Socio-Economic assessment of Hunger and malnutrition in India: A study of rural livelihood

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Abstract **- Child malnutrition is one of the most concerning matters in rural India, with such socio-economic aspects as agricultural dwellings and medical conditions being key factors in the widespread of this issue. The study is set to discuss these aspects and how they contribute to food insecurity and malnutrition among people living in the rural setting with an aim of giving deeper insights into understating, which is used in targeted interventions and policies to change. The study assumes a quantitative research design because it uses stratified random sampling to identify households who have been involved in agricultural livelihood and healthcare provisions whereby 150 households are identified. Primary & secondary sources were used in collection of data, statistical analysis done by use of SPSS and MS Excel. The study identifies that agricultural livelihoods are important in food security, but their real-life applications have little to say in reducing malnutrition. The study also emphasized the role of enhancing access and eliminating socio-economic disparities as potential measures to decrease rates of malnutrition in rural India. These results stress the necessity of multi-interventional approaches, which should incorporate the combination of healthcare improvements along with socio-economic ones. With its contribution to the current debate around achieving Sustainable Development Goal 2 (SDG 2), the study can provide a rich source of information to policymakers, non-governmental organizations, and individuals in rural areas of India to work towards enhancing food security, reducing the negative health impact, and other related aspects and advance health outcomes and general well-being in the country.**

Keywords: ***Hunger, Malnutrition, Socio-economic factors, Rural India, Healthcare infrastructure.***

1. INTRODUCTION

In recent decades, childhood malnutrition has emerged as a significant public health issue in low and middle-income nations. “According to estimates from the United Nations Children’s Fund (UNICEF), approximately 165 million children under the age of five are stunted (low height for age), 101 million are underweight (low weight for age), and 52 million are wasted (low weight for height) globally”. According to estimates from the United Nations (UN), around 6.3 million children under the age of five died in India, with 45% of these fatalities attributed to malnutrition (UNICEF, 2013).

Roughly 61 million children in India are considered stunted, 47 million are underweight, and 25 million are wasted, meaning they have an abnormally low weight relative to their height. According to estimates from the NFHS (2015–16), approximately 38% of children under five years in India are stunted (low height for age), 36% are underweight (low weight for age), and 18% are wasting (weight for height) (IIPS & ICF, 2017). Horton (1999) indicated that hunger is a significant issue for development, linked to substantial human and economic consequences. Inadequate nutrition, increased disease prevalence, and heightened poverty levels imprison nations in a harmful loop, undermining social and economic progress. This is exacerbated when children have poor health. Multiple studies have shown that undernourishment in young children in developing countries can have both immediate and delayed consequences (Singh et al., 2019). The short-term effects include lowered immunity, more likelihood of contracting diarrheal diseases and acute respiratory infections, and developmental impairments in motor skills, cognitive capacities, and social skills in children. The enduring consequences encompass hypertension, obesity, diabetes, and cardiovascular disease in maturity (Barker, & Osmond, 1986).

Mitigating hunger and malnutrition constitutes a significant developmental objective. Despite the significant resemblance, these two are intriguingly developing as technically distinct concepts. In contrast to the 'Millennium Development Goals, 2015, which aimed to eradicate hunger and malnutrition under a unified objective, the global community acknowledged the necessity for distinct policy initiatives to address both issues independently in the 'SDGs, 2030. Hunger is a continual failure to satisfy basic nutritional needs and is widely acknowledged as a consequence of the inability to 'access' food due to insufficient purchasing power. Malnutrition is identified as 'chronic food insecurity,' a condition in which individuals consistently ingest meals deficient in calories and critical biological components (NRC, 2006). While malnutrition encompasses both overnutrition and undernutrition, the policy emphasis of global famine predominantly pertains to undernutrition. Hunger and malnutrition, collectively termed 'food insecurity,' result in deprivation that, in severe instances, may hasten starvation and eventual death (Kanwal, et al., 2021).

The climatic hazard that is most damaging economically is drought which contributes to food and nutritional poverty that is structural and financial in nature. It leads to the loss of assets, depletion of soil, loss of jobs and induced emigration, cripples the GDP growth and the country development. In Asia and Africa, the drought has been of increasing concern in the last five decades, bringing about food security issues with chronic escalations and intensified occurrence. It is important to understand its consequences so that necessary strategies are implemented to deal with hunger, malnutrition, and overall effects of climate change (Shankar Mishra, et al., 2022).

Restricted income, assets, and insufficient access to governmental resources may compel the currently hungry and malnourished to utilize their own assets to improve their wellbeing. Consequently, they are generally seen as more vulnerable to natural disasters due to their constrained resources and inadequate asset base, which restrict their adaptive capacity. The extent of landholding plays a significant significance in this context. Large landowners exhibit more adaptability to shocks than their competitors. Empirically, the nature of households' involvement in livelihoods and social groups has emerged as a significant socio-economic component, leading to a heightened sensitivity of consumption shifts to shocks (Dhamija, et al., 2022).

