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Child Undernutrition and Food Security in Jhajjar District, Haryana

Jyoti[1], Dr. Sudhir Malik[2]

[1]Research Scholar, Geography, Baba Mastnath University, Asthal Bohar, Rohtak, Haryana
[2]Professor, Geography, Baba Mastnath University, Asthal Bohar, Rohtak, Haryana

ABSTRACT

Undernutrition refers to the insufficient intake of essential nutrients due to inadequate food quality or the consumption of inappropriate food lacking necessary macro and micronutrients vital for healthy growth and development. The objective of this study is to investigate the relationship between child undernutrition and food security in the peripheral National Capital Region (NCR) district of Haryana, specifically in Jhajjar, from a geographical perspective. The concept of food security stands basically on three pillars of availability, accessibility and utility. Food Availability is a function of production of foodgrains through advancement in agriculture with in the country or through import. Data for this research has been gathered from secondary sources, with an analysis of child undernutrition conducted at the community development block level. The spatial patterns of child undernutrition(stunting, wasting and underweight) has been examined using data from the Department of Child and Women Development under the Ministry of Women and Child Development for Jhajjar for the year 2023-24. The assessment of child undernutrition is based on the proportion of low weight children among the total number of active children enrolled in Aanganwadi centers.In present paper, data has been analyzed on block level.Food Security Index (FSI) = 1/3(FAI + FACI + FUI). The values of the index vary between 1 and 0. It means the blocks having index value near to 1 are performing better in food security while the blocks having index values near 0 are having poor status of food security.

Keywords: Food Security, Undernutrition, Food Availability, Food Accessibility, Food Utility, Stunting, Wasting, Underweight

INTRODUCTION

Nutritional level is the physiological status of any individual that finds from balance and nutrient needs and intake as well as ability of body to use nutrients. On the other hand, undernutrition is that condition in which a body does not proper meet its energy as well as proper amount of macronutrients (protein, Fats and Carbohydrates) and micronutrients (minerals and vitamins). On the other hand, Undernutrition means lack of adequate nutrition by not having good food or not eating proper food containing macro and micro nutrient which necessary for proper growth and health.Undernutrition leads to children being underweight, too short in height and less weight according to their age.

The indicators of undernutrition among the children are basically three in number:

a. Underweight (low weight for age)
b. Stunting (low height for age)
c. Wasting (low weight for height)

UNISEF(2006), defined undernutrition as the outcome of insufficient food intake and repeated infection diseases.According to FAO (2000), food security is achieved when all person on all time have physical,economic and social access for food availability, accessibility and utility of food. Physical existence of food from production and market of food availability.

To get proper food with adequate nutrition is to need ensure on household level. The utility of food security is great significance in determining the nutrition condition of any individual because ill health resulting from lack of clean drinking water and sanitation hinders the proper absorption of nutrition in human body thus leading to undernutrition.There are very vast regional variations of undernutrition on the prevalence of under five years age child undernutrition over worldwide. There are also wide differences in the occurrence of under nutritional children with in the developing regions of the world.

RESEARCH PROBLEM

The study aim to understand the problem of child underweight in a food secure and peripheral NCR region district of Haryana namely Jhajjar in geographical point of view. The present study will also reveal the spatial pattern of child undernutrition problem in form of underweight and finding of the study provide useful inputs to policy makers for formulating area and problem specific government policies. By the results of the present study, Government pursue the food related programmes to solve the problem of the child undernutrition in Jhajjar district and other region of Haryana as well as India.

OBJECTIVE OF STUDY

The main objective of this study is to analysis the spatial patterns of undernutrition in form of undernutritionamong child population under five in Jhajjar district of Haryana and also check out the relation between food security and child undernutrition in different blocks of Jhajjar district.

METHODOLOGY

This paper also analyzed the spatial pattern of child underweighting of 0-5 age group at block level of Jhajjar district. For block level analysis, data have been taken from the department of Women and Child Welfare of Jhajjar district. This department collected and compiled data from Aanganwadi centers. The department provide data for 7 circles of Jhajjar district. But there are 5 blocks in Jhajjar district. So firstly data categorized from circles to block wise. The data provided in terms of total no. of child in 0-5 years age group, number and percentage of stunted children. The data report from the department is for March 2024.Block level data on various socio-demographic variables including number of children (0-5 age group), population density, literacy rate, total workforce, proportion of scheduled caste population, water from treated sources and toilet facilities within premises have been collected from Directorate of Census Operations, Haryana for the year 2011. The figure of total area of the block, total foodgrains (rice and wheat) production have been taken from the Agricultural Department of Jhajjar district. The spatial patterns of child undernutrition at block have been depicted through choropleth Maps. Statistical Package for the Social Sciences (SPSS) has been used for finding the association of child undernutrition with its possible determinants like literacy rate, proportion of scheduled castes population, urbanization level, water from treated sources and toilet facilities within premises, children per Aanganwadi centre and total foodgrains production (rice and wheat). The total foodgrains production of wheat and rice crops have been take because usually these crops are used daily in food. That data of production has been taken for year of 2022-23 from Agricultural Department of Jhajjar. For testing of food security of the state, a food security index has been computed at block level. This index has been calculated considering three dimensions of food security namely, food availability, food accessibility and food utilization. Among these, food availability index (FAI) has been computed through total foodgrains production. Literacy rate, employment rate and proportion of S.C. population have been used to calculate the food accessibility index (FACI). The food utilization index (FUI) has been computed by using access to safe drinking water and toilet facilities. In this index, all three dimensions of food security carry the same weightage. Food Security Index (FSI) = 1/3(FAI + FACI + FUI). The values of the index vary between 1 and 0. It means the blocks having index value near to 1 are performing better in food security while the blocks having index values near 0 are having poor status of food security.The Spatial pattern food security and child undernutrition at block level has been showed through the choropleth map prepared by using ARC GIS 10.4 software.

