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Food Security in Rural Areas of Bundelkhand Region, M.P.

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Abstract

This study is based on the field survey conducted in the sample villages of Sagar division of Madhya Pradesh. This region is known for frequent drought because of the failure of monsoon rains. This region is an example of climate change, where food security is challenging. Earlier, there was an acute deficiency of food availability in the first half of the twentieth century but after continuous efforts the situation has reversed, and the region entered the condition of food security after the period 2016-17. Food availability and food security are decided by agricultural production and rate of growth, population size and its growth, purchasing power of households, and post-harvest losses in this region.

Key words: Food security, Food availability, purchasing power, agricultural development.

Introduction

Food security is a pressing concern that afflicts a significant number of less developed and developing nations. In tropical regionsmost food comes from agriculture and therefore, food security has significantly threatened livelihood for many decades (Edame, et al., 2011).

Food availability is becoming a problem and food security is a challenge in developing countries because the population growth is not keeping pace with the growth of food production. In our country, tremendous progress has been recorded in foodgrain production during the second half of the twentieth century, however the growth of population has outstripped the progress in foodgrain production. Our country is self-sufficient in foodgrains however, some parts of the country again entered the category of deficit regions, Bundelkhand is one of such regions. In the first half of the twentieth century, our country was prone to the insecurity of food because of lower production and lower size of population. In the twenty-first century, the conditions have changed, now there is sufficient food and our country become an exporter of foodgrains and we have entered the stage of food security. However, the acceleration in the growing population needs attention otherwise the situation can change again what it was earlier.

In the Bundelkhand region where major food comes from agriculture five major components determine food security- (i) the level of agricultural development and factors that affect food production, (ii) trends in food production, and (iii) trends in population change (Mishra, 2022, p.64), (iv) purchasing power of households and (v) post-harvest losses.Food availability is basically determined by two primary components, one of which is food production, and the second is size and trends of population growth. These two components are dynamic and interrelated, and any change in them during a particular period can affect the food availability scenario largely in a region.

The level of agricultural development depends on several components such as type of soil and its fertility level, size of farm holdings, use of fertilizers, high-yielding varieties of seeds, use of farm machinery, nature of crop and cropping pattern, productivity level,economic and social status of farmers, and overall socio-economic development of the region. Since agriculture mainly depends upon monsoon rains, the failure of monsoon rains affects the overall food production of food in this region.Other than monsoon rains, some other weather conditions such as temperature, humidity, and moisture in the atmosphere, adverse weather conditions such as hailstorms, untimely rain, and drought also play a crucial role in determining the cropping pattern, nature and variety of crops, productivity level, amount, and quality of food production.Moreover, adverse changes in weather conditions, such as heavy rains, droughts, rising temperatures, or hailstorms, can indirectly affect agricultural production and food security. Climate change directly or indirectly affects crop yields, soil fertility, water-holding capacity,crop pests and diseases and domestic agricultural production(Gitz et al., 2016; Alagidede et al., 2015);).Thus, any change in the rainfall and weather conditions affects agricultural productivity, food production and food security in this area. This region is known for frequent drought occurrences, affecting the people's agricultural conditions and the overall economy. Agriculture in this region affects not only the availability of food but also the purchasing power of individuals and the society's overall socio-economic development.Food availability, accessibility and food security are directly associated with income, particularly in low- and middle-income groups of families where food insecurity is prevalent (Herforth and Ahmed, 2013). Food insecurity and high prices are associated with poor dietary