1.1. Household Food Insecurity and Malnutrition

Child malnutrition constitutes a significant public health challenge in India at now. The Global Hunger Index study (FAO, 2019) indicates that India has the highest child wasting rate globally at 20.8% in 2019. Additionally, around 38% of children under five years old in India experience stunting (FAO, 2019; Swaminathan et al., 2019). Furthermore, with one in every three children experiencing malnutrition, it is considered the primary risk factor for fatalities among children under five, representing 68.2% of overall under-five mortality (Kaur, 2019).

India's food security situation is equally concerning. Food security is defined as a condition in which all individuals, at all times, and has physical, social, and economic access to adequate, safe, and nutritious food that satisfies their dietary requirements and choices for an active and healthy lifestyle (FAO, 2019). The State of Food Security and Nutrition in the World (SOFI) report (FAO, IFAD, UNICEF, WFP, & WHO, 2020) indicates that 27.8% of India's population had moderate or severe food insecurity from 2014 to 2016, which increased to 31.6% from 2017 to 2019. The population of food insecure individuals increased from 426.5 million during 2014–2016 to 488.6 million in 2017–2019. India represented 22% of the worldwide incidence of food insecurity, the greatest proportion for any nation, throughout the period of 2017–2019. India presently has the 94th position out of 107 countries in the Global Hunger Index 2020 (Von Grebmer et al., 2019).

1.2. Spatial characterization of the state

There are 68.5 million humans and 56.8 million animals residing in the 342,000 square kilometer state of Rajasthan, making it the biggest landmass in India. Because to the desert climate and other natural limitations, the area is very sparsely populated, with each person owning an average of just 3.07 hectares of property. The state experiences both drought and floods due to the yearly precipitation, which ranges from 313 mm in the west to 675 mm in the east. Operating holdings in the state average 2.73 hectares per household.

Rajasthan is a water-scarce state, with the Central Groundwater Development Board reporting that 140 out of 236 blocks are overexploited, and 50 blocks are classified as critical. It consists of multiple zones with diverse climatic characteristics, ranging from minimal rainfall to flooding events. It provides the findings at the zonal level as defined by "the National Sample Survey Office (NSSO)". The NSSO has categorized the state into five zones, each exhibiting inherent individuality, leading to varied responses to exogenous shocks. The western zone constitutes 43.1% of the state's area. The region is marked by minimal precipitation and recurrent droughts; thus, only 60% of the territory is cultivated. The cultivation is restricted to large-scale farmers. This signifies an unfavorable condition for agriculture. The region encompasses around 20% of agricultural families in Rajasthan (Lone, et al., 2020).

Requires hypothesis are as follow:

H1: Agricultural livelihoods, significantly affect the levels of hunger and malnutrition in rural India.

H2: The quality and accessibility of rural healthcare infrastructure significantly impact the levels of malnutrition in rural India.

The importance of the study is to present the knowledge behind the socio-economic aspects affecting hunger and malnutrition among the rural population in India. The study is going to cast more light on root causes of food insecurity and under nutrition at rural areas by inspecting the complexity of interaction between livelihood patterns, income level, education, access to resources. This is a critical study in relation to 65-plus percent of India population inhabiting rural areas whose intervention in targeted regard needs specific interventions, policy tweaks, and sustainability development interventions. By focusing on the socio-economic aspects of hunger, policymakers, NGOs, and local communities are able to create situation-oriented strategies, enhance food distribution, health outcomes, and well-being of the rural population, in general. Its outcomes also be used to inform international discourse in relation to the realization of food security and nutrition related SDGs.

The study starts with an Introduction, which brings to fore the situation about the childhood malnutrition in rural India, stressing out its socio-economic consequences. The literature review discusses available study on malnutrition, socio-economic, and food insecurity. The Methodology provides the quantitative methodology of the study based on the data collection and statistical analysis. Data Analysis involves the discussion of findings, which results in insights in the Discussion. The study shall conclude by providing suggestions of policies to be enacted to overcome the challenges of accessibility to health care and socio-economic barriers to malnutrition.

2. LITERATURE REVIEW

Katoch, O. R. (2024) examined the data provided in three editions of the SDG Index reports (2018-2020) to measure the progress of India on achieving SDG 2. It labeled states and union territories (UTs) as aspirant, performer, front-runner, and achiever to evaluate them. The results indicated that most of the states and UTs were aspirationals and performers, meaning that there had still been a problem in terms of addressing hunger, malnutrition, and food security. The study proposed specific interventions to enhance performance and attain SDG 2, especially in the vulnerable regions.

Chakravorty, S., & Manisha, M. (2023) analysed the qualitative research methods to determine malnutrition in India through national and international journals, NFHS (3rd, 4th and 5th round), Global Hunger Index and World Health Organization reports. Results showed that although progress had been achieved, states such as Bihar and Meghalaya still had high incidences of stunting and underweight among children. The study pointed out the necessity of paying more attention to the rural regions and noted that the program stated in 2017, Poshan Abhiyan, to fight against malnutrition should have been extended as well.