STUDY AREA

The present study has taken district Jhajjar of Haryana as study area. Jhajjar district is one out of the 22 districts of Haryana state in Northern India. It carved out of Rohtak district on 15 July 1997 and with it's headquarter in Jhajjar city. It far away only 29 kilometers from Delhi. It is peripheral region of National capital of Indiaand developed into an important industrial Centre. Other towns in the district are Bahadurgarh, Badli and Beri. Geographically, it spread in 1834 sq. kilometers. It lies in 29º21'30" to 29º51'30" North latitude and 76º16'30" to 76º58'30" East longitude. It surrounded by Rohtak and Sonepat in north; Rewari and Gurugram in south; national capital Delhi in the east and Bhiwani in west. It has 3 tehsils, 1 sub-tehsil, 5 blocks and 247 inhabited villages.

RESULTS AND DISCUSSION

In this point, the block level performance of child undernutrition has been analyzed. To analysis the block level performance, data has been taken from the department of Women & Child Welfare which work under the Ministry of Women and Child Welfare.For block level data, the monthly report is compiled from rural and urban Aanganwadi centers of Jhajjar District. The data of child undernutrition is collect by seven circles. But in present study, data has been analyzed on block level. In Bahadurgarh block, there are three circles, two circles are rural and another is urban Bahadurgarh. So, the highest child population of 0-5 years age in Bahadurgarh block. Block Beri data has been complied at Dighal circle. Dighal circle cover both rural and urban areas of Beri blocks. Jhajjar block data has been

collected under Jhajjar circle. Matainhel and Salhawas block data has been compiled and collected as in same circle like Matainhel & Salhawas. The child undernutrition data of all block is collected on three parameters like stunting (low height for age), wasting (low weight for height) and underweight (low weight for age). The department of Women and Child Welfare has been provided data in total number of children who actively participated in Aanganwadi centers, total number and percentage of children affected by stunting, wasting, underweighting and overweighting. The overweighting is form of overnutrition. So it does not be carried in present study. Data of each parameter is categorized in to two category-SAM and MAM. SAM is stand for severely acute malnutrition and MAM is for moderate acute malnutrition. The data is carried out up to month March 2024.

Table 1: ***Block-wise Number of Child Undernutrition, 2023-24***

Block	Total Child[1] (0-5)	Stunted Child[2]	Wasted Child[2]	Underweighted Child[2]
Bahadurgarh	20908	3781	342	598
Beri	7596	1414	78	227
Jhajjar	12196	2996	261	476
Matainhel	6846	1189	140	265
Salhawas	5340	1169	77	147
Total	52286	10549	898	1713

[1] = Total active children measured (height & weight)
[2] = SAM+MAM
Source: Department of Women & Child Welfare, Jhajjar

Table 1 showed that block wise total population of child of 0-5 age, total no. of stunted, wasted and underweighted child. This Table revealed that the highest population of child is in Bahadurgarh block, second highest in Jhajjar block and then in Beri block. Salhawas and Matainhel block are totally rural blocks. Among three parameters, the highest prevalence child recorded under problem or in form of stunting. The total stunted child population in Jhajjar district is 10549. In Jhajjar district, total underweighted children are 1713. The lowest no. of child undernutrition in form of wasting is only 898. The highest stunted child has been recorded in Bahadurgarh block with 3781 children. The lowest stunted child recorded in Salhawas block. In context of wasted child, the highest recorded in Bahadurgarh and the lowest in Salhawas. The total no. of underweighted child recorded the highest and the lowest number in same blocks Bahadurgarh and Salhawas.

Composite Score of Child Undernutrition of Community Development Blocks in Jhajjar District

To thoroughly assess the overall situation of undernutrition within the various blocks of Jhajjar district, a systematic approach has been adopted that involves the establishment of a composite score for each block. This scoring mechanism is grounded in key metrics that are critical indicators of child health and nutrition, specifically stunting, wasting, and underweight. These three metrics are widely recognized in public health as essential measures for evaluating the nutritional status of children, and they provide a comprehensive view of undernutrition.The scoring system categorizes the blocks into three distinct prevalence categories: low, medium, and high. This classification is visually represented in Table 2.18, which outlines the specific criteria for each category. Each block is assigned a score that ranges from 1 to 3, with the scoring criteria defined as follows: a score of 1 corresponds to low prevalence of undernutrition, indicating that the block has relatively few cases of stunting, wasting, and underweight among children; a score of 2 denotes moderate prevalence, suggesting a more significant but still manageable level of undernutrition; and a score of 3 signifies high prevalence, reflecting a concerning level of child undernutrition that requires urgent attention and intervention.