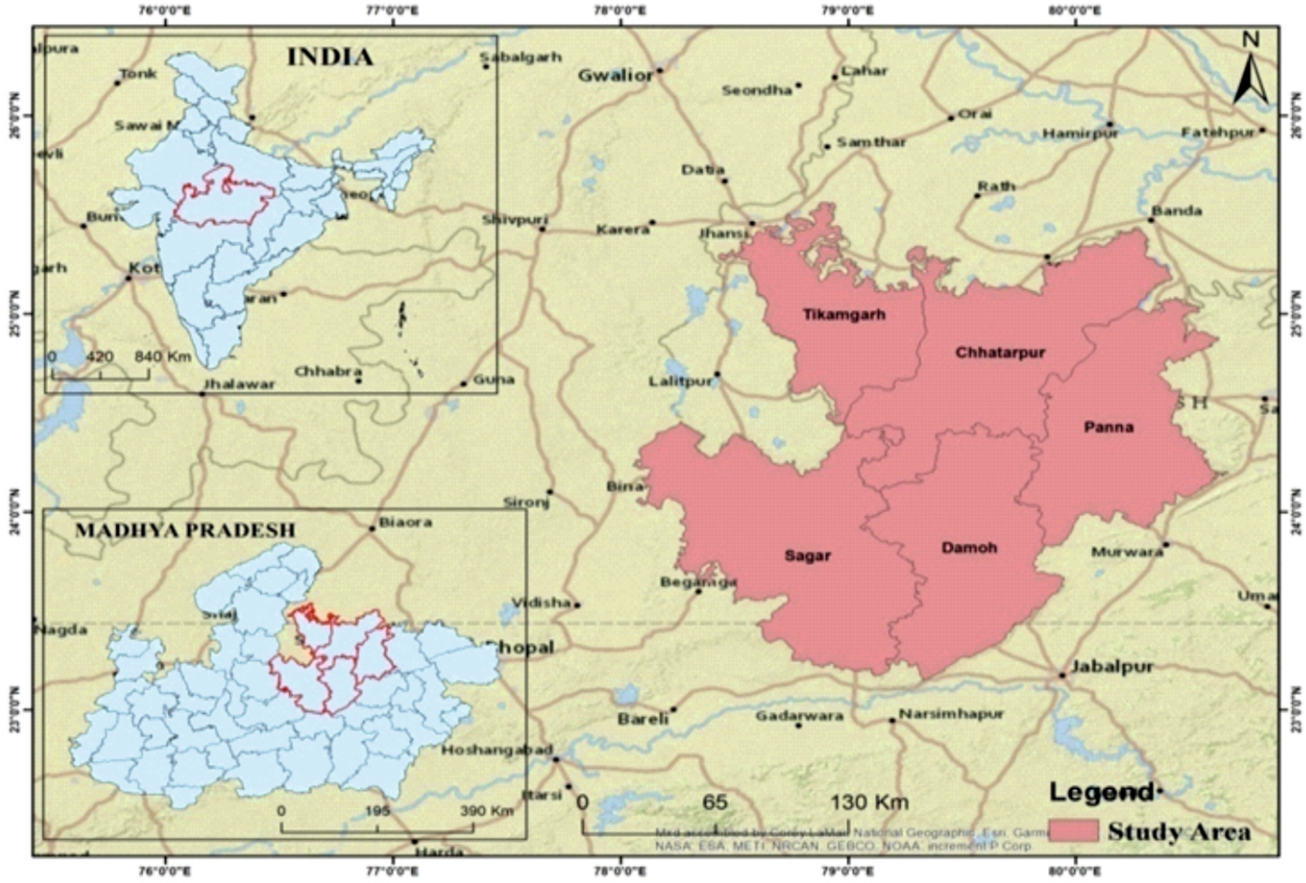
quality, disproportionately affecting low-income and vulnerable populations (Headey and Alderman, 2019).

During the Green Revolution, yield-increasing technologieswere adopted in agriculture; consequently, food production increased to a large extent, but consistency in the sustainability in food availability may not improve because the demographic factors widened its gap after the decade 1971 (Mishra, 2006). The Bundelkhand region of Madhya Pradesh has a peculiar situation in terms of food production and its availability. Seven decades ago, there was an acute food crisis, and this region was classed in the deficient category despite low population pressure because the food production was very low. During 1961-71, this region became almost self-sufficient in food security because of increased gross cropped area, per hectare yield rate and overall agricultural production. After this decade, increase in the incidences of drought conditions; the agricultural production declined while, on the other side, the population increased at a faster rate, and therefore this region has taken a path towards food deficiency as it was in the first half of the twentieth century. The previous scarcity was due to lower agricultural production with low population pressure, while the current condition is because of both higher agricultural production and a higher population growth rate (Mishra, 2022).Food security can be improved by management of soil degradation, increasing agricultural productivity and production, farming of climate-resilient crops, proper use of water for irrigation, use of manures, farm machines, reducing wastage of post-harvest losses, sustainable agricultural practices, and infrastructure for small farmers (Rosegrant, et al., 2018).

