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Analysis of Food Security in Pakistan Incorporating Various Trades of Life

Saira Batool [1]*, Maryam M. Ali[2], Areeba Amer[1]
[1]Center for Integrated Mountain Research, University of the Punjab, Lahore.
[2]Department of Space Science, University of the Punjab, Lahore.
*** Corresponding Email**: saira.cimr@pu.edu.pk

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For humans to thrive, they must be able to access high-quality, nutritional food. Economic growth, poverty reduction, trade opportunities, global security and stability, and better health and health care are benefits of food security. Pakistan's food security is the focus of the current study. Many factors need to incorporate for the calculation of food security including food availability, accessibility, utilization, and stability. One criterion was determined for developing countries, and another was created for countries in specific regions (South Asia). According to the study's findings, a food shortage has been found in Pakistan. It follows behind in terms of food supply and consumption, leading to inferior overall food security scores. According to the report, Pakistan's food security situation might be improved by focusing on enhancing food supply and consumption, followed by food accessibility and stability. Food availability and consumption must be addressed first in Pakistan before the other two dimensions can be addressed.

Keywords: Agricultural security, food security, multidimensional food security, linear scaling approach, and Pakistan.

Introduction

Pakistan's population is growing at a faster rate than any other country globally, making it the fifth most populous on the planet. As a result of all of this, the country is placed 148th in the Human Development Index rankings (HDI). An investigation of Pakistan's current food security situation and possible solutions is the primary objective of this study. Food insecurity is a major issue in many developing countries. It was envisioned that reducing poverty, hunger, and food insecurity would be a prerequisite to both human and economic development. SDGs also call for a world free of hunger by 2030 [1][2]. All of the Sustainable Development Goals of the United Nations are negatively impacted by food insecurities, including physical, social, emotional, and cognitive development. However, according to Pérez-Escamilla (2017)[3][4][3], around 800 million people still lack access to sufficient food, and over two billion people are vitamin deficient. Thus, food security is an important development issue that directly impacts economic growth and progress[5]. For economic development to occur, food security and economic growth must work in concert. Human safety and nation-building depend on a healthy and stable food supply[6]. Humans cannot sustain their health requirements to increase human resources, making food security a global problem.

According to the Minutes of the World Food Summit held in 1974, "Food is stated to be secure when an adequate amount of all basic foodstuff supplies is available to maintain an extraordinary development of food consumption and to override the impacts of production and price changes". First, food availability was prioritized over all other considerations regarding food security. As a result, policymakers, researchers, and international organizations began working on a better solution to the problem. The FAO broadened the definition of food security in 1983 to include "ensuring people's physical and economic access to basic food and food supplies." This notion also emphasized the necessity for adequate economic and infrastructure resources to procure food that satisfies people's needs from the existing food supply, which is part of the demand side of food security. According to Reutlingen in 1986, food should be available "so that people can lead a healthy and active lifestyle." It was decided to increase the quality of life for people by making food more readily available. "Global food security is attained when every person has physical and economic access to adequate, nutritious, and safe food to meet their dietary needs to live an active and healthy life," said the World Food Summit in 1996, which redefined food security[7]. Consistent availability, ease of access, and food consumption are all included in this definition of food security. For example, "the existence of food security means a situation where all people have both physical and economic access to adequate safe and nutritious foods at all times to overcome nutritional energy deficiency and to provide food choices for a healthy life" [8] was updated in the state of food security (2001). There are three food security indicators: experience base, coping techniques, and dietary diversity. These only measure quantity and quality. The use of experience-based and individual dietary variety indicators [9] is advised to evaluate an individual's availability of high-quality food and adequate micronutrients. In terms of food security, Peng and Berry (2018)[10][11]cite four characteristics: national availability, household accessibility, individual utilization, and stability across time. Sustainability, a long-term concept, has become a part of modern studies. A wide range of indicators can quantify and assess food security and food insecurity at different levels.

An accurate assessment of the dimensional status is necessary to identify improvements that can improve food security outcomes. Using the Nigerian multidimensional assessment of the food security framework, Ike et al. claim that policymakers and the government may get a clear picture of the extent and scope of food insecurity and take appropriate action (2017) [12]. Pakistan's rapid population growth and climate change pose a serious challenge to the country's food supply. The average yield per hectare is still substantially

lower, and there are large geographic disparities, thus, there is still room for growth in food production. Economic and physical access to food is hindered by extreme poverty, diminishing HDI scores, and a lack of employment opportunities for a growing population, low labor force participation, and rising food prices. Education is also a factor in limiting food security and nutrition. There is a shortage of access to safe drinking water, suitable drainage and sewage systems, and healthcare facilities, limiting the amount of food that can be consumed. Food insecurity has always been a major problem because of the instability of the food supply.