Table2: ***Prevalence of Stunting, Wasting and Underweight of Child (0-5) in Jhajjar District***

Category	Stunting	Wasting	Underweight
High	Jhajjar	Jhajjar, Matainhel	Salhawas,
Moderate	Salhawas	Bahadurgarh, Salhawas	Matainhel, Jhajjar
Low	Beri, Bahadurgarh, Matainhel	Beri	Beri, Bahadurgarh

Source: Prepared by Research Scholar from the data based on table 1

Following the assignment of individual scores based on these metrics, a composite score for each block has been calculated, as detailed in Table 2. This composite score serves as an aggregate measure that encapsulates the overall nutritional status of children within the block.

A higher composite score indicates a greater prevalence of child undernutrition, suggesting that the block faces more severe challenges related to child health and nutrition. Conversely, a lower composite score implies a more favorable situation, with fewer children experiencing the adverse effects of undernutrition.

Table 3: ***CD Block-wise Composite score of Child(0-5) Undernutrition in Jhajjar District, 2023-24***

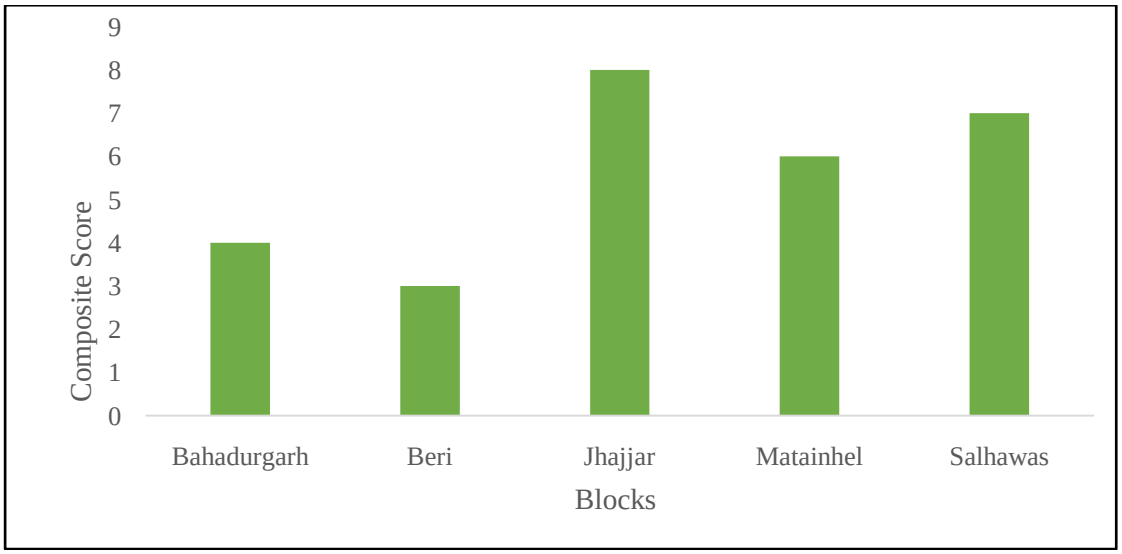
Sr. No.	Block	Stunting	Wasting	Underweight	Composite Score
1	Bahadurgarh	1	2	1	4
2	Beri	1	1	1	3
3	Jhajjar	3	3	2	8
4	Matainhel	1	3	2	6
5	Salhawas	2	2	3	7

Source: Based on table 2

This analytical framework not only facilitates a clearer understanding of the varying levels of undernutrition across the blocks of Jhajjar district but also aids in identifying areas that may require targeted interventions and resources. By utilizing this scoring system, stakeholders can prioritize their efforts and allocate resources more effectively to combat child undernutrition in the district.

The average child undernutrition score of the Jhajjar district is calculated to be 5.8 with minimum value of 3 in Beri block to a maximum value of 8 in Jhajjar block. Table 2.19 revealed that the Jhajjar block has the highest undernourished children under the age of five years. Block Beri has the lowest prevalence of child undernutrition in Jhajjar district. It has recorded the lowest composite score. Bahadurgarh has better score than other 2 blocks Salhawas and Matainhel.

Figure 1 presents a comprehensive visual representation of the nutritional status of children across various blocks in the Jhajjar district. This combined image effectively highlights the status of three critical indicators of child malnutrition, allowing for a clear comparison between the different blocks. In this analysis, a higher overall score correlates with a more severe situation regarding child malnutrition, indicating that blocks with elevated scores are facing greater challenges in ensuring the nutritional well-being of their young populations.



Source: Based on table 3

Figure 1: ***CD Block-wise Composite score of Child(0-5) Undernutrition in Jhajjar District, 2023-24***

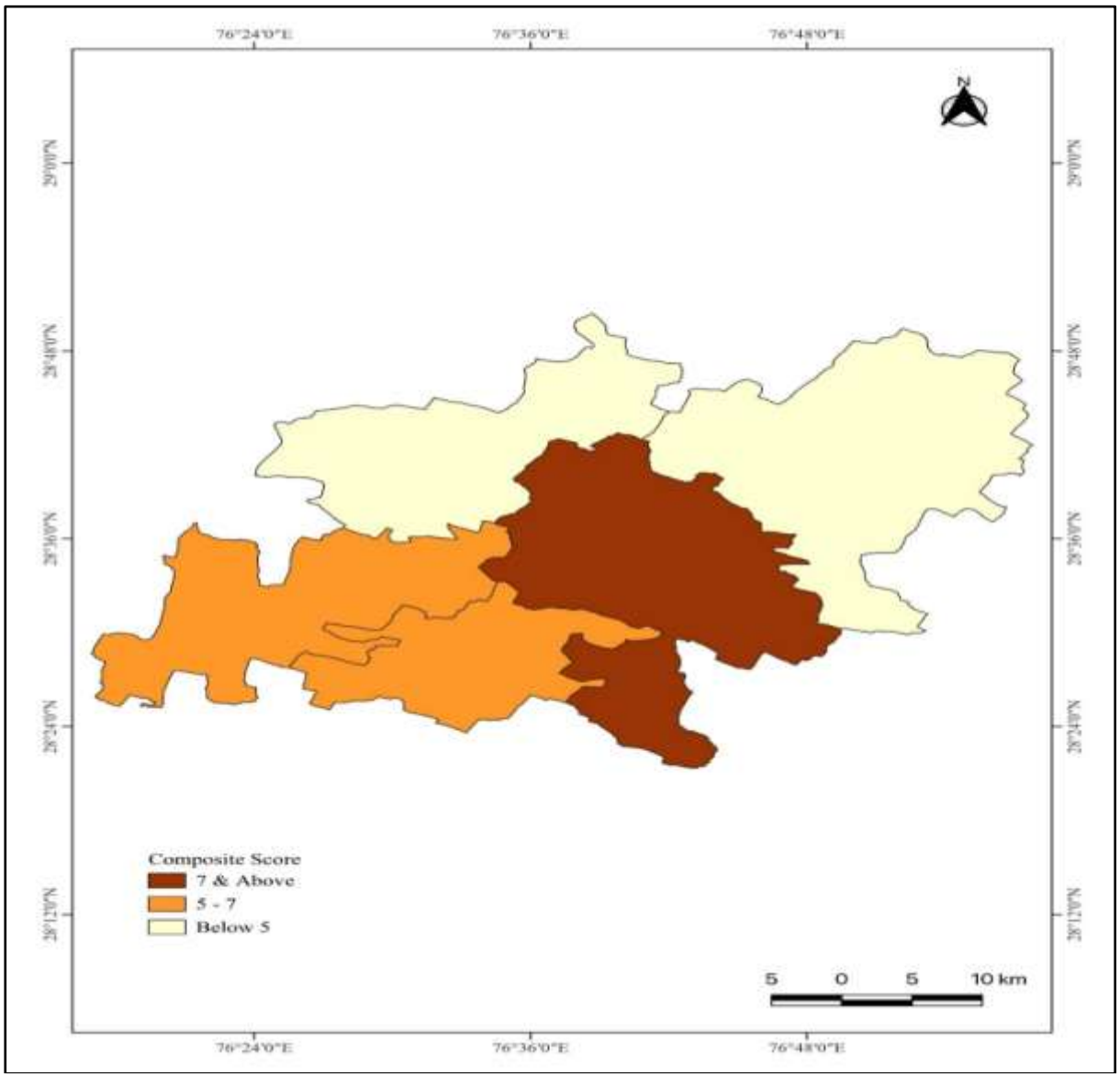
Among the five blocks assessed in Jhajjar, the Jhajjar block emerges as the most concerning, as it records the highest overall score, signifying a dire situation for child nutrition and health. Following closely is the Salhawas block, which also exhibits a troubling nutritional status, reflected in its score of 7. This indicates that children in this area are experiencing significant malnutrition issues, warranting urgent attention and intervention. In contrast, the Matainhel block presents a moderate condition, suggesting that while there are challenges, the situation is not as severe as in Jhajjar and Salhawas.

