,220	5,536	Militant Operation
	(3.1)	(-2.7)	(-10.1)	
2013-14	25,979	4,944	6,798	
	(7.3)	(17.2)	(22.8)	
2014-15	25,086	4,937	7,003	Militant Operation
	(-3.4)	(-0.1)	(3.0)	
2015-16	25,633	5,271	6,801	Militant Operation
	(2.2)	(6.8)	(-2.9)	
2016-17	26,674	6,134	6,849	
	(4.1)	(16.4)	(0.7)	
2017-18 Growth %	25,492	5,702	7,442	Drought and Militant Operation
	(-4.4)	(-7.0)	(8.7)	

P:Provisional(July-February),Figuresinparenthesesaregrowth/declinerates,

Source: Pakistan Bureau of Statistics, 2018

Graph 03: Production of Crops in Pakistan (2008-2018) (Tonnes)



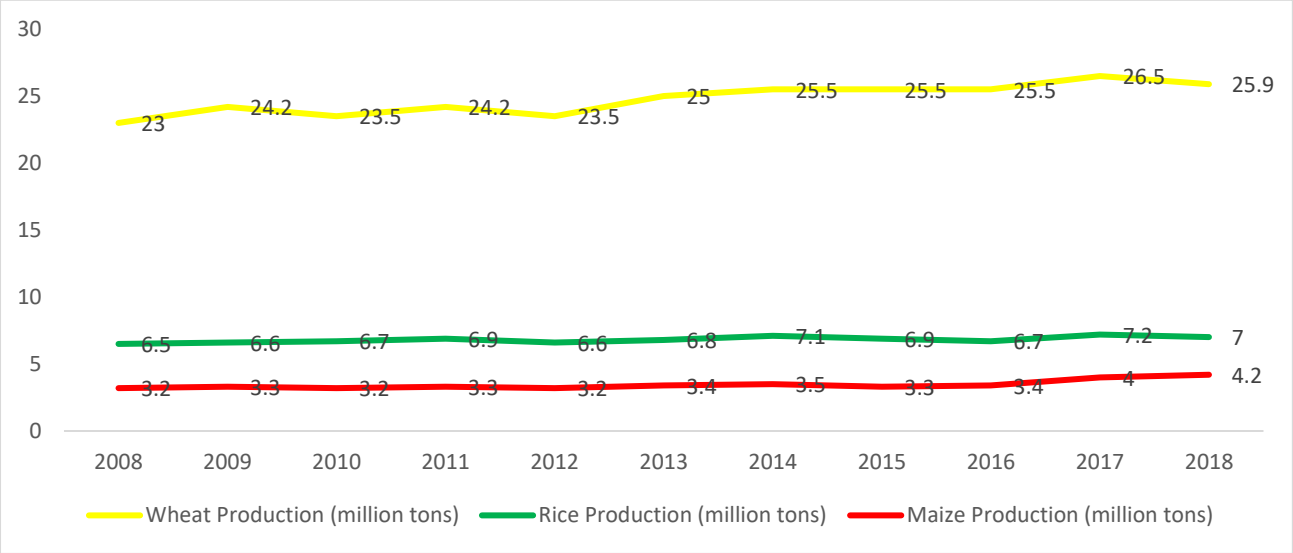
Source: Pakistan Bureau of Statistics, 2018

Table: 03 Production of wheat, Rice and Maize percentage changes 2008-18 in Pakistan

Years	Wheat Production (million tons)	% Change	Rice Production (million tons)	% Change	Maize Production (million tons)	% Change
2008	23.0	-	6.5	-	3.2	-
2009	24.2	+5.2	6.6	+1.5	3.3	+3.1
2010	23.5	-2.9	6.7	+1.5	3.2	-2.9
2011	24.2	+3.0	6.9	+3.0	3.3	+3.1
2012	23.5	-2.9	6.6	-4.3	3.2	-2.9
2013	25.0	+6.4	6.8	+2.9	3.4	+6.3
2014	25.5	+2.0	7.1	+4.4	3.5	+2.9
2015	25.5	0	6.9	-2.8	3.3	-5.7
2016	25.5	0	6.7	-2.9	3.4	+3.0
2017	26.5	+3.9	7.2	+7.5	4.0	+17.6
2018	25.9	-2.3	7.0	-2.8	4.2	+5.0

Source: Pakistan Bureau of Statistics. (2019)

Figure: 05 Production of wheat, Rice and Maize percentage changes 2008-18 in Pakistan



Based on Table 02 and Figure 04, it is stated that there is no strong evident that shown the Political instability have significant impacts on agricultural production in different years. But we examine other variable such as climate changes, floods and drought have significant effects on crop production. These events led to the displacement of farmers, damage to crops and livestock, and widespread devastation to agricultural infrastructure. In 2008-2009, the Operation Earthquake, clashes with militants in Swat and Bajaur, and subsequent displacement of farmers caused significant disruptions to agricultural activities. This resulted in reduced production and agricultural losses. In 2010, a massive flood occurred, causing devastation to crops and infrastructure across the country. This catastrophic event had severe consequences for agricultural productivity and led to significant losses in the sector.

In 2012, the Taliban attack on Bacha Khan International Airport and the shooting of Malala Yousafzai created an atmosphere of insecurity and displacement. These events affected farmers and resulted in damage to crops and livestock, adversely impacting agricultural production. The year 2014 witnessed the Zarb-e-Azb military operation, leading to the displacement of farmers and damage to crops and livestock. These factors contributed to reduced agricultural output. In 2015-16, an earthquake in Pakistan-administered Kashmir, along with ongoing militant operations, caused widespread devastation to crops and agricultural infrastructure, resulting in decreased agricultural production.

Lastly, in 2017-18, the problem of drought and untimely rainfall affected agricultural activities. Insufficient water availability and delayed precipitation had negative implications for crop production

and overall food security. The mentioned events and their associated impacts provide evidence of the significant influence of conflicts and natural disasters on agricultural production in Pakistan. These disruptions disrupt the livelihoods of farmers, damage crops and livestock, and contribute to decreased agricultural output and food insecurity in the affected regions.

4.1.2.1 Wheat crop

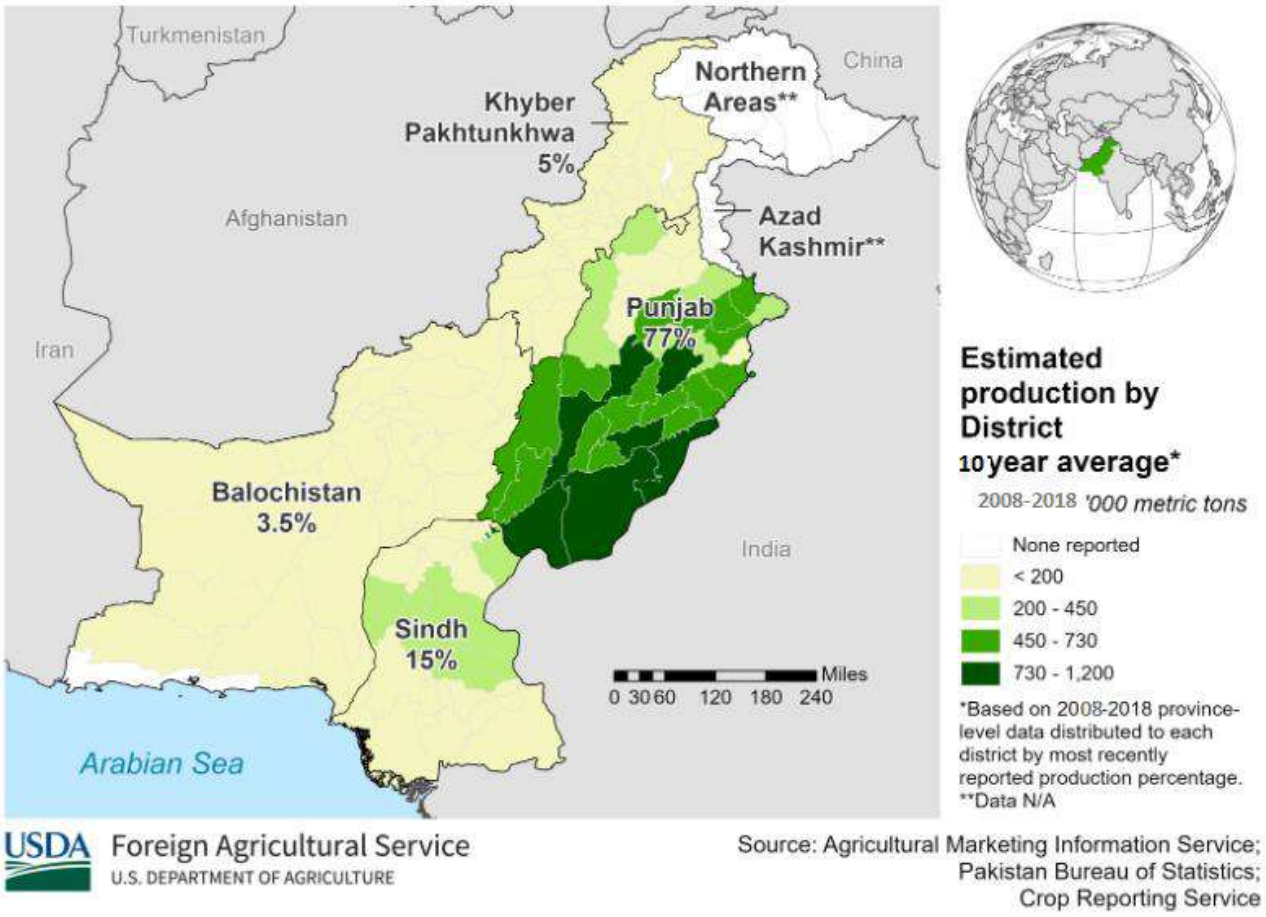
Wheat is a major crop in Pakistan and is the second-largest staple food after rice. It is cultivated in all provinces of the country, with Punjab being the largest producer. Wheat is a source of essential nutrients such as carbohydrates, protein, vitamins, and minerals, and it plays a vital role in the food security of the country. Wheat cultivation in Pakistan involves several stages, including land preparation, seed selection, sowing, irrigation, and harvesting. Traditional methods such as broadcasting or drilling are still used in some areas, while modern methods such as zero tillage and direct seeding are becoming more popular. One of the main challenges facing wheat cultivation in Pakistan is water scarcity. Irrigation is necessary for wheat cultivation, and the availability of water is limited in many areas. To address this challenge, farmers are encouraged to adopt water-efficient technologies such as drip irrigation and sprinkler irrigation. Another challenge is the use of pesticides and fertilizers, which can have negative impacts on the environment and human health. To promote sustainable wheat cultivation, the government and NGOs are promoting the use of organic farming practices and Integrated Pest Management (IPM) techniques. Wheat is also susceptible to various diseases, such as rust and smut, which can reduce yields. To address this challenge, farmers are encouraged to use disease-resistant varieties of wheat and to practice crop rotation. The Pakistani government has implemented various policies and programs to support wheat cultivation and ensure food security. For example, the Wheat Support Price Program provides support to farmers by guaranteeing a minimum price for their wheat crops. The government also provides subsidies for inputs such as fertilizer and seeds to help farmers reduce their costs and increase their yields.

Furthermore wheat is the leading food grain of Pakistan and being staple diet of the people, it occupies a central position in formulation of agricultural policies. According to Economic survey of Pakistan, 2009 It contributes 14.4% to the value added in agriculture and 3.1% to GDP. The area and wheat production plan for 2009-10 were set at 9,045,000 hectares and 25 million tonnes, respectively. Wheat was cultivated on an area of 9,042 thousand hectares, which is 0.04% less than in the previous year on an area of 9,046 thousand hectares. The lack of political stability refers to an unstable or insecure environment, which can disrupt agricultural activities and hinder farmers' ability to engage in proper

cultivation. Political instability can lead to uncertainty, fear, and insecurity, which can discourage farmers from investing in and expanding their agricultural operations.

According to Economic survey of Pakistan 2018 Wheat accounts 8.9% value added in agriculture and 1.6% of GDP of Pakistan. Wheat harvest a slight increase of 0.5% was shown to 25,195 million tons more than last year's production 25.076 million tons, but did not reach the target by 4.9%. And the area under cultivation declined by 0.6% (8,797 to 8,740 Thousands of hectares) this is a nominal reduction in area compared to last year due to relocation of area to Oilseeds and other competitive crops. However, production increased due to better crop yield and healthy grain formation. Wheat cultivated area in 2017-18 increase due to attractive market rates induced the growers to put more area under wheat crop and availability and use of inputs remained adequate. Production of wheat crop in 2017-18 decreased due excessive rains and hailstorm at the time of harvesting of wheat crop.

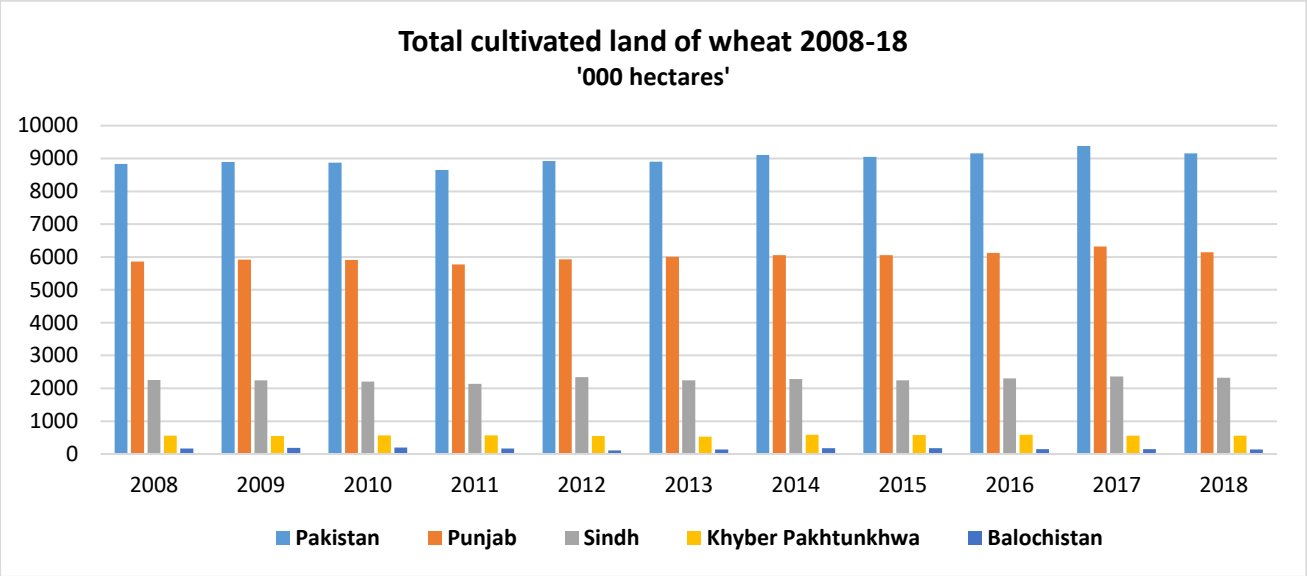
Figure: 06 Wheat production map of Pakistan



TOTAL CULTIVATED LAND OF WHEAT 2008-18

According to the Pakistan Bureau of Statistics, 2021 the total wheat crop cultivated area in Pakistan and its provinces from 2008-2018 is as follows:

Graph: 04 Total cultivated land of wheat 2008-18



Source: Bauru of statistic Pakistan, 2018

The total wheat crop cultivated land in Pakistan by province and the reasons for the increase or decrease in the area from 2008-2018 are as follows:

I. **Punjab:** Punjab is the largest wheat-producing province in Pakistan, and it has a significant impact on the overall wheat production of the country. The cultivated area of wheat in Punjab was 5857.3 '000 hectares in 2008, and it increased to 6055.5 '000 hectares in 2014, a rise of 3.4%. However, from 2014 to 2018, the cultivated area of wheat in Punjab decreased slightly to 6142.3 '000 hectares, which could be due to several reasons, such as the shift towards other crops or declining soil fertility.

II. **Sindh:** The cultivated area of wheat in Sindh was 2253.7 '000 hectares in 2008, and it increased to 2336.3 '000 hectares in 2012, a rise of 3.7%. However, from 2012 to 2018, the cultivated area of wheat in Sindh decreased slightly to 2323.2 '000 hectares. One of the reasons for this decrease could be the shortage of water due to the construction of dams, which reduced the water supply to the agricultural land in the province.

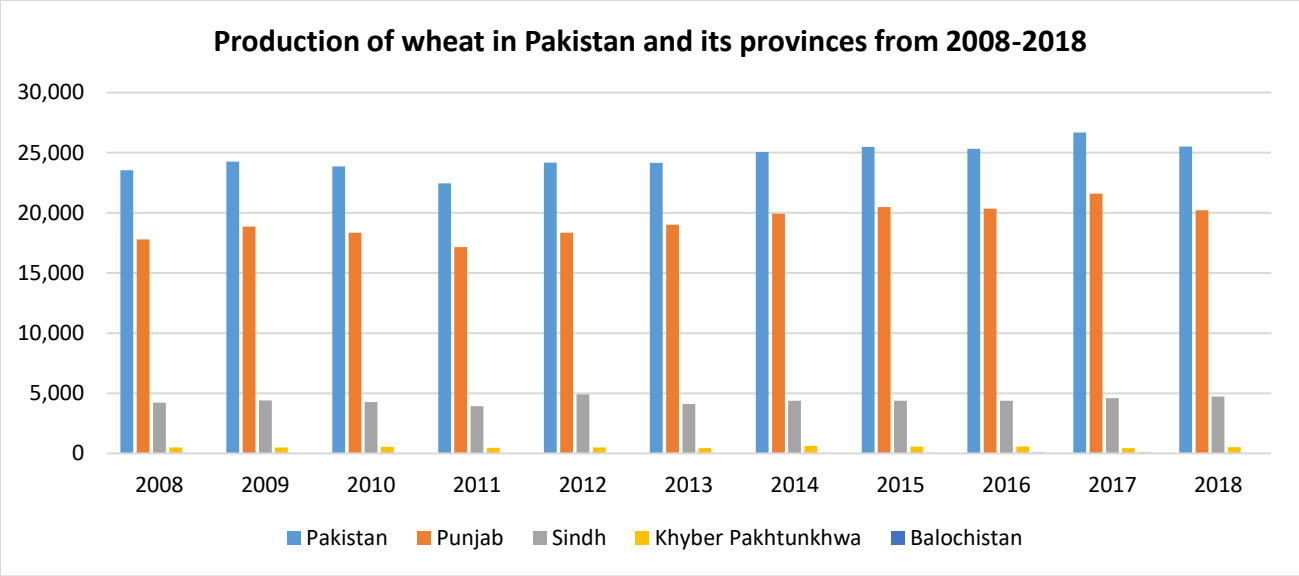
III. **Khyber Pakhtunkhwa (KPK):** The cultivated area of wheat in KPK was 555.2 '000 hectares in 2008, and it increased to 588.8 '000 hectares in 2016, a rise of 6.1%. However, from 2016 to 2018, the cultivated area of wheat in KPK remained relatively stable. One of the reasons for the increase in the cultivated area of wheat in KPK could be the government's efforts to promote the cultivation of wheat in the province.

IV. **Balochistan:** The cultivated area of wheat in Balochistan was 165.7 '000 hectares in 2008, and it increased to 178.5 '000 hectares in 2014, a rise of 7.7%. However, from 2014 to 2018, the cultivated area of wheat in Balochistan which shown decreased slightly to 139.9 '000 hectares. One of the reasons for the decrease in the cultivated area of wheat in Balochistan could be the water shortage in the province due to the construction of dams and poor irrigation infrastructure.

Overall increase or decrease in the cultivated area of wheat in Pakistan's provinces from 2008-2018 can be attributed to various factors such as political instability, soil fertility, water availability, government policies, and infrastructure development.

Graph: 05 Total Production of Wheat in Pakistan
2008-2018

('000 metric tons')



Source: Bauru of statistic Pakistan, 2018

I. **Punjab**: Punjab is the largest wheat-producing province in Pakistan, accounting for more than 70% of the total production in most years and it has a significant impact on the overall wheat production of the country. The wheat production in Punjab was 17,794 '000 metric tons in 2008, and it increased to 20,468 '000 metric tons in 2015, a rise of 15.0%. However, from 2015 to 2018, the wheat production in Punjab decreased slightly to 20,210 '000 metric tons, which could be due to several reasons, such as the shift towards other crops or declining soil fertility.

II. **Sindh:** The wheat production in Sindh was 4,227 '000 metric tons in 2008, and it increased to 4,386 '000 metric tons in 2015, a rise of 3.8%. However, from 2015 to 2018, the wheat production in Sindh decreased slightly to 4,725 '000 metric tons. One of the reasons for this decrease could be the shortage of water due to the construction of dams, which reduced the water supply to the agricultural land in the province. Sindh, Khyber Pakhtunkhwa, and Balochistan produce smaller amounts of wheat, with their combined production accounting for around 30% of the total.

The production of crops in Pakistan has shown a general increase during the selected periods, while it tends to decrease with a few fluctuations observed in certain years between 2008 and 2018. The increase in production can be attributed to several factors, including improved irrigation systems, advancements in seed varieties, and government policies that aim to enhance crop yields and support agricultural development.

Furthermore, the implementation of effective irrigation systems has played a significant role in boosting wheat production. Improved access to water resources for irrigation purposes ensures that crops receive adequate moisture, contributing to higher yields. The government's initiatives to enhance irrigation infrastructure, such as the construction of canals and dams, have contributed to increased wheat production in favorable political conditions.

4.1.2.2 Rice crop

Rice is a staple food crop that is cultivated in many countries around the world, including Pakistan, India, China, Indonesia, and many others. It is a major source of food for over half of the world's population and provides essential nutrients such as carbohydrates, proteins, and vitamins. Rice is grown in a variety of climates, from tropical to temperate, and can be planted in irrigated or rain fed

areas. In Pakistan, rice is mainly grown in the provinces of Punjab and Sindh, where the climate is suitable for its cultivation. In Pakistan, after wheat, rice is the second main staple food crop as well as cash crop. Rice prominently grows in high rainfall areas. It requires average temperatures of 25°c and a minimum of 100 cm of rainfall. It's traditionally grown in waterlogged rice paddy fields. Major Rice producing districts are D.I. Khan, Swat, Malakand, Dir. Lower and Dir upper & Malakand etc.

There are two main types of rice: Indica and Japonica. Indica rice is long-grain, while Japonica rice is short-grain. In Pakistan, Basmati rice is a popular variety of Indica rice that is known for its aroma and flavour. It is grown mainly in the Punjab region and is exported to many countries around the world. Rice cultivation involves several steps, including land preparation, seedling production, transplanting, irrigation, and fertilization. Farmers use both traditional and modern methods of cultivation, depending on the availability of resources and technology.

One of the challenges facing rice cultivation in Pakistan is water scarcity. Irrigation is necessary for rice cultivation, but water resources are limited in many areas. To address this challenge, farmers are encouraged to adopt water-saving technologies such as the System of Rice Intensification (SRI), which can increase yields while reducing water usage. Another challenge is the use of pesticides and fertilizers, which can have negative impacts on the environment and human health. To promote sustainable rice cultivation, the government and NGOs are promoting the use of organic farming practices and Integrated Pest Management (IPM) techniques.

According to the Economic Survey of Pakistan 2009, rice accounted for 6.4% of the value added in agriculture and 1.4% of GDP. However, according to the Economic Survey of Pakistan 2018, the contribution of rice to the value added in agriculture decreased to 3.0%, while its contribution to GDP declined to 0.6%. These figures indicate a significant reduction in the importance of rice in both the agricultural sector and the overall economy.

During the year 2018-19, the rice crop area witnessed a decrease of 3.1%. Several factors contributed to this decline in production. Firstly, there was a decrease in the area cultivated, which can be attributed to various factors such as land conversion to other crops like maize, mash, and Kharif fodders. Additionally, the rice crop faced challenges due to unfavorable weather conditions, including dry weather and water shortages. The availability of water for irrigation purposes is crucial for rice cultivation, and its scarcity adversely affected the crop's production.

However, one of the significant factors impacting rice production in 2018-19 was Drought. And some influence of political issue. The change in the government regime during that period led to political disturbances, which had an impact on the agricultural sector. Farmers may have been hesitant to

engage in rice cultivation due to the uncertain political environment and associated risks. Moreover, the availability of good quality seeds from the government, which is essential for crop productivity, may have been compromised during the period of political instability.

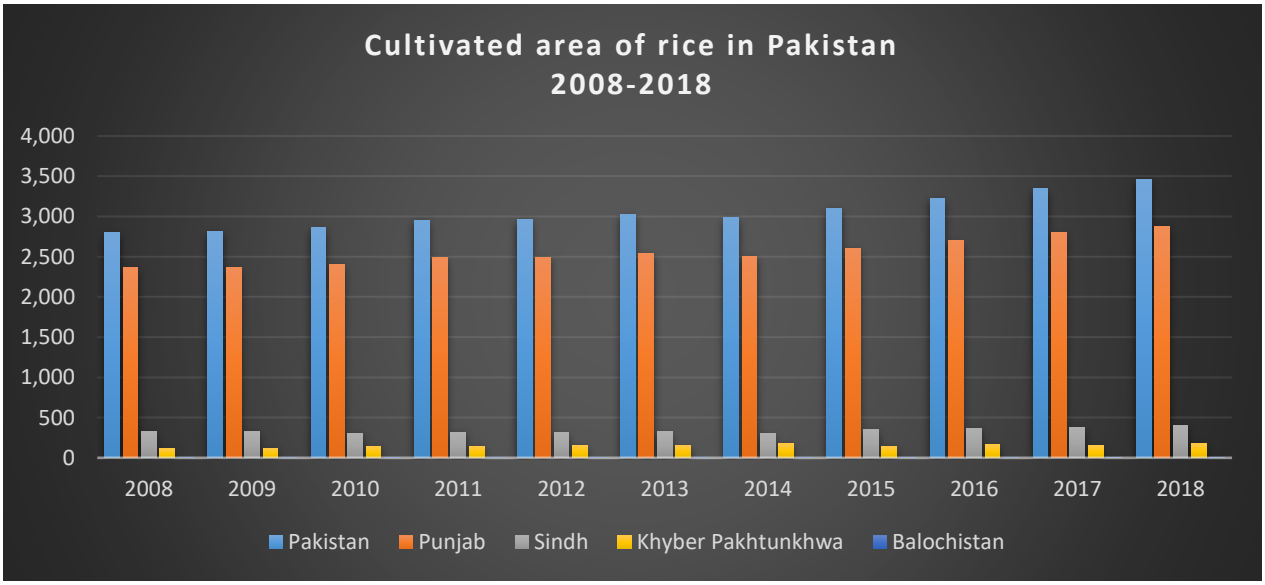
The fear and uncertainty among farmers, coupled with challenges in accessing quality seeds and the general disruption caused by political disturbances, have contributed to this decline.

TOTAL CULTIVATED AREA OF RICE IN PAKISTAN AND ITS PROVINCES FROM 2008-2018

According to the Pakistan Bureau of Statistics, the total cultivated area of rice in Pakistan and its provinces from 2008-2018 is as follows:

Graph: 06 Total Cultivated Land of Rice in Pakistan
2008-2018

('000' hectares)

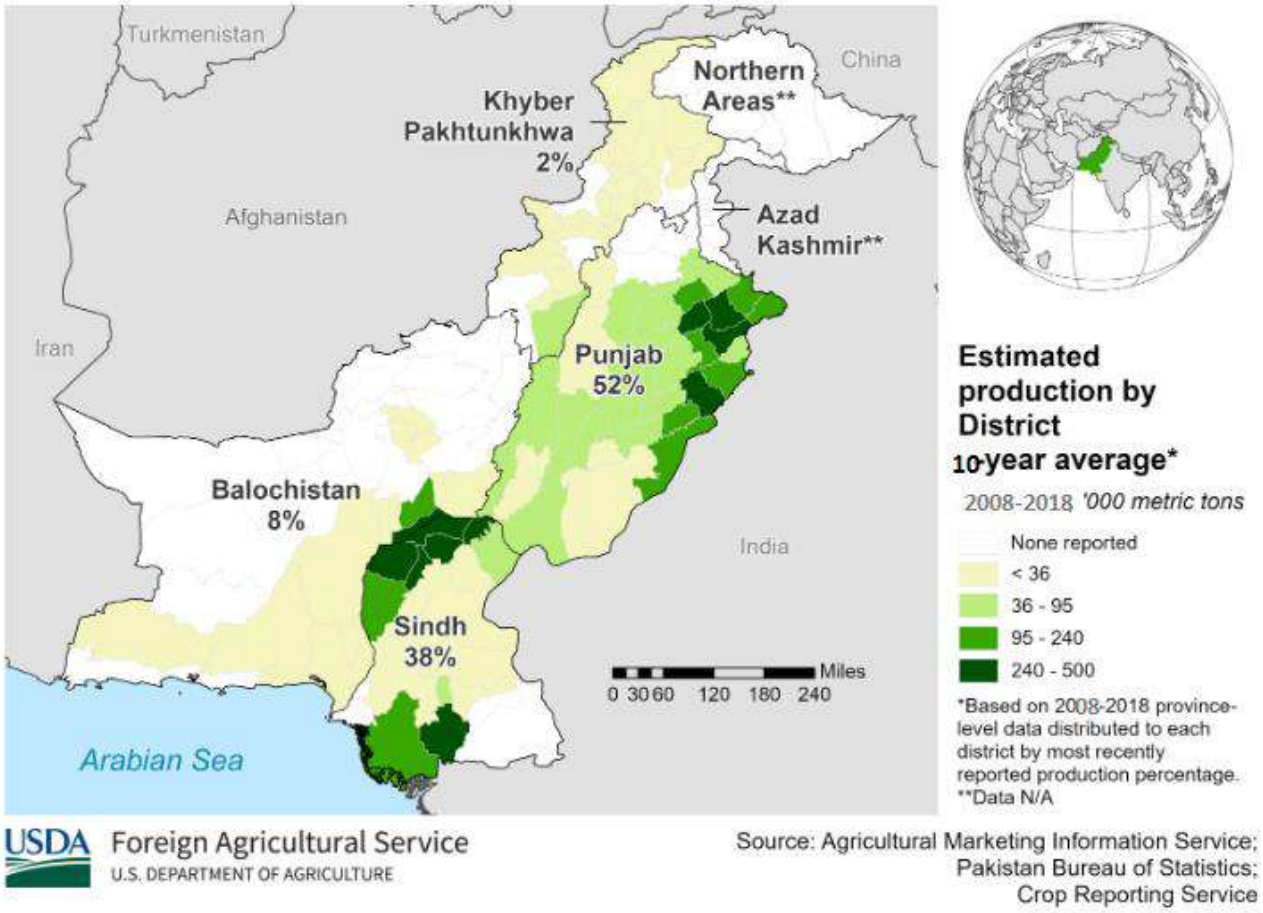


Source: Bauru of statistic Pakistan, 2018

As we can see from the graph 06, the total cultivated area of rice in Pakistan has increased from 2,797 thousand hectares in 2008 to 3,464 thousand hectares in 2018, which represents an increase of approximately 24%. The largest rice producing province in Pakistan is Punjab, followed by Sindh, Khyber Pakhtunkhwa, and Balochistan.