Undernourishment in Pakistan, a low-middle-income country, has decreased little in the last two decades, although it is still significant. As a result of a series of good harvests, Pakistan has a surplus, but 60% of its people remain food insecure and cannot afford adequate nutrition. If only 30 percent of Pakistan's potential is utilized, the country is nearly self-sufficient in food, with 35 percent of the country's food supply remaining untapped. Because of poor food procurement and distribution networks, low consumer purchasing power, inadequate marketing, illegal food movement, and natural disasters[13][14], there remains a food gap despite this potential. To ensure food security in Pakistan, a full understanding of the various facets of food security is required to assess potential obstacles and achieve a star food security profile. Agriculture is the primary food security and nutrition source in Pakistan, a low-income country with a rapidly increasing population. The world's population is projected to double by 2050 at the current growth rate, while cultivated land expansion is relatively sluggish, and the urban population is increasing, putting pressure on cultivated land. Although wheat is a staple in many countries, it is imported considerably. Slowing population growth and improving field technologies would assist to close the food demand and supply imbalance[15][16].

However, there are a number of studies on the subject, but none focus on food security in Pakistan. Governments and policymakers need to identify the most vulnerable aspect of food security before going on to the others, so they may focus their efforts on improving that aspect first. This article uses a multidimensional food security index to examine Pakistan's food security and compare it to other nations in the area and developing economies. Papers like this one help to identify which components of Pakistan's food security profile are strong and which are weak, based on a comparison of various features with thresholds. The current investigation is the first of its kind in the field. The same research could be conducted in multiple countries or regions.

Methods and Materials

Also included here are explanations of the indicators and data sources employed to construct the many facets of this phenomenon. An index with multiple dimensions can be created by following the steps outlined by Nardo and colleagues[17]. The first step is to adopt a theory to help with the selection of indicators for each dimension. The next step is to imputation missing data and normalize the information. The last step is to weigh the indicators and aggregate the data. It is possible to estimate the complexity of the problem of food insecurity by looking at a variety of different indicators [17][18]. The concept of food availability, accessibility, utilization, and stability may be divided into four major aspects, each of which comprises a separate set of indicators. Numerous FAO studies on worldwide food insecurity provided the data for this study. The theoretical significance of each indication in each dimension was taken into consideration.

FAO statistics, FAO food security indicators, World Development Indicators (WDI), and UN statistical data sources compiled this report. Over 29 years (1991-2019), the World Bank's 10 regions, including six countries in South Asia, collected data from 20 developing nations.

The data has been normalized, a linear modification of the data, because the indicators have different measurement units and the aggregate is helpful only when the indications are similar. The Minimum-Maximum technique was used rather than z-score transformation because z-score transformation does not remain stable when new data for a new time point is available [17].

For linear aggregation, the simple arithmetic mean is employed. An aggregation method is used in this study in which each attribute is collected separately and then blended into one composite index of food security based on [17]methodologies. Data from each country and time period are combined. For each country (t), Equation (1) provides the formula for calculating the food security multi-dimensional index (FSMI): To calculate FSMIit, use the formula: FSMIt=1/4(FAV+FAC+FUT+FST).... (1)

According to certain studies, the geometric mean is a useful technique to aggregate dimensions. Regarding about deprivation index (Nardo et al., 2005)[14][19], it was claimed that geometric aggregation solves the problem of wide differences in sub-dimension values. The geometric average was also employed in the Human Development Report (2000)[20], which was followed and Sen. Using a basic arithmetic average, Neumayer et al. (2010)[21] looked at human progress and sustainability. To compensate for one indicator's greater position and another's lower position, the various components are mixed to achieve the final result. According to (Sagar and Najam, 1998) and (Desai, 1991)[22], [23], we are discussing the general phenomenon of multiple dimensional indexes. Consequently, one sign could serve as a substitute for another.

Findings

To assess Pakistan's food security and the factors that contribute to it, this study used two benchmarks. First, the developing country average was derived and the Pakistani data were compared to it, and then a regional (South Asia) criterion was produced and compared to the Pakistani situation. Results show the rankings and scores of emerging countries, including Pakistan. In light of these facts, Pakistan's food security situation can be better understood. The dimensions of Pakistan's predicament in contrast to other emerging countries and neighboring countries reflect the comparative state in Pakistan. This comparison helped us to determine which areas in Pakistan's food security situation need to be improved first and provides a set of activities that may be performed.

Pakistan's standing in other developing countries is measured by the average value of each category and total food security. Countries over the threshold are regarded as the best, while countries below the barrier are considered the worst. Pakistan ranks 19th, 16th, 18th, and 17th regarding food supply, accessibility, utilization, stability, and overall food security. This means Pakistan is ten times the average in terms of food availability, six times below the average in terms of access to food, and four times below the average in terms of food utilization. This means Pakistan is ten times the average in terms of food stability and ten times above the average in food accessibility. Even so, Pakistan falls eight spots (3.60 points) short of the developing-country average when it comes to food security overall.