On a more positive note, the Bahadurgarh block stands out as having the least malnourished children among the blocks evaluated. The improvements in children's health status in Bahadurgarh can be largely attributed to several key factors, including higher employment rates, increased access to education, and improved water and sanitation conditions. These

elements play a crucial role in enhancing the overall health and nutritional outcomes for children in this area. Lastly, the Beri block is noted for having the best nutritional status among the blocks, with its residents benefiting from higher per capita income and advancements in agricultural development. These economic factors contribute significantly to better food security and access to nutritious food, thereby positively impacting the health of children in Beri.
In summary, the nutritional status of children in Jhajjar district varies significantly across its blocks, with Jhajjar and Salhawas facing severe challenges, while Bahadurgarh and Beri demonstrate more favorable conditions due to a combination of economic and social factors. This analysis underscores the need for targeted interventions to address malnutrition in the most affected areas while also recognizing the successful strategies employed in the better-performing blocks.

The composite score has been mapped. The Map 1 revealed that clearly, higher prevalence of undernutrition is found in Jhajjar block with composite score of 8 and Salhawas with composite score of 7. Areas of moderate level of prevalence is in Matainhel block. The corresponding with low prevalence of undernutrition are Bahadurgarh and Beri block. These two block are corresponding with area of better infrastructure facilities related to toilet and safe drinkingwater and high literacy and employment rate. The better usage of institutional facilities such as antenatal and postnatal care is also in these blocks of the Jhajjar district. To effectively reduce undernutrition among children under 5 years of age in Jhajjar district, it is imperative to prioritize the development of robust infrastructure and enhance institutional health facilities.

Map 1 : ***CD Block-wise Composite Score of Child Undernutrition of Jhajjar District, 2023-24***



Source: Based on table 3

This multifaceted approach should encompass several key strategies aimed at addressing the root causes of undernutrition and improving the overall health and well-being of young children in the region.Firstly, the government should invest in building and upgrading healthcare facilities, ensuring that they are adequately equipped to provide

essential services such as regular health check-ups, nutritional counseling, and immunization programs. Access to well-trained healthcare professionals, including pediatricians and nutritionists, is crucial in delivering quality care and guidance to families. By establishing more health centers in both urban and rural areas, particularly in remote and underserved regions, the government can significantly improve access to healthcare services for vulnerable populations.
In addition to enhancing healthcare infrastructure, it is vital to initiate comprehensive awareness campaigns aimed at educating parents and caregivers about the importance of nutrition, hygiene, and health practices. These campaigns should utilize various communication channels, including community workshops, local media, and social media platforms, to reach a wider audience. By providing information on balanced diets, the significance of breastfeeding, and the importance of regular health check-ups, these initiatives can empower families to make informed decisions that positively impact their children's health. Moreover, educational facilities play a crucial role in combating malnutrition. The government should focus on improving access to quality education, particularly in rural and inaccessible areas of Jhajjar district. By establishing schools that incorporate nutrition education into their curriculum, children can learn about healthy eating habits from a young age. Additionally, providing training for teachers and community leaders on nutrition-related topics can help disseminate knowledge and foster a culture of health and wellness within the community.

Collaboration with local non-governmental organizations (NGOs) and community-based organizations can further enhance these efforts. These organizations often have established relationships within the community and can facilitate outreach programs that address specific local needs. By working together, the government and NGOs can create a comprehensive support system that not only addresses immediate nutritional needs but also promotes long-term health and development.

In conclusion, reducing malnutrition among children under 5 years of age in Jhajjar district requires a holistic approach that combines the development of healthcare infrastructure, educational initiatives, and community engagement. By prioritizing these areas, the government can create a supportive environment that fosters the health and well-being of children, ultimately leading to a significant decrease in malnutrition rates and improved quality of life for families in the region.

Food Security Index in Jhajjar District

Food security is the most important topic in present day scenario. The definition of food security seems to be an unending process and is also undergoing steady change, depending upon the circumstances under which that definition is required to be viewed (Sud 2006).Food availability is a function of production of food grains through advancement in agriculture with in the country or through import.

Food security exists when all people at all times have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (WHO, 2012). Food security is therefore a prerequisite for nutrition security but is not sufficient to guarantee optimal nutritional status. In to achieve nutrition security, one needs to have access to appropriate care giving practices and to hygienic environment and adequate health care services, in addition to a diet that meets nutritional needs for a healthy and active life (FAO, 2014).).

The concept of food security stands basically on three pillars of availability, accessibility and utility. Food Availability is a function of production of foodgrains through advancement in agriculture with in the country or through import.

Food Security Index = 1/3(FAI+FACI+FUI)

For each of the above-mentioned indicators, an index has been constructed by using Range Equalization Method (REM).

For positively associated indicator: Variable Index = $(X_i – \text{Min } X)/ (\text{Max } X-\text{Min } X)$

For negative associated indicator: Variable Index = $(\text{Max } X- X_i)/ (\text{Max } X- \text{Min } X)$

Here, X_i = Value of the variable

Min X = minimum value of X in the scaling
Max X = maximum value of X in the scaling

Here:

i. FAI (Food Availability Index) represents the availability of food grain per head per annum.
ii. FACI (Food Accessibility Index) represents factors such as literacy rate, urban population, SC population, and working population.

iii. FUI (Food Utilization Index) represents access to drinking water and toilet facilities.

Table 4: ***Selected Indicators and Variables for measuring Food Security Index***

Indicator	Variable
Food Availability (FAI)	Availability of foodgrains (Kg per head per head per annum)
Food Accessibility (FACI)	Employment Rate Literacy rate Urbanization level Percentage of SC population
Food Utility (FUI)	Safe Drinking water Toilet Facility

Source: Prepared by Research Scholar

Among the blocks evaluated, Bahadurgarh emerges with a notable FSI of 0.9828, signalling robust food security.This result is underpinned by moderate food availability, supported by a substantial urban population and adequate access to amenities like drinking water and sanitation facilities.Salhawas, despite its lower literacy rate and absence of urban population, demonstrates a commendable FSI of 0.9724, attributed to its significant food availability and strong working population. In contrast, Matainhel records the lowest FSI at 0.6134, indicating comparatively weaker food security. Factors such as lower food availability, limited urbanization, and moderate literacy and SC population rates contribute to this outcome.

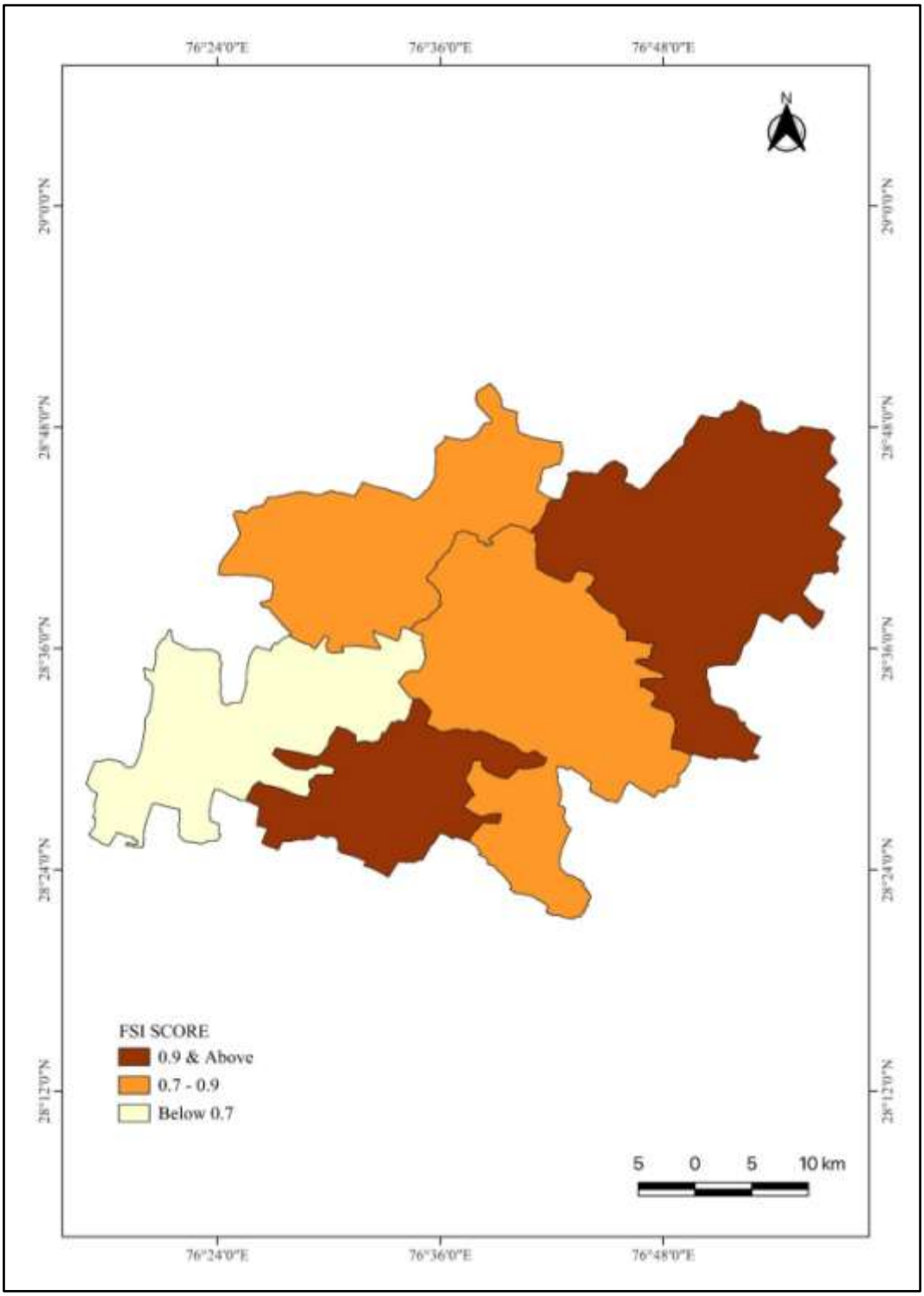
Beri exhibits a moderate FSI of 0.8093, reflecting decent food security levels. Its higher food availability is somewhat offset by moderate literacy rates and SC population figure Jhajjar showcases a moderate FSI of 0.7666, suggesting a reasonable level of food security. Despite its moderate food availability, Jhajjar benefits from relatively higher literacy rates and urban population, though access to sanitation facilities remains an area of improvement. These findings underscore the nuanced interplay of various factors influencing food security across different blocks, providing valuable insights for targeted interventions and formulation. Clean drinking water, environmental hygiene, primary health care and elementary education also determine food safety. Ecological factor also determine sustainable food security system.

Table 5: ***Calculate the FSI for each Block by Averaging the Values of FAI, FACI and FUI***

Block	Food Grain (FAI)	Literacy Rate (%)	Urban Population (%)	SC Population (%)	Working Population (%)	Drinking Water (%)	Toilet Facility (%)	FSI
Bahadurgarh	0.243	16.3	42.30	16.3	50.71	56.67	80.21	0.9828
Beri	0.816	18.02	11.99	18.02	31.12	42.06	68.92	0.8093
Jhajjar	0.285	18.80	21.77	18.80	32.14	42.5	75.31	0.7666
Matainhel	0.350	20.71	0	20.71	38.20	44.48	49.97	0.6134
Salhawas	0.743	17.68	0	17.68	86.42	46.08	48.98	0.9724

Source: Calculated by the Research Scholar

Map 2: ***CD Block-wise Food Security Index of Jhajjar District***



Source: Based on table 5

Correlation between Child Undernutrition and Food Security Index in Jhajjar District

Finally the hypothesis thatchild undernutrition is more prevalent in less food secure areas of the state has been tested by calculation of correlation between food security index and proportion of stunting, wasting, underweight and composite score of child undernutrition.

Table 6 show the correlation between food security index and child undernutrition and its parameters (stunting, wasting and underweight). There is very week positive correlation between stunting and food security in Jhajjar district. It means highly food safe region are facing more problem of low height for age (stunting). Then, wasting and food security correlation also be calculated.

Table 6: ***Correlation Values between different parameters of Child Undernutrition with Food Security Index of Jhajjar District, 2023-24***

Variables	Correlation
Stunting and FSI	0.153
Wasting and FSI	-0.482
Underweight and FSI	-0.862
Composite Score and FSI	-0.180

Source: Calculated by Research Scholar

Here the value of correlation is – 0.482, it show the moderate inverse relationship between wasting and food security in Jhajjar district. It means highly food safe blocks are recorded low no. of wasted children under the age of five years. The correlation between underweight and food security is noticeable because there is strong negative correlation (-0.862) between food security and low weight for age. It means. Highly food secure blocks are not facing problem of underweighting.

At last, the correlation between food security index and composite score of child undernutrition is also calculated. The composite score represent overall problem of child undernutrition under the age of five years. The correlation value between composite score and food security is -0.18. It show very week inverse relationship between child undernutrition and food security in Jhajjar district. But this prove our research hypothesis that there is inverse relation between food security and child undernutrition in Jhajjar district. This low value means food security is not even main factor of child undernutrition. There is other factor at household and institutional level are also very important to examine to tackle the problem of undernutrition among children under the age of five years.

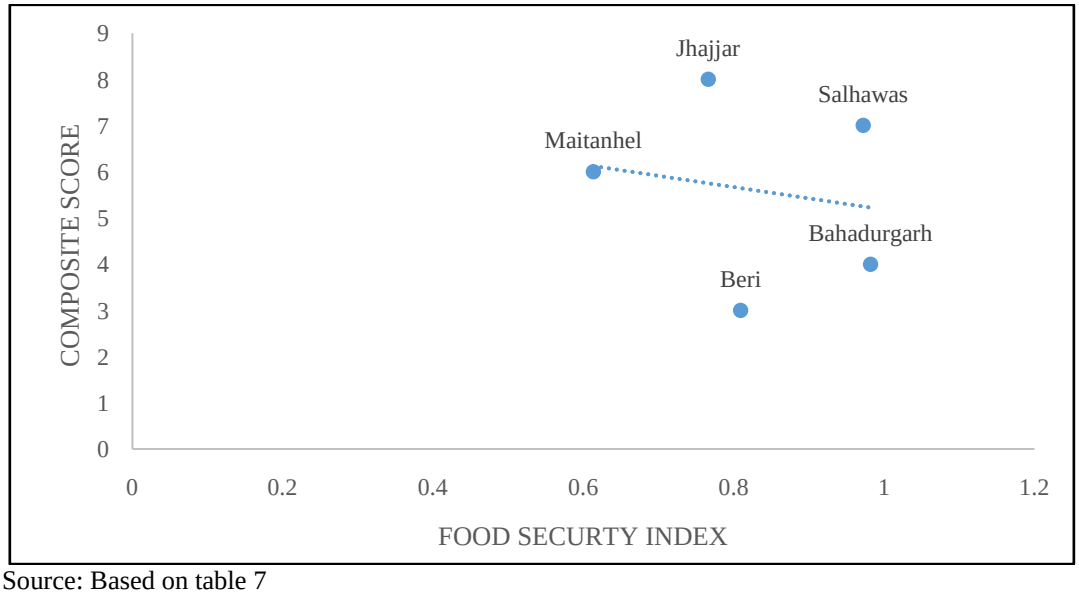
Correlation between Composite Score and Food Security Index = -0.180

Table 7:*CD Block-wise Composite Score of Undernutrition and Food Security Index of Jhajjar district, 2023-24*

Blocks	Composite Score	Food Security Index
Bahadurgarh	4	0.9828
Beri	3	0.8093
Jhajjar	8	0.7666
Matainhel	6	0.6134
Salhawas	7	0.9724

Source: Based on table 2.19 and 2.21

The graph shows a scatter plot with Composite Score on the vertical axis and Food Security Index on the horizontal axis.