The increase in rice cultivation can be attributed to several factors, including the availability of better rice varieties, government policies that have encouraged farmers to expand rice cultivation, improved irrigation systems, and increased demand for rice both domestically and internationally. Additionally, the government has provided incentives to rice growers such as subsidized fertilizers, improved irrigation systems, and extension services to improve yields. The growth in rice cultivation has also been driven by an increase in the use of modern technology and agricultural practices.

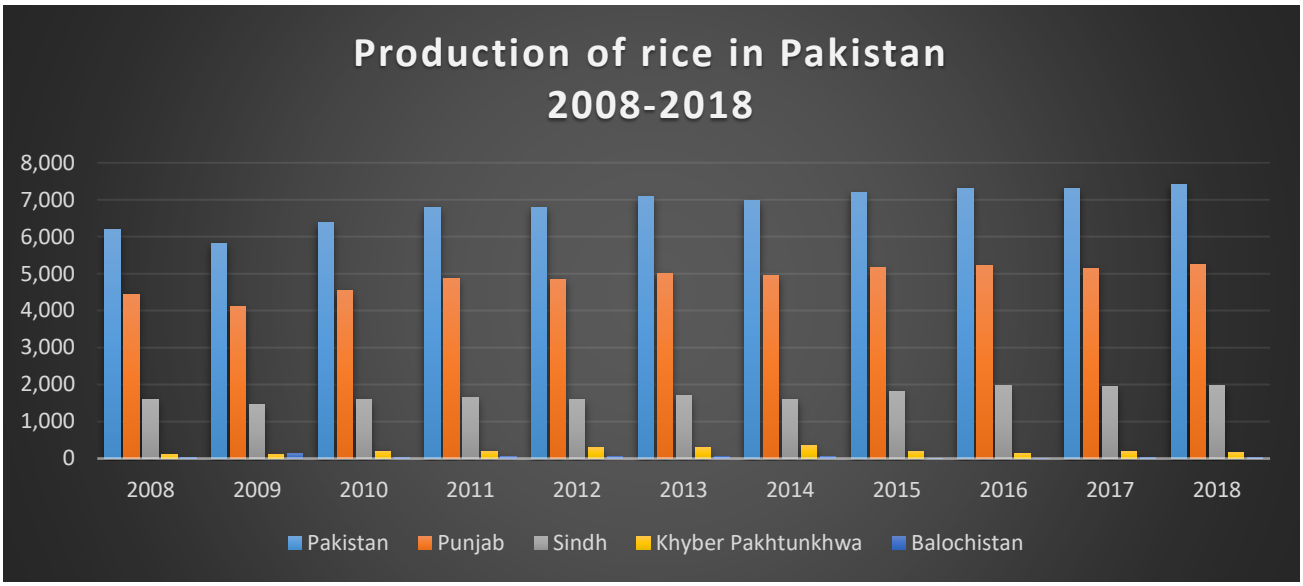
Figure: 07 Rice production Map of Pakistan



According to the Pakistan Bureau of Statistics and FAO, 2020 the total production of rice in Pakistan by provinces wise from 2008-2018 is as follows:

Graph: 07 Total Production of Rice Crop in Pakistan
2008-2018

(Thousand metric tons)



Source: Bauru of statistic Pakistan, 2018

As we can see from the Graph 07, the total production of rice in Pakistan has remained relatively stable, ranging from 5,824 thousand metric tons in 2009 to 7,405 thousand metric tons in 2018. The largest rice producing province in Pakistan is Punjab, followed by Sindh, Khyber Pakhtunkhwa, and Baluchistan. The production of rice increase during concern period due to favourable condition during cultivation and subsides on seeds, fertiliser etc from governments furthermore demand of rice in markets which provide good income facilities to former.

Additionally, the growth in rice cultivation has also been driven by an increase in the use of modern technology and agricultural practices. However, natural disasters such as floods and droughts have had negative impacts on rice production in some years. Overall, the stability in rice production can be seen as a positive development for the agricultural sector in Pakistan.

4.1.2.3 Maize crop

Maize, also known as corn, is an important crop in Pakistan, especially for animal feed and industrial use. It is cultivated in all provinces of the country, with Punjab being the largest producer. Maize is a source of carbohydrates, proteins, fiber, and vitamins, and it plays a significant role in the livestock industry. Maize cultivation in Pakistan involves several stages, including land preparation, seed selection, sowing, irrigation, and harvesting. The traditional method of broadcasting is still used in some areas, but modern methods such as drilling and planting in rows are becoming more popular. Water scarcity poses a significant challenge to maize cultivation in Pakistan. Maize crops heavily rely on sufficient irrigation to ensure optimal growth and development. However, the availability of water resources is limited in many regions of the country. To tackle this issue, farmers are being urged to adopt water-saving technologies like drip irrigation and sprinkler irrigation. These modern irrigation addressing the challenges of water scarcity and pest/disease management in maize cultivation is essential to ensure sustainable production and enhance crop yields in Pakistan. By adopting water-saving technologies and employing effective pest and disease management strategies, farmers can mitigate the negative effects of these challenges and improve the productivity and profitability of maize farming.techniques help in conserving water by delivering it directly to the plant roots, minimizing wastage. In addition to water scarcity, maize cultivation in Pakistan also faces the threat of pests and diseases. Common pests affecting maize include stem borers, armyworms, and various fungal diseases. These pests and diseases can cause significant damage to the maize crop, leading to reduced yields and economic losses for farmers. To combat this challenge, farmers are encouraged to plant disease-resistant varieties of maize that exhibit natural resistance to prevalent pests and diseases. Implementing Integrated Pest Management (IPM) techniques is also advocated, which involves a combination of preventive measures, biological control, and judicious use of pesticides to minimize the impact of pests and diseases on maize crops.

The Pakistani government has implemented various policies and programs to support maize cultivation and ensure food security. For example, the Maize Support Price Program provides support to farmers by guaranteeing a minimum price for their maize crops. The government also provides subsidies for inputs such as fertilizer and seeds to help farmers reduce their costs and increase their yields. In addition to its use as animal feed and industrial raw material, maize is also used for human consumption in the form of cornmeal, cornflour, and other products. The government and NGOs are promoting the use of maize in the production of fortified foods to address malnutrition and improve public health.

Furthermore Maize is one of the third most cultivated crops in the world with an area of more than 118 million hectares and an annual production of about 600 million metric tons. In Pakistan, maize is the fourth largest crop grown after wheat, cotton and rice. The area cultivated with maize in Pakistan is over one million hectares and the production of 3.5 million metric tons. KPK contributes 56%of the total area and 63% of the production, (DWAN, March 2007)

Figure: 08 Maize Crop Production Map of Pakistan

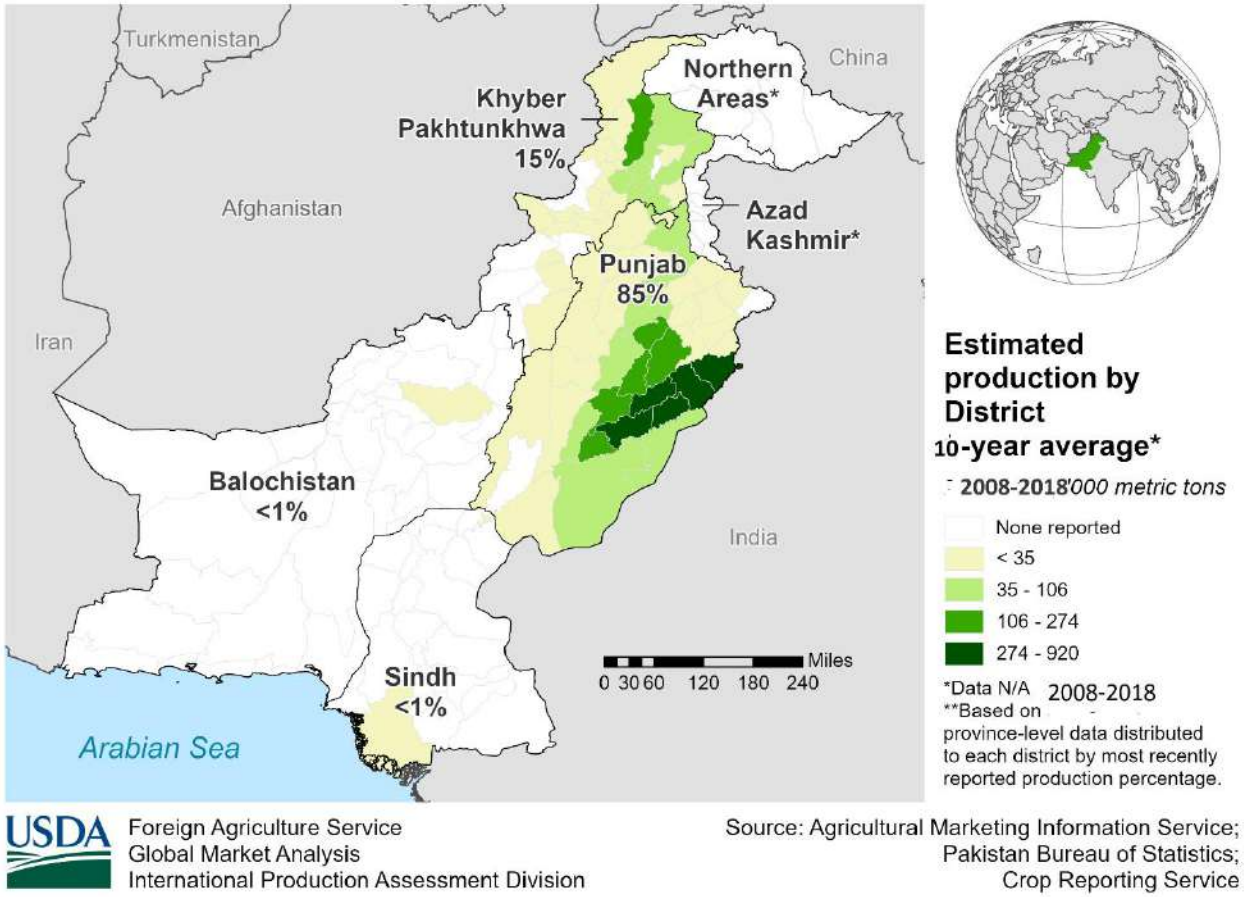
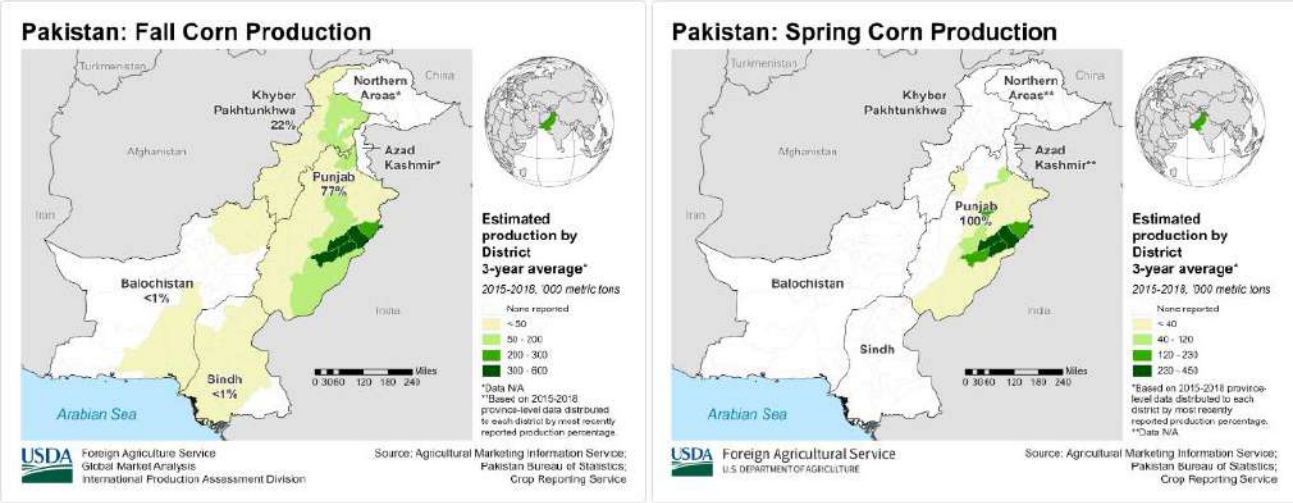


Figure: 09 Seasonal Maize Production map of Pakistan



During 2014-15 the areas decrease due to Shifting of area to other kharif crops and law & order situation in EX-FATA, because in this period Pak army start an operation against terrorism in EX-FATA. Another reason for change in production 2014-15 is due to corresponding decrease in area; however, yield of the crop has been improved due to use of high yielding varieties as well as favourable weather conditions. During 2015-16, the positive change is due to better economic return of the crop and the downward trend in production by 4.03% over the last year is due to torrential rain accompanied by flood in northern areas of the province.

During the year 2016-17, the weather condition was very favourable for cultivation along with good market prices of the commodities, which encouraged the people to cultivate more area of Maize crop. The production also increases due to the corresponding increase in area. Another reason was the sowing of high yielding varieties of maize crops and judicial use of fertilizers and pesticides.

During 2017-18 cultivated area increased due to better supply of irrigated water, and better economic returns of the crop due to proper irrigation facilities. But the production decreased due to dry spell, which was started from September, 17 and continue till the harvesting period of the crop, due to which the production level dropped drastically.

According to the Pakistan Bureau of Statistics, the total cultivated area of maize in Pakistan has increased overall during the period of 2008-2018. Here is a table showing the total cultivated area of maize for each year as seen from the below graph 08, the total cultivated area of maize crop in Pakistan increased from 595 thousand hectares in 2008-09 to 926 thousand hectares in 2017-18. The province of Punjab has the largest cultivated area of maize crop, followed by Sindh, Khyber Pakhtunkhwa, and

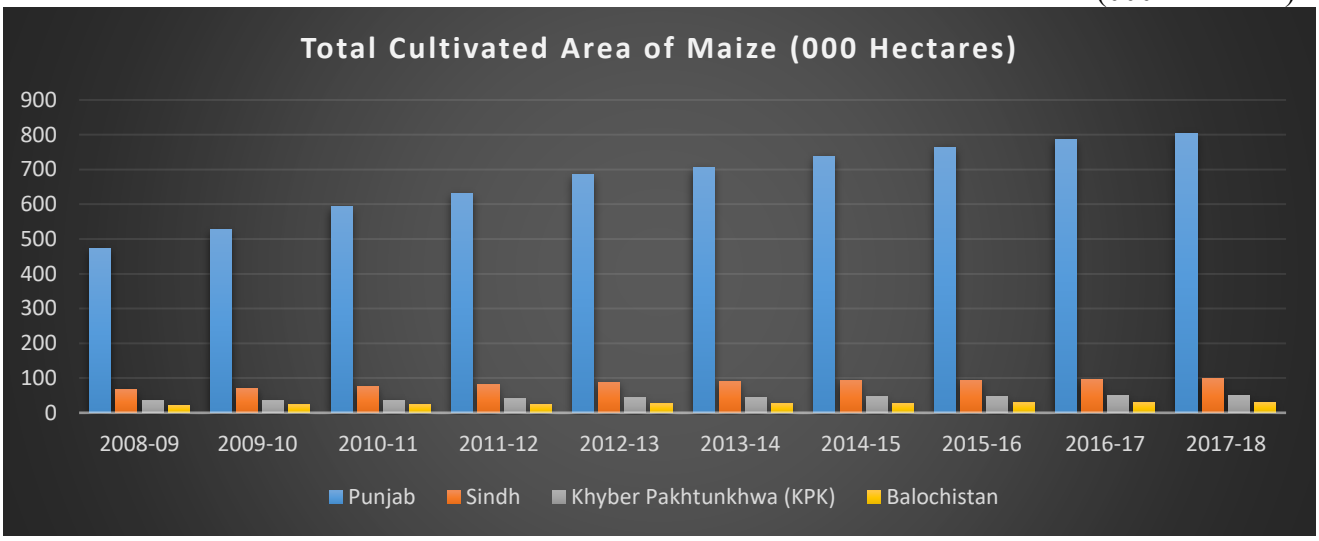
Balochistan. There is a steady increase in the cultivated area of maize crop in all provinces over the period, except for Sindh, which showed a slight decline in 2015-16. The increase in the cultivated area of maize crop can be attributed to several factors, including:

High Demand: The demand for maize as animal feed and for human consumption has increased over the years, which has led to an increase in the cultivated area of maize crop.

Government Support: The government has provided support to maize farmers through subsidies on inputs, such as fertilizers and seeds, and by offering good price support. This support has encouraged farmers to increase the cultivated area of maize crop as compare other crops.

Graph: 08 Total Cultivated Area of Maize Crop in Pakistan (000 Hectares)
2008-2018

(000' Hectares)



Source: Bauru of statistic Pakistan, 2018

According to the Pakistan Bureau of Statistics, 2021 the total production of maize in Pakistan by its provinces from 2008-2018 is as follows:

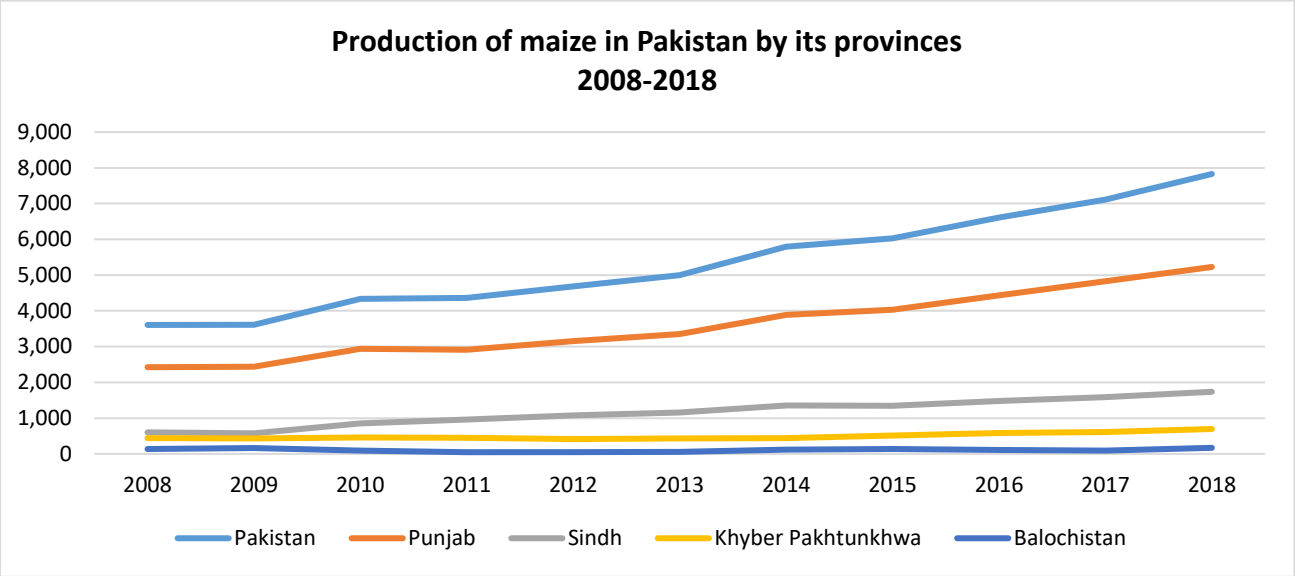
As we can see from the figure, the total production of maize in Pakistan has increased from 3,606 thousand metric tons in 2008 to 7,827 thousand metric tons in 2018, which represents a significant increase of approximately 100%. The largest maize producing province in Pakistan is Punjab, followed by Sindh, Khyber Pakhtunkhwa, and Balochistan.

The increase in maize production can be attributed to several factors, including improved seed varieties, better irrigation systems, Political stability and government policies that have encouraged farmers to diversify their crops, and increased demand for maize as a feedstock for the poultry and livestock industry

Graph: 09 Total Production of Maize Crop in Pakistan

2008-2018

'000' metric tons



Source: Bauru of statistic Pakistan, 2018

Irrigation infrastructure in Pakistan 2008-18 (Land area equipped for irrigation, %)

This indicator assesses the percentage of cultivated agricultural area which is equipped for irrigation. Pakistan irrigated percentage is 54.8 while world average is10.4, so it's very good for Food production. The percentage of land area equipped for irrigation in Pakistan has remained constant at 44.5% from 2008 to 2018. This indicates that there has not been a significant increase in the availability of irrigation facilities during this period.

The lack of irrigation infrastructure has been identified as a major challenge to the agricultural sector in Pakistan, particularly in light of climate change and water scarcity. Improved irrigation

infrastructure is crucial for increasing agricultural productivity, ensuring food security, and reducing poverty in rural areas.

Table: 04 Land area equipped for irrigation (% of total arable land)

YEARS	LAND AREA EQUIPPED FOR IRRIGATION (% OF TOTAL ARABLE LAND)
2008	44.5
2009	44.5
2010	44.5
2011	44.5
2012	44.5
2013	44.5
2014	44.5
2015	44.5
2016	44.5
2017	44.5
2018	44.5

(Source: World Bank)

To address this challenge, the government of Pakistan has launched various initiatives to improve irrigation infrastructure, including the construction of new dams, the rehabilitation of existing irrigation systems, and the adoption of modern irrigation technologies. These efforts will be essential for increasing the land area equipped for irrigation in the future and improving the overall productivity of the agricultural sector in Pakistan.

In Pakistan had a world best irrigation system opportunity which very helpful for crop production. But due to lack of government interest it's become worse which required upgradation. Total area of Pakistan under irrigation is 19.02 million hectares and 50% of labour force employed in this sector. Pakistan possess the world largest irrigation system called Indus Basin Irrigation System (IBIS) which consists of three major Dams (Tarbela, Mangla and Chashma) 19 barrages which are Ferozepur, Sulemanki, Islam, Balloki, Marala,Trimmu, Panjnad, Kalabagh, Sukkur, Kotri, Taunsa, Guddu, Chashma, Mailsi,Sidhnai, Rasul, Qadirabad and Marla.

According to Economic survey of Pakistan 2009, the availability of water as an important input for Kharif 2009 (for the crops such as rice, maize) has been 0.3% more than the normal supplies and 0.6%

more than last year's Kharif (sowing beginning in April and harvest between October and December). The water availability during Rabi season(beginning in October-December and ending in April-May) (for major crop such as wheat), is, however, estimated at 26.0 MAF, which is 28.6% less than the normal availability, and 4.4% more than last year's Rabi. Efficient irrigation system is a pre-requisite for higher agricultural production since it helps increase the crop intensity. Despite the existence of a good irrigation canal network in the Pakistan, it still suffers from wastage of a large amount of water in the irrigation process.

Position of rainfall during monsoon and winter season, in the monsoon season (July to September 2009), the average rainfall is 137.5 mm, while the real rainfall received was 101.8 mm which indicates a decrease of 26.0%. Likewise, during winter (January to March 2010), actual rainfall was 49.2 mm, while normal rainfall occurred during this period was 70.5 mm, which shows a decrease of 30.2% compared to normal rainfall.

According to Economic survey of Pakistan 2018-19, the total water availability for kharif crops in 2018 was recorded at 59.6 Million Acre Feet (MAF) and remained a deficit of 11.2% compared to the system's average utilization 67.1 MAF and 14.9% compared to Kharif 2017. During the 2018-19 rabbis' season availability was recorded at 24.8 MAF, up 2.5% from Rabbi 2017-18 and 31.9% less than the normal 36.4 MAF availability.

Table 05: Area irrigated by different Sources in Pakistan

Name	Area in million hectares
Canal	6.36
Tube-wells	3.79
Wells	0.3
Canal tube wells	7.60
Canal wells	0.25
Other sources	0.31
Total irrigation Area	18.63

Source: *Agricultural Statistics of Pakistan 2011-12*

According to data for the last 10 years, the area irrigated by the channels has increased by 6%, but due to the continuous increase in the number of pipe wells, its participation in irrigation is now stable and now 20% more irrigated area as compare to 10 years ago. About 77.4% area of Punjab irrigated which is equal to 8.58 million hectares, 2.8% of area in KPK is irrigated, which serves 0.34 million hectares area and 19.8% of area in Sindh is irrigated, which serves 5.38 million hectares and Baluchistan serve 0.33 million hectares.

Pakistan is overwhelmed by a devastating water shortage. The country's availability of water per capita is among the lowest in Asia, and it is lower than that of many African nations. At least 90%of Pakistan's dwindling water supplies are allocated to agriculture, but inefficient irrigation and insufficient drainage have produced flooding and soil salinity epidemics across the countryside. As a result, "vast expanses" of agricultural land do not produce successful crops, (MICHAEL KUGELMAN & ROBERT M. HATHAWAY, 2009).

4.1.3 Access to food

Accessibility of food in Pakistan has been a significant issue in the country, particularly between 2008 and 2018. While there have been improvements in certain areas, many factors have contributed to the continued challenges in accessing sufficient, safe, and nutritious food for a large percentage of the population. One of the primary factors affecting food accessibility in Pakistan has been poverty. According to the World Bank, approximately 24% of Pakistan's population lived below the poverty line in 2015, with higher rates of poverty in rural areas. Poverty has limited the ability of many households to purchase adequate food, with many families relying on low-cost, low-nutrition options to survive. In addition to poverty, other factors have impacted the accessibility of food in Pakistan, including limited access to markets and transportation. Many rural areas lack adequate infrastructure, making it difficult for farmers to transport their goods to markets or for consumers to access markets themselves. This has limited the availability and variety of food options in many areas, contributing to food insecurity. Furthermore, political instability may have a significant impact on the access to food in Pakistan. Which often leads to social and economic disruptions, which can affect various aspects of food access.

Here are some ways in which political instability can impact food access, 1) Disruption of supply chains: Political instability, including conflicts and civil unrest, can disrupt transportation networks, One notable example is the political protest and sit-in staged by a political party in 2014, which lasted

for several months. They blockades of roads that have disrupted supply chains and caused significant economic disruptions, resulting in difficulties in moving food from production areas to markets and consumers. This disruption can lead to food shortages and increased prices, making it harder for people to access an adequate and affordable food supply.2) Economic instability: Political instability can negatively impact the overall economy of a country. Uncertain political situations, changes in government regimes, and policy instability can lead to economic downturns, currency devaluation, inflation (in 2016 was 2.86% while in 2019 is 7.34% and 2023 is 32.23), and loss of investor confidence. These factors can affect people's purchasing power and make it challenging to afford nutritious food, especially for vulnerable populations.3) Weakened agricultural sector: Political instability can hinder the development and functioning of the agricultural sector. Investments in agriculture, infrastructure, and research and development may be neglected during periods of instability, leading to reduced agricultural productivity and food production. This can result in decreased food availability and increased dependence on food imports.4) inadequate governance and food policies: Political instability can lead to weak governance and a lack of effective policies and programs addressing food security. Instability may divert government attention and resources away from implementing measures to ensure food access for the population, including social safety nets, food subsidies, and nutritional programs. Additionally natural disasters such as floods, droughts, and earthquakes have also impacted food accessibility in Pakistan.