Another significant determinant of food security is the population which has grown at an accelerating rate since 1971, putting extra pressure on the food resources in the Bundelkhand region. Newcomers in the coming decades will need extra food and other infrastructural facilities, which may change the condition of food security. Therefore, there is an urgent need to control the population and also search for alternative food items for the people.

The study area

Bundelkhand region of Madhya Pradesh is situated in the north-central part of Madhya Pradesh between 78°00′ to 80°40′ E and 23°20′ to 25°30′ N (Map.-1). The region has all the conditions of monsoon climate, which affect the entire physical and socio-economic conditions of the society. Though the average annual precipitation ranges between 750 and 1250 mm, however, failure of rainfall in every three years severely effects the food production and overall socio-economic development. Rivers, tanks, ponds, wells and tubewells are the sources of water. This region is administratively divided into six districts, namely Sagar, Damoh, Tikamgarh, Chhatarpur, Panna and Niwari.



The population of the Bundelkhand region was 7.87 million in 2011, almost equivalent to the combined population of Denmark and Latvia (PRB, 2022) or the combined population of Himachal Pradesh and Mizoram. Nearly, three-fourthspopulation is living in rural areas, which primarily depend upon agriculture for their livelihood; therefore, agriculture is the main economic activity, and most of the working population is engaged in the agricultural sector. Some other occupations are household industries, small and cottage scale industries, and some other occupations. The population is growing with higher rate (18.5%) which is higher than the national average growth rate of the population (17.64%). The population density (207 persons) is lower than the state's average of 236 persons. About 78.8 per cent of males and 57.6 per cent of females are literate; it indicates that nearly one-fourth males and little less than half of the females are illiterate, and this is one of the indicators of backwardness of this region.

Objectives

- To analyse the level of food security in a backward region of Madhya Pradesh by using household surveys in the sample villages.
- To analyse different dimensions of food security such as sources of foodstuffs, food production from agricultural resources, food consumption pattern, dietary pattern, nutritional requirements and availability and differentials.
- To analyse possible factors that affect food production and food availability.

Database and methodology

The study is based on a structured questionnaire to collect information from 60 households distributed in ten sample villages selected from five districts two villages from each district.

The analysis of food security is based on (i) Daily Calorie Intake (DCI), (ii) Household Food Insecurity Access Scale (HFIAS), (iii) Coping Strategy Index (CSI) and (iv) Food Consumption Score (FCS). Whilethe analysis of food and nutritional availability is based on the methods used by FAO (1957), Shafi (1960), Sukhatme (1962), Choubey (1979), Mishra (1984), and NIN (Gopalan, 2004).

Some information and data from secondary sources also used in this study. District-wise food production data obtained from website of Ministry of Agriculture and Year wise Agricultural Statistics of Madhya Pradesh. The primary data and information related to this study collected through field survey conducted in ten sample villages, two each from a district of the region. These villages are- Lakhni and Vijaypura (Sagar), Bhuri and Bansa Kalan (Damoh), Mokhra and Putrikhera (Tikamgarh), Rajpura and Sunahara (Chhatarpur), and Puraina and Kartariya (Panna).

Results and Discussion

I. Food Production

The production of food grains has increased by about six times, from 0.86 million tonnes (1970-71) to 5.06 million tonnes (2020-21). This production of food grains has not recorded a continuous increase between 1970-71 and 2018-19, and there were several fluctuations. The decrease was ranges from 0.43% to 28.76%, this decline was due to the failure of monsoon and deficiency of rainfall. During the last five decades, there have been four distinct divisions in the production of food grains (Mishra, 2022)-

(I) The period from 1956-57 to 1980-81 when production was below 1.0 million tonnes. This period recorded an acute deficiency of foodgrains when area and production of food grains was very low.