Source: Based on table 7

Figure 2: ***Correlation between Composite Score and Food Security Index of Jhajjar District, 2023-24***

Here, it representsComposite Score (y-axis) Ranges from 0 to 9, with higher scores likely representing a better or more favourable composite outcome.Food Security Index (x-axis): Ranges from 0 to 1.2, likely representing the level of food security, where higher values suggest better food security.

There is a dotted trend line indicating a slight downward slope, suggesting a negative correlation between the Food Security Index and Composite Score in this dataset.This implies that as the food security index increases, the composite score tends to decrease. In summary, the chart suggests that higher food security index values are associated with lower composite scores based on the provided data.

Correlation between Stunting and Food Security Index =0.153

The image shows the correlation coefficient between stunting (S) and the Food Security Index(FSI) as 0.153.This indicates a weak positive correlation between stunting and the Food Security Index. It means the Food Security Index increases (which typically means better food security), stunting also tends to increase slightly, though the relationship is very weak. The positive value suggests that better food security does not strongly reduce stunting in this case, or there could be other factors influencing stunting rates more than food security itself. However, since the correlation is close to 0, this weak association implies that the FSI may not be a strong predictor of stunting in this context.

Correlation between Wasting and Food Security Index = -0.482

The correlation coefficient between wasting and the Food Security Index (FSI) is -0.482. This indicates a moderate negative correlation between wasting and the Food Security Index. It means the Food Security Index increases (implying better food security), wasting tends to decrease. The negative value suggests that in areas with better food security, the prevalence of wasting is lower, meaning there is a moderate association between improved food security and a reduction in acute malnutrition (wasting). This relationship is stronger than the one observed for stunting, showing that food security has a more significant impact on reducing wasting rates compared to stunting in this dataset.

Correlation between Underweight and Food Security Index = -0.862

The correlation coefficient between underweight and the Food Security Index (FSI) is -0.862. This indicates a strong negative correlation between underweight and the Food Security Index. It means the Food Security Index increases (representing better food security), the prevalence of underweight children tends to increase slightly. The negative value shows that improved food security is associated with a reduction in underweight cases, but the relationship is weak. Thus, while better food security has some impact on reducing underweight rates, it is not a strong predictor of changes in underweight prevalence in this context.

CONCLUSION

In conclusion, the spatial analysis of child undernutrition in Jhajjar district sheds light on the complexities of malnutrition and its prevalence across different blocks. The analysis utilizes data on stunting, wasting, and underweight to illustrate the state of child nutrition at both district and block levels. The analysis reveals that stunting is highly prevalent in the district, with 20.2% of children aged 0-5 years affected. Jhajjar block, in particular, has the highest stunting rate, largely due to a lack of economic development and inadequate urbanization. On the other hand, blocks like Beri and Bahadurgarh show lower rates of stunting, attributed to higher literacy rates, better access to food, and employment opportunities.

This highlights the role of economic factors and urbanization in improving child nutrition.Wasting**,** which indicates acute malnutrition, is less prevalent compared to stunting, with an overall rate of 1.71%. The highest levels of wasting are seen in Jhajjar and Matainhel blocks, where poor sanitation, water supply, and low incomes contribute to the problem. However, the study finds that Beri block performs well, with the lowest wasting rates, indicating better healthcare and food security.Underweight children represent a combination of chronic and acute malnutrition. This indicator is a significant concern in blocks like Salhawas**,** where low literacy and poor healthcare access exacerbate the problem. The overall rate of underweight children in Jhajjar district is 3.47%, with Salhawas and Jhajjar blocks recording higher percentages. The study also explores the correlation between food security and child undernutrition. While the hypothesis suggests an inverse relationship, the results show that food security is not the only determinant of nutritional outcomes. Factors such as economic conditions, literacy, and access to healthcare play a crucial role in mitigating child undernutrition.

In summary, the paper concludes that child undernutrition in Jhajjar district is a multifaceted issue influenced by socio-economic, infrastructural, and healthcare-related factors. Although some blocks show improvement due to better urbanization and resources, others continue to struggle with high rates of malnutrition. Addressing these disparities requires targeted interventions, improved infrastructure, and socio-economic development to ensure better nutritional outcomes for children in Jhajjar. There is inverse relationship between child undernutrition and food security in Jhajjar district, Haryana.

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