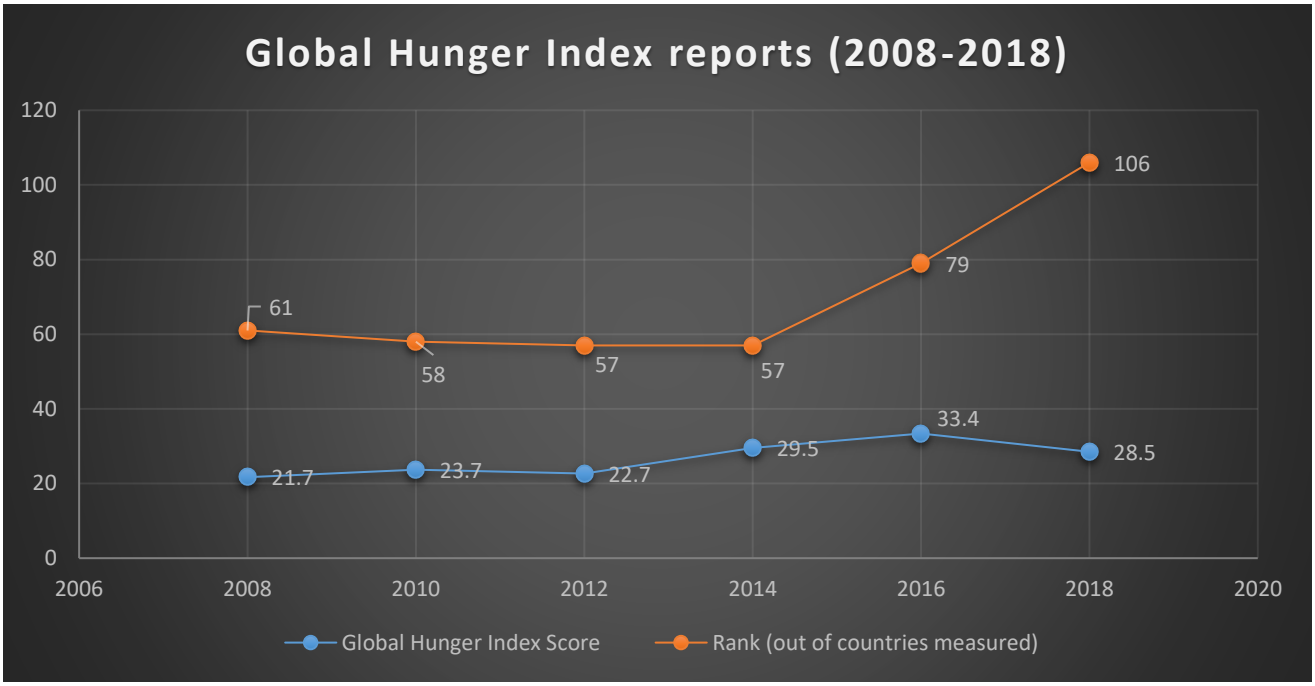
In recent years, the Pakistani government has taken steps to improve food accessibility in the country. These include the introduction of food security programs and initiatives to improve infrastructure and agricultural practices. However, significant challenges remain, particularly in rural areas where poverty and limited infrastructure continue to impact food accessibility. Another important indication is access to food and affordable access to the population. According to the World Food Program 2009, Pakistan's average household monthly income is Rs 14,127. However, it is different from rural to urban areas. Another important indicator is the Food Consumption Score (FCS) which is measured in calorie intake. According to World Food Program, 2009 report, 15.7% of the population is malnourished, compared to 58% of population live on country boarder line (ARSHAD, 2012).

According to Food and Agriculture Organization of the United Nations, 2011) that in 2008, the per capita food supply in Pakistan was 635 kilograms per year while in 2018, the per capita food supply in Pakistan had increased to 683 kilograms per year. These figures suggest that the average amount of food available for consumption in Pakistan has increased over the past decade. However, as noted in my previous answer, food loss has also increased over this period, which suggests that efforts are needed to ensure that food is not wasted and that it reaches those who need it most.

According to the Global Hunger Index (GHI) reports for 2008, 2010, 2012, 2014, 2016, and 2018, Pakistan's hunger and malnutrition situation has remained a serious concern throughout the period. The GHI is a tool designed to measure and track hunger globally, and it considers various factors such as undernourishment, child wasting, child stunting, and child mortality.

In 2008, Pakistan had a GHI score of 21.7, which ranked it 61st out of 88 countries. In 2018, Pakistan's GHI score improved slightly to 28.5, but it still ranked 106th out of 119 countries, indicating a high level of hunger and malnutrition in the country.

Figure: 10 Global Hunger Index Report 2008-2018

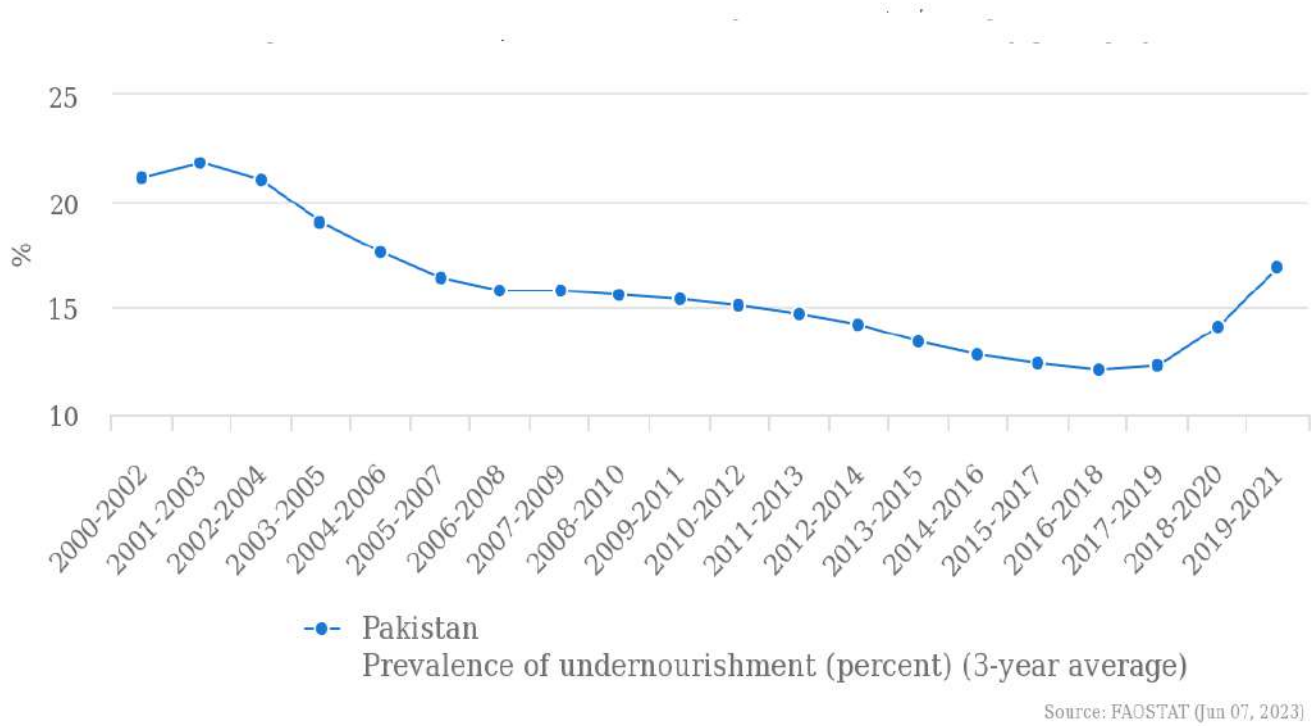


Source: world Bank, 2018

These figures indicate that food accessibility in Pakistan has remained a significant issue over the past decade, despite some efforts by the government to address the problem

Pakistan is among the list of countries where almost 65% of the world's population lives and is suffering from the problem of food insecurity. These countries include Congo, China, India, Indonesia, Pakistan, Ethiopia, and Bangladesh (FAO, 2014).The worst countries in terms of food insecurity and which are unable to take practical steps to overcome this issue include many Asian and African countries. Moreover, they are unable to meet the millennium development goals and hunger eradication objectives (FAO, 2014).The number of undernourished people in Pakistan is given in Figure 10.

Figure 11. Prevalence of undernourishment People 2008-21 (Percentage annual value)



Source: FAOSTAT, 2023

According to Figure 10, 11 and 12 the number of undernourished people in Pakistan has been increasing, potentially due to Population growth because the production of crops (see figure 05) is almost no changes but the population increasing very rapidly (see Figure 15). Political instability effect on food prices which effecting food access. It is observed that after 2017, when political tensions began to rise, there has been a noticeable upward trend in the prevalence of undernourishment. This period coincides with a decrease in food access and rise in inflation (see figure 14), further exacerbating the issue. The unstable political environment can disrupt policy implementation, affect investment in the agricultural sector, and create an uncertain business environment for farmers and food producers. These factors can contribute to a decline in crop production, which in turn can lead to food insecurity and an increase in the number of undernourished people.

Figure: 12 Prevalence of severe food insecurity in the total population (percentage annual value)

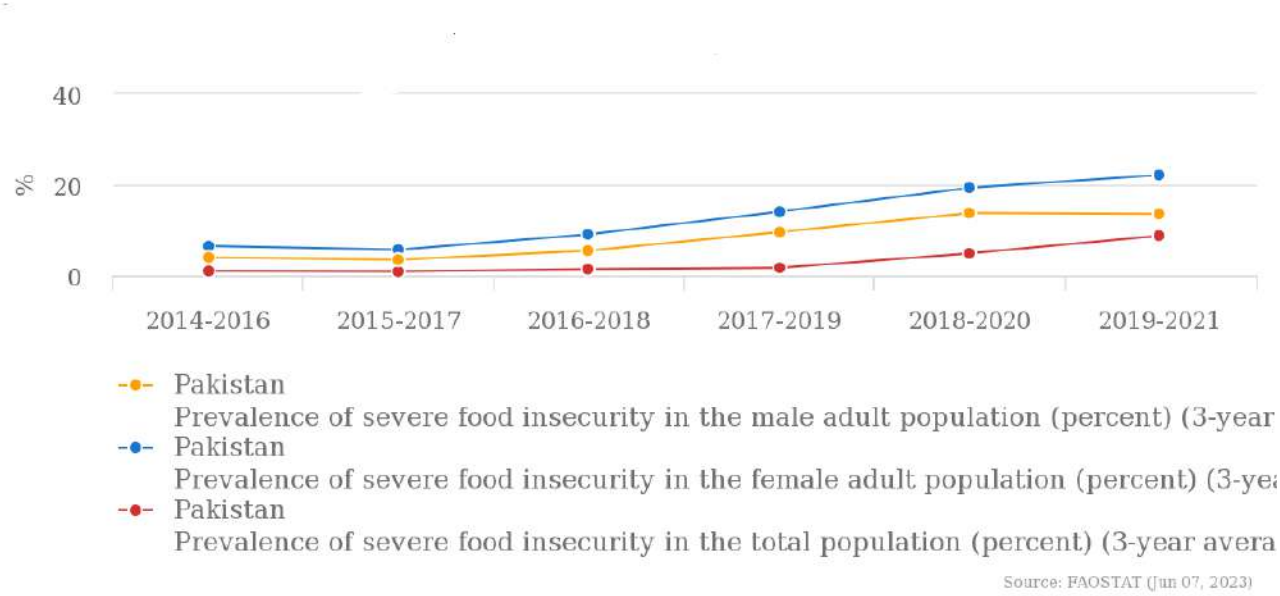
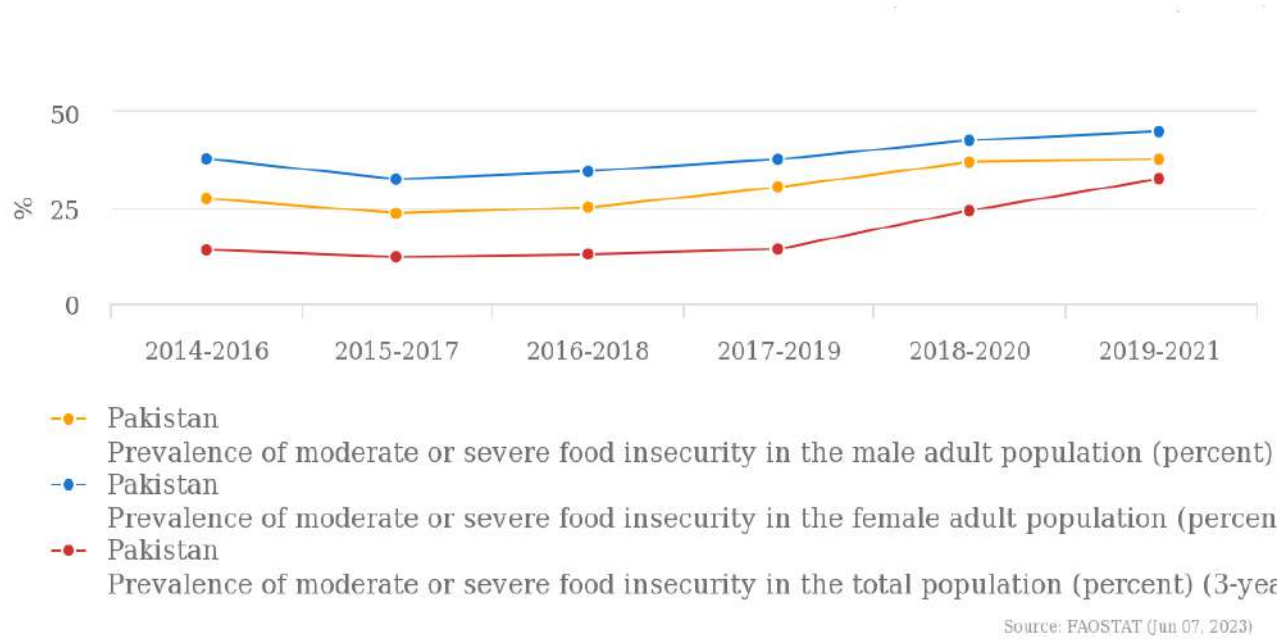


Figure: 13 Prevalence of moderate and severe food insecurity (percentage annual value)



Regularity of food offer was analysed on the basis of food availability in the market, household expenditure on food and household food stock. Household surveys as well as market assessments have

shown that the availability of food in the market is generally not an issue. However, when it comes to economic access to food, that is, purchasing power, limitations arise. Most of the families reported that they do not have enough resources to buy enough food in the markets. Spending on food, especially as a proportion of total household monthly expenditure, is an important determinant of household food security, reflecting a household's level of affordability. Poor and food insecure households spend most of their total spending on food, leaving little for other needs such as health and education; The richest and most food secure families spend a smaller part of their monthly expenses on food. An analysis of household survey data revealed that on an average around 28% of households are spending more than 60% of their monthly expenditure on food; a strong indicator of vulnerability related to economic access. This means that they have little disposable income for other basic needs and are more vulnerable to any increase in food prices. In addition, about 34%of the households are spending 40 to 60% of their total monthly expenditure on food. Overall, households living in Urban area communities were spending a higher proportion of their monthly expenditures on food, compared to those living in rural area because in rural area maximum people attached to agriculture activity. The availability of food stocks at the household level is an important indicator of household access to food. Overall, more than 50% of households were found to have a food supply barely a week or less to meet the household's food needs. Only 25% of families had enough food stock for more than two weeks. This is an important indicator of the vulnerability of families with regard to access to food. The Food Consumption Score (FSC) is one of the most commonly used indicators that measures household food security to achieve overall food consumption. The FCS measures dietary diversity (types of foods consumed), frequency of meals (number of days used by each group) and the relative nutrition of each food group **(**Food and Agriculture Organization of the United Nations).Based on the one-week recall of food consumed by respondents at home, and using the default threshold, households are divided into one of three groups, namely, "acceptable" food consumption, "limit" food consumption, and "limit" food consumption. "Poor" food. From the analysis of the food consumption data from the household survey, it was found that overall, 41.6% of the households had acceptable food consumption, and 8.6% were reported under poor consumption category, while the majority, 51.8%, showed borderline consumption levels. The situation inside urban area was slightly better, with 44.7% of the households showing acceptable consumption, compared to 39.6% in rural area. The fact that more than half of rural households are in the borderline food consumption group requires further analysis. Those in the borderline group have the potential to improve by moving to the acceptable consumption group with some dietary improvements, including improvements in dietary diversity. On the other hand, those in the borderline group can easily slide into the poor consumption group with any deterioration in their condition, which can be caused by exposure to shocks (eg, sudden

increase in food prices) or the cessation of humanitarian assistance (87% of surveyed households benefited from food assistance).

Pakistan has made progress in reducing hunger and improving food security over the past decade. According to the Food and Agriculture Organization (FAO), the prevalence of undernourishment in the country decreased from 23.9% in 2000-2002 to 9.5% in 2016-2018. However, food insecurity remains a challenge in Pakistan, particularly in rural areas. Climate change, water scarcity, and soil degradation are major threats to agricultural productivity, and many small-scale farmers lack access to resources and support to improve their yields. Food insecurity is often linked to poverty and inequality, and many vulnerable populations in Pakistan continue to face challenges in accessing adequate and nutritious food. The government of Pakistan has launched various initiatives to address these challenges, including social protection programs and efforts to improve the productivity and resilience of small-scale farmers. Overall, while progress has been made in improving food security in Pakistan, ongoing efforts will be necessary to ensure that all populations in the country have access to adequate and nutritious food on a regular basis.

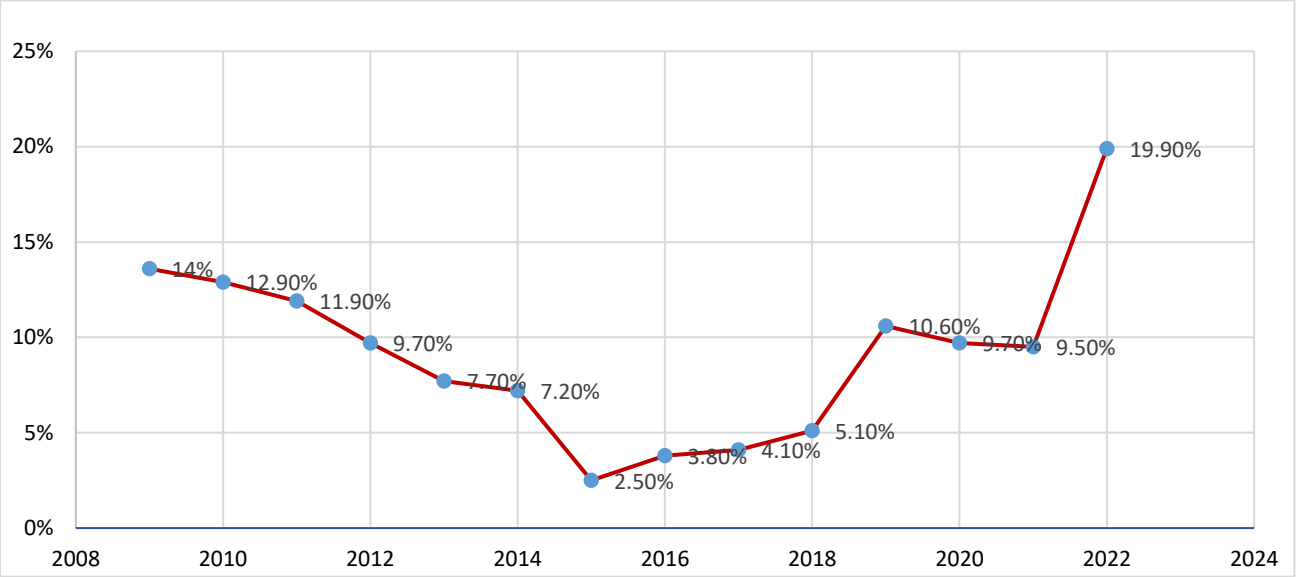
Inflation has been one of the major factors impacting food access and food security in Pakistan between 2008 and 2018. Inflation is defined as the rate at which the general level of prices for goods and services is rising, and it can have a significant impact on the ability of households to purchase sufficient and nutritious food. According to the Pakistan Bureau of Statistics, inflation in Pakistan has been on the rise in recent years. Between 2008 and 2018, the average annual inflation rate increased from 14.4% to 3.9%, with fluctuations over the years. The impact of inflation on food prices has been significant, with food prices increasing by more than 50% between 2008 and 2018.

The impact of inflation on food access and food security has been particularly severe for vulnerable populations, such as those living in poverty and in rural areas. As food prices increase, households may need to reduce the amount and quality of food they consume, which can lead to malnutrition and food insecurity. Furthermore, households may also be forced to reduce spending on other essential items, such as healthcare and education, in order to afford food. The government of Pakistan has taken steps to mitigate the impact of inflation on food security, including subsidies for basic food items and other support programs for vulnerable populations. However, the effectiveness of these programs in reducing food insecurity remains limited due to the scale of the problem and challenges in implementation.

Overall, the impact of inflation on food access and food security in Pakistan between 2008 and 2018 has been significant, particularly for vulnerable populations. It is important for the government and

other stakeholders to continue to prioritize efforts to address inflation and improve food security in the country.

Figure 14: Pakistan food inflation (2008-2022)



Source: worldbank.org

Furthermore Agriculture share of Government Expenditure, divided by the Agriculture value added share of GDP. A measure of government spending on agricultural research and development, included in the Agricultural Guidance Index, a surrogate indicator for assessing public investment in agriculture. The Agricultural Guidance Index (AGI) is a measure used by the United Nations Sustainable Development Goals to capture investments in the agricultural sector, including 'rural infrastructure, agricultural research and services, technology development and plant and animal gene banks to improve agricultural productivity production ". According to the United Nations, an agricultural orientation index (AOI) greater than 1 reflects a higher orientation in the agricultural sector, which receives a larger share of government spending in relation to its contribution to economic added value. An AOI value less than 1 reflects a lower agricultural focus, while an AOI value equal to 1 reflects government neutrality in the agricultural sector. The AOI value of 2009 for Pakistan is 0.19 which is decreasing to 0.09 in 2018.

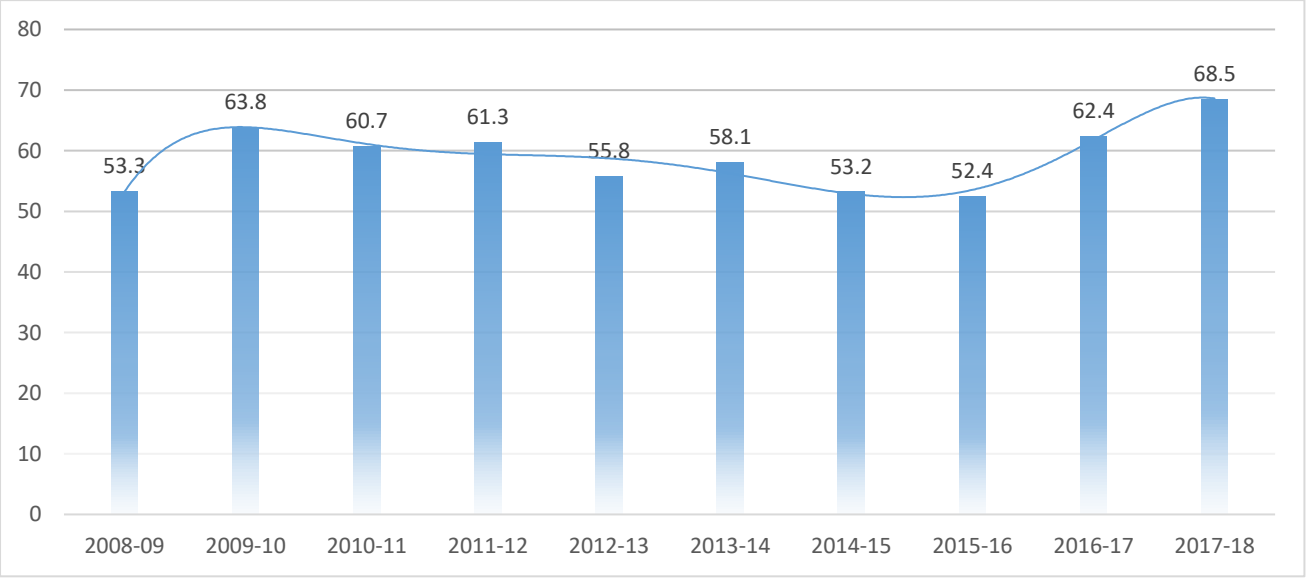
Table: 06 Approximate Prices of wheat, Rice and Maize (PKR per kilogram) 2008-2022

Years	Wheat Price per Kg (PKR)	Maize Price per Kg (PKR)	Rice Price per Kg (PKR)
2008	12-15	10-12	40-50
2009	15-18	12-15	50-60
2010	18-22	15-18	60-70
2011	22-26	18-22	70-80
2012	26-30	22-26	80-90
2013	30-34	26-30	90-100
2014	34-38	30-34	100-110
2015	38-42	34-38	110-120
2016	42-46	38-42	120-130
2017	46-50	42-46	130-140
2018	50-55	46-50	140-150
2019	55-60	50-55	150-160
2020	60-65	55-60	160-170
2021	65-70	60-65	170-180
2022	70-75	65-70	180-190

Source: Economic Survey of Pakistan, 2018

Graph: 10 Public Expenditure on Agriculture in Pakistan

(In Billion PKR 2008-2018)



Source: Economic Survey of Pakistan

The impact of public expenditure on agriculture on food security in Pakistan has been significant. The agricultural sector is the main source of food for the population, and investments in this sector can help to improve food production and availability.

In recent years, the government of Pakistan has focused on improving food security through various initiatives, including the provision of subsidies and other forms of support to farmers, investment in irrigation infrastructure, and research and development programs to improve agricultural productivity.

These efforts have had a positive impact on food security in the country, as evidenced by the reduction in the percentage of the population that is undernourished. According to the Food and Agriculture Organization (FAO), the prevalence of undernourishment in Pakistan decreased from 18.2% in 2008-2010 to 9.5% in 2016-2018. However, challenges remain in ensuring food security for all in Pakistan. Climate change, water scarcity, and soil degradation are all major threats to the agricultural sector and must be addressed through sustained investments in agriculture and other related sectors.

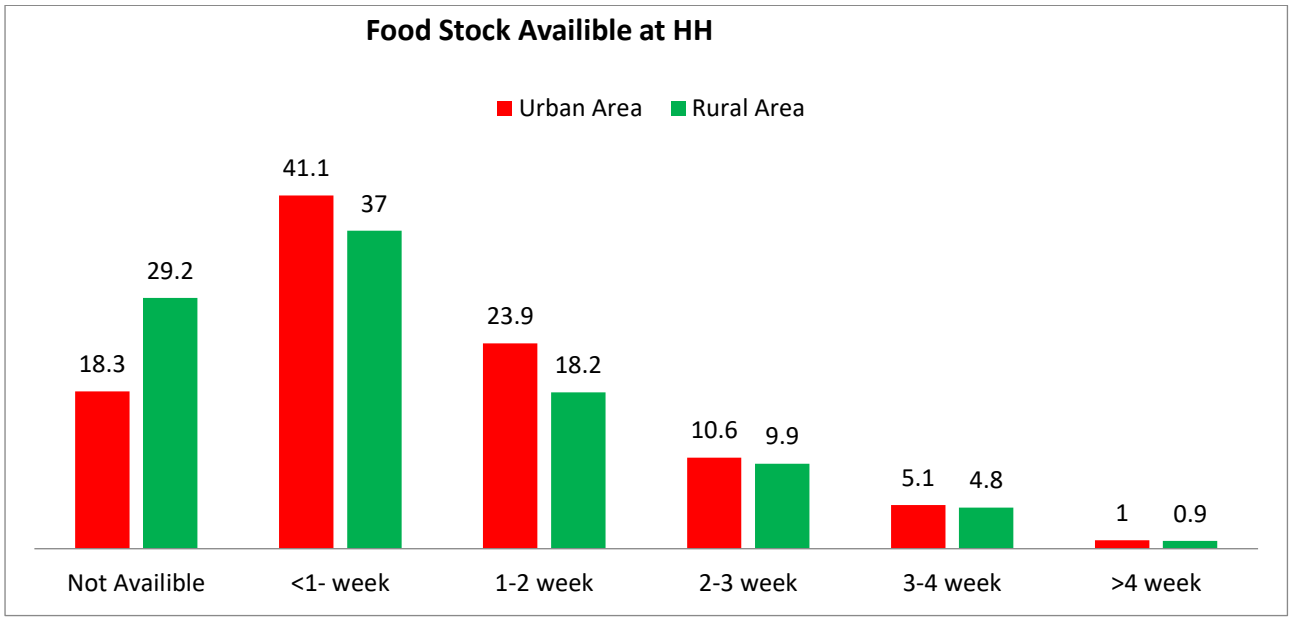
Food consumption patterns in Pakistan: According to the Household Integrated Economic Survey (HIES) conducted by the Pakistan Bureau of Statistics, food consumption patterns in Pakistan have undergone some changes between 2008 and 2018. However, the survey does not group food consumption into specific categories or groups.

The HIES data shows that there has been a shift towards more consumption of processed and packaged foods in urban areas, while rural areas continue to rely more on traditional staples such as wheat, rice, and maize. The survey also indicates that the average calorie intake per person has increased over the past decade, but there are still significant disparities between different regions and income groups.

In general, the consumption of meat, dairy, and vegetables has increased in urban areas, while rural areas continue to rely more heavily on cereal crops. However, it is important to note that food consumption patterns in Pakistan are influenced by a variety of factors, including cultural and religious practices, as well as economic and environmental conditions.