In general, food insecurity is a problem in Pakistan. Food security must be improved in order to overcome the hurdles posed by developing countries. To become a food-secure country, Pakistan must put food availability and use first, followed by food accessibility. Due to a shortage of resources, Pakistan's food production is poor, putting the country at risk of running out. To add insult to injury, there isn't enough dietary energy to meet the needs of those suffering from malnutrition. Arable land, high-yielding seeds, fertilizer and insecticide, and high-tech automated farming tools must be available in Pakistan to boost the food supply. Food nutritional value could further improve by increasing average calorie intake and moving the energy source away from tubers and roots and toward other foods such as fruits, meats,

and vegetable oils. Food security can be improved by increasing the supply of agricultural inputs like seeds and diversifying sources of income and nourishment.

There are several ways to increase the quantity and quality of food available in a country. Among these are diversifying sources of food supply such as cattle, fisheries, and poultry, increasing agricultural inputs like seeds, fertilizers, and pesticides, and improving access to finance [24]. Similarly to this, the availability of food, which can be attained through food production, is a prerequisite for food and nutrition security. A low-impact technology deployment is important to securing the green revolution and food and nutrition security in the long term[25]. In addition, food aid and safety net programs could help increase food availability.

Additionally, farmers' capitalization, stability in yield, and the transition from rainfall to alternative forms of irrigation are critical[26]. There is only one way to guarantee Ethiopia's food security: boosting production. Increasing the technical efficiency of crop growers and making investments in their socioeconomic situations are two ways to get there [27].

Another area in which Pakistan can enhance its national food security is food use, also known as food absorption. Compared to poor countries, food usage or absorption capacity is exceedingly low, preventing nutritional health from being acquired through food consumption. There is a direct correlation between the lack of clean water and sanitary services, malnutrition, under-nourishment, stunted growth, and the occurrence of several diseases. To increase food consumption, simple procedures that limit illogical fertilizer and pesticide use, inappropriate waste disposal, and sewer and industrial water contamination can be implemented. Strategic activities include bio-remediation of sewage and industrial water and a preventative approach to food safety throughout the supply chain of food items [24].

Pakistan's food profile is reasonably stable, the amount of food available, accessible, and consumed is shock-resistant. Shocks have little effect on Pakistan's food security. Pakistan is 4.91 points below the threshold for food availability, 4.2 points below the accessibility threshold, 15.15 points below the utilization level, 9.18 points over the stability barrier, and 3.78 points below the total food security threshold in terms of food availability. By comparing it to the regional scenario and the regional threshold.

Pakistan's position is comparable to that of developing countries regarding the regional threshold. Regarding food supply, availability, consumption, and overall food security, Pakistan falls short of the regional standard by 5.1 points, 4.14 points, 16.13 points, and 4 points. However, it is over the mark when it comes to food security. Pakistan's total food security is in peril due to a lack of food utilization, followed by food availability.

The area is now the most important comparison point because of the similarity in geography, climate, topography, seasons, social and cultural traits, economic conditions, and infrastructure facilities. Pakistan appears to have a better intra-regional condition than other countries,. In order to determine the optimum possible settings, the regional average is used as a guideline. In terms of food consumption and availability, Pakistan is lagging behind the rest of the world's population. Regarding food availability and consumption, Pakistan falls short of the region's averages, coming in fourth and third, respectively, of the six countries surveyed. As shown in the above scenario, we must first address food use and availability to improve overall food security. As a result of malnutrition and hazardous water and sanitation facilities, the best usage profile cannot be achieved.

Conclusions

This paper aims to build a food security policy for Pakistan. There are many ways to measure food security, and each has its own set of dimensions and indicators. An original method to increasing food safety is taken in this study, which makes it stand out from the crowd. Each facet of food security is influenced by different factors, necessitating a thorough examination of each. After creating a food security index that included averages of each

component and composite index values, this study compared Pakistan's overall food security position with that of other countries throughout the study period. International, interregional (developing world areas), and intraregional are some of the many thresholds that can be crossed (South Asia). There are two levels of condition: good and bad. Good values are those that are over the threshold; bad values are at or below the threshold. Pakistan's food security is better than most other countries. Yet, food availability and usage are far from optimal and much below the thresholds set by the paper's results and discussions section. First, the government must improve supply and use, and only then can access be improved, allowing the country to achieve food security. An important aspect of this strategy is that it provides a tangible road ahead and aids in managing the effort to gradually resolve the issue. When new characteristics are added to the idea of food security, future scholars may add other dimensions to their analysis.

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