(ii) The period from 1980-81 to 2010-11 when production was below 2.0 million tonnes. During this period the area under foodgrains was increased, but there were very high fluctuations in the production of food grains.

(iii) The period from 2011-12 to 2015-16 when production exceeded 2.0 million tonnes. This period has also recorded fluctuations in the production of food grains and the growth was almost stable or low.

(iv) The period from 2016-17 to 2020-21 when production exceeded 4.0 million tonnes. This period has recorded low fluctuations in the production of food grains.

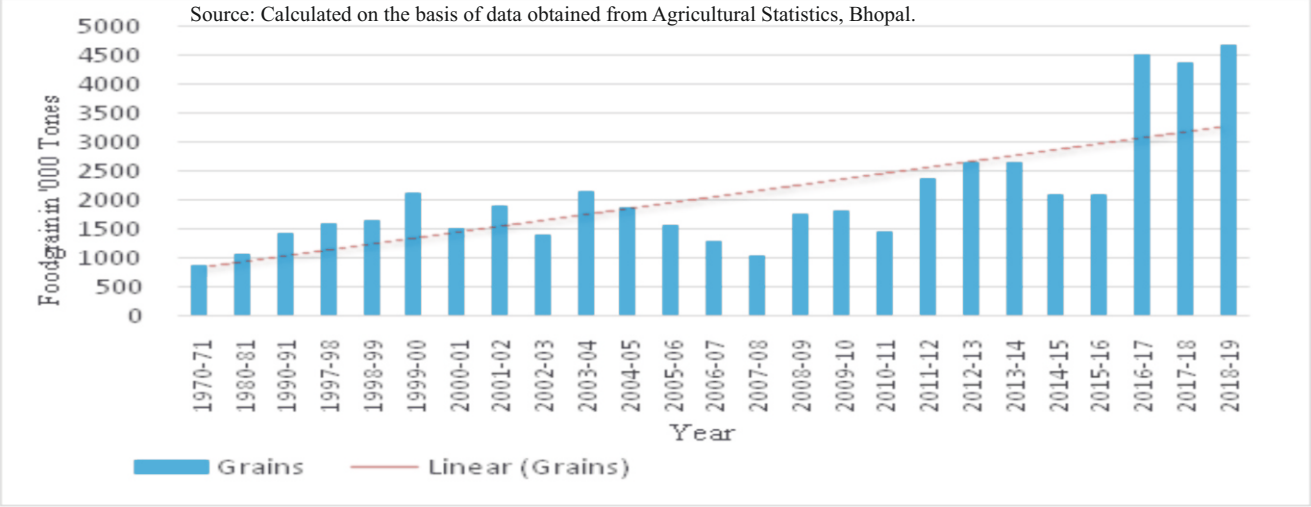


Fig.1: Foodgrain Production in Bundelkhand Region, M.P.

Sources of Food in Rural Areas*:* In rural areas, food primarily originates from local farmlands where residents cultivate crops to meet their annual dietary needs. This includes a variety of staples like cereals and pulses, along with certain vegetables and other essential food items. However, supplementary items such as leafy vegetables, green vegetables, root vegetables, fats and oils, fruits, sugar, and milk are procured from nearby markets. Therefore, the accessibility of some foodstuffs hinges on the financial capacity of households. Consequently, cereals and pulses constitute a substantial portion of their year-round diet. In addition to their agricultural farms, rural communities often maintain small gardens near their settlements, and sometimes even within their homesteads, to cultivate crops like corn, roots, green vegetables, and leafy green vegetables. These vegetables are typically available during the rainy and winter seasons.

II. Food Availability

Despite exhaustive attempts, the population of hungry and malnourished individuals continues to rise. Therefore, ensuring an ample food supply for everyone will continue to pose a formidable challenge throughout the 21st century (Walter Falcon et al., 2005). This persistent challenge in eradicating hunger and malnutrition is intricately linked to the disruptive impacts of climate change on ecosystems, agriculture, and food security (Hossain et al., 1998; Schmidhuber&Tubiello, 2007). The relentless growth of the population only exacerbates the situation, demanding that food production rates keep pace with this ever-increasing demographic expansion.

Food production has increased by about six times while per capita availability increased by only two times in the last five decades.The per day per capita food availability has fluctuated during the period from 1970-71 to 2020-21 in this region (Table-1). During 1970-71 the availability was 586 grams per person per day, and in the next decade (1980-81), it decreased by 2.05 percent from 586 grams to 574 grams. It increased by 6.97% during the next decade, from 574 grams to 614 grams. Further, it has decreased by 15.31 percent, from 614 grams (1990-91) to 520 grams (2000-01), and again by 24.62%, from 520 grams to 392 grams. During 2015-16, it increased by 42.6 percent from 392 grams (2010-11) to 559 grams (2015-16) and again it increased by 126.48 percent from 559 grams (2015-16) to 1266 grams (2020-21). These fluctuations in food availability indicate instability in food security conditions in this region.

Table1. Trends inFood Availability in the Bundelkhand Region, Madhya Pradesh

Period	Gross Availability of Food Grain (000 Tonnes)	Net Availability of Food Grains (000 Tonnes)	% Change in Foodgrains Availability	Population (Million)	Per Capita Per Day (PCPD) Availability (g)	% Change in PCPD Availability
1970-71	858.5	716.85	--	3.35	586	--
1980-81	1055.7	881.51	22.97	4.21	574	-2.05
1990-91	1429.8	1193.88	35.44	5.33	614	6.97
2000-01	1509.8	1260.68	5.60	6.64	520	-15.31
2010-11	1348.7	1126.17	-10.67	7.87	392	-24.62
2015-16	2081.0	1737.64	54.30	8.51	559	42.60
2020-21	5064.3	4228.69	143.36	9.15	1266	126.48

Source: Calculated and compiled on the basis of data obtained from Agricultural Statistics, Madhya Pradesh Directorate of Agriculture, MP, Bhopal,1973,1981,1993,2002,2011,2022.
Note: Calculation for 2015-16 and 2020-21 is based on projected population.

The deficiency and fluctuationswere because of a differential in the rate of growth in food production and population. Population is increasing with geometrical progression continuously while the food production is increasing by arithmetic rate, this proves the theory of Malthus. This condition was due to failure monsoons and deficiency of rainfall, and continuous growth in population with higher rate. Thus, climate change impacts indirectly, particularly precipitation, the agricultural productivity, family purchasing power, per capita food availability and food security.The agriculture of this area is mainly rainfed; it primarily depends on rainfall, not only rabi crops but also kharif crops. The dependency on rainfall resulted in lower productivity and lower production in agriculture, which is the primary source of livelihood.However, after 2015-16, a condition of sufficiency has been achieved in food production and this region become self-sufficient in food availability. This may be because of increase in the area under irrigation and use of fertilisers, high yielding varieties of seeds, farm machinery and other farm inputs.

Season-wise availability of foodstuffs: Second half of the rainy season, characterized by increased atmospheric

moisture and higher temperatures, supports the flourishing of a variety of leafy vegetables, green vegetables and other vegetables. These vegetables are easily available and become part of the diet of rural areas. Similarly, the first half of the winter season offers optimal conditions for the growth of numerous green vegetables, leafy vegetables, root and tubers, other vegetables and seasonal fruits due to its low temperatures, adequate moisture levels, and ample water supply. Consequently, these vegetables become abundant in the final two months of the rainy season. In contrast, during the summer season, the arid atmosphere and limited water resources in rural areas lead to a scarcity of most vegetables.

*Public Distribution System (PDS):*This system has emerged as a mechanism to manage food security by making food grains available at a very cheap price. The Central Government, primarily through the Food Corporation of India (FCI), takes on the roles of procuring, storing, transporting, and making bulk allocations of food grains to the State Governments. Meanwhile, the operational responsibilities, such as the allocation of food grains within the state, the identification of eligible beneficiary families, the issuance of Ration Cards, and the supervision of Fair Price Shops (FPSs).

In the study area, poor families are getting wheat, rice, and some other food items on a scanty rate, consequently, food sufficiency has been achieved in recent years. The government is distributing four kg/personwheat and one kg/person rice per month through its public distribution system. In addition to these staple food grains the state government also distributes additional items such as sugar, pulses, edible oils, iodized salt, etc.

Antodaya Anna Yojana (AAY): Another step towards food security is the *Antodaya Anna Yojna* (AAY) which was a step under the **Targeted Public Distribution System (**TPDS) to reduce hunger among the poorest segments of the BPL population. A National Sample Survey Exercise pointed towards the fact that about 5% of the total population in the country sleeps without two square meals a day. This scheme has also been in operation in this area since its beginning, and very poor families, helpless and disabled families are getting 35 kg of wheat per family per month through public distribution system.

III. Analysis of Sample villages

Food Consumptions Pattern: In the population of the surveyed villages cereals and pulses constitute more than three-fourths (76.8%) of an average diet, while vegetables are among other food sources, contributing nearly one-tenth (12.3%) and fruits only 0.8%. This dietary pattern is different from the recommended requirement (Table 02). Per capita per day availability of green vegetables (32.1 gm), other vegetables (6.4 gm), and root vegetables (27.2 gm) was lower than the recommended requirement. Availability of fruits was only 5.8 gm (deficiency of 80.7%), and milk was 21.9 grams (78.1% deficient). Average diet of females is also deficient in different foodstuffs.

Table 2. Average Food Consumption in Sagar Division, Madhya Pradesh

Foodstuffs	Per capita per Day Requirement (g)	Per capita per Day Consumption (g)	% of Requirement	Surplus/ Deficit (%)	% of Total food
Cereals	460	570.3	124.0	24.0	74.2
Pulses	50	20.2	50.5	-49.5	2.6
Green Vegetables	50	17.9	35.8	-64.2	2.3
Other vegetables	60	53.6	89.3	-10.7	7.0
Roots & Tubers	50	22.8	45.6	-54.4	3.0
Fats & Oils	40	25.2	63.0	-37.0	3.3
Sugar & Jaggery	30	30.7	102.3	2.3	4.0
Fruits	37	5.8	19.3	-80.7	0.8
Milk & its Products	100	21.9	21.9	-78.1	2.9

The main economic activity of people is farming, and their food comes only from farmlands; therefore, their food is restricted to the locally available foodstuffs. Normally, in this region, farmers mainly produce cereals (wheat, rice, jowar, maize) and pulses (gram, urad, moong), and these food grains constitute a major part of their daily diet. Their purchasing power is decided by the size of agricultural land and their products, middle-class and rich farmers can purchase vegetables from the nearby markets while poor families depend upon cereals and pulses only. In sample villages, the predominant dietary preference is vegetarianism, with cereals and pulses constituting a significant portion of their daily sustenance. It is noteworthy that green and leafy vegetables become scarce during the summer. Moreover, items such as milk, fats, oils, pulses, sugar, and jaggery are consumed in relatively small quantities. Several factors shape the dietary

choices of the population, including agricultural yields, the presence of large family units, the limited purchasing power of impoverished households, and a lack of adequate nutrition knowledge.

Conclusions

- It is thereforeconcluded that this regionwas under the category of food insecurity before 1970-71.
- During 1970-71 to 2015-16 a fluctuating trend was recorded and after 2015-16 the situation has improved, and now this regionentered the condition of the food security.
- Cereals and pulses constitute more than three-fourths (76.8%) of the total food consumption, while vegetables are the other food sources, comprising less than one-fourth of the diet.
- There is a deficiency of some essential food items, people of the rural areas are not taking balanced diet; their diet is highly grain-oriented, and there is a deficiency of many essential food items.

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