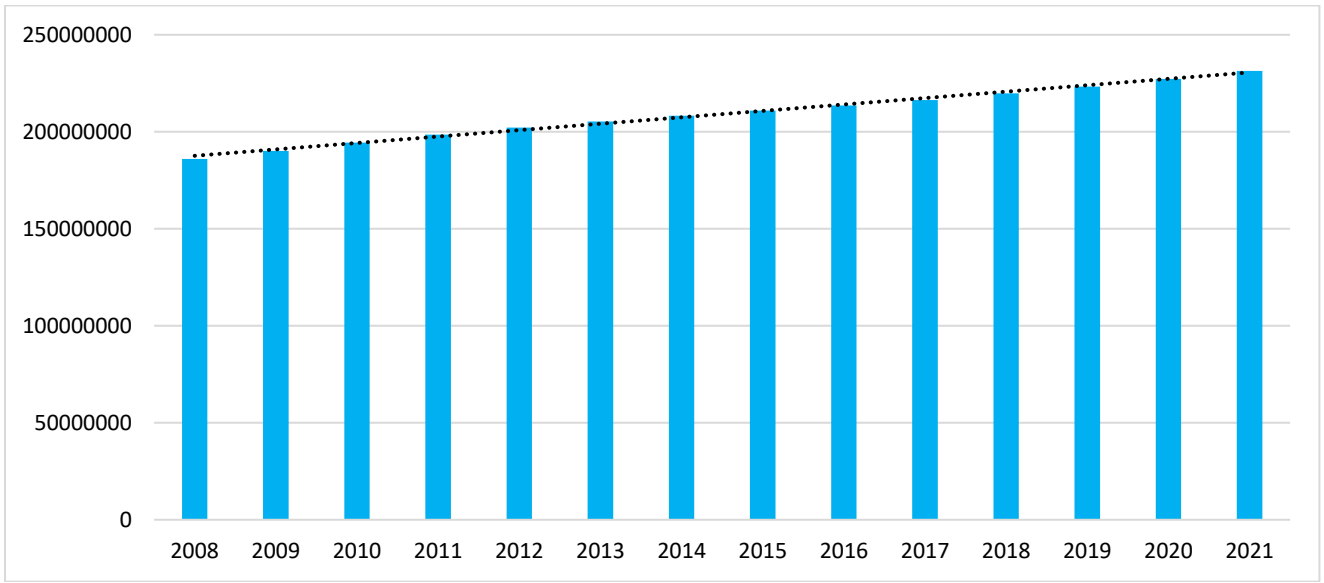
The availability of food stocks at the household level is an important indicator of household access to food. Overall, Average more than 39.05% of households was found to have food stocks that were barely enough for a week or less to meet the household's food needs. Only in Rural area 23.9%and in urban area 18.2% of the households had enough food stock for more than two weeks. This is an important indicator of the vulnerability of families with respect to access to food.

Graph11: Food stock available at household



Source: Household servey, 2018

Figure: 15 Annual Papulation Growth of Pakistan 2008-2021



Source: world Bank, 2021

4.1.4 Partial Conclusion

Pakistan has faced a significant problem of food instability since its independence in 1947. The hypothesis states that "Political instability would affect crop production and consequently food access." However, during the research, it was found that crop production has generally increased, with occasional decreases due to factors such as climate change, floods, and droughts. Nevertheless, the study revealed that while crop production remained relatively stable, the demand for food increased. According to Figure 05, there were no clear indications of changes in crop production from 2008 to 2018 that could be attributed to ongoing conflicts or political instability. However, Figure 14 highlights the impact of political instability on increasing food prices, leading to inflation and making it challenging for people to access food. Additionally, Figure 15 shows a significant growth in the population ratio during this period, while crop production remained stagnant. This fact suggests that both increasing population and rising inflation had a more determinant impact on food access in Pakistan than political instability. Due to the corresponding increase in demand.

4.2 Second hypothesis: social aspects

This hypothesis was based on four variables: education, family structure, income and food accessibility.

4.2.1 Education in Pakistan

Education is an important factor that affects income and food insecurity in Pakistan. Over the period of 2008-2018, the country has made progress in improving access to education, particularly for girls. However, there are still significant challenges that need to be addressed. Shown at the Research that education can have a significant impact on income and food security in Pakistan. As individuals obtain higher levels of education, they are more likely to secure better paying jobs, which in turn improves their ability to access food and reduce food insecurity. Additionally, education also improves people's knowledge of nutrition and healthy eating habits, which can further reduce food insecurity and improve overall health outcomes. However, despite the importance of education, Pakistan continues to face significant challenges in this area. The country has one of the highest rates of out-of-school children in the world, particularly among girls. This limits their opportunities for education and can perpetuate cycles of poverty and food insecurity. Furthermore, even when education is available, many children struggle to attend school due to issues such as poverty, inadequate infrastructure, and lack of transportation. These issues are particularly prevalent in rural areas of the country, where poverty and food insecurity are also more pronounced. In order to address the challenges related to education and its impact on income and food insecurity, the government of Pakistan needs to prioritize education as a key policy area. This can involve increasing funding for education, improving access to schools and infrastructure, and addressing issues related to poverty and inequality that can prevent children from accessing education. By doing so, the country can ensure that more of its citizens have the knowledge, skills, and opportunities needed to improve their income and reduce food insecurity over the long term.

Furthermore Education is an important factor that can impact food access and food security in Pakistan. Education can increase people's income levels, improve their employment opportunities, and enable them to make informed decisions about their food choices. According to data from the Pakistan Social and Living Standards Measurement (PSLM) survey, there is a positive correlation between education levels and food security. The survey found that households headed by individuals

with higher levels of education were less likely to be food insecure than households headed by individuals with lower levels of education. In addition to income and employment opportunities, education can also improve people's knowledge about nutrition and health. Education programs that promote healthy eating habits and proper food storage and preparation can help to improve food security and reduce the prevalence of malnutrition in Pakistan. However, access to education remains a challenge in Pakistan, particularly in rural areas where poverty rates are high and schools may be inaccessible or of poor quality. In addition, the cost of education can be a barrier for many families, particularly for girls, who may be expected to stay home to help with household chores or get married at a young age. Overall, improving access to education in Pakistan can have a positive impact on food security by improving income levels, employment opportunities, and knowledge about nutrition and health. However, addressing the barriers to education access in the country is a complex challenge that requires sustained investment and commitment from the government and other stakeholders. Pakistan also belongs to the countries with the worst literacy rate in the world, which is the main reason for its slow agricultural growth and slow economy. The literacy rate in Pakistan is 113 out of a total of 120 countries. This is a major problem for the country and its economic development as well as a shameful and frightening situation. Without attention and reform in the education sector, Pakistan is doomed to face major problems. Education plays an important role in assuring individuals access to public information, especially in health, nutrition and hygiene. This study considers the influence of education on food security in low-income household of Pakistan. According to (FAO 2005, p. 14) “lack of education undermines productivity, employability and earning capacity, leading directly to poverty and hunger”. Mainly the rural household education level is low as compared to urban areas and due to this factor people of rural areas is more affected by food insecurity. Pakistan promises to increase its literacy rate from 58% to 70% in 58 years, giving access to school for approximately 22.8 million students, improving the education system for all ages with modern technology. Female: 52.6% and Male: 72.5% (ECONOMIC SURVEY PAK, 2018-19).

According to the Pakistan Labour Force Survey 2009-10, the overall literacy rate (age 10 years and above) is 57.7% (69.5% male and 45.2% female) However, in 2017-18, literacy rate trends shows 62.3 %,(71.6% male and 49.6% female).

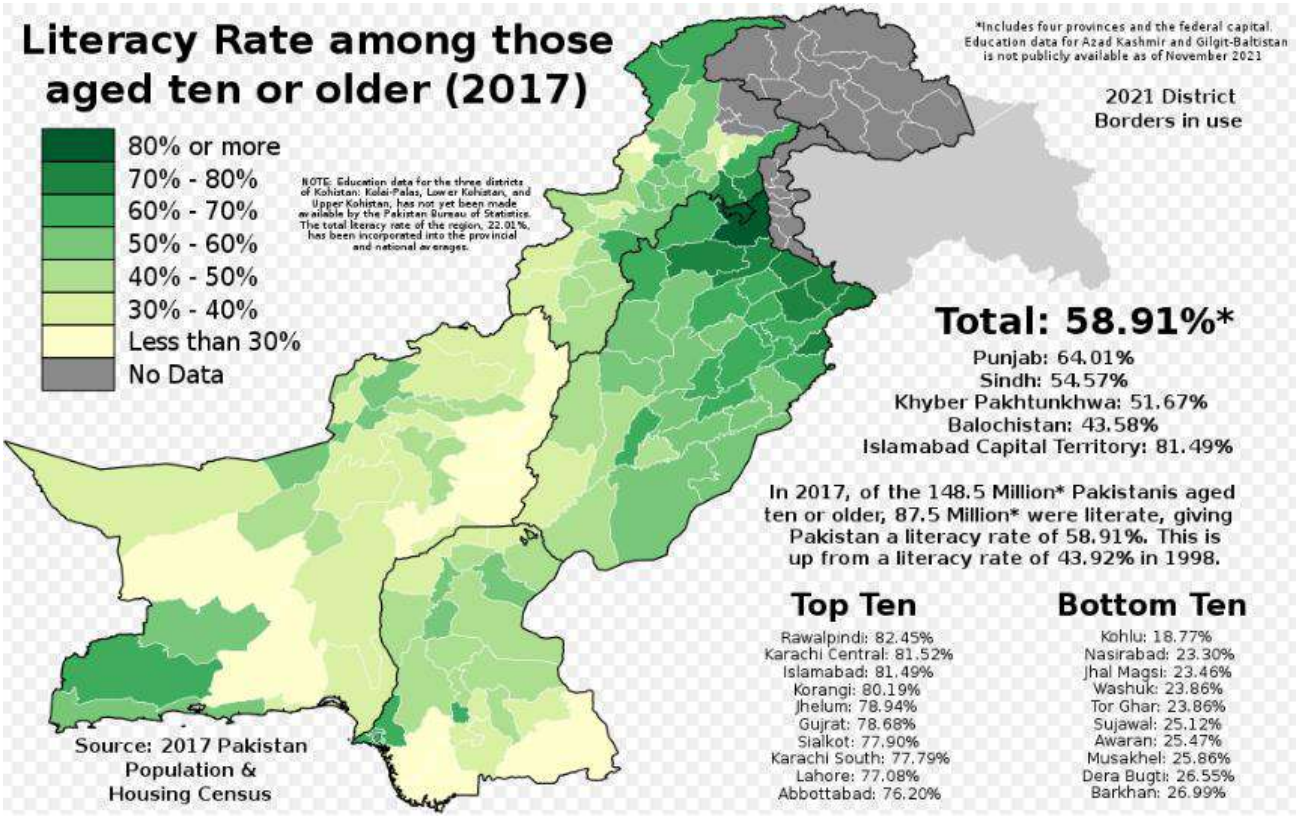
Table 07: Education/ Literacy Rate of Pakistan (10 Years and Above) (%Age)

Province/Area	2014-15			2017-18			
	Male	**Female**	**Total**	**Male**	**Female**	**Total**	**Average Income(US$)**
Pakistan	**71.6**	**49.6**	**60.7**	**72.5**	**51.8**	**62.3**	**1413**
Rural	65.3	38.4	51.9	66.3	40.5	53.3	210
Urban	82.4	69.3	76.0	82.2	70.6	76.6	1213
Punjab	**70.4**	**53.6**	**61.9**	**72.2**	**57.4**	**64.7**	
Rural	65.0	44.6	54.6	66.5	47.8	56.9	
Urban	80.1	71.0	75.6	80.9	73.3	77.2	
Sindh	**73.9**	**50.7**	**63.0**	**72.8**	**49.9**	**62.2**	
Rural	61.2	26.2	45.0	60.1	25.7	44.1	
Urban	86.0	72.7	79.6	84.3	71.7	78.4	
Khyber Pakhtunkhwa	**72.1**	**36.8**	**54.1**	**73.3**	**38.5**	**55.3**	
Rural	70.2	33.1	51.3	71.6	35.3	52.7	
Urban	80.0	52.4	66.3	80.4	53.3	66.8	
Balochistan	**72.0**	**33.0**	**54.3**	**73.0**	**33.5**	**55.5**	
Rural	67.7	27.7	49.5	68.9	26.8	50.5	
Urban	83.4	47.1	67.0	84.2	50.1	68.5	

Source: Labour Force Survey, 2017-18, Pakistan Bureau of Statistics

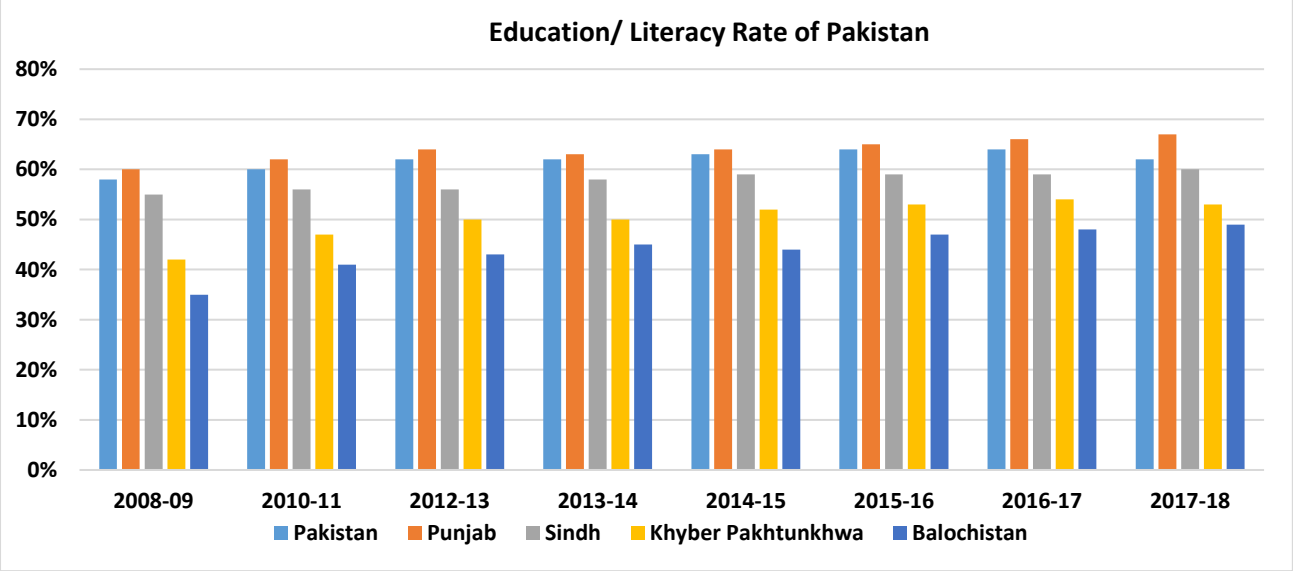
According to the Pakistan Social and Living Standards Measurement (PSLM) survey which conducted by the Pakistan Bureau of Statistics, the literacy rates for individuals aged 10 years and above in Pakistan by province for the years 2008-2018 are as follows figure 15:

Figure: 16 Literacy Map of Pakistan



Source: Pakistan Population & Housing Census Department

Graph: 12 Literacy Rates for Individuals Aged 10 Years and Above In Pakistan by Province Wise (2008- 2018)



It's important to note that the literacy rates in each province have increased over the past decade, but there are still significant disparities between provinces and genders. The overall literacy rate for

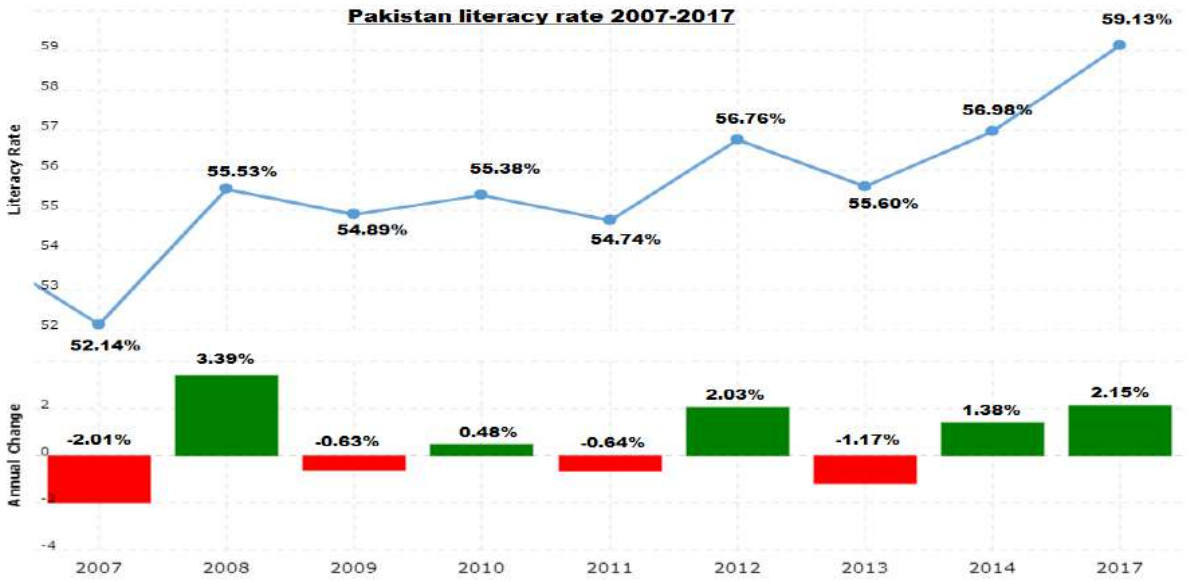
Pakistan for individuals aged 10 years and above increased from 58% in 2008-09 to 62% in 2017-18. But there have been fluctuations in the rate over the past decade. The rate increased steadily from 2008-09 to 2014-15, but then remained relatively stable over the next few years. The reasons for the fluctuations in literacy rates may be due to various factors such as changes in education policies, economic conditions, and other social factors.

Table 08: Percentage distribution of employed people (ten years and above) by age, gender and level of education, 2018-19

LEVEL OF EDUCATION	Total (10 Years and Above)	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65 and above
1	2	3	4	5	6	7	8	9	10	11	12	13	14
ILLITERATE													
Male	26.85	0.65	2.21	2.19	2.56	2.29	2.60	2.40	2.95	2.40	2.51	1.72	2.37
Female	10.33	0.51	0.76	0.77	1.37	0.89	1.30	1.43	0.90	1.12	0.68	0.30	0.30
LITERATE													
Male	58.24	1.08	7.77	9.99	8.24	7.23	6.45	5.19	4.60	3.07	2.15	1.39	1.08
Female	4.57	0.09	0.42	1.04	0.90	0.60	0.59	0.41	0.30	0.14	0.04	0.01	0.02
LESS THAN PRIMARY													
Male	4.51	0.45	0.64	0.83	0.47	0.41	0.32	0.34	0.22	0.24	0.18	0.22	0.17
Female	0.22	0.05	0.04	0.05	0.00	0.04	0.02	0.02	0.01	0.00	0.00	0.00	0.00
PRIMARY													
Male	13.31	0.51	2.45	1.95	1.60	1.42	1.54	1.30	0.94	0.65	0.47	0.25	0.21
Female	0.85	0.04	0.20	0.15	0.19	0.07	0.05	0.06	0.04	0.04	0.00	0.00	0.01
Middle													
Male	10.13	0.10	1.87	1.76	1.23	1.30	1.08	0.78	0.65	0.56	0.43	0.20	0.18
Female	0.48	0.00	0.11	0.07	0.08	0.10	0.05	0.05	0.03	0.00	0.00	0.00	0.00
Matric (SSC)													
Male	14.09	0.02	1.86	2.43	1.78	1.78	1.66	1.41	1.32	0.76	0.45	0.30	0.34
Female	0.70	0.00	0.03	0.18	0.11	0.09	0.15	0.07	0.04	0.01	0.01	0.01	0.00
INTERMEDIATE(HSSC)													
Male	7.20	0.00	0.65	1.94	1.21	0.98	0.85	0.40	0.4	0.35	0.18	0.12	0.07
Female	0.39	0.00	0.01	0.10	0.07	0.04	0.05	0.04	0.05	0.2	0.00	0.00	0.00
B.A/B.Sc/MBBS/DEGREEENG./COMPUTER/AGRI.													
Male	4.13	0.00	0.06	0.69	0.89	0.54	0.50	0.40	0.46	0.21	0.20	0.13	0.03
Female	1.00	0.00	0.03	0.32	0.21	0.10	0.15	0.07	0.05	0.04	0.03	0.00	0.00
M.A/M.Sc													
Male	3.35	0.00	0.00	0.20	0.84	0.63	0.43	0.43	0.40	0.13	0.19	0.07	0.03
Female	0.74	0.00	0.00	0.14	0.21	0.15	0.15	0.10	0.05	0.00	0.00	0.00	0.01
MPhil/PhD													
Male	0.15	0.00	0.00	0.01	0.03	0.06	0.01	0.02	0.00	0.00	0.00	0.02	0.00
Female	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	000	0.00
OTHERS													
Male	0.25	0.00	0.02	0.03	0.04	0.09	0.03	0.01	0.01	0.00	0.00	0.02	0.00
Female	0.01	0.00	0.00	0.00	0.00	0.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Economic Survey of Pakistan (2018)

Graph 13: Pakistan Literacy Rate 2007-17



Source: World Bank (http://datatopics.worldbank.org/world-development-indicators)

Before 2008 literacy late shown decline because that time in Pakistan no democracy there was a dictatorship so no attention shown to education. Then in 2008 a new election held and once again a political party named Pakistan People party cone as a new democratic Government so the invest more money on education and the result is 3.39% increase shown. So in this government 5 years tenure a little bet increase in education some time decline due to terrorism and environmental hazard in this area. Now Pakistan is secure for education as compared to last 5 years so the education level high and after the Pakistan People Party government in 2013 When election held so Muslim league Nawaz Political Party take over the Government and they work more on Education and economy so the Pakistan literacy rate for 2017 was 59.13%, a 2.15% increase from 2014.

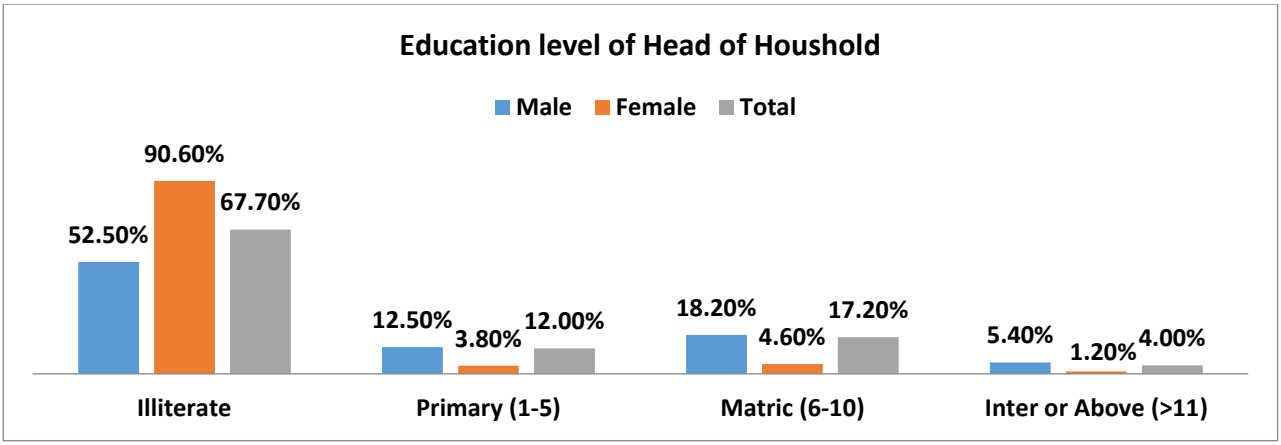
From questioner survey considering the educational level of household heads, two-thirds of respondent household heads were illiterate. The illiteracy rate in female heads of households was significantly higher than in males (90% vs. 52%, respectively). Overall, 5% (male and female combined) had an education level of more than 10 years (matriculation), while only 1.2% of household heads had an education above 10th grade.

Table 09: Education Levels of Household Heads

	Illiterate	Primary (1-5)	Matric (6-10)	Inter or Above (>11)
Male	52.50%	12.50%	18.20%	5.40%
Female	90.60%	3.80%	4.60%	1.20%
Total	67.70%	12.00%	17.20%	4.00%

Source: household survey, 2018

Graph 14: Education Level of Household Heads



Source: household survey, 2018

Table: 10 Education level effects on annual income in Pakistan (PKR, US$)

Schooling Years	Education	Average annual Income (PKR)	Percentage difference	Average annual Income (US$)
0	Illiterate	1-30,000		1-104
1-5	Primary	30,000-45,000	50%	104-156
6-10	Matric	45,000-63,000	40%	156-209
>11	Inter or Above	63,000- >	90%	209->

Source: household survey, 2018

According to Table 10, the annual income is considerably lower for illiterate individuals compared to those with primary education and higher levels of education. The table shows that the maximum income for individuals with primary education is 45,000 rupees per year which 50% more then illitrate, while for those with a matriculation level of education (equivalent to completing 10 years of schooling), the maximum income is 63,000 rupees per year, 40% more than Primary level. While for individuals with an intermediate level of education or above, the income is reported to be 63,000 rupees or higher, his income 90% more than Matric level of education.

It is important to note that these figures are approximate and may vary depending on various factors such as occupation, industry, experience, and geographic location within Pakistan. The table suggests a positive correlation between educational attainment and income levels, indicating that individuals with higher levels of education tend to earn more. And then income consequently effects on food access. In the rural context, education affects food security through access to information on optimal agricultural production, nutrition and sanitation; increased efficiency, hence increased productivity and better decision-making as well as the pride of education (DE MURO &BURCHI, 2007), (BASHIR &SCHILIZZI 2013). Education has played a key role in home food security. In particular, women's education is most important for food preparation and serving (ASGHAR & MUHAMMAD, 2013), the outcome of this study indicated that education has a positive impact on food security status. The more the educated household head is the more food secure the household will be and vice versa. Impact of Education on Food security in Pakistan 2008-18: Education can have significant impacts on food security in Pakistan, both at the national level and in each province. Here are some ways in which education can impact food security:

Agricultural productivity: Education can improve agricultural productivity by providing farmers with knowledge and skills in modern farming techniques, soil management, crop rotation, and pest control. This can increase crop yields and improve food security.

Income generation: Education can help individuals acquire skills and knowledge that can lead to better job opportunities and higher income levels. This can improve households' ability to purchase food and reduce the risk of food insecurity.

Nutrition knowledge: Education can increase individuals' knowledge about nutrition and healthy food choices, which can improve the overall health and well-being of the population and reduce the risk of malnutrition.

Government policies and programs: Education can empower individuals to demand better government policies and programs related to food security, such as subsidies for small farmers, food assistance programs, and nutrition education programs.

However, it's important to note that the impacts of education on food security may vary by province due to differences in access to education, economic conditions, and other factors. Therefore, it's essential to develop province-specific strategies that prioritize education and its impacts on food security.

Furthermore education has a significant impact on food insecurity in Pakistan between 2008 and 2018. The evidence suggests that education can improve access to food by increasing household income and empowering individuals to make informed decisions about their food choices. Education also plays an important role in promoting health and nutrition awareness, which can help to improve the nutritional status of individuals and communities.

However, despite the importance of education, there are still significant challenges in improving access to education in Pakistan. Issues such as poverty, gender inequality, and lack of infrastructure continue to limit access to education, particularly for marginalized groups. Addressing these challenges will be critical in ensuring that education can play a more effective role in improving food security in Pakistan.

Overall, investments in education, particularly for women and girls, are crucial for addressing food insecurity in Pakistan. Education can help to break the cycle of poverty and improve access to food and other basic needs. The government, civil society, and the private sector should continue to work together to ensure that education is accessible to all and that it is used as a tool to promote food security and sustainable development in the country.

4.2.2 Family structure

Family structure can have an impact on food insecurity in Pakistan. The family structure in Pakistan is predominantly based on an extended family system. The extended family typically includes multiple generations living together under one roof or in close proximity, often in a joint family setup. This family structure emphasizes strong bonds among relatives and the importance of collective decision-making and support. In the traditional Pakistani family, the head of the household holds significant authority and plays a central role in decision-making processes. This person is usually the eldest male, who is responsible for providing financial support and maintaining the overall well-being of the family. Respect for elders and maintaining family honour are integral values within the Pakistani family structure. Extended family members often live together to share resources, responsibilities, and emotional support. This arrangement allows for a sense of security and cohesion within the family unit. One way in which family structure can impact food insecurity is through household income. In Pakistan, households with larger family sizes may have more mouths to feed, which can lead to increased expenses and financial strain. This can be particularly challenging for households with low incomes, as they may struggle to afford enough food to meet the needs of everyone in the household. In addition, families with a single income earner or where one or more members are unemployed may be more vulnerable to food insecurity, as they may have limited financial resources to purchase food. Access to social support is another way in which family structure can impact food insecurity in Pakistan. Social support refers to the assistance provided by family members, friends, and other members of the community. Families with larger support networks may be better able to cope with food insecurity, as they can rely on others for assistance in times of need. On the other hand, families with limited support networks may be more vulnerable to food insecurity, as they may not have anyone to turn to for help. Finally, family structure can impact food insecurity through the distribution of household resources. In some households, resources may be distributed unevenly, with certain family members receiving more resources than others. This can be particularly challenging for vulnerable family members, such as children or elderly individuals, who may require more resources to meet their nutritional needs. Overall, family structure can have a significant impact on food insecurity in Pakistan. Families with larger family sizes, limited access to social support, and uneven distribution of household resources may be particularly vulnerable to food insecurity. It is important for policymakers and other stakeholders to take into account the impact of family structure on food insecurity when developing policies and programs to address this issue. Furthermore, in Pakistan, males are generally considered the primary earners in households. According to Islamic tradition, when both the husband and wife are employed, the woman's income is considered her own right and

does not necessarily have to be spent on household expenses. In traditional households, it is believed to be the sole responsibility of the man to provide for his wife, children, and any extended family members, whether they reside with them or elsewhere. This will depend on the economic status of the family, but generally across Pakistan, men are expected to earn for the family while women look after the home and general well-being of the family. Some families still practice the seclusion of women (*purdah*) by which females can only leave the domestic realm when veiled and accompanied by a man. This custom varies significantly between ethnicities and social backgrounds. For example, Pashtoon and Balochis in the highlands generally observe purdah while urban middle-class Pakistanis appears to have stopped doing so. However, women generally still occupy a subordinate status in Pakistan's society. This is somewhat due to the fact that they carry greater expectations of social compliance and are sometimes seen as particularly vulnerable targets that need to be protected. Culturally, women are seen as being more liable to bring dishonour on a family. Ultimately, a woman's independence and freedom to make choices for herself (i.e. to work, get an education, marry, divorce, bear children or not) varies significantly depending on the attitude of her husband or closest male relative. For example, traditional rural homes in areas of Khyber Pakhtunkhwa, Sindh, Baluchistan and Punjab are generally more conservative regarding women's public participation and social roles. While stratification between the genders is visible, the increase in education is playing a large role in changing of this trend. The prevalence of education in urban areas has led to an increase in the female employment ratio, resulting in more frequent cases of both husband and wife jointly heading the household. Many women are among the country's leading politicians and journalists. Gender inequality makes it difficult to purchase food "from farm to plat" in the food production chain. Women are generally responsible for selecting and preparing food and for the care and nutrition of children. Women are the key to their families' food security (ASKING et al. 1995). As women are becoming increasingly powerful, Pakistan ranks 143rd in the world gender ranking. In 2012, average household size of study area was 7.22 persons living and eating together in a single household but about one-quarter (26 percent) of all households have four or fewer members and average numbers of earners per household was 1.63. In every household there is having many children which affect food security.

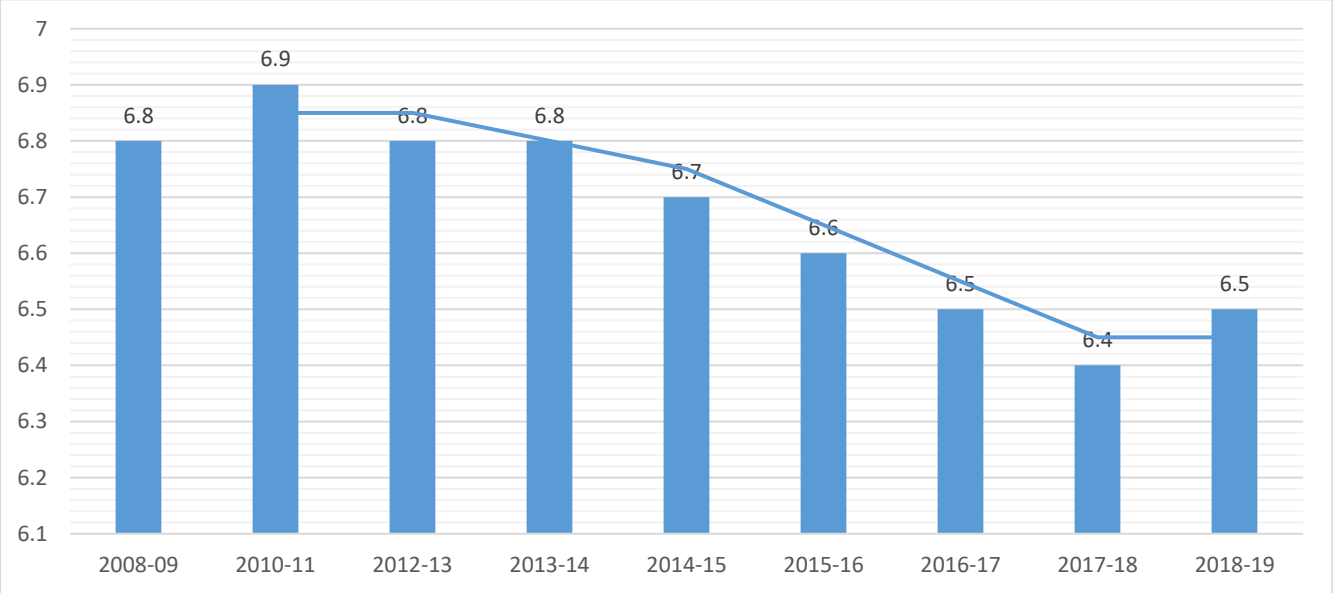
According to the Pakistan Social and Living Standards Measurement (PSLM) survey, the average household size in Pakistan from 2008 to 2018 is as follows:

Table 11: average household structure, average number of earner and affected HH from FS in Pakistan

Years	Average Households structure	Average Number of earners per HH	Affected HH from Food Insecurity
2008-09	6.8	4.5	43.9%
2010-11	6.9	4.0	45.6%
2012-13	6.8	3.8	47.7%
2013-14	6.8	3.6	52.6%
2014-15	6.7	3.3	55.5%
2015-16	6.6	3.0	57.7%
2016-17	6.5	2.5	58.7%
2017-18	6.4	2.7	56.6%
2018-19	6.5	2.5	59.70%

Source: PSLM & Field survey, 2018

Graph 15: Average household structure in Pakistan

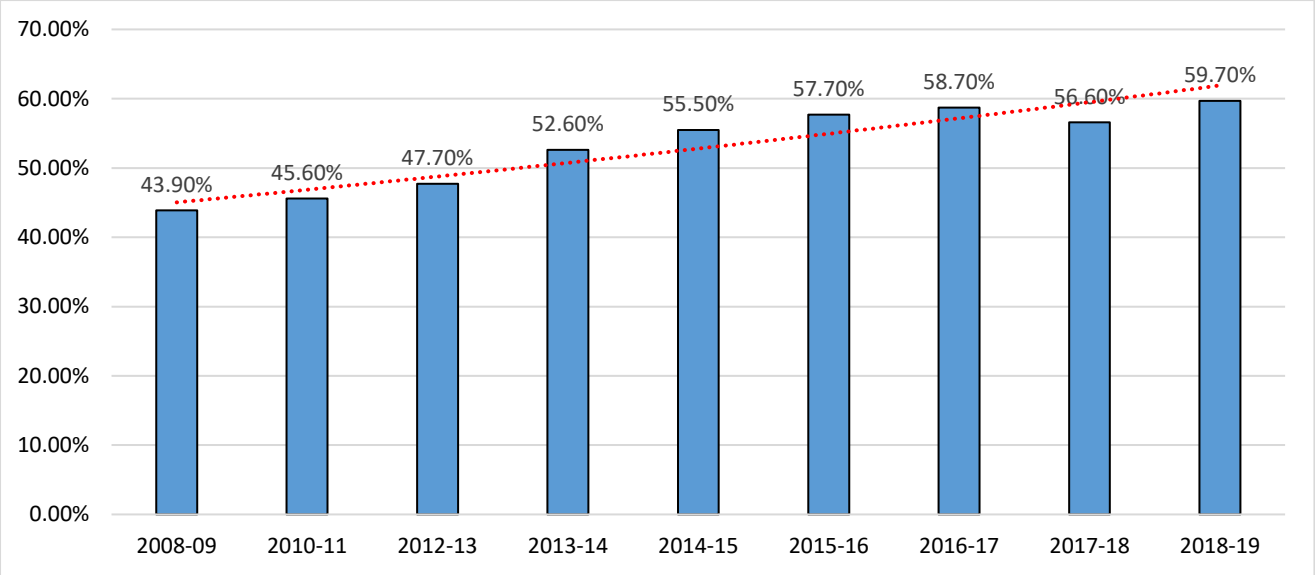


Source: PSLM, 2018

The average household structure has been gradually declining over the past decade, from 6.8 in 2008-09 to 6.4 in 2017-18. This trend may be due to various factors, such as changes in family planning policies, increased access to education and employment opportunities for women, and changing social norms. It's important to note that household structure may vary by province and rural/urban areas, and

larger households may face greater challenges in achieving food security due to the higher demand for food and limited resources.

Graph 16: Average Households suffering from food insecurity in Pakistan from 2008 to 2018



Source: Pakistan Social and Living Standards Measurement (PSLM) survey

These figures indicate that the prevalence of food insecurity has been increasing over the past decade, due to family structure which effect income as you see in table 11, those family more affected by food insecurity who have less number of earner. Although it remains a significant challenge in Pakistan. The increase in food insecurity is due to various factors such as political instability, low income resulting from low education levels and large family structure, which contribute to unfavourable economic conditions and reduced food access. However, it is important to note that food insecurity continues to be a pressing issue, particularly in certain provinces and rural areas. Further efforts are needed to address this problem. In Pakistan, the dependency ratio refers to the number of dependents (such as children and elderly family members) in relation to the number of working-age adults in a household. High dependency ratios can strain household resources and impact food security.

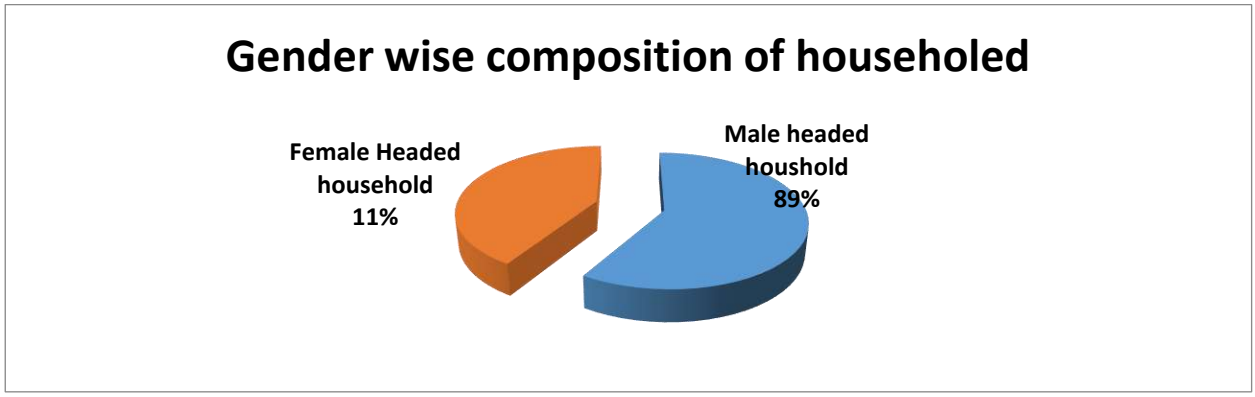
Family support networks can impact food security by providing assistance during times of hardship, such as droughts or economic downturns. These networks can help household's access food and other resources when needed. Cultural practices, such as sharing food or celebrating festivals that involve large meals, can also impact food security. In some cases, these practices can contribute to food waste or put a strain on household resources.

4.2.2.1 Gender and age composition role in food insecurity

In many households in Pakistan, women are responsible for preparing meals and managing household resources. This can limit women's access to education and employment opportunities, which can impact household income and food security.

After analysis of the food security situation in the study area, the most vulnerable populations are female-headed households, many of whom are widows, and are considered extremely vulnerable as they have little capacity to respond to or deal with sudden. In the study area Female headed household ratio is 11% while 89% male headed household.

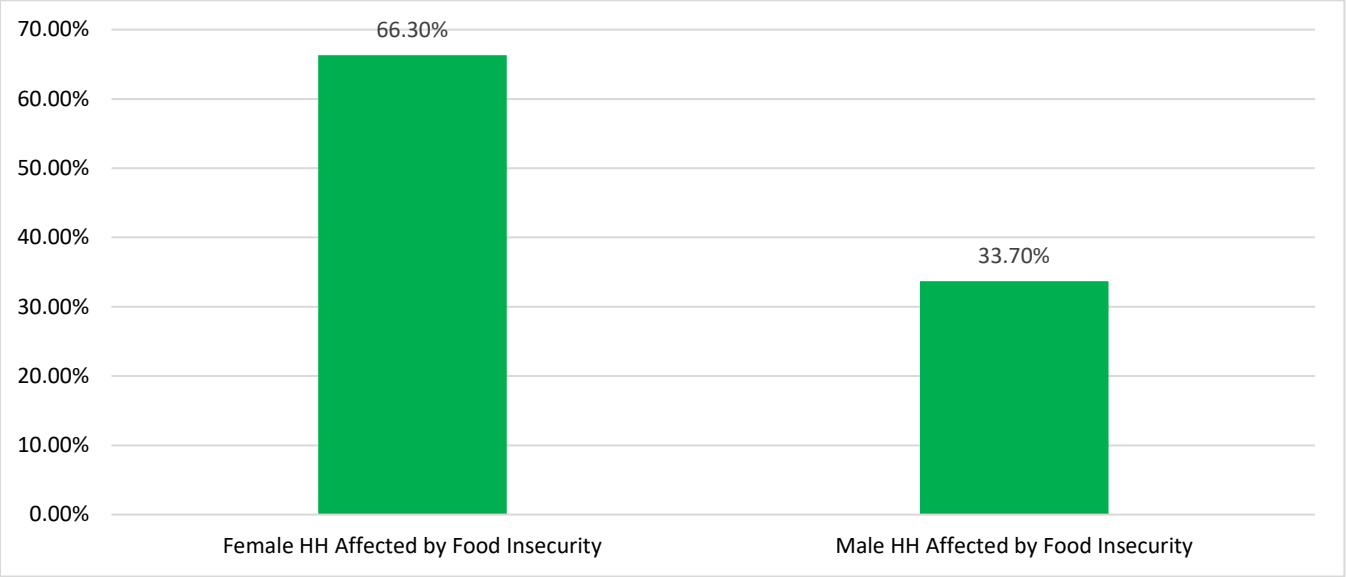
Graph 17: Gender composition of families in PAKISTAN.



Source: household survey,2018

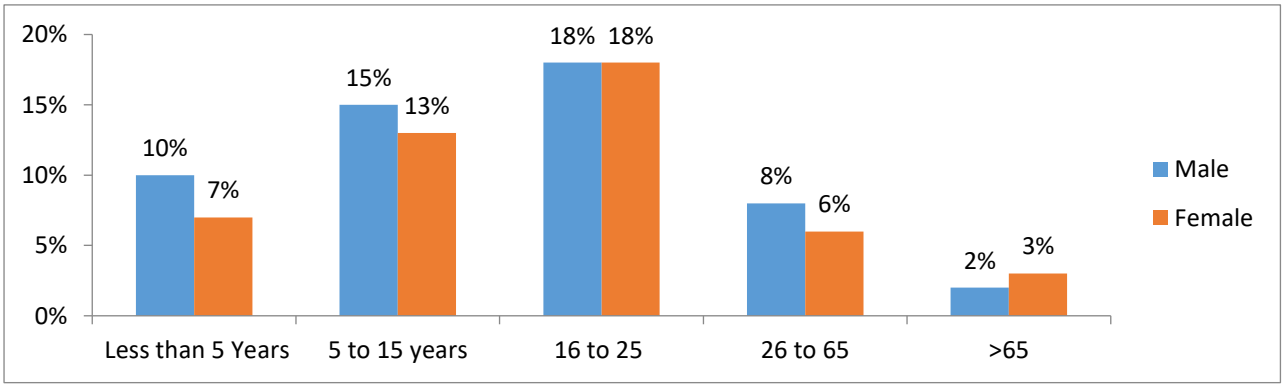
In PAKISTAN (the study area), 50% of the females heading households were widowed and the remaining were married but their spouses/husband were living away from house due to different reasons majority living in foreign country for the purposes of job.

Figure 17: Gender composition of families affected by Food insecurity in PAKISTAN.



Source: household survey, 2018

Graph 18: Gender and age composition of Household Head



Source: household survey, 2018

Female literacy plays a fundamental role in achieving adequate utilisation as women's knowledge and awareness directly impacts household knowledge of a balanced diet and food quality. But unfortunately, female literacy across the country is scarce to the point where a significant majority of women are either poorly educated, or have no education at all. In rural areas, literacy rate drops even further, a serious condition for net food security as 67% of the country's population currently resides in rural areas. Based on figure 17, the female HH household more affected then Male HH household it's because the Female education ratio is less than male and also job ratio (see table 14). According to the SDPI's 2009 Food Security Report, women in rural areas can only collect fuel wood and water for up to five hours a day and prepare food for four hours. In both rural and most urban middle-class

households, women inevitably face a double burden of salaried and unpaid household work, which can adversely affect their own health. To eliminate food insecurity, the government must demonstrate not only political commitment to the three pillars of food availability, access and usage through comprehensive national and provincial policies, but also focus on the broader transformation of traditional gender roles, which can only be achieved through structural policies changes in the socio-cultural paradigm. Ensuring decent wages, improving access to education, strengthening access to credit and social security networks and guaranteeing the right to property and access to land are simple but effective tools to alleviate food insecurity and reduce hunger. As a society, we need to seriously consider the elimination of gender, economic, social and cultural discrimination; if we are to guarantee food security and interchangeable economic development and inclusive growth, which are permanent features of our country. In Pakistan, women didn't have access to the same education, healthcare, or information technology as men. Women are often responsible for the primary care-takers of children and house, but they are inadequately informed about how to care for their own health and the nutrition needs of their children; they may also have little say in the economic activities of their household. Increasing female education and empowerment significantly improve child nutrition and child health outcomes. (PAPPACHAN, BINU, CHOONARA, 2017).The source of income is particularly important in determining access to nutrition. Due to financial and emotional pressures of food insecurity, low wage work and scarcity members of low-income families, including children, may experience high levels mental and physical health problems (e.g anxiety, depression). In the study area, due to cultural restrains the women do not work outside from their homes, and only men work. It leads to low income of the households and resultantly accessibility of food is affected severely. Political instability has particularly damaging effect on the ability of the poor class to generate income in the non-agricultural sector and thus buy food.

4.2.2.2 HOW GENDER/AGE CAN AFFECT FOOD SECURITY IN PAKISTAN.

In Pakistan, women are usually subordinate to men, and their role is limited to only household chores and childcare. They infrequently have access to productive resources and have very slight participation in important household decisions. Even the most important decisions in a woman's life, such as education, work, marriage, major purchases, number of children, decision regarding children education and marriage are taken by male members. Their low relative status at home is reflected in their high illiteracy, low educational level, limited opportunities for skills development and low participation in economic and political activities. Age is an important factor in determining household food security status in Pakistan. The Household with the older head was food secure and the household

with the younger head was food insecure. Moreover, gender played a dominant role in food insecurity as female headed household were food insecure while male headed household were food secure in Pakistan.

Table 12: Wage Difference (The Ratio of Female Wages to Male Wages)

Provincial Name	Years		
	2006-2010	2011-2015	2016-2020
Punjab			
Average Male income(U$)	101	122	115
Average Women income(U$)	81	102	82
Percentage % difference	22%	18%	33%
Sindh			
Average Male income(U$)	119	141	126
Average Women income(U$)	115	119	114
Percentage % difference	3.4%	17%	10%
KPK			
Average Male income(U$)	97	133	113
Average Women income(U$)	81	102	82
Percentage % difference	18%	26.4%	31.7%
Baluchistan			
Average Male income(U$)	139	164	134
Average Women income(U$)	114	132	121
Percentage % difference	19.8%	21.6%	10.1%

Source: Labor Force Survey, State Bank of Pakistan and Global Data Lab

Gender and age can have significant impacts on food security in Pakistan from 2008 to 2018, as they affect both access to and control over resources necessary for food production and consumption. Here are some ways in which gender and age can impact food security:

I. **Women**: Women in Pakistan often have limited access to resources such as land, credit, and education, which can affect their ability to produce or purchase food for their households. This can lead to greater levels of food insecurity among female-headed households or households

where women are the primary caregivers. Women may also have limited decision-making power within households, which can impact their ability to prioritize food needs.

II. **Children:** Children are particularly vulnerable to food insecurity as they have higher nutrient requirements for growth and development. Malnutrition during childhood can lead to long-term health problems and reduced productivity in adulthood. Children in Pakistan may be at greater risk of malnutrition if they live in households with limited access to nutritious foods or if they suffer from health problems that affect their ability to absorb nutrients.

III. **Elderly:** Older adults in Pakistan may also be at greater risk of food insecurity, particularly if they have limited access to income or social support networks. This can be exacerbated if they suffer from health problems that affect their ability to prepare or consume food.

Overall, addressing gender and age inequalities is important for reducing food insecurity in Pakistan. Efforts to improve access to education, credit, and resources for women can help to increase their ability to produce or purchase food. Programs that target children and the elderly can help to ensure that they receive adequate nutrition, while social safety nets and support networks can help to protect vulnerable households from food insecurity.

4.2.3 Income

Before describing aspects of family income and how it can be affected by the two previous variables (education and family structure), we will show some general information related to economy in Pakistan and how they affect family income.
The economic situation of the family is an important factor that greatly affects the education of children at the school level. In this context, literary information suggests that children in low-income families are deprived of verbal communication and cognitive development, (DAHL BG, 2012).

Income has been a major factor affecting food insecurity in Pakistan between 2008 and 2018. A significant proportion of the population in Pakistan lives below the poverty line, with limited access to basic necessities, including food. Poverty and low income have been identified as major causes of food insecurity in the country, as they limit people's ability to purchase adequate and nutritious food.

According to the Pakistan Social and Living Standards Measurement (PSLM) survey conducted by the Pakistan Bureau of Statistics, the percentage of the population living below the poverty line increased from 17.2% in 2007-08 to 24.3% in 2015-16. This increase in poverty has contributed to a rise in food insecurity, particularly among vulnerable populations, including women and children.

In addition to poverty, income volatility and instability have also been identified as factors affecting food insecurity in Pakistan. The majority of the population in Pakistan is engaged in the informal sector, where income is irregular and unpredictable. This can make it difficult for people to plan and budget for food purchases, leading to inadequate and inconsistent access to food.

Furthermore, income inequality has also been identified as a contributing factor to food insecurity in Pakistan. The country has a high level of income inequality, with a large gap between the rich and poor. This has led to unequal access to resources, including food, with vulnerable populations, including women, children, and the elderly, being disproportionately affected.

The government of Pakistan has implemented various programs and initiatives to address income-related issues that contribute to food insecurity. For example, the Benazir Income Support Program (BISP) provides cash transfers to vulnerable households to help them purchase basic necessities, including food. Similarly, the Kissan Package provides support to small farmers to increase their income and improve their access to food.

However, more needs to be done to address income-related issues that contribute to food insecurity in Pakistan. This includes improving job opportunities and wages, addressing income inequality, and promoting sustainable livelihoods to ensure that people have access to adequate and nutritious food.

According to Economic survey and Beauru of Statistic of Pakistan, Family income is a significant factor that can impact food security in Pakistan from 2008 to 2018, as it affects a household's ability to purchase or produce sufficient food. Here is a breakdown of the relationship between family income and food security by province and year:

In Punjab, households with lower income were more likely to suffer from food insecurity. For example, in 2008-09, households with incomes below the poverty line had a food insecurity rate of 75.5%, while those above the poverty line had a rate of 44.6%. This trend continued through 2017-18, where households below the poverty line had a food insecurity rate of 49.8%, while those above the poverty line had a rate of 26.1%. In Sindh, households with lower income were also more likely to suffer from food insecurity. For example, in 2008-09, households with incomes below the poverty line had a food insecurity rate of 68.8%, while those above the poverty line had a rate of 39.7%. This trend continued through 2017-18, where households below the poverty line had a food insecurity rate of 52.4%, while those above the poverty line had a rate of 28.4%. Khyber Pakhtunkhwa (KPK) households with lower income were also more likely to suffer from food insecurity. For example, in 2008-09, households with incomes below the poverty line had a food insecurity rate of 84.1%, while those above the poverty line had a rate of 50.6%. This trend continued through 2017-18, where households below the poverty line had a food insecurity rate of 64.3%, while those above the poverty line had a rate of 33.7%. While in Baluchistan, households with lower income were also more likely to suffer from food insecurity. For example, in 2010-11, households with incomes below the poverty line had a food insecurity rate of 77.7%, while those above the poverty line had a rate of 50.1%. This trend continued through 2017-18, where households below the poverty line had a food insecurity rate of 59.9%, while those above the poverty line had a rate of 32.6%.

Overall, these findings suggest that poverty reduction measures are critical for improving food security in Pakistan, particularly for vulnerable households with lower incomes. Efforts to improve access to employment opportunities, social protection programs, and education can help to increase household incomes and reduce food insecurity.

Here is a breakdown of family income by province wise in Pakistan from 2008-18:

Punjab: In Punjab, the average household income increased from PKR 30,031 in 2008-09 to PKR 56,617 in 2017-18.

Sindh: In Sindh, the average household income increased from PKR 29,937 in 2008-09 to PKR 50,348 in 2017-18.

Khyber Pakhtunkhwa (KPK): In KPK, the average household income increased from PKR 24,237 in 2008-09 to PKR 47,365 in 2017-18.

Baluchistan: In Baluchistan, the average household income increased from PKR 21,951 in 2010-11 to PKR 43,359 in 2017-18.

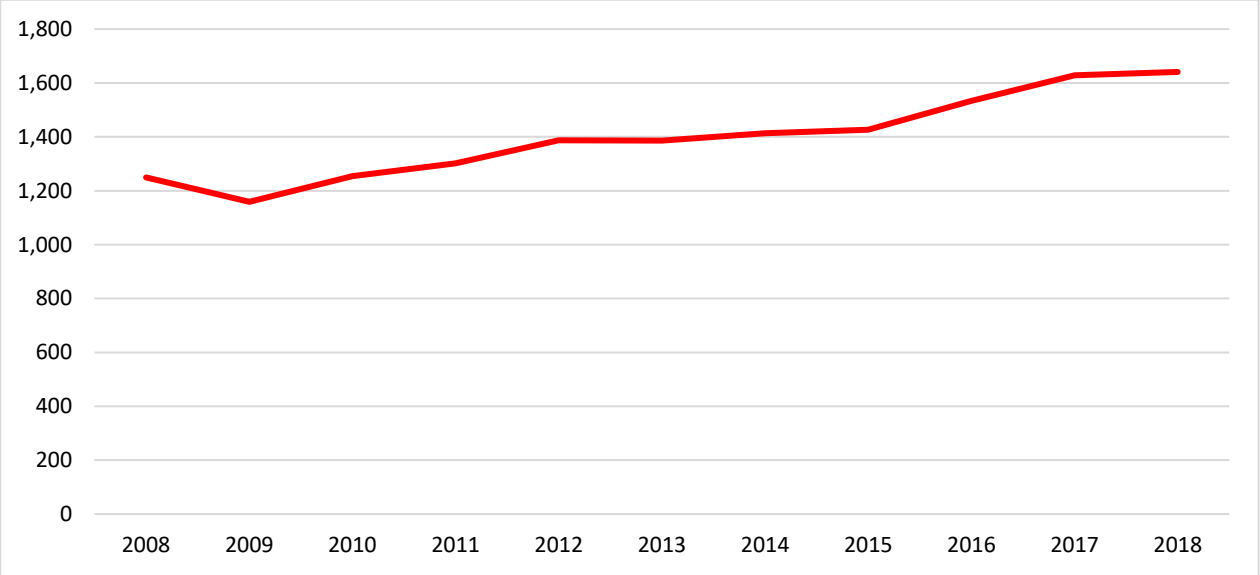
Overall, there was a general trend of increasing household incomes in three provinces over the 2008-18 period while income levels in Baluchistan remained lower than in the other provinces, with the average household income in 2017-18 still below PKR 50,000. This suggests that efforts to reduce poverty and improve household incomes are particularly important in this province.

Table 13: Per capita Income (U$) 2008-18

Year	***Per Capita Income (in US$)***
2008	**1,250**
2009	**1,159**
2010	**1,254**
2011	**1,302**
2012	**1,387**
2013	**1,386**
2014	**1,413**
2015	**1,427**
2016	**1,534**
2017	**1,629**
2018	**1,641**

Source: World Bank, 2018

Figure 18: Per capita Income (U$) 2008-18



Source: World Bank, 2018

Relationship between income level and food security in Pakistan by province from 2008-18:

In Punjab, households with lower income were more likely to suffer from food insecurity. For example, in 2008-09, households with incomes below the poverty line had a food insecurity rate of 75.5%, while those above the poverty line had a rate of 44.6%. This trend continued through 2017-18, where households below the poverty line had a food insecurity rate of 49.8%, while those above the poverty line had a rate of 26.1%. In Sindh, households with lower income were also more likely to suffer from food insecurity. For example, in 2008-09, households with incomes below the poverty line had a food insecurity rate of 68.8%, while those above the poverty line had a rate of 39.7%. This trend continued through 2017-18, where households below the poverty line had a food insecurity rate of 52.4%, while those above the poverty line had a rate of 28.4%.In Khyber Pakhtunkhwa (KPK) households with lower income were also more likely to suffer from food insecurity. For example, in 2008-09, households with incomes below the poverty line had a food insecurity rate of 84.1%, while those above the poverty line had a rate of 50.6%. This trend continued through 2017-18, where households below the poverty line had a food insecurity rate of 64.3%, while those above the poverty line had a rate of 33.7%. In Baluchistan, households with lower income were also more likely to suffer from food insecurity. For example, in 2010-11, households with incomes below the poverty line had a food insecurity rate of 77.7%, while those above the poverty line had a rate of 50.1%. This trend continued through 2017-18, where households below the poverty line had a food insecurity rate of 59.9%, while those above the poverty line had a rate of 32.6%.

In Pakistan, there is a correlation between gender, low income, and low access to food. Women often face multiple challenges that contribute to their vulnerability to food insecurity:

1. Economic Disparities: Women in Pakistan tend to have limited economic opportunities and lower income levels compared to men. Women in Pakistan earn, on average, 34% less than men. The same report reveals that women in Pakistan make up 90% of the bottom 1% of wage earners in the country. This economic disparity can lead to difficulties in accessing sufficient and nutritious food for themselves and their families.

2. Gender Pay Gap: Women often experience a gender pay gap, with lower wages and limited access to formal employment opportunities. This wage disparity can affect their purchasing power and ability to afford an adequate diet.

3. Limited Control over Resources: Cultural norms and traditional gender roles may restrict women's control over resources such as land, property, and financial assets. This limitation can impact their ability to produce food or access income-generating activities.

4. Limited Decision-Making Power: Women may have limited decision-making power within households, including decisions related to food choices and allocation of resources. This can affect their ability to prioritize and access nutritious food for themselves and their families

Overall, these findings suggest that income levels are a significant factor that can impact food security in all provinces of Pakistan, and households with lower income are more vulnerable to food insecurity. Efforts to reduce poverty, improve access to employment opportunities, and increase household incomes can help to improve food security for vulnerable households in Pakistan. Furthermore Low-income working families - whose incomes keep them out of the fold of voluntary / informal social security - and especially in rural areas, are at risk of inflation in food prices and politics of protestation more likely to occur. However, there is little evidence that this is a source of serious or potential instability in the country, whether there are opportunity costs or disruptions to collective action. Therefore, riot incidents and other incidents related to food prices are likely to be episodic rather than reflecting a possible widespread uprising. Between the period 2007 and 2018 experienced high food price, food price rapidly increased, and disruptions in the distribution and availability of basic foodstuffs in many regions of the world (FAO, 2011).These trends occurred against a long-term increase in global dependence on food imports, and therefore, increased international food prices. The increase in international food prices - especially when translated into local markets - has a direct

impact on human security in developing countries, deepening the poverty of almost 1 billion people, who are already living in deprivation.

Table 14: Pakistan per capita Gross national income (GNI) at current prices (USD)

YEARS	VALUE	CHANGES%
2007	922	8.95
2008	897	-2.66
2009	944	5.23
2010	1,010	6.90
2011	1,206	19.48
2012	1,205	-0.09
2013	1,211	0.51
2014	1,347	11.19
2015	1,421	5.47
2016	1,446	1.81
2017	1,537	6.29

(Source: world bank tradingeconomics.com)

The source of income is particularly important in determining access to nutrition. Gross domestic product per capita (US$ PPP) A measure of individual income and, hence, affordability of food in Pakistan is5,580 while World average is23,099.5. Members of low-income families, including children, may experience high level of stress and mental and physical health problems (e.g anxiety, depression) due to financial and emotional pressures of food insecurity, low wage work and scarcity. In the study area due to cultural restrains women doesn't work outside from the home and only man work for livelihood, so the income of household is low and due to low income the accessibility of food is affected. According to World Bank 2009, in the study area labour force participation rates of male were 64.3% while the women were 16.9%. Access to health care, inadequate transportation, poor housing is also affected by income. According to the report, almost 39% of Pakistan's citizens live in multidimensional poverty, with the highest poverty rates in FATA (Federally Administered Tribal

Areas) 73% and Baluchistan 71%. Pakistan's PMI (Purchasing Managers Index) showed a sharp decline, with the national poverty rate falling from 55% to 39% from 2004 to 2015(UNDP&OPHI, 2016).The annual income level for people who do not finish high school is on average $ 20,241. For those who finish high school, the income jumps to US $ 30,627. Now we are going to examine people who attend college but do not complete a diploma. His average income shows a slight increase of $ 32,295. Those completing membership increase their income to $ 39,771 on average.

Now, for those who complete their bachelor's degrees, their annual income increases to $ 56,665. An advanced degree, such as a master's degree, raises revenue to $ 73,738. Ph.Ds reaches $ 103,054, while those with professional degrees, such as doctors and lawyers, have an average annual income of $ 127,803.While the rates of unemployment for these groups of people. Those without secondary education have an average unemployment rate of 9.1%, almost double the national rate. For high school graduates, the unemployment rate drops to 6.2% and, for those with associate degrees, unemployment drops to 5.4%. Those with at least 4 years of bachelor's degree have an average unemployment rate of 3.2%, well below the national average.

Table 15: Average number household members earning income

Average number household members earning income	
Male Headed HH	3.57%
Female Headed HH	1.82%
Total (Average)	2.7%

4.2.3.1 Average income level and effects on food security

The risk of food insecurity increases when money to buy food is limited or unavailable. In 2016, 31.6% of low-income households were food insecure, compared to the national average of 12.3 %

(Coleman-Jensen A, 2017).The high unemployment rate among low-income populations makes it more difficult to meet basic household food needs. Unemployment can also negatively affect a household's food security status. The high unemployment rate among low-income populations makes it more difficult to meet basic household food needs (Nord M *et al*, 2012).

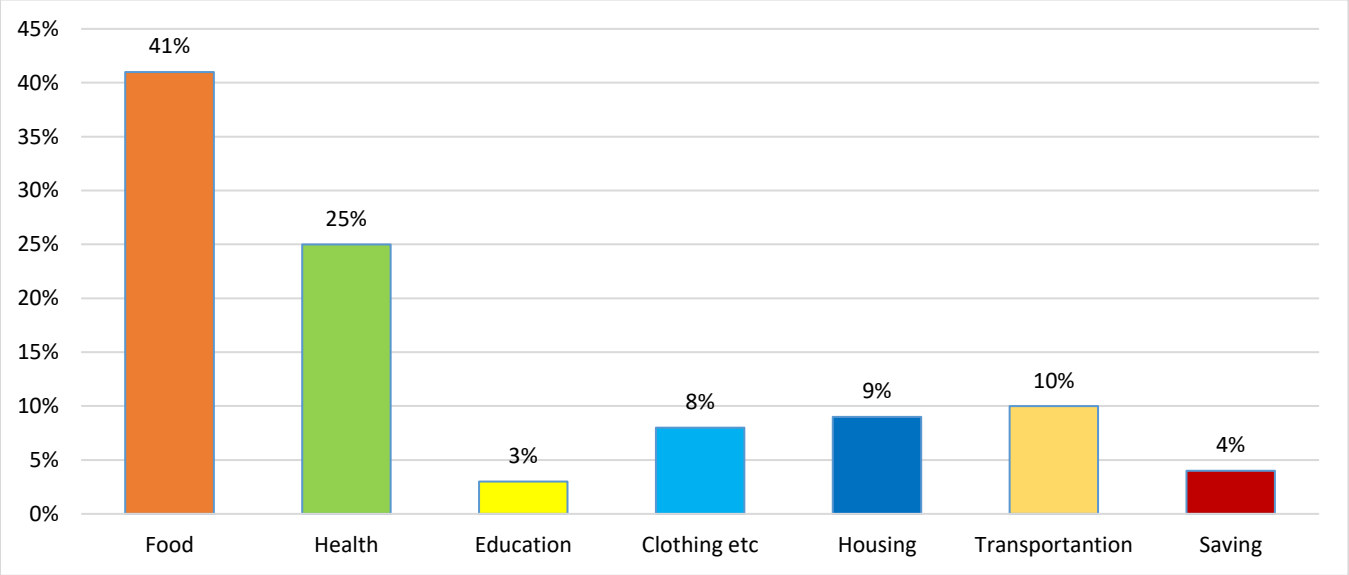
Table 16: Average income level and source of income percentage changes

	Average income in last month (PKR)	income in last month (PKR) Comparison of current income (% of HHs)		
	Mean	Increase	Same	Decrease
Government employee	12000	8.4%	13.4%	78.3%
Private job income	5000	5.8%	9.6%	84.6%
Agriculture income	4000	Nill	Nill	2.1%
Others source	1000	Nill	Nill	Nill
Total	14230	6.8%	11.1%	82.0%

Source: Household survey, 2018

Changes in income levels also appear to be related to the duration of the source of income. Families earning from the same source for two years or more reported a comparatively stable income level and less reduction in income. Similarly, increase in income levels was also positively correlated with livelihood diversification; That is, greater diversification of livelihood leads to more consistent income levels. In addition, these families also reported receiving outside help/assistance more often than other families.

Graph 19: Average monthly expenditure



Source: Household survey, 2018

Food is one of the major sources of expenditure for households. The average Pakistani household spends 41% of his income on food. Poor households spend 61% of their income on food, while other households spend 39% of their income. In study area on average, households spent 41% of their income on food related expenses. This percentage is relatively high as compared with other situations. Other than food; health, rent for housing, associated utility expenses and debt settlements were reported as other significant sources of expenditure. Maximum parts of income of household spent on Food and Health in study area.

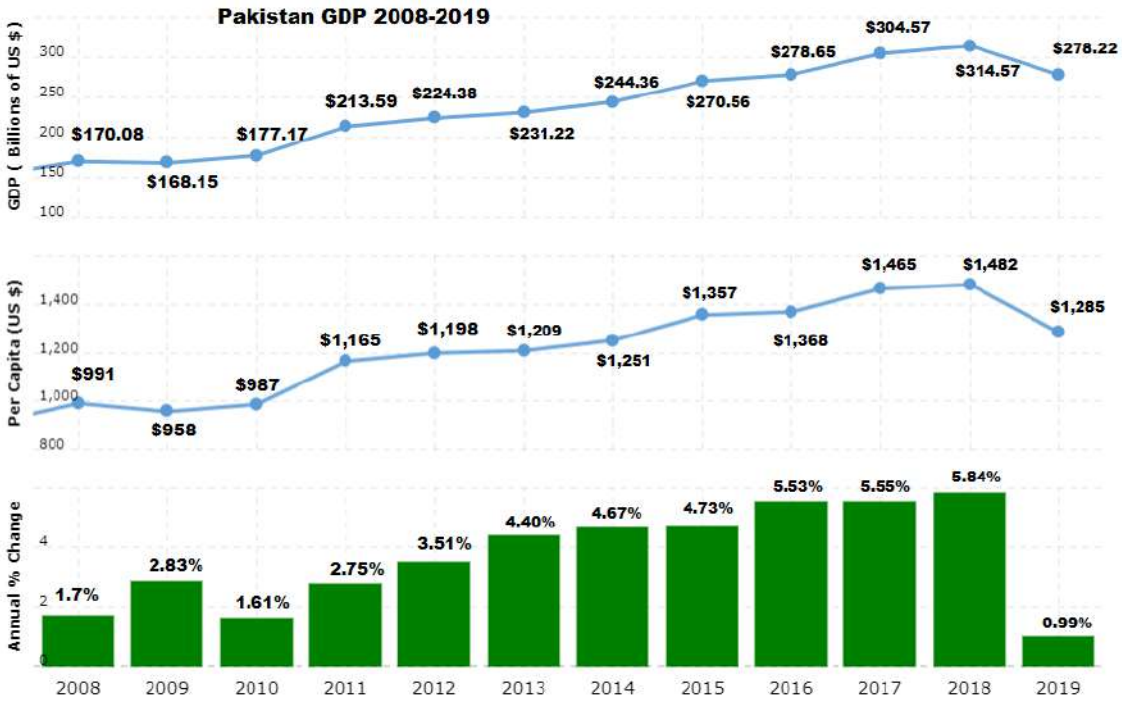
4.2.4 Partial Conclusions

The second hypothesis states that “Family structure and education affecting on income while income consequently effects on food access”. However, during the research it was found that family structure and education have a significant impact on income, which in turn affects food access in Pakistan.

We have observed that households with a higher number of earners experienced less impact and had better access to food, while households with a congested structure and fewer earners were more affected, leading to lower food access. In 2008, the average family structure consisted of 6.8 individuals, with only 4.5% of earners per household, resulting in 43.9% of families experiencing food insecurity. By 2018, this ratio had increased to 59.7% of households being affected by food insecurity. Furthermore, education has been found to have a positive impact on income. During our research, we noted that individuals who were illiterate earned 50% less income compared to those with primary level education (1-5 years), and a significant 90% less income compared to highly educated individuals. Gender inequality has also been found to contribute to income disparities, with women in Pakistan earning 34% less than their male counterparts. Hence, improving access to education can play a crucial role in reducing poverty and enhancing food security. It is important to recognize that income is a strong determinant affecting food access in Pakistan. Additionally, the family structure, particularly the size of the household, has been identified as having a negative impact on income, as larger families tend to have lower incomes and higher levels of poverty.

Here we show general information about Pakistan economy, related to the inflation.

Figure 19: Pakistan GDP ($USD) and per capita ($USD) income with Annual Changes



Source: World Bank

The above chart shown the GDP of Pakistan 2008 was $170.08B, a 1.7% increase from 2007 while in 2013 was 4.40% increase this is the Pakistan People Party Government and then the new Government PML(N) take over from 2013 to 2018 and the GDP of Pakistan increase to $314.57B, which shown the highest Annual increase in the last 10 years incensement which is 5.84% its due to good Policies of Governments but in 2019 a new Government take over the government and they refused all the previous governments polices so the GDP of Pakistan for 2019 was $278.22B, a 11.55% decline from 2018.

1ST PRIMARY DATA (HOUSEHOLD SURVEY)

Household Survey

The household survey was conducted to determine household level indicators of food security, focusing on family structure, income and education of household.

Table 17: Number of Employed Person (Average/ Percentage) Per HH By gender and quintiles 2018-19

Average Number of Employed Person	Number of Employed by Quintile					
	Total	1st	2nd	3rd	4th	5th
1	2	3	4	5	6	7
Average Number of: Members per HH	6.24	8.11	7.27	6.42	5.78	4.72
Employed Person per HH	1.82	2.18	2.10	1.92	1.73	1.41
Number of Employed by Nature (Head of HH or Not) in Percentage						
Head of HH	44.55	7.31	8.05	8.93	9.55	10.70
Other than Head of HH	55.45	11.18	11.79	11.64	11.00	9.84
Number of employed person by Gender in Percentage						
Male	77.80	13.28	14.82	15.95	16.68	17.07
Female	22.20	5.21	5.03	4.63	3.86	3.47
Percentage No of employed person per HH						
One	46.83	38.27	39.93	44.23	48.04	58.33
Two	28.38	29.40	29.00	28.64	29.16	26.40
Three	13.44	14.92	15.59	13.74	13.91	10.32
Four	6.34	7.93	7.85	7.99	5.67	3.48
Five and Above	5.01	9.48	7.64	5.40	3.22	1.47

Income and expenditure

Respondents were also asked about their current income levels. According to the results, the average monthly income at the time of the survey was Rs 14,230 (USD, 83.51). 82 % of them considered

that their income levels had decreased; 11% reported the same level, and 6.8% reported an increase in their income comparer last month.

Table 18 :Percentage Distribution of Monthly HH income by source and quintile

Source of Income	Total Monthly Income by Quintile					
	Total	1st	2nd	3rd	4th	5th
1	2	3	4	5	6	7
Average Monthly Income	35662	19742	23826	28020	33668	60451
Total	100	100	100	100	100	100
Salaries / Wages	40.93	45.21	43.64	40.68	38.62	40.53
Crop Production	9.43	13.24	11.65	11.03	10.20	7.20
Livestock	7.81	11.85	11.19	11.41	9.76	4.00
Non Agriculture Activities	13.53	9.21	12.19	13.16	14.69	14.32
Property	3.03	0.34	0.63	1.15	1.95	5.33
Owner occupied Houses	10.44	6.24	7.28	8.44	9.56	13.19
Social Insurance benefits	2.59	0.46	0.95	1.48	2.26	3.97
Gift & Assistants	1.93	5.75	3.79	2.49	1.600	0.65
Foreign Remittance	5.75	1.74	2.93	4.71	6.21	7.42
National Remittance	4.00	4.29	4.48	4.82	4.71	3.21
Others Source	0.56	1.65	1.28	0.64	0.45	0.18

Source: Filed survey, 2018

Table 19: Percentage distribution of monthly consumption expenditure per Household on major food items by quintiles, 2014-2018

MAJOR FOOD ITEMS	QUINTILES					
	Total	1st	2nd	3rd	4th	5th
1	2	3	4	5	6	7
Average Monthly Expenditure on Food (Rs)	13406.27	9608.19	11283.03	12448.71	13575.97	17677.82
% Consumption						
Cereals	17.33	24.96	22.11	19.88	17.05	11.65
Wheat	12.55	19.18	16.67	14.64	12.22	7.76
Rice	3.45	3.92	3.73	3.71	3.53	2.98
Maize	1.33	1.87	1.72	1.53	1.30	0.91
Baked & Fried Products	1.34	0.95	1.05	1.08	1.25	1.78
Pulses, Split & Whole	2.31	2.66	2.57	2.54	2.46	1.88
Meat(Mutton Beef Chicken)	8.21	5.34	6.46	7.16	8.05	10.55
Fish and Sea Food	0.80	0.57	0.62	0.56	0.74	1.12
Milk, Cheese and Eggs	26.04	22.85	25.11	27.09	27.70	25.87
Edible Oil & Fats	7.05	8.39	7.84	7.65	7.30	5.80
Fruit	4.33	2.14	2.87	3.80	4.31	6.11
Vegetables	9.02	10.87	10.28	9.59	9.21	7.47
Sugar, Jam, Honey, Chocolate and Confectionery	5.69	7.01	6.49	5.86	5.51	4.94
Condiments & Spices(salt etc)	3.55	3.57	3.56	3.45	3.54	3.59
Coffee, Tea and Cocoa	2.66	3.23	3.09	2.94	2.66	2.15
Mineral Water Soft Drink,Juices etc	1.71	0.89	0.99	1.11	1.46	2.75
Alcoholic Beverages Tobacco	2.70	3.16	3.06	2.93	2.81	2.22
Readymade Food Product(Home made)	7.25	3.42	3.89	4.65	5.95	12.12

Source: Field survey, 2018

Income and expenditure trends in Pakistan from 2008-18:

Income trends: Over the 2008-18 period, there was a general trend of increasing household incomes in Pakistan. However, income growth was not uniform across all income groups, and households in lower income brackets experienced slower income growth compared to those in higher income brackets. According to data from the Pakistan Bureau of Statistics, 2018 the average monthly income of households in Pakistan increased from PKR 22,761 in 2008-09 to PKR 44,915 in 2017-18.

Table 20: Average percentage changes in monthly income of households in Pakistan in PKR 2008-18

Years	Monthly Average Income (PKR)	%age Changes
2008-09	22,761	
2017-18	44,915	97% increase

Expenditure trends: Household expenditure patterns in Pakistan shifted over the 2008-18 period, with a greater share of expenditure going towards non-food items. For example, expenditures on education and healthcare increased significantly, while food expenditures declined as a share of total expenditure. According to data from the Pakistan Household Integrated Economic Survey, in 2008-09, food expenditures accounted for 46.2% of total household expenditures, while in 2015-16, this share had declined to 40.6%. Meanwhile, expenditures on education increased from 2.6% to 4.2% of total expenditure, and healthcare expenditures increased from 2.2% to 2.8%.

Overall, these trends suggest that household incomes in Pakistan increased over the 2008-18 period, but the benefits of this growth were not distributed evenly across all income groups. Additionally, while non-food expenditures increased, food security remains an ongoing challenge for many households in Pakistan, particularly those in lower income brackets.

The most direct effect was seen on the price level. Two-thirds of communities reported a significant increase in prices in the last one year before the Survey in the study area. Mostly Respondent report an increase in food prices, especially for wheat, Oil, and vegetables etc.
Compared to Pakistan's overall inflation rate (General Consumer Price Index (CPI) of 13% in 2019-20), migration areas the price increase was quite high. The biggest gainers were wheat, tomatoes, onions and potatoes.

5. COMPLEMENTARY INFORMATION THAT HELP TO EXPLAIN THE FALLING FOOD SECURITY IN PAKISTAN

In this section, we decided to add more information that may help us to better understand the fall of food security in Pakistan.
The decrease of food insecurity in Pakistan from 2008-18 can be attributed to several factors:

Inflation: Inflationary pressures on food prices in Pakistan have been a major contributor to food insecurity in the country over the past decade. The Consumer Price Index (CPI) for food in Pakistan increased by more than 75% between 2008 and 2018, according to data from the Pakistan Bureau of Statistics. This inflationary pressure has disproportionately affected lower-income households in the c Inflation can have a significant impact on income and food access in Pakistan, as it can reduce the purchasing power of households and make it more difficult for them to afford basic necessities such as food.

According to data from the Pakistan Bureau of Statistics, the average inflation rate in Pakistan increased from 11.9% in 2008-09 to 3.9% in 2017-18. However, despite the decrease in inflation, the prices of food items have continued to rise, making it difficult for households to access nutritious food. The data shows that the prices of staples such as wheat, rice, and sugar have increased significantly over the period, which has increased the cost of food for households. For example, the price of wheat increased by 179% between 2008 and 2018, while the price of sugar increased by 126%. As a result, many low-income households have struggled to afford adequate food, leading to high levels of food insecurity. Moreover, inflation can also affect income levels in Pakistan, as it can reduce the value of wages and salaries. Inflation can be particularly harmful for individuals on fixed incomes, such as those in low-paying jobs or with limited access to employment opportunities. As a result, inflation can exacerbate poverty and inequality, which can further impact food access and food security.

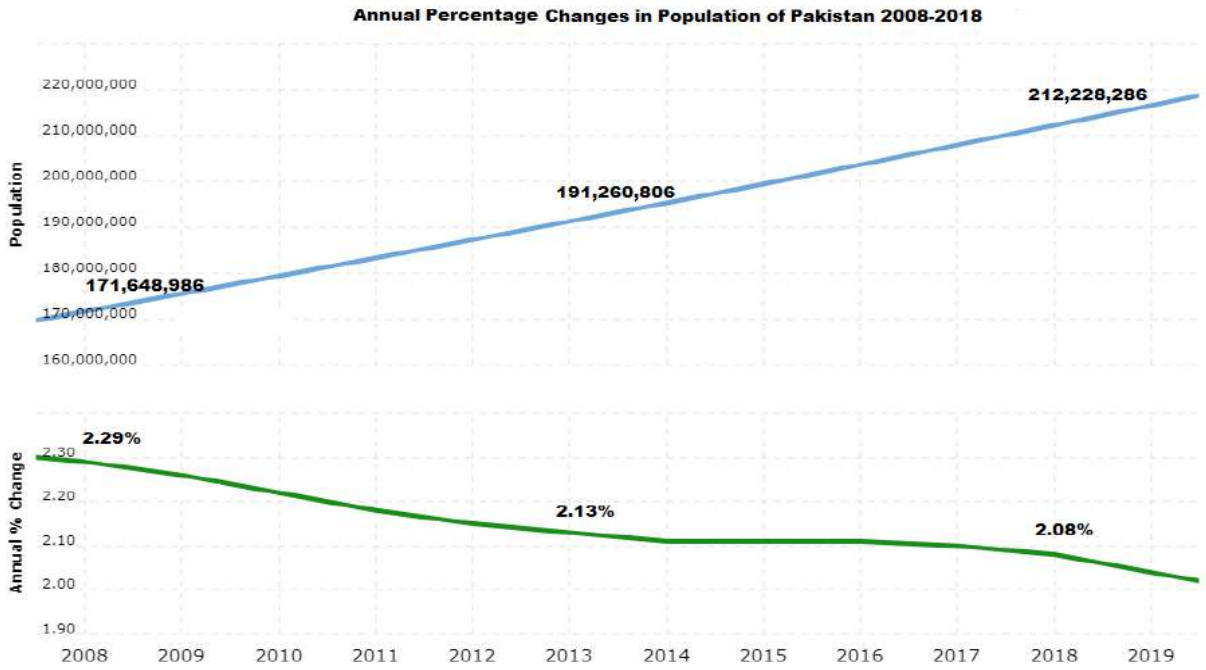
In conclusion, inflation has had a significant impact on income and food access in Pakistan from 2008-2018. To address these challenges, it is important to implement policies and programs that address the root causes of inflation, such as improving economic growth, reducing fiscal deficits, and promoting

price stability. Additionally, measures to improve food production, distribution, and affordability can also help to promote food security in Pakistan.

Poverty: Poverty is a major contributor to food insecurity in Pakistan. According to the World Bank, the poverty rate in Pakistan increased from 23.9% in 2008 to 24.3% in 2015. This has meant that a significant proportion of the population is unable to afford sufficient and nutritious food.

Climate Change: Pakistan has also been facing the impact of climate change, including floods, droughts, and extreme weather events, which have adversely affected agricultural production and disrupted food supply chains. The country has experienced a significant reduction in water availability, and the changing patterns of rainfall have resulted in low crop yields and, in some cases, crop failure.

Graph 20: Annual percentage changes in population of Pakistan 2009-2018



Source: United Nations - World Population Prospects

The population of Pakistan increasing so rapidly year by year and the resources is going down like agriculture sector impacted more as compared to other because maximum agriculture areas going to converting build up areas people constructing houses, factories etc. and the areas for agriculture decrease so the country face to food security issue. The population of Pakistan in 2008

was 171,648,986, a 2.29% increase from 2017 while the population of Pakistan in 2013 was 191,260,806, a 2.13% increase from 2012 while the population of Pakistan in 2018 was 212,228,286, a 2.08% increase from 2017 and now the current population of Pakistan in 2021 is 225,199,937, a 1.95% increase from 2020.

Average food supply affected by political instability

Developing countries are facing economic crises. People are being affected by food prices. Hereditary structural problems that are factors such as inflation (Partly due to economic and energy crisis), panic buying and hoarding, inefficient and inactive Social safety nets, and rising production costs have made food inaccessible to many people in Pakistan (MUNIR & EJAZ, 2020). The average food supply in Pakistan from 2008-2018 can be analysed through data from the Food and Agriculture Organization of the United Nations (FAO) and the Pakistan Bureau of Statistics.

According to FAO data, the average per capita calorie supply in Pakistan was 2,340 kcal/day in 2008, which increased to 2,450 kcal/day in 2018. This indicates a slight improvement in food supply over the period, but the level of food supply in Pakistan remains below the recommended dietary intake of 2,500 kcal/day. Moreover, the data shows that the composition of the food supply has also changed over the period, with an increase in the supply of fats and oils, and a decrease in the supply of pulses and legumes. This indicates a shift in dietary patterns towards more processed and high-fat foods, which can have negative implications for public health. However, it is important to note that the average food supply may not reflect the food security situation at the household level, as access to food can vary significantly depending on factors such as income, geography, and household composition. In Pakistan, for example, the prevalence of food insecurity remains high, with approximately 40% of households reporting food insecurity in 2017-18.

Average dietary energy supply adequacy (percent) (3-year average)

A measure of the sufficiency of food available to meet the population needs expressed as a percentage of the total requirement over a three-year period.

According to FAO Pakistan average dietary energy supply adequacy ranked (2008-10) was 107 and for 2018 is 110 while world average is 122.6. Its means Pakistan accessibility is worse in 2018 as compared to 2009. The average dietary energy supply adequacy (DESA) is a measure of the percentage of energy available from the food supply that is actually consumed by the population. In

Pakistan, the DESA has remained below the recommended level of 100% over the period of 2008-2018, indicating a shortfall in dietary energy consumption.

According to data from the Food and Agriculture Organization of the United Nations (FAO), the average DESA in Pakistan was 91.5% in 2008, which decreased to 88.3% in 2018. This indicates a decline in the proportion of energy available from the food supply that is actually consumed by the population. Moreover, the data shows that the DESA varies significantly by province and by income group. For example, in 2018, the DESA in Punjab was 91.7%, while in Balochistan it was only 80.5%. Similarly, the DESA for the highest income quintile was 94.6%, while for the lowest income quintile it was only 83.2%. Low DESA levels can have negative implications for public health, as they indicate a shortfall in dietary energy consumption and can lead to malnutrition and other health issues. To improve DESA levels in Pakistan, it is important to address the root causes of food insecurity, such as poverty, inequality, and access to education and healthcare, and to promote policies and programs that support sustainable and nutritious food production, distribution, and affordability. Additionally, efforts to promote dietary diversity and nutrition education can also help to improve DESA levels in Pakistan.

In conclusion, while the average food supply in Pakistan increased slightly from 2008-2018, the level of food supply remains below recommended dietary intake and the prevalence of food insecurity remains high. To improve food security in Pakistan, it is important to address the root causes of food insecurity, such as poverty, inequality, and access to education and healthcare, and to promote policies and programs that support sustainable and nutritious food production, distribution, and affordability.

Five years polices plans – (2008-13), (2014-18)

Policy Types	
Type 1: Financial Support	Financial aid provided to farmers in the form of credits, tax benefits, loan aid, insurance aid or financial incentives
Type 2: Input Support	Materials provided to farmers to aid in production in the form of subsidized seeds, fertilizer or machinery
Type 3: Output Support/Restrictions	Aid for or restrictions on farmers regarding post-production activities, such as supply chain support, price supports, price controls, production quotas
Type 4: Technical Support	Aid provided to farmers in the form of extension services, investment in structural development (e.g., road construction, rural development), or in the organization of farming cooperatives

Government policy can definitely effect on agricultural production. The government can easily determine the quality and quantity of economic inputs from the agricultural system. However, government policy sometimes fails to influence agricultural production through subsidies. This can be explained by examples from different farming systems.

First, the government develops agriculture with a view to increasing gross national product (GDP). It can impose direct or indirect measures. Subsidies, low interest loans and a guaranteed price can increase the volume of agricultural production, i.e. the yield. With an increase in capital, the quality of agricultural production can also be raised. For example, by using a combine harvester it is possible to ensure that the crop is fresh. Better seeds can be produced. In addition, quotas are applied to discourage the import of certain types of product from other countries. Domestic production increases after the imposition of quotas. These have a direct impact on agricultural production.

The effects of government subsidies on farming output are sometimes offset by the slow growth of productivity in various areas as natural hazards. For example, floods occur frequently in 2010 Khyber pakhtun khwa. Rice, Maize production is significantly reduced. Crops can hardly be grown despite significant subsidized input. Moreover, pests and diseases are also bad for crop growth.

The ultimate objective of the new (2018) Pakistani National Food Security Policy is to raise the agriculture growth rate to 4% per year. Though 4% may seem like a minuscule number, it will be no small feat for the Pakistani government to accomplish. The agriculture growth rate has been relatively low over the past decade, averaging about 2.5% since 2008. Increasing that number will require a lot of changes to be made.

The average growth of agriculture between 2008-09 was just 2.4%, with the crop sector growing only by 1.3% in this period. If the declining trend in agriculture growth was not reversed, it could jeopardise food security, increase malnutrition, cause significant increase in rural unemployment and poverty, leading to increase in the rural-to-urban migration, and slow agro-based industrial growth.

In Pakistan, there has been under-investment in the agriculture sector and neglect of agriculture infrastructure and institutions over the past two decades. The production of major crops showed a mixed trend during 2008-13.

Wheat production remained below 25 million tonnes, when about 25.2 million tonnes of wheat were produced. The country was thus self-sufficient in its staple diet, and also generated surplus for export. Rice production increased initially, but failed to sustain the momentum. Maize has emerged as a crop yielding consistently well. The underinvestment in agriculture (water, seed, and technology) and deterioration of agriculture terms of trade coupled with markets failures were the major reasons for less than historical production trend

The 11th Five Year Plan (2013-2018) is being issued at a time when Pakistan is facing multiple challenges on the economic, security, and development fronts. One issue brought up in the Pakistani National Food Security Policy is the lack of modern technology in the agriculture sector. According to the report, Pakistani farmers do not have access to machinery such as rice transplanters, vegetable planters, fruit pickers and other useful tools that would allow them to run their farms more efficiently and turn larger profits. To mitigate this problem, the new policy will reduce taxes on imports of farm machinery and create incentives for farmers willing to adopt newer technologies. The 11th Five year plan missed most of the targets and failed to transform the economy into a vibrant and resilient economy. During the 11th Five Year Plan period (2013-18), the GDP growth remained relatively high (4.7% average over 2013-14 to 2017-18). However, this growth masks many inequalities like crop sector which employs 38% of workforce only grew by 0.8% on average during the plan period.

Pakistan has produced more food than its population consumes and has become a major producer of wheat and rice. However, the poorest and most vulnerable people in Pakistan cannot afford a sufficient and nutritious diet despite the overall growth in food production. Despite this The prevalence of food insecurity in the country is estimated at 38.1% of the population in 2021, while the population of food

insecure in Pakistan is estimated at 90.7 million. In 2031, Pakistan is projected to grow by 16.0% to 285.2 million which is at the current level of 38.1% out of 238.3 million, (The NEWS, August 01, 2021).

According to the Asian Development Bank (ADB), Pakistan's agricultural productivity is relatively low compared with global competitors as various environmental, political and economic shocks hinder agriculture production. While the Government policies about food production, distribution, and consumption influence the cost, availability, and safety of the food supply domestically and internationally Commodity crops, such as Maize, rice and wheat are most often at the heart of agricultural policy-making.

In the period of 2009-2018 Production affected by political stability and impertinent thing policy regarding Agriculture sector when government plane for subsidies on fertilizer, seeds and agriculture instruments like tractor, machine etc, so the farmer buys cheap fertilizer and use more to crops and they crops show high production. In addition, farming can be affected by political instability. For example, wars may drag labour to a field. And products are drawn by government. Sometimes outputs are destroyed in advance. Furthermore, farmers may not aim to maximize profits but gain interests. Farmers 'perception, traditional beliefs and inertia reduce farmers' motivation.

Furthermore this continuous, decades-long downturn in the Agriculture sector has provoked many reactions. The PPP (Pakistan People Party) has steadily increased the prices of wheat and sugar during its rule. This had the effect of shifting urban and rural trade to the latter, increasing cash flow to producers (while making goods more expensive for non-landowners).while The PML-N,(Pakistan Muslim League Party N) in response to protests from organizations representing medium and large farmers, such as the Abadkar Board and Kisan Ittehad, first announced a farmers' package, and now announces a bundle of pro-farmer measures in Friday's budget. What is it. These include input subsidies, reduction in electricity rates for tube well use, removal of sales tax on pesticides and removal of duties on imported feed (Dawn, June 6th, 2016)

Food loss in Pakistan (Total waste/total domestic supply quantity (tonnes))

A measure of post-harvest and pre-consumer food loss as a ratio of the total domestic supply (production, net imports and stock changes) of crops, livestock and fish commodities is in tonnes. According to Dwan news report, 40% of food in Pakistan is wasted. This includes food loss during

the supply chain (production, post-harvest handling, agro-processing, distribution and consumption) that occurs every year. And 36 million tonnes of food wasted in Pakistan every year (DWAN NEWS PAPER, March 12th, 2018).

Food loss refers to the edible food that is lost or wasted during production, post-harvest handling, and processing stages before it reaches the final consumer. In Pakistan, food loss is a significant challenge, as it leads to the inefficient use of resources and exacerbates food insecurity.

In 2008, the total amount of food loss in Pakistan was 36.9 million tonnes, which accounted for 33.6% of the country's total domestic food supply, (FAO & UN, 2011).

By 2018, the total amount of food loss had increased to 44.2 million tonnes, which accounted for 37.6% of the country's total domestic food supply, (FAO&UN, 2021).

According to data from the Food and Agriculture Organization of the United Nations (FAO), the total food loss in Pakistan ranged from 15.6% to 29.8% of the total domestic supply quantity (TDSQ) over the period of 2008-2018. The highest food losses were observed for fruits and vegetables, followed by cereals and pulses. The data also shows that the food loss varies significantly by province and by commodity. For example, in 2018, the food loss for fruits and vegetables was highest in Balochistan (52.8%), while for cereals and pulses it was highest in Khyber Pakhtunkhwa (23.7%). Similarly, the food loss for rice was highest in Punjab (10.7%), while for wheat it was highest in Sindh (5.5%). According to Food and Agriculture Organization (FAO) of the United Nations in 2019, the average food loss in Pakistan during the period of 2008-2018 was estimated to be 16.6%.

Table 21: Average food loss in Pakistan 2008-18

Food Category	Average Food Loss (2008-2018)
Cereals	15.2%
Fruits & Vegetables	24.9%
Roots & Tubers	25.2%
Meat	10.4%
Dairy	13.4%
Fish	12.3%

Source: FAO, 2019

Reducing food loss in Pakistan requires a multi-faceted approach that addresses the root causes of food loss, such as poor infrastructure, inadequate storage and processing facilities, and insufficient market linkages. This can be achieved through investments in post-harvest handling and storage technologies, improvements in transportation and market access, and the promotion of sustainable and efficient food production practices. Additionally, raising awareness among producers, consumers, and policymakers about the importance of reducing food loss and waste can also help to address this issue.

Quantity of food supply in Pakistan

According to DAWN newspaper report (July 5th, 2021) Pakistan ranks as 94th out of 117 qualifying countries with serious hunger level in 2019 (Global Hunger Index, 2019) While Pakistan ranks as 92 out of 117 qualifying countries with score 36.7 and in 2018 was 32.1 but it still in serious stage, Furthermore 43% of the country citizens remain food insecure while 18% facing a severe shortage, (Global Hunger Index, 2009). In addition According to the Food and Agriculture Organization (FAO) of the United Nations, the total quantity of food supply in Pakistan has increased steadily from 2008 to 2018. In 2008, the total food supply in Pakistan was estimated to be 2,531 kilocalories per capita per day, which increased to 2,765 kilocalories per capita per day in 2018.

Here is a table summarizing the estimated quantity of food supply in Pakistan for different food categories during the same period:

Table 22: Average food supply in kilocalories per capita in Pakistan

FOOD CATEGORY	QUANTITY OF FOOD SUPPLY (KILOCALORIES PER CAPITA PER DAY)
CEREALS	1,921
ROOTS & TUBERS	89
VEGETABLES	118
FRUITS	38
MEAT	65
DAIRY	122
EGGS	33
FISH	8
OTHER	392

Source: (FAO, 2020)

It is important to note that the quantity of food supply may not reflect the actual food intake of individuals, as it does not account for food losses, waste, and distribution inequalities. Additionally, the availability of nutritious and diverse foods is also important for ensuring food security and reducing malnutrition.

Nutrition monitoring and surveillance - Qualitative assessment (0-1)

A binary indicator that measures whether the government monitors the nutritional status of the general population or not? Examples of monitoring and surveillance include the collection of data on undernourishment, nutrition-related deficiencies, etc. A country receives credit if there is evidence of survey been conducted within the past five years. Pakistan1 while World average is 0.7(World Bank) Nutrition monitoring and surveillance is an essential component of public health in Pakistan, where malnutrition is a significant problem. A qualitative assessment analysis which conducted in Pakistan from 2008-2018 showed that nutrition monitoring and surveillance programs have improved, but challenges still exist.

According to the National Nutrition Survey (NNS) 2018, the overall malnutrition prevalence in Pakistan is 40.2%, with stunting prevalence at 28.9%, wasting prevalence at 17.7%, and underweight

prevalence at 22.7%. However, the data from 2008-2018 shows that the nutrition situation has improved since 2008, when the overall malnutrition prevalence was 43.7%, stunting prevalence was 37.5%, wasting prevalence was 15.1%, and underweight prevalence was 31.5%.

One of the major challenges in nutrition monitoring and surveillance in Pakistan is the lack of reliable and timely data. There are gaps in the data collection and analysis systems, as well as issues with the quality and coverage of data. The National Nutrition Survey (NNS) is conducted every five years, which may not be frequent enough to capture the changes in the nutrition situation in a timely manner.

Another challenge is the inadequate allocation of resources for nutrition monitoring and surveillance. The resources for nutrition surveillance programs are limited, which limits the coverage and quality of the data.

However, there have been some improvements in nutrition monitoring and surveillance in Pakistan over the past decade. The government has launched various nutrition programs, including the National Nutrition Program (NNP), the Lady Health Worker (LHW) Program, and the National Fortification Alliance (NFA). These programs have helped improve nutrition outcomes in the country.

In conclusion, the qualitative assessment of nutrition monitoring and surveillance in Pakistan from 2008-2018 showed that while there have been some improvements, challenges still exist. To improve the nutrition situation in the country, it is essential to address the challenges of data collection, analysis, and resource allocation.

Food safety - Score 0-100, where 100=best

Composite indicator that measures the enabling environment for food safety, According to World Bank Pakistan rank 53.8 while World average is 62.9 for Food safety.

Percentage of population with access to potable water

% of population using at least basic drinking water services

According to World Bank 88.572% of Pakistan population using at least basic drinking water services while in 2018 its percentage increase to 89.875%. But the world average percentage is 74.836%, 80.505% respectively. This indicator measures the percentage of people using at least basic water services, encompassing both people using basic water services as well as those using safely managed water services. Basic drinking water service is defined as drinking water from an improved source,

provided collection time is not more than 30 minutes for a round trip. Improved water sources include piped water, boreholes or tube wells, protected dug wells, protected springs and packaged or delivered water. Furthermore 20% of Pakistan's population has access to clean drinking water. The remaining 80% of the population is forced to use unsafe drinking water due to lack of safe and healthy drinking water sources, (Daud, 2017).

Ability to store food safely

% of population with access to electricity in all areas

According to the World Bank Assess access to refrigeration through a proxy indicator of the proportion of the population with access to electricity was reported in 2009 was 70.39% while in 2018 is 73.91%. Furthermore on world level its percentage is 89.419%.

Stability refers to consistent supply of nutritious food at the national level as well as stability in access to food at the household and individuals levels. ... Fluctuations/shortages in food grains production have therefore been very common in Pakistan.

Pakistan Corruption Perceptions Index, 100 = no corruption

According to World Bank The average value for Pakistan during (2001-2020) period was 27 points with a minimum in 2004 was 21 points and a maximum in 2018 was 33 points. While the latest (2020) value is 31 points while the world average points are 44 in 2020 based on 177 countries. Which shown that in Pakistan have more corruption as compare to world average. A measure of the pervasiveness of corruption in a country by assessing the risk of corruption,
Pakistan's agricultural sector is a frequent victim of corruption. For example, in September 2009, government officials announced the "Benazir tractor scheme", announced as a computerized lottery that grant thousands of free tractors to randomly selected small farmers of Pakistan. However, among the "winners" were those who had thousands acres of land (to be eligible for the draw, only a maximum of 25hectares), suspiciously including 48 family members from one single parliamentary member. As an editorial in a Pakistani daily, “number of powerful individuals ... conspired together to rob poor people an opportunity to improve themselves (The News, February 8, 2010).

Agriculture Polices and Its Impact on Food Production and Food Security 2008-2018

Pakistan's agriculture policies underwent several changes from 2008 to 2018. During this period, the government introduced several policies to improve agricultural production, enhance farmers' incomes, and address food security concerns. The following are some of the significant differences and impacts of the agriculture policies of Pakistan from 2008 to 2018:

Subsidies: In 2008, the government introduced subsidies on fertilizers, pesticides, and other inputs to boost crop yields. However, these subsidies were gradually phased out by 2018 due to their high cost and limited impact.

Impact: The subsidies initially helped farmers to increase their crop yields, but their withdrawal resulted in increased production costs, reducing farmers' profitability.

Crop diversification: In 2015, the government launched the National Food Security Policy to promote crop diversification, reduce water wastage, and increase food production.

Impact: The policy resulted in the cultivation of new crops, such as olives, and increased crop yields, enhancing food security in the country.

Seed development: The government invested in research and development to produce high-yielding and disease-resistant crop varieties.

Impact: The new crop varieties increased crop yields, reduced crop losses due to diseases, and improved farmers' incomes.

Irrigation: In 2013, the government launched the National Programme for Improvement of Watercourses in Pakistan to improve irrigation infrastructure and water management.

Impact: The program resulted in increased water availability for irrigation, improved crop yields, and reduced water wastage.

Agricultural credit: The government introduced several policies to increase farmers' access to credit, including the Agriculture Credit Guarantee Scheme and the Agriculture Credit Card Scheme.

Impact: The policies increased farmers' access to credit, enabling them to invest in modern farming technologies and enhance their productivity.

In conclusion, the agriculture policies of Pakistan from 2008 to 2018 were geared towards increasing crop yields, enhancing food security, and improving farmers' incomes. The policies had varying impacts on the agriculture sector, including increased crop yields, improved water management, and increased access to credit. However, the withdrawal of subsidies had negative impacts on farmers' profitability, inefficient implementation of some policies, limited focus on small farmers, and neglect of the livestock sector were some of the negative impacts of the policies.

6. CONCLUSIONS AND OTHER COMPLEMENTORY REFLEXION

This study investigated the main causes of food insecurity in Pakistan, proposing two hypothesis Political instability and Family structure.

1 Based on the first hypothesis related to conflicts, our conclusion was that conflict did not directly affect food production, contrary to our initial proposal. However, it had a strong impact on inflation, which in turn affected food access. In 2008, the inflation rate in Pakistan was 12%, while it rose to 19.8% in 2022. During this period, there was a notable increase in the prices of various commodities, including wheat, maize, and rice. In 2008, the approximate price of wheat was 12-15 PKR per kilogram. By 2018, the price had risen to 50-55 PKR per kilogram. Similarly, the price of maize per kilogram in 2008 was 10-12 PKR, which increased to 45-50 PKR in 2018. The price of rice per kilogram in 2008 was approximately 40-50 PKR. By 2018, it had risen to 160-180 PKR per kilogram. This increase attributed to factors such as inflation, changes in supply and demand, inflationary pressures. The inflationary pressures negatively affected the income of families in Pakistan, making it more difficult for them to afford food. Furthermore, during the period of study from 2008 to 2018, we observed an increase in demand for food while production levels remained relatively stable. This increase in demand could be attributed to the rapid population growth in Pakistan. In 2008, the population was 185.9 million, while in 2018, it increased to 219.7 million, representing a 17% increase. Additionally, for wheat crop production, there was a minor increase from 24,033 tons in 2008 to 25,492 tons in 2018, indicating only a 5% growth. As the population grew, the demand for food naturally rose, putting additional strain on the already limited resources and contributing to the inflationary pressures mentioned earlier. In summary, our findings suggest that crop production was not directly affected by political instability. However, it did have significant effects on food prices. Moreover, our study revealed another significant factor: population growth. While the production of crops in the study areas remained relatively stable. This indicates that as the population grows, the demand for food increases while production levels struggle to keep up.

2 Based on the second hypothesis related to three variables, we may assert that education has a significant impact on income and food access in Pakistan. Individuals with higher levels of education are more likely to have increased income, better job prospects, and improved career

opportunities, enabling them to afford a sufficient and nutritious diet. Throughout the study period (2008-2018), we observed that illiterate individuals had an average annual income 50% lower than those with primary education. Additionally, individuals with primary (1-5 years) education earned 40% less than those with a matriculation level (6-10 years) of education, while individuals with higher education earned 90% more than those with primary education. These findings suggest that education directly affects income in the study area during the period of 2008-2018.

Second variable, family structure has a significant impact on income and food access in Pakistan, with factors such as the number of earners, division of labor, presence of dependents, sharing of resources, and support networks influencing economic resources and the ability to access a nutritious diet. Throughout the study period from 2008 to 2018, we observed that the study area had a high prevalence of congested family structures. However, we noted that families with a higher number of earners were less affected by food insecurity. For instance, in 2008, the average household structure was 6.8 individuals, with 4.5% earners per household. This configuration resulted in 43.9% of families being affected by food insecurity. In contrast, by 2018, the average household structure had decreased to 6.5 individuals, and the number of earners also declined to 2.5% persons per household. Consequently, food insecurity affected 59.7% of families in this year, leading to limited access to quality food. Therefore, these findings suggest that family structure has a direct impact on income in the study area.

Third variable income has a direct impact on food access. The finding of this research shows that income inequality in Pakistan is significant, with the top 10% of households earning 42% of the country's income, while the bottom 50% only earn 13%. This means that the wealthiest households in Pakistan earn more than three times the income of the poorest households. The country's Gini coefficient, which measures income inequality on a scale from zero (representing perfect equality) to one (indicating perfect disparity), was 0.334 in 2018. According to the World Bank, this value is greater than the average for lower-middle-income countries, which is 0.313.

Furthermore, the gender wage gap also has an impact on income and is prevalent across numerous nations, sectors, and professions, disproportionately affecting low-income women. Pakistan stands out as the epicenter of this inequity. According to the Global Wage Report 2018/19 by the International Labour Organization (ILO), women in Pakistan earn, on average, 34% less than men. The same report reveals that women in Pakistan make up 90% of the bottom 1% of wage earners in the country. The gender wage gap in Pakistan is due to low education. It is important to note that half of the women in Pakistan have not attended school,

and a staggering 90% of women lack post-secondary education. This education gap exacerbates the gender wage gap in Pakistan, as women with post-secondary education experience a threefold increase in pay compared to women with only a primary education. These findings strongly suggest that income directly impacts food access in the study area.

In summary, the first hypothesis suggests that political instability or conflict does not have a significant impact on crop production, but effected inflation. However, it argues that food insecurity is primarily caused by a combination of inflation and high demand.
On the other hand, the second hypothesis demonstrates that family structure and education have a significant impact on income, which in turn affects food access. Therefore, based on the findings mentioned above, it can be concluded that the second hypothesis is fully supported.

FOOD PRODUCTION AFFECTED BY FLOODS.

Pakistan experienced several devastating floods that had significant impacts on food production in the country. These floods caused widespread destruction of crops, livestock, and agricultural infrastructure, leading to food shortages, increased food prices, and food insecurity. According to (Shahid, I., & Venturi, L. A. B. 2022) the 2010 floods in Pakistan were one of the worst disasters in the country's history. According to the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), an estimated 20 million people were affected, and large areas of agricultural land were submerged. The floods destroyed crops, including wheat, rice, and sugarcane, and resulted in a significant decline in food production. In 2011, Pakistan experienced another series of devastating floods, particularly in Sindh province. The floods caused extensive damage to agriculture, affecting over 2.2 million hectares of agricultural land. According to the Food and Agriculture Organization (FAO) of the United Nations, the floods resulted in significant losses of crops, livestock, and fisheries, leading to a decline in food production and increased food insecurity. The 2014 floods in Pakistan, mainly affecting the Punjab and Azad Kashmir regions, caused substantial damage to agriculture. According to the Provincial Disaster Management Authority (PDMA) of Punjab, over 2.3 million acres of crops were destroyed, including rice, sugarcane, and cotton. The floods also led to livestock losses and damaged agricultural infrastructure, impacting food production and rural livelihoods. In 2015, heavy monsoon rains triggered floods in various parts of Pakistan, particularly in Khyber Pakhtunkhwa, Baluchistan, and Gilgit-Baltistan. The floods caused significant damage to agriculture, including the loss of crops, livestock, and agricultural infrastructure. The Provincial Disaster

Management Authority (PDMA) of Khyber Pakhtunkhwa reported a decline in food production and increased food insecurity in the affected areas.

Ways to overcome the issues

Land that has been declared useless due to salinity and floods should be reclaimed. Tubular tubes should be installed in the affected areas to reduce salinity. The beds of the new channels should be made of concrete to avoid flooding. These measures should be taken as a priority to avoid further deterioration of the soil.

The serious problem in Pakistan's agriculture is water scarcity. Most of the land is unused which necessitates to enhance irrigation facilities to increase agricultural production.

The use of fertilizers can also significantly increase agricultural income. The use of synthetic fertilizers should be introduced throughout the country. Due to poverty and illiteracy, our farmers are reluctant to buy fertilizers.

The use of improved seeds, fertilizers and modern equipment is not possible for farmers without adequate credit lines. The government has greatly expanded existing credit lines. Commercial banks also lend to farmers, but more facilities are still needed, because our farmers are very poor. Farmers should get best quality seeds at the lowest prices and at the right time.

Different plant diseases mostly damage our gardens. But our farmers have no effective control over them. Therefore, caution and statement should be made across the country. Mechanization of agriculture refers to the use of different tools at different stages of cultivation. Due to the of modern tools, better results can be achieved in less time.

Cooperation agriculture refers to mutual aid and cooperative agriculture. With this method, the things will be stable, and situations can be handled. That is why small storage owners can use fertilizer and modern equipment at the same time. After the harvest, the income can be distributed to the owners according to their property. There is a need today to increase literacy rates in rural areas, especially in traditional education. The more educated the farmers, the better the results. The marketing process should be simplified and various marketing facilities should be provided to the farmers.

There should be road and rail links with marketing centres in rural areas of the country and better means of transportation and communication.

New policies, plans and programs for future agriculture

- Development and adoption of new types
- Improved access to markets for inputs (seeds, fertilizers, agricultural mechanization, credit, water) and products
- Improved infrastructure, including storage and cooling facilities
- Reduction in post-crop losses
- Maximum investment in research, development and expansion
- Comply with international markets and competition for better quality and quarantine requirements
- Maximum diversity, especially small but high value crops
- In agricultural inputs and production prices
- Demand Policies:
- Income, growth and development
- Education and knowledge
- Stability in food prices
- Market policies:
- Market effectiveness
- Policies to separate local markets from global markets
- Access to local markets

As an agricultural country, the agricultural sector of Pakistan's economy is still lagging behind. The use of modern technology, provision of credit lines, infrastructure and agricultural research resources are essential to overcome all of the problems in the agricultural sector.

In order to achieve a food security and agricultural growth in Pakistan, the Government of Pakistan has to adopt a comprehensive approach towards the increasing of productivity of all foods, not just to focus upon only wheat-based food security. In addition, the farmers should be able to adopt the new agricultural techniques and should be able to finance the higher cost of inputs, and diversify their livelihoods through optimal farming.

7. FURTHER STUDIES AND RECOMMENDATIONS

Pakistan is an agriculture country but the agricultural sector of Pakistan facing many problems. According to the government of Pakistan this sector cannot grow more than 1.9% in2020 financial year. The agriculture sector has been playing the main role in Pakistan's financial system since independence. In the early days, it was considered a dominant sector, but due to some local political, social, environmental and climatic conditions, its production is gradually declining and it is currently the second largest sector in Pakistan. So in my opinion for further study researcher continue analysis of food insecurity in Pakistan on the basis of flood and drought because in Pakistan flood and climatic changes is also responsible for food insecurity. In 2010 the flood destroyed crops and livestock, and damaged irrigation systems, which led to a significant decline in food production and an increase in food insecurity. According to the World Food Programme, the flood affected more than 2.5 million hectares of agricultural land and caused an estimated loss of 1.7 million tons of crops. Another gap for researcher to analyse Food insecurity in Pakistan, can indeed be influenced by geopolitical factors involving its neighbour's, particularly in the context of regional tensions, trade relations, and border issues. Several key geopolitical considerations can impact food security in Pakistan. Pakistan shares borders with India, Afghanistan, Iran, and China. Trade relations and border closures with these countries can significantly affect the availability of essential food items, especially if trade routes are disrupted due to geopolitical tensions. In summary, food security in Pakistan can affected by a complex interplay of geopolitical factors, including trade relations, conflicts, water disputes, regional alliances, and climate change. It's essential for policymakers in Pakistan to consider these factors when developing strategies to ensure food security and work toward regional cooperation to address common challenges. According to UNO, Pakistan Exports to Afghanistan was US$833.42 Million during 2021. Russia and Ukraine war, these conflict can disrupt global markets, especially for commodities like wheat and oilseeds. Ukraine is a major exporter of wheat and other agricultural products. If the conflict disrupts Ukraine's agricultural exports or leads to increased global food price volatility, it could affect the prices of these commodities in international markets. Pakistan, as a net food importer, could be impacted by higher prices for essential food items.

SOME SUGGESTION FOR IMPROVING WOMEN CONDITION IN PAKISTAN

Improving the condition of women in Pakistan requires a holistic and multifaceted approach. By focusing on education, healthcare, economic empowerment, legal reforms, political participation, gender sensitization, community engagement, media representation, support for vulnerable groups, research, and international collaboration, Pakistan can make significant strides toward achieving gender equality and empowering women. It's a collective effort involving government, civil society, individuals, and international partners that will contribute to positive change and a more equitable society for all.

ACKNOWLEDGMENT

I would like to express my sincere gratitude to my esteemed supervisor, Prof. Dr. Luis Antonio Bittar Venturi, for his invaluable supervision, support, and tutelage throughout my PhD degree. Under his guidance, I have grown both academically and personally, and his expertise has been instrumental in shaping the success of my research. I would also like to extend my thanks to CAPES for providing me with the funding opportunity to pursue my studies at the Department of Physical Geography, University of Sao Paulo, Brazil. This financial support has been crucial in enabling me to focus on my research and contribute to the field of study. I would also like to acknowledge my family and friends for their unwavering encouragement and support throughout my academic journey. Their belief in my abilities has been a constant source of motivation and strength.

REFERENCES

1. ABID QAIYUM SULERI AND SAHIB HAQ. (2009). *Food Insecurity in Pakistan in 2009. Available from http://documents.wfp.org/stellent/groups/public/documents/ena/wfp225636.pdf 8*
2. AGRICULTURE DEPARTMENT KHYBER PAKHTUNKHWA (2019):www.crs.kp.gov.pk
3. AHMAD, M., & FAROOQ, U. (2010). The state of food security in Pakistan: Future challenges and coping strategies. *The Pakistan Development Review*, 903-923.
4. AHMAD, F. (2009). Food security in Pakistan. *Pak. J. Agri. Sci*, *46*(2), 83-89.
5. AHMAD, M., &FAROOQ, U. (2010). The State of Food Security in Pakistan: Future Challenges and Coping Strategies. *Pakistan Development Review*, *49*(4 Part II), 903-923.
6. AKBAR NOTEZAI, M. (2016). *The Dilemma of Pakistan's Foreign Policy*. Retrieved from http://thediplomat.com/2016/08/the-dilemma-of-pakistans-foreign-policy/.
7. ALAIMO, K., OLSON, C. M., FRONGILLO JR, E. A., & BRIEFEL, R. R. (2001). Food insufficiency, family income, and health in US preschool and school-aged children. *American journal of public health*, *91*(5), 781.
8. ALWANG, J., SIEGEL, P. B., & JORGENSEN, S. L. (2001). *Vulnerability: a view from different disciplines* (Vol. 115, p. 60). Social protection discussion paper series.
9. ALI, S., NOOR, M. T., & ALAM, K. J. (2016). The determinants of food security among households in Rangpur City, Bangladesh: A logistic regression approach. *IOSR Journal of Economics and Finance*, *7*(4), 51-56.
10. AMERICAN NUTRITION ASSOCIATION (2015) 'USDA Defines Food Deserts'. Available online at: http:// americannutritionassociation.org/newsletter/usda-defines-food-deserts Carter,
11. ANDERSEN, (1990), Sue Ann. Andersen Core indicators of nutritional state for difficult to sample populations J.Nutr., 120 (11) (1990), pp. 1555-1660
12. AREZKI, M. R., & BRUCKNER, M. (2011). *Food prices and political instability*. International Monetary Fund.
13. ARMAR-KLEMESU, M. (2000). Urban agriculture and food security, nutrition and health. *Growing cities, growing food: urban agriculture on the policy agenda. A reader on urban agriculture*, 99-117.
14. ARMSTRONG, K. (2011). *A Letter to Pakistan.* Oxford: Oxford University Press.
15. ARSHAD, S., & SHAFQAT, A. (2012). Food security indicators, distribution and techniques for agriculture sustainability in Pakistan. *International Journal of Applied Science and Technology*, *2*(5).
16. ASGHAR, Z., & MUHAMMAD, A. (2013). Socio-economic determinants of household food insecurity in Pakistan.
17. AUSTRALIAN BUREAU OF STATISTICS. (2017). *Census 2016, Country of Birth of Person by Sex (SA2+)* [Data set]. http://stat.data.abs.gov.au/Index.aspx?DataSetCode=ABS_C16_T06_SA.
18. BALA, B. K., &HOSSAIN, M. A. (2010).Food security and ecological footprint of coastal zone of Bangladesh. *Environment, Development and Sustainability*, *12*(4), 531-545.

19. BASHIR, M. K., SCHILIZZI, AND PANDIT. R. (2013). "Impact of socio-economic characteristics of rural households on food security: the case of the Punjab, Pakistan." *Journal of Animal and Plant Sciences,* 23(2): 611-618.
20. BAUMANN, F. (2021). The next frontier—human development and the anthropocene: UNDP human development report 2020. *Environment: Science and Policy for Sustainable Development*, *63*(3), 34-40.
21. BELLEMARE, M. F. (2015). Rising food prices, food price volatility, and social unrest. *american Journal of agricultural economics*, *97*(1), 1-21.
22. BOHLE, H. G. (2002). Vulnerability: editorial to the special issue. *Geographica Helvetica*, *57*(1), 2-4.
23. BUGHIO, M. (2014). Determining the Status and Use of Languages Spoken in Pakistan. *Sustainable Multilingualism*, 4(4), 46-56.
24. BUREAU OF DEMOCRACY, HUMAN RIGHTS AND LABOR. (2007). *Pakistan: International Religious Freedom Report 2007*. U.S. Department of State. Retrieved from http://www.state.gov/j/drl/rls/irf/2007/90233.htm.
25. BURKI, S. J., & ZIRING, L. (2017). *Pakistan*. Retrieved from https://www.britannica.com/place/Pakistan.
26. CAPALDO, J., KARFAKIS, P., & KNOWLES, M. (2010). *A model of vulnerability to food insecurity*. ESA Working Paper Series No. 10–03. Rome: Food and Agriculture Organization.
27. CENSUS AND ECONOMIC INFORMATION CENTER, (2019). https://www.ceicdata.com/en/pakistan/household-integrated-economic-survey-household-income-and-expenditure
28. CHAMBERS, R. (1989). Editorial introduction: vulnerability, coping and policy.
29. CHUGHTAI, M. W., ZAHEER, M. F., & TAJ, S. (2015). Effectiveness of micro financing for poverty alleviation: A case study of Tameer microfinance bank. *Research Journal of Economics & Business Studies*, *4*(05), 1-9.
30. CITY, BANGLADESH: A logistic regression approach. *IOSR Journal of Economics and Finance*, *7*(4), 51-56.
31. COLEMAN-JENSEN, A., NORD, M., ANDREWS, M., & CARLSON, S. (2011). *Household Food Security in the United States in 2010: Statistical Supplement* (No. 2238-2019-2887).
32. COLEMAN-JENSEN A, RABBITT MP, Gregory CA, Singh A. Household food insecurity in the United States in 2016. USDA-ERS Economic Research Report No. (ERR-237). 2017.
33. DAHL BG, LOCHNER L. (2012). The impact of family income on child achievement: Evidence from the earned income tax credit. American Economic Review.102(5):1927–1956.
34. DAUD, M. K., NAFEES, M., ALI, S., RIZWAN, M., BAJWA, R. A)., S)HAKOOR, M. B., ... & ZHU, S. J. (2017). Drinking water quality status and contamination in Pakistan. *BioMed research international*, *2017*.
35. DAVIS, M. (2001). Late Victorian Holocausts: El Niño Famines and the Making of the Third World. London: Verso. p. 9. ISBN 978-1-85984-739-8.
36. DAWN, JUNE 6TH, (2016) https://www.dawn.com/news/1263018
37. DAWN, THE BUSINESS AND FINANCE WEEKLY, (March 12th, 2018)https://www.dawn.com/news/1394618
38. DE CASTRO, J., & BRANCO, J. C. (1952). Geografia da fome. Casa do Estudante do Brasil.
39. DE CASTRO, J. (2022). Geografia da fome: o dilema brasileiro: pão ou aço. Todavia.
40. DE MURO, P., & BURCHI, F. (2007). Education for rural people and food security. *A Cross Country Analysis. Food and Agricultural Organization of the United Nations, Rome*.
41. DEVEREUX, S., & MAXWELL, S. (2001). *Food security in sub-Saharan Africa*.ITDG Publishing.
42. DOPPLER, W. (2002). Farming and rural systems approaches. *Published Lecture Material*.

43. DOLAN, A. H., & Walker, I. J. (2006). Understanding vulnerability of coastal communities to climate change related risks. *Journal of Coastal research*, 1316-1323.
44. DURKIN, A. (2015). Grow markets, fight hunger: A food security framework for US-Africa trade relations. *The Chicago Council on Global Affairs, Chicago, Illinois*.
45. DWAN NEWS MARCH 2007https://www.dawn.com/news/236949/maize-cereal-with-a-variety-of-uses
46. ECONOMIC SERVEY OF PAKISTAN,2018 https://www.pbs.gov.pk/content/household-integrated-economic-survey-hies-2018-19
47. ECONOMIC SERVEY OF PAKISTAN,(2017) https://www.pbs.gov.pk/content/household-integrated-economic-survey-hies-2017-18
48. EDWARD NEWMAN, 'Hungry, Or Hungry for Change? Edward Newman, 'Hungry, or Hungry for Change? Food riots and political conflict, 2005–2015', *Studies in Conflict and Terrorism, 2018: DOI: 10.1080/1057610X.2018.1454042.*
49. ERICKSEN, POLLY J., JOHN SI INGRAM, AND DIANA M. LIVERMAN. "Food security and global environmental change: emerging challenges." *Environmental Science & Policy* 12.4 (2009): 373-377.
50. FAROOQ, *et al,* (2010). Biosorption of heavy metal ions using wheat based biosorbents–a review of the recent literature. *Bioresource technology*, *101*(14), 5043-5053.
51. FELKER-KANTOR, E., & WOOD, C. H. (2012). Female-headed households and food insecurity in Brazil. *Food Security*, *4*(4), 607-617.
52. FITRIATI, D., HASBULLAH, R., &RACHMAT, R. (2015).Penentuan Prioritas Sarana Pascapanen Jagung Untuk Menurunkan Kehilangan Hasil Dengan Metode Analytical Hierarchy Process (Ahp).*Jurnal Penelitian Pascapanen Pertanian Volume*, *12*(2), 10-19.
53. FAO,(2006):https://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf
54. FAO, (2009): https://www.fao.org/3/i0680e/i0680e.pdf
55. FOOD AND AGRICULTURE ORGANIZATION, (2010): https://www.fao.org/3/i2050e/i2050e00.htm
56. FOOD AND AGRICULTURE ORGANIZATION (FAO, 2011), "*The State of Food Insecurity in the World: How does international price volatility affect domestic economies and food security?"*
57. FOOD AND AGRICULTURE ORGANIZATION, (2011). Global Food Losses and Food Waste Extent, Causes and Prevention. Rome. Retrieved from http://www.fao.org/fileadmin/user_upload/ags/publications/GFL_web.pdf.
58. FOOD AND AGRICULTURE ORGANIZAITON (2013). The State of Food Insecurity in the World the Multiple Dimensions of Food Security. Food and Agriculture Organization of the United Nations, Rome (2013)
59. FOOD AND AGRICULTURE ORGANIZATION UN, (2019) http://www.fao.org/home/en
60. FOOD AND AGRICULTURE ORGANIZATION, (2020): https://www.fao.org/sustainable-development-goals/indicators/2a1/en/
61. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. (2021). FAOSTAT Database. Retrieved from http://www.fao.org/faostat/en/#data/FBS
62. FULLBROOK, D. (2010). Food as security. *Food Security*, *2*(1), 5-20.
63. FUTURE DIRECTION (2019).*Food security in Pakistan.*

64. GLOPOLIS, (2013). *Food Security and Agricultural trade in Kenya. The Impact of the Economic*
65. GLOBAL FOOD SECURITY INDEX, (2019) https://foodsecurityindex.eiu.com/Index
66. GLOBAL HUNGER INDEX,(2020) https://www.globalhungerindex.org/pakistan.html
67. GOVERNMENT OF PAKISTAN, (2010). Household Integrated Economic Survey, Islamabad Federal Bureau of Statistics.
68. GREGORY, P. J.; INGRAM, J. S. I.; BRKLACICH, M. (29 November 2005). "Climate change and food security". *Philosophical Transactions of the Royal Society B: Biological Sciences*. 360 (1463): 2139–2148
69. HALEY, N. C. (2001). Impact of the 1997 drought in the Hewa area of Southern Highlands Province. *Food Security for Papua New Guinea*, *11*, 168.
70. HAMILTON,W. L., COOK, J. T., THOMPSON, W. W., &BURON, L. F. (1997).*Household food security in the United States in 1995: Summary report of the Food Security Measurement Project*. AbtAssociates.x,
71. HART, S. D. (2001). Assessing and managing violence risk. In K. Douglas, C. Webster, S. Hart, D. Eaves, & J. Ogloff (Eds.), HCR-20 violence risk management companion guide (pp. 13-25). Burnaby, Canada: Mental Health, Law, & Policy Institute, Simon Fraser University, and Department of Mental Health Law and Policy, Florida Mental Health Institute, University of South Florida
72. HARVEY, *et al,* (2014). Extreme vulnerability of smallholder farmers to agricultural risks and climate change in Madagascar. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *369*(1639), 20130089.
73. HAYSOM, GARETH, AND GODFREY TAWODZERA. ""Measurement drives diagnosis and response": Gaps in transferring food security assessment to the urban scale." *Food Policy* 74 (2018): 117-125.
74. HDI, (2020)/ https://tribune.com.pk/story/2276065/pakistan-ranks-154th-on-uns-human-development-index
75. HOLZMANN, R., & JORGENSEN, S. (2000). *Social risk management: A new conceptual framework for social protection and beyond*. Social Protection Discussion Paper No. 0006. Washington, D.C.: World Bank
76. HUMANDEVOLAPMENTINDEX,(2018).http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/PAK.pdf
77. HUSSAIN, Z., & AKRAM, W. (2008). Persistent food insecurity from policy failures in Pakistan. *The Pakistan development review*, 817-834.
78. INDUS RIVER SYSTEM AUTHORITY PAKISTAN,(2019): http://pakirsa.gov.pk/
79. IPC. (2017). <http://reliefweb.int/sites/reliefweb.int/files/resources/kp_ipc_jun_2015.pdf> (accessed on 23 February, 2017).
80. INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE. (2018). An analysis of dietary diversity patterns and nutritional outcomes of women and children in Pakistan. Retrieved from https://www.ifpri.org/publication/analysis-dietary-diversity-patterns-and-nutritional-outcomes-women-and-children-pakistan
81. INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE. (2020). Global Food Policy Report 2020. Retrieved from https://www.ifpri.org/publication/global-food-policy-report-2020
82. JACOBS, K., & SUMNER, D. A. (2002). The food balance sheets of the food and agriculture organization: a review of potential ways to broaden the appropriate uses of the data. *Berkeley, CL: Department of Agricultural Economics, University of California*.

83. JAMES, A. J., ADOLPH, B., LALITA, K., REDDY, T., RAO, J., &SHANKARI, U. (2002). Towards a decentralized grain management system.
84. KENNEDY, EILEEN. "Keynote paper: Qualitative measures of food insecurity and hunger." *Rome: FAO* (2005).
85. KHAN, R. E. A., AZID, T., & TOSEEF, M. U. (2012). Determinants of food security in rural areas of Pakistan. *International Journal of Social Economics*.
86. KHAN, S. (2017). Impact of Inflation on Economic Growth: A Case Study of Pakistan. Journal of Economics and Sustainable Development, 8(3), 56-62.
87. KHAN, M. A., & AKHTAR ALI SHAH, S. (2011). Food Insecurity in Pakistan: Causes and Policy Response. *Journal of Agricultural and Environmental Ethics*, *24*, 493-509.
88. KIRBY, M., MAINUDDIN, M., KHALIQ, T., & CHEEMA, M. J. M. (2017). Agricultural production, water use and food availability in Pakistan: Historical trends, and projections to 2050. *Agricultural Water Management*, *179*, 34-46.
89. KUGELMAN, M., & HATHAWAY, R. M. (2009). Running on Empty. *Woodrow Wilson International Center for Scholars, Washington*.
90. KUGELMAN, M. (2010). Pakistan's food insecurity: Roots, ramifications, and responses. *HUNGER*.
91. LAGI, M., BERTRAND, K. Z., & BAR-YAM, Y. (2011). The food crises and political instability in North Africa and the Middle East. *arXiv preprint arXiv:1108.2455*.
92. LOVENDAL, *et al*, (2004). *Understanding vulnerability to food insecurity: Lessons from vulnerable livelihood profiling* (No. 854-2016-56191).
93. LØVENDAL, C. R., & KNOWLES, M. (2005). Tomorrow's hunger: A framework for analyzing vulnerability to food insecurity. Agriculture and Development Economics Division ESA working paper, 05–07.
94. MAHMOOD, S., TABASSUM, A., KHAN, S. A., & JABEEN, N. (2014). An investigation of determinants of food security in rural areas of Faisalabad, Pakistan. *Mediterranean Journal of Social Sciences*, *5*(4), 676.
95. MANGO, N., ZAMASIYA, B., MAKATE, C., NYIKAHADZOI, K., & SIZIBA, S. (2014). Factors influencing household food security among smallholder farmers in the Mudzi district of Zimbabwe. *Development Southern Africa*, *31*(4), 625-640.
96. MAXWELL, S., & FRANKENBERGER, T. R. (1995). *Household food security: concepts, indicators, measurements: a technical review*. Unicef.
97. MINISTRY OF NATIONAL FOOD SECURITY AND RESEARCH. (2018). *National Food and Security Policy, Ministry of National Food Security and Research, Islamabad; Interviews, Islamabad, June 2018.*
98. M., L. DUBOIS AND M. TREMBLAY (2014) 'Place and Food Insecurity: A Critical Review Synthesis of the Literature', Public Health Nutrition 17(1): 94–112.
99. MOSER, C. O. (1998). The asset vulnerability framework: reassessing urban poverty reduction strategies. *World development*, *26*(1), 1-19.
100. MUMTAZ, Z., SALWAY, S., & NYKIFORUK, C. (2012). Women's health in Pakistan: overlooked and underinvested. Journal of women's health, 21(3), 281-286.
101. MUNIR, I. U., HUSSAIN, S., IJAZ, M. S., UR REHMAN, Z., & ZULFIQAR, B. (2020). DO GENDER AND FINANCIAL LITERACY RELEVANT ON THE RELATIONSHIP BETWEEN EMOTIONAL INTELLIGENCE AND INVESTMENT BEHAVIOR?. *International Journal of Management (IJM)*, *11*(8).

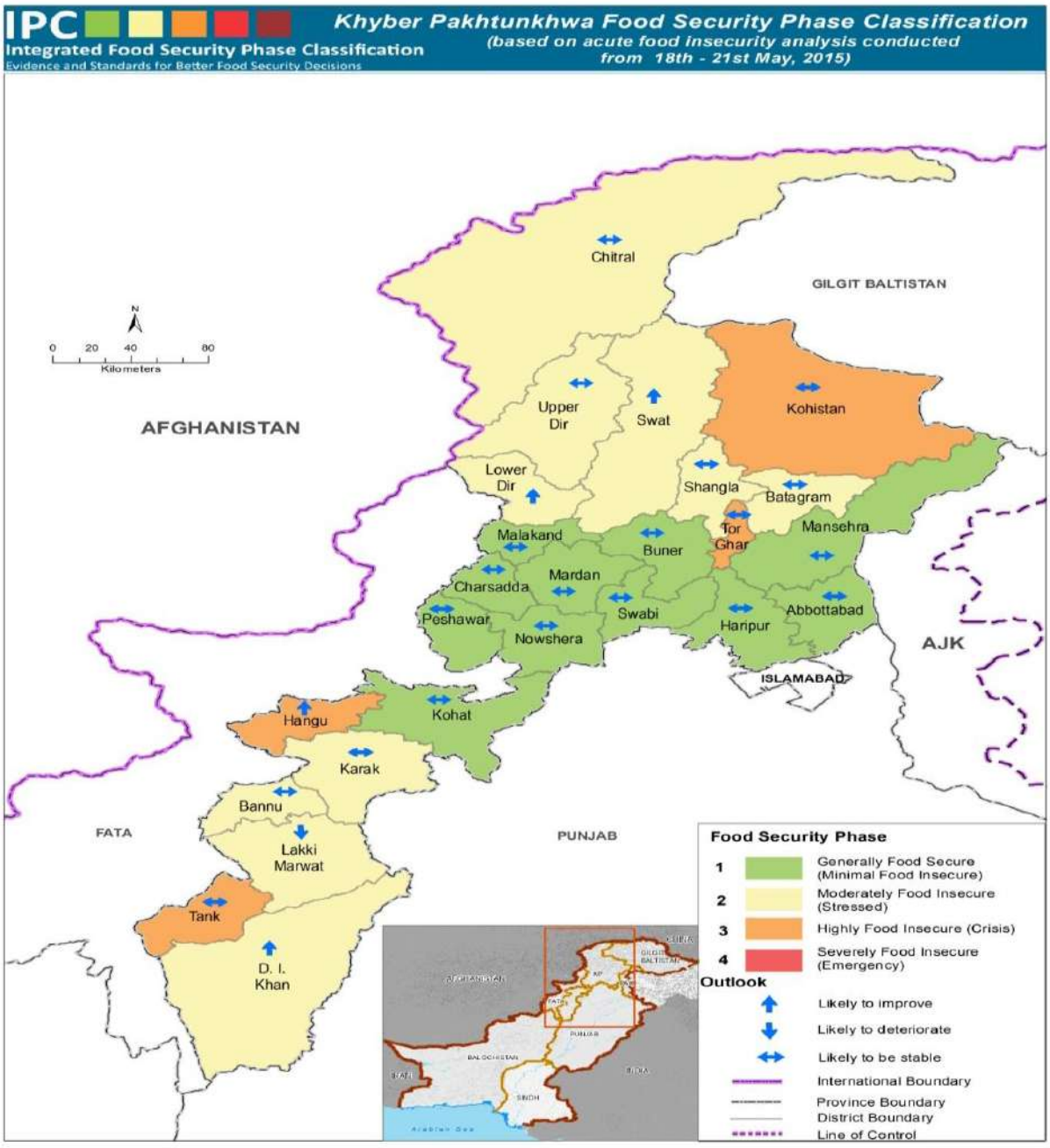
102. MUSTAFA, S. (1996). An appraisal of the socio-political and economic environment for food security in Nigeria. Proceedings of the Strategic Grains Reserve Programme: Nucleus for National Food Security, Federal Ministry of Agriculture, Abuja, Nigeria.
103. NATIONAL NUTRITION SURVEY, (2018) https://www.unicef.org/pakistan/national-nutrition-survey-2018
104. NEWMAN, E. (2020). Hungry, or hungry for change? Food riots and political conflict, 2005–2015. *Studies in Conflict & Terrorism*, *43*(4), 300-324.
105. NORD, M., ANDREWS, M., CARLSON, S., (2005). Household Food Security in the United States, 2004. USDA-ERS Economic Research Report (11).
106. NORD, M. (2007). Characteristics of low-income households with very low food security: an analysis of the USDA GPRA food security indicator. *USDA-ERS Economic Information Bulletin*, (25).
107. Nord, M., *et al,* (2012). Household food security in the United States. *Economic Research Report ERR-141*, *37*.
108. OPHI, (2016). https://www.undp.org/sites/g/files/zskgke326/files/2022-12/UNDP-OPHI-Regional-MPI-Brief-Latin-America-and-the-Carribeans.pdf*et*
109. OLSON, C. M., ANDERSON, K., KISS, E., LAWRENCE, F. C., & SEILING, S. B. (2004). Factors protecting against and contributing to food insecurity among rural families. *Family Economics and Nutrition Review*, *16*(1), 12-21.
110. OMOLE, T. (1996). The impact of international politics and trade on food security. Proceedings of the Strategic Grains Reserve Programme: Nucleus for National food Security, Federal Ministry of Agriculture, Abuja,.
111. [ONLINE] AVAILABLE AT: http://www.futuredirections.org.au/wp content/uploads/2019/04/Food-Security-in-Pakistan-Surplus-Food-is-not-Enough-to-Create-a-Food-Secure-Country.pdf
112. OYAKHILOME, D. E. (1996). Institutional framework for a national food security programme. *Proceedings of the Strategic Grains Reserve Programme: Nucleus for National Food Security, Federal Ministry of Agriculture, Abuja, Nigeria*, 67-73.
113. PAKISTAN BAURU OF STATISTIC: https://www.statista.com/statistics/383760/inflation-rate-in-pakistan/#statisticContainer
114. PAKISTAN AGRICULTURAL RESEARCH COUNCIL. (2009). "Household Poverty and Food Security Situation Survey for the Year 2008-09." Islamabad: Social Sciences Division, PARC.
115. PAKISTAN BUREAU OF STATISTIC (2010). 'https://www.pbs.gov.pk/publications'
116. PAKISTAN BUREAU OF STATISTICS (2018). *"DISTRICT AND TEHSIL LEVEL POPULATION SUMMARY WITH REGION BREAKUP: KHYBER PAKHTUNKHWA" (PDF*
117. PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS. (2016). Inflation and Household Expenditure Inequality in Pakistan. Retrieved from https://ideas.repec.org/p/pid/wpaper/2016-138.html
118. PAKISTAN NATIONAL NUTRITION SURVEY (2018). Ministry of National Health Services, Regulations and Coordination, Government of Pakistan. https://www.nips.org.pk/nnis-2018-key-findings-report/.
119. PAPPACHAN, B., & CHOONARA, I. (2017). Inequalities in child health in India. *BMJ Paediatrics Open*, *1*(1).
120. PATEL, R., BEZNER KERR, R., SHUMBA, L., & DAKISHONI, L. (2015). Cook, eat, man, woman: understanding the New Alliance for Food Security and Nutrition, nutritionism and its alternatives from Malawi. *Journal of Peasant Studies*, *42*(1), 21-44.
121. PINSTRUP-ANDERSEN, P. (2009). Food security: definition and measurement. *Food security*, *1*(1), 5-7.

122. RAYFUSE, N. WEISFELT,(2012). The Challenge of Food Security, 327 (2012), pp. 812-819, 10.4337/9780857939388
123. REDDY, M. T. (2001).Literature Review on Decentralised Food Security and Grain Storage. *CEC. Hyderabad*.
124. ROSEGRANT, MARK W., AND SARAH A. CLINE. "Global food security: challenges and policies." *Science* 302.5652 (2003): 1917-1919.
125. RUKUNI, M. (2002). Africa: addressing growing threats to food security. *The Journal of nutrition*, *132*(11), 3443S-3448S.
126. SAFANSI, (2018). https://www.worldbank.org/en/programs/safansi
127. SDPI, S. (2009). Food insecurity in Pakistan. Islamabad, Pakistan: Sustainable Development Policy Institute (SDPI), SDC, and WFP.
128. SDPI (2010) 'Migration and development', Sustainable Development Policy Institute, Islamabad, Pakistan.
129. SHAHID, I., & VENTURI, L. A. B. (2022). Analysis of the Main Causes and Damages of 2010 Flood in Pakistan (A case study of Hameed Dhere & Faqir Abad District Charsadda). *East Asian Journal of Multidisciplinary Research*, *1*(2), 129-142.
130. SHIMALA MATRI-DAWOOD, June (2008). "Life below the Line" http://www.newslinemagazine.com/2008/06/life-below-the-line/.
131. SLEET, P. (2019). Food Security in Pakistan: Surplus Food is not enough to create a Food Secure Country.
132. SMITH, L. (2002). Keynote paper: the use of household expenditure surveys for the assessment of food insecurity. In *FAO. Measurement and assessment of food deprivation and undernutrition. In: Proceeding of International Scientific Symposium, Rome* (pp. 26-28).
133. SMITH, L. C., & SUBANDORO, A. (2007). *Measuring food security using household expenditure surveys* (Vol. 3). Intl Food Policy Res Inst.
134. SULERI, A. Q. (2009). Food crises in developing countries: the role of national governance.
135. STATE BANK OF PAKISTAN, (2019). Retrieved from https://www.sbp.org.pk/reports/quarterly/inflation/Inflation-Monitor-July-2019.pdf
136. SZABO, S., HOSSAIN, M. S., ADGER, W. N., MATTHEWS, Z., AHMED, S., LÁZÁR, A. N., & AHMAD, S. (2016). Soil salinity, household wealth and food insecurity in tropical deltas: evidence from south-west coast of Bangladesh. *Sustainability science*, *11*(3), 411-421.
137. TARASUK, V. S. (2001). Household food insecurity with hunger is associated with women's food intakes, health and household circumstances. *The Journal of nutrition*, *131*(10), 2670-2676.
138. THE NEWS, FEBRUARY 8, (2010), "FREE TRACTORS," http://www.thenews.com. pk/print1.asp?id=223057.
139. THE NATION, (2017). <http://nation.com.pk/national/31-Oct-2013/food-insecure-kpk> (accessed on 23 February, 2017).
140. THE NEWS, (2021). https://www.thenews.com.pk/print/871459-despite-claims-pakistan-poised-to-be-most-food-insecure-in-region
141. THELEGATUMPROSPERITYINDEX,(2023).https://www.prosperity.com/globe/pakistan#:~:text=Pakistan%20(Ranked%20136th)%20%3A%3A%20Legatum%20Prosperity%20Index%202023.

142. TIMMER, C. P. (2000). The macro dimensions of food security: economic growth, equitable distribution, and food price stability. *Food policy*, *25*(3), 283-295.
143. TIMMER, P. (2004). Food security and economic growth: an Asian perspective. *Center for global development Working Paper*, (51).
144. TITUS, B., & ADETOKUNBO, G. (2007). An analysis of food security situation among Nigerian urban households: Evidence from Lagos State, Nigeria. *Journal of Central European Agriculture*, *8*(3), 397-406.
145. TURNER, *et al*, (2003). A framework for vulnerability analysis in sustainability science. *Proceedings of the national academy of sciences*, *100*(14), 8074-8079.
146. UNDP, P. (2016). Multidimensional poverty in Pakistan.
147. UPPSALA CONFLICT DATA PROGRAM, Department of Peace and Conflict Research, Uppsala University: *http://ucdp.uu.se*
148. USMAN, M, (2016). "Contribution of agriculture sector in the GDP growth rate of Pakistan." *Journal of Global Economics*.
149. VINK, N. (2012). Food security and African agriculture. *South African Journal of International Affairs*, *19*(2), 157-177.
150. WALLACE-STEPHENS, F. (2019). Economic Insecurity: The case for a 21st century safety net.
151. WOMEN FATORE IN FOOD SECURITY, (2018) :https://www.pakistantoday.com.pk/2014/11/15/the-woman-factor-in-food-insecurity/
152. WORLD BANK (2001). Nuts and Bolts. Downloaded at <http://wbinoo18worldbank.org/rdv/food,nsf>.
153. WORLD BANK, (1990-2018).https://knoema.com/atlas/Pakistan/topics/Food Security/Expenditures-Spent-on-Food/Expenditures-spent-on-food
154. WORLDOMETER, (2019) https://www.worldometers.info/world-population/pakistan-population/
155. WORLD FOOD PROGRAMME (2009). Food assistance for people affected by high food Prices. WFP Emergency Operation, Islamabad.
156. WORLD FOOD FROGRAMME, (2018).https://www.wfp.org/countries/pakistan
157. WORLD FOOD PROGRAMME, (2020).https://www.fao.org/3/cb9997en/cb9997en.pdf
158. WORLD BANK,(2021). Inflation Retrieved from https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=PK
159. YAMAMOTO, S. S., PHALKEY, R., & MALIK, A. A. (2014). A systematic review of air pollution as a risk factor for cardiovascular disease in South Asia: Limited evidence from India and Pakistan. *International journal of hygiene and environmental health*, *217*(2-3), 133-144.
160. ZEREYESUS, YACOB A., *et al*. (2017). "Implications of non-farm work to vulnerability to food poverty-recent evidence from Northern Ghana." *World Development* 113-124.
161. ZHOU, DEYI, *et al*. (2019). "Factors affecting household food security in rural northern hinterland of Pakistan." *Journal of the Saudi Society of Agricultural Sciences* 201-210.

APPENDIXES

A. Integrated Food Security Phase Classification 2018



B. Mardan land use map