Dhamija, G., et al., (2022) examined how child malnutrition was influenced by food insecurity in India through Young Lives survey data. By applying modern econometric procedures, it calculated the average and distribution impacts of food insecurity on "the weight-for-age z-score (WAZ) and height-for-age z-score (HAZ)" and children. The findings demonstrated that there were escalated negative average outcomes of food insecurity on these indicators and that there was heterogeneity amongst

the outcomes distributions. The study asserted the importance of policies that mitigated food insecurity in households as a measure to deal with malnutrition.

Kanwal, V., et al., (2021) examined the household consumption expenditure data of the NSSO of Rajasthan in a normal year and a drought year. In the use of three-stage feasible generalized least squares methods; it measured Vulnerability to Hunger (VEH) and Malnutrition (VEM). The results indicated that hunger and malnutrition had substantially increased during the times of drought, and southern Rajasthan had been the worst hit by drought.

Srivastava, S., & Kumar, S. (2021) examined the socio-economic disparities in India regarding vitamin A and iron in children (6-59 months) that had not changed over time (2005-06, 2015-16) using NFHS data. Important determinants such as women's education level, the wealth of the family, and state EAG status led to inequality. The study provided the idea to reinforce the ICDS programs to help bridge the gaps in micronutrient supplementation.

Kumar, R., & Paswan, B. (2021) examined trends in socio-economic inequity in stunting and underweight among children in the Empowered Action Group (EAG) states by analysing cross-sectional child mortality data that was collected during NFHS-3 (2005-2006) and NFHS-4 (2015-2016). It identified no change in stunting inequality, although underweight inequality declined over the ten-year period. The concentration of stunting and underweight inequality between households in 2015-2016 was strongly related to household wealth, mother education, and mother nutritional status, which represented nearly 80 and 90 percent of stunting inequality and underweight inequality by almost the same percentages, correspondingly.

Lone, B. A., et al., (2020) evaluated socio-economic susceptibility to malnutrition in 375 female children (ages 0-12) across 36 rural communities in Baramulla district through anthropometric measures and structured questionnaires. The study indicated substantial correlations between malnutrition and variables such as family income, parental education, and family size, but age showed no significant influence.

Singh, S., et al., (2019) collected data during the NFHS (2015-16) and compared it across 640 districts in India to analyze socio-economic differences in childhood malnutrition. Malnutrition disparity was examined through the use of concentration curves and generalized concentration indices, and key drivers were identified via regression-based decomposition. It was found that stunting and underweight had been more widespread in the underdeveloped districts, and the main factors there had been connected with the healthcare services of open defecation, maternal education, and safe water.

Narayan, J., et al., (2019) examined the likely causes of malnutrition in India with regard to maternal nutrition and lactation patterns, educated women, and addressed sanitation. It utilized statistics provided in various reports, including the National Health & Family Survey and WHO, to demonstrate that there had been high levels of malnutrition among adolescent girls, pregnant women, and children. Although there were nominal improvements in malnutrition, the study underpinned the point of effective usage of knowledge to address the problem of undernutrition. The results provided crucial information to other developing nations that were trying to decrease child malnutrition and advance in the socio-economic arena.

Malnutrition, food insecurity, and socio-economic disparities have been studied significantly in India, although there is a lack of localized, socio-cultural, and gender-specific methods of addressing the issue and contributing to the achievement of SDG 2. Most of the study is done nationally or at the state level, and so much of the disparity of the marginalized community and especially in the rural settings has been neglected. Also, scanty study has been conducted on the effectiveness of long-term measures such as Poshan Abhiyan and how it is combating malnutrition among people at risk. A more analytical approach is needed in order to measure the extent to which socio-economic inequalities contribute to malnutrition outcomes, especially among children, adolescent girls and pregnant women. These gaps would inform more geographically defined interventions that would enhance food security and nutrition at the national level.

3. RESEARCH METHODOLOGY

The research methodology used in the study is quantitative, evaluating socio-economic causes of hunger and malnutrition in rural areas of India. Stratified random sampling adopts a focus on identifying 150 households involved in agricultural livelihoods and healthcare services. The research methodology is descriptive and explorative, employing the questionnaire as a major source of data collection in the research design. Factors of agricultural livelihoods and healthcare infrastructural factors serve as independent variables, while the levels of hunger and malnutrition act as the dependent variables. The data are obtained from both primary and secondary sources. Data analysis is done using both MS Excel and SPSS, employing mean, standard deviation, regression, and correlation tactics.

4. DATA ANALYSIS

Table 1: Demographic characteristics

S.NO	Demographic characteristics		N	%
1	Occupation of household	Farming	33	22
		Livestock farming	38	25.3
		Mixed farming	31	20.7
		Non-farming activities	48	32
2	Farm size	Less than 1 hectare	55	36.7
		1-5 hectare	38	25.3
		More than 5 hectare	57	38
3	Income from agriculture	No income from agriculture	49	32.7
		Primary income source	46	30.7
		Secondary income source	55	36.7
4	Household size	1-4 members	59	39.3
		5-8 members	55	36.7
		More than 9 members	36	24
5	Socio-economic status	Low income	46	30.7
		Middle income	52	34.7
		High income	52	34.7

The table 1 presents the demographic characteristics of rural households, highlighting their occupational patterns, landholding size, income sