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RESEARCH PAPER

Future Food Demand for Pakistan: An Analysis

[1]Nadia Asghar*, [2]Dr.Alia Afzal and [3]Dr. Gulnaz Hameed

1. PhD Scholar, Department of Economics, Arid Agriculture University Rawalpindi, Punjab, Pakistan
2. Assistant Professor Department of Economics, Arid Agriculture University Rawalpindi, Punjab, Pakistan
3. Assistant Professor Department of Economics, Arid Agriculture University Rawalpindi, Punjab, Pakistan

***Corresponding Author:** nadiaasghar21@yahoo.com

ABSTRACT

Food is a basic human need and right of all individuals. Every nation is trying to be self-sufficient in food production. Pakistan is a developing country, facing challenges of increased population and food demand. In this study, the demand for certain food commodity groups is projected for the future in Pakistan after an analysis of current household food demand. Data is obtained from Pakistan Panel Household Survey (PPHS) conducted by Pakistan Institute of Development Economics (PIDE) 2021. The demand elasticity is calculated by using the linear approximation/almost ideal demand system (LA/AIDS) model, and food demand predictions are made using a straight forward growth model. According to the empirical findings, milk and meat are considered luxuries while food items like grains, pulses, ghee, sugar, and vegetables are added as basic requirements. On the basis of the available previous data obtained from farmer mentioned sources, future food demand for the country is projected. Study is significant for government policy makers' in devising policies to meet the food demand in future.

KEYWORDS Future Food, Grains, LA/AIDS

Introduction

Food refers to any substance that is consumed to provide nourishment, sustain life, and support growth and development in living organisms, particularly humans. It is typically of plant or animal origin, and it contains essential nutrients, including carbohydrates, proteins, fats, vitamins, minerals, and water, which are necessary for the body's proper functioning. Food can take various forms and be prepared through cooking, processing, or fermentation (Ahmad 2020). It encompasses a wide range of items, including fruits, vegetables, grains, meats, dairy products, seafood, legumes, nuts, seeds, oils, spices, and beverages. It can be consumed raw, cooked, or processed into different forms such as bread, pasta, soups, stews, salads, and more. In addition to its nutritional value, food also plays a significant role in cultural, social, and emotional aspects of human life. It is often associated with traditions, celebrations, and gatherings, serving as a means of expressing cultural identity and fostering social connections. It is a fundamental component of human existence, providing sustenance, energy, and essential nutrients required for the body's growth, maintenance, and overall well-being (Ahmad et.al 2021).

The demand for food is influenced by several factors, including population growth, economic development, dietary preferences, and global trends. Food is a basic necessity for human survival, and as the world's population continues to increase, so does the demand for food. The global population is growing at a significant rate.

According to the United Nations, the world's population is projected to reach 9.7 billion by 2050 (Anderson & Watson 2011). With more people to feed, the demand for food will continue to rise.

Literature Review

The literature review explores the topic of food demand by examining various studies and research papers published in the field of food economics, agricultural economics, and related disciplines. The review provides an overview of the key factors influencing food demand, trends in food consumption patterns, and the implications of changing food demand for food security, sustainability, and policy-making. The synthesis of existing literature aims to shed light on the complex dynamics of food demand and contribute to a comprehensive understanding of this critical aspect of global food systems.

As countries experience economic growth and rising incomes, there is often a shift in dietary preferences. People tend to consume more meat, dairy products, fruits, and vegetables, which can increase the demand for agricultural products and processed foods. Dietary patterns vary across regions and cultures. In recent years, there has been a growing trend towards healthier eating habits, such as increased consumption of plant-based foods, organic products, and locally sourced ingredients. This shift in dietary preferences can impact the demand for specific types of food (Kumar 2009). Urbanization is occurring at a rapid pace worldwide, with more people moving to cities. Urban areas often rely on food supply chains to meet the demand for food, including transportation, storage, and distribution systems. This can create challenges in ensuring a steady supply of food to urban populations. Climate change poses significant challenges to food production. Extreme weather events, such as droughts, floods, and heat waves, can disrupt agricultural activities and reduce crop yields (Metal 2008). These climate-related factors can impact the availability and affordability of food, potentially leading to increased demand and higher prices. There is a growing awareness of the environmental impact of food production. Issues such as deforestation, water scarcity, greenhouse gas emissions, and soil degradation are driving the demand for sustainable and environmentally friendly agricultural practices. Advances in agricultural technology, such as precision farming, genetic engineering, and vertical farming, have the potential to increase food production and efficiency. These innovations can help meet the growing demand for food by improving crop yields, reducing waste, and optimizing resource utilization (Farooq et al 2009).

Meeting the demand for food is a complex global challenge that requires a combination of sustainable agricultural practices, technological advancements, and equitable distribution systems. It is crucial to ensure food security for all while minimizing the environmental impact of food production. There can be several causes of low food production in Pakistan. Pakistan heavily relies on irrigation for its agricultural practices, and water scarcity is a major challenge. Climate change, reduced rainfall, and mismanagement of water resources can lead to insufficient water availability for crops, resulting in lower food production. Soil erosion, salinization, and depletion of nutrients in the soil can lead to reduced crop yields. Improper land management practices, deforestation, and overuse of chemical fertilizers contribute to land degradation, negatively impacting agricultural productivity (Sulehri et al 2009).

The adoption of modern agricultural techniques, such as improved seed varieties, efficient irrigation systems, mechanization, and use of fertilizers and pesticides, is relatively low in many parts of Pakistan. Limited access to these practices hampers

productivity and prevents farmers from maximizing their output (Farooq et al 2009). Inadequate storage, transportation, and processing facilities pose significant challenges to the agricultural sector in Pakistan. Post-harvest losses are high due to a lack of proper storage infrastructure, and inefficient transportation networks make it difficult to move agricultural produce from rural areas to urban markets (Zaheer 2013).

Small farmers often face difficulties in accessing credit and essential agricultural inputs, such as seeds, fertilizers, and machinery. The lack of financial resources prevents farmers from adopting modern farming techniques and investing in their agricultural operations (Malik et al 1988). Pakistan is vulnerable to climate change impacts, including erratic weather patterns, extreme temperatures, and frequent natural disasters like floods and droughts. These events can devastate crops and livestock, leading to decreased food production and food insecurity. Insufficient investment in agricultural research and development limits the development and dissemination of innovative farming practices and technologies (Mudassar 2012). Lack of knowledge about advanced farming methods hinders progress in increasing food production. Political instability, governance issues, and lack of policy coherence can hinder agricultural growth and investment. Inconsistent policies, corruption, and inadequate support from the government can create an unfavorable environment for agricultural development (Seher 2012).

It is important to note that these factors can vary in their significance across different regions of Pakistan, and addressing them requires a multifaceted approach involving government initiatives, technological advancements, infrastructure development, and support for farmers at various levels.

Analyzing the future food demand in Pakistan involves considering various factors such as population growth, urbanization, economic development, dietary patterns, and climate change. While I can provide a general overview, please note that specific projections and trends may vary depending on various assumptions and data sources.

Pakistan has a rapidly growing population, which is projected to reach 403 million by 2050, according to the United Nations. With more people to feed, the demand for food will continue to rise (Yousaf 2012). Urbanization is occurring at a significant rate in Pakistan. As people move from rural areas to cities, there is an increased reliance on food supply chains and a shift in dietary patterns. Urban areas typically have higher demand for processed and convenience foods, including fruits, vegetables, dairy products, and meat. Cultural and regional preferences in Pakistan influence the people (Zahoor et al 2011). Traditional Pakistani cuisine includes a variety of spices, grains, lentils, and vegetables. However, there has been a trend towards the consumption of processed foods, fast food, and sugary beverages, which may impact future demand.

Above literature is just a glimpse of the previous work on agriculture production and food demand. Researchers and policymakers continue to investigate these areas and adapt their strategies to meet the changing demands of consumers in future. This study is also an attempt to project the future food demand of the country along with the analysis of the factors that are affecting the food production and food demand in Pakistan.

Theoretical Unpinning

Demand analysis is a science of choices and preferences made by consumer and household among different goods and services. Demand analysis id the analysis of

consumers; choices and preferences. It is about the distribution of income by the consumers in order to maximize utility. Economic theory introduced the concept of utility to explain the level of satisfaction. Demand analyses focuses on two basic problems.

a. How to maximize utility within limited resources/budget?

b. How to expenditure?

Theory of demand rooted in economic principles and is based on the premise that consumers behave rationally in their decision-making process. The theory considers various factors that influence food demand, including price, income, tastes and preferences, and the availability of substitute goods. The theory of food demand provides a framework for understanding how consumers make choices about the types and quantities of food they purchase and consume. It helps policymakers, researchers, and businesses analyze and predict consumer behavior and make informed decisions regarding food production, distribution, pricing, and marketing strategies.

Material and Methods

Data Collection and Source

The data is obtained from Pakistan Penal Household Survey (PPHS), conducted by Pakistan Institute of Development of Economics (PIDE) in the year 2021. The data was consisted of total 4076 households. Data of quantities consumed and expenditure made on various commodities like food grains, ghee, pulses, milk, sugar, meat, vegetables is included.

Data of per capita GDP growth from the year 2022 to 2030 is obtained from Economic Research Service (ERS). ERS projected the per capita growth rate on the basis of the value dollar 2015. While the data of population and population growth rate for the years 2022 t0 2030 is obtained from Asian Development Bank (ADB) (Asia Pacific 2021).

Data Analysis Methods/Technique

The food demand is projected using the following growth formula introduced by Deaton and Muellbauer in 1980 (Deaton &Muellbauer 1980).

$$D= d\times N(1 + y \times e)t$$

where,

Dt = Household demand of a commodity group in year t (in million metric tons).

d0 = Per capita consumption (kg) of the commodity group in base year i.e. the year 2020.

Nt= The projected population in the year t (in million). ADB data set projects the future population of various countries separately including Pakistan with the help of simple compounding formula from the year 2021 to 2030.

y = Per capita growth in income i.e (GDP).

e = Elasticity of demand of expenditure/income for the commodity group (t=Years 1, 2, 3…n. for base year t = 0).

This formula is widely used to project future food demand in all over the world. The basic characteristic of this formula is that it requires less parameters and information. Model is based on following assumptions.

a) Population Growth remains constant

b) Prices remain constant.

c) No technological advancements i.e. constant technology of production.

d) Taste and preferences remain same.

Results and Discussion

Table 1
Statistical Analysis of Commodity Group and Households

Commodity Group	Mean	Standard Deviation	Coefficient of Variation
Budget Share			
Food Grains	26.88	18.11	72.39
Pulses	8.01	6.87	91.40
Ghee	15.93	8.83	58.12
Milk	13.64	15.12	118.21
Sugar	14.96	10.98	71.41
Meat	13.79	14.92	101.32
Vegetables	8.59	7.78	74.11
Household Composition By Age			
Children less than age 5 years	1.081	1.381	121.63
Age Group 5-15	1.729	1.624	93.92
Greater than 15	4.259	2.452	56.38
Household Size	7.813	3.781	53.29

Table 2
Per Capita Consumption/Demand of Various Food Commodity Groups in 2021

Commodity	Demand (Kg/Per Year)
Food Grains	124
Pulses	97.1
Ghee	38.5
Milk	56.5
Sugar	92.2
Meat	21.42
Vegetables	132

Table 3
Base Year 2021 and Projected Population for the Year 2022 to 2030 (Million)

Year	Population (In Millions)
2022	235.8
2023	238.2

2024	242.6
2025	245.2
2026	248.9
2027	251.6
2028	253.5
2029	257.4
2030	259.5

Table 4
Projected Growth Rates in per capita Income (% Per Annum)

Year	Per Capita Income Growth
2022	2.83
2023	2.88
2024	2.90
2025	2.94
2026	2.98
2027	3.01
2028	3.03
2029	3.05
2030	3.07

Table 5
Projected Total Demand for Various Food Commodity Groups from 2022 to 2030 (Million Metric Tons/Year)

	Commodity Groups						
Year	Food Grains	Pulses	Ghee	Milk	Sugar	Meat	Vegetables
2022	28.2	26.1	7.9	21.2	23.42	8.10	35.3
2023	29.2	26.8	8.6	21.93	24.80	9.53	37.8
2024	30.7	27.9	9	23.43	25.68	10.30	38.23
2025	31.2	29.3	9.2	24.59	26.21	11.21	39.10
2026	32.7	30.4	9.6	25.36	27.51	11.98	40.10
2027	33.1	31.8	10.1	26.20	28.63	12.12	41.25
2028	34.52	32.25	10.92	27.45	29.65	13.25	42.52
2029	36.25	33.21	11.52	28.57	31.86	14.85	44.74
2030	38.32	35.52	12.87	29.78	32.33	15.02	47.18

Conclusion

Table 1 shows the demographic statistics of households included in survey, table 2 shows the per capita consumption demand of included food items, and table 3 projected the future population while table 4 depicts the per capita income. Table 5 projects the future food demand of various food items. Results show that in future demand of all food items is going to be increase. There is a huge gap between demand of food and production of food. In the year 2022, the demand of food grains was projected 28.2 million metric tons while production was 26,400 million metric tons. If production is not increased than the gap between supply and demand of food items will get widen and Pakistan will have to rely on import to meet the demand. Therefore, it is essential for Pakistan to prioritize sustainable agricultural practices, improve infrastructure, enhance food distribution systems, and promote nutrition education to meet the future food

demand. Collaboration between the government, private sector, and international organizations can contribute to ensuring food security and addressing the challenges posed by population growth, urbanization, and climate change.

Recommendations

As discussed earlier that increasing food production in Pakistan requires a multi-faceted approach that addresses various factors such as agricultural practices, infrastructure, technology, and policies. Study recommends following policy measures in order to enhance the food production in the future

- It is suggested that government should allocate resources to support research and development in agriculture. This includes developing high-yielding crop varieties that are resistant to pests, diseases, and environmental stresses. Promote the adoption of modern farming techniques, such as precision agriculture and hydroponics, to increase productivity.

- Enhance irrigation infrastructure by investing in water storage facilities, canal lining, and efficient water management systems is also recommended. This will help optimize water usage and ensure that sufficient water reaches the fields, particularly during dry periods. Additionally, promote the use of drip irrigation and sprinkler systems to improve water efficiency.

- It is recommended that government should facilitate farmers by providing credit and financial services particularly to smallholders. This will enable them to invest in modern farming equipment, quality seeds, fertilizers, and other inputs necessary for increased productivity. Implement policies that incentivize banks and financial institutions to provide loans and financial services to the agricultural sector.

- Programs to strengthen agricultural extension services to provide farmers with up-to-date knowledge, training, and technical supports are much needed. This includes educating farmers about modern agricultural practices, climate-smart techniques, and effective pest and disease management strategies. Extension services can also assist in disseminating information about market trends, prices, and value-addition opportunities.

- It is also recommended that programs and incentives to encourage farmers regarding adoption of sustainable farming practices that promote soil health, conserve water, and reduce environmental degradation must be initiated. This includes promoting organic farming, agroforestry, conservation agriculture, and integrated pest management techniques. Implement policies that provide incentives for farmers to adopt these practices.

- It is suggested that government should enhance post-harvest management practices to minimize losses and increase the shelf life of agricultural produce as major chunk of production lost due to unavailability of post-harvest facilities. This involves improving storage facilities, transportation infrastructure, and cold chain systems. By reducing post-harvest losses, more food can reach the market, increasing availability and reducing wastage.

- Poor infrastructure is also one of the cause of food grains wastage. It is suggested that government should develop efficient and transparent agricultural markets

that connect farmers with buyers, processors, and retailers. This includes establishing agricultural marketing infrastructure, supporting farmer cooperatives, and facilitating the formation of producer groups. Strengthening market linkages will help farmers get fair prices for their produce and encourage them to increase production.

- Government should must invest in farmer education and training programs to enhance their knowledge and skills. This includes providing training on modern farming practices, financial literacy, business management, and value-addition techniques. Well-informed and skilled farmers are more likely to adopt innovative practices and make informed decisions regarding their farming operations.

- Policy makers must develop and implement policies that support the agricultural sector, including incentives for agricultural investment, subsidies for essential inputs, and risk management mechanisms such as crop insurance. Policy coherence is crucial to provide a favorable environment for farmers and agribusinesses to thrive.

- It is also recommended that government should encourage collaboration between the public and private sectors to leverage expertise, resources, and innovation. Public-private partnerships can facilitate technology transfer, knowledge sharing, and investment in the agricultural sector.

- Production and use of dairy items as food substitute must be encouraged and promoted, moreover awareness and advocacy about the sensible eating and not to waste of food is also suggested to educate masses to save food.

References

Ahmad, A.U.F. (2020). The state of food security in Pakistan: Future challenges and coping strategies. Paper presented at the 26th *AGM and Conference of PSDE in Economics*. National Research Center, Islamabad, Pakistan.

Ahmad, N., Cheema, A.R., &Saleem, A. (2021). Food consumption analysis in Pakistan: expenditure elasticities approach using HIES data. *Interdisciplinary Journal of Contemporary Research in Business, 4(4)*, 466–475.

Andersen, P.P., & Watson D.D., II (2011). Food policy for developing countries: The role of government in global, national and local food systems. *Ithaca:* Cornell University Press.

Burki, A.A. (1997). Estimating Consumer Preferences for Food, Using Time Series Data of Pakistan. *The Pakistan Development Review, 36(2),* 131–153.

Deaton, A., & Muellbauer, J. (1980). An almost ideal demand system. *The American Economic Review, 70(3*), 312–326.

Farooq, U.T.Y., & Muhammad, I. (1999). An investigation into the farm households' consumption patterns in Punjab, Pakistan. *The Pakistan Development Review, 38(3),* 293–305.

Kumar, P., Joshi, P.K., & Birthal, P.S. (2009). Demand Projections for food grains in India. *Agricultural Economics Research Review, 22,* 237–243.

Malik, S.J., Mushtaq, M., &Ghani, E. (1988). Consumption patterns of major food items in Pakistan: Provincial, sectoral and intertemporal differences 1979 to 1984–85. *The Pakistan Development Review, 4(II),* 751–761

Mudassar, K., Aziz, B., & Anwar, A. (2012). Estimating consumer demand of major food items in Pakistan: A micro data analysis. *Pakistan Journal of Life and Social Sciences, 10(1),* 53–58.

Mittal, S. (2008). Demand-supply trends and projections of food in India (Working Paper).New Delhi: *Indian Council for Research on International Economic Relations*.

Muellbauer, A.D.J. (1980). An almost ideal demand system. The American Economic Review, 70(3), 312–326.

Sher, F., Ahmad, N., & Safdar, S. (2012). Income and economies of scale effect on household food demand pattern in Pakistan using PSLM data. *Academic Research International, 3(1),* 50–56.

Suleri, S.H., de Franchis, Laura, Herbinger, W., Ramay, S.A., Ahmed, A., Anwar, A., & Salman, A. (2009). Food Insecurity in Pakistan. Pakistan: SDC Swiss Agency for Development and Cooperation, SDPI Sustainable Development Policy Institute, *WFP World Food Programme Pakistan*.

Yousaf, S., & Khalil, A.H. (2012). Analysis of consumption and demand elasticities for food products in Balochistan. *International Journal of Asian Social Science, 2(7),* 1103–1122.

ZahoorulHaq, H.N., Meilke, M., Muhammad, I., Khattak, A., Hasmi, A.H., &ur Rahman,F. (2011). Food demand patterns in pakistani punjab. *Sarhad Journal of Agriculture, 27(2)*, 305–311.

Zaheer, D.R. (2013) Analyzing the performance of agriculture sector in Pakistan. *International Journal of Humanities and Social Science Invention, 2(5),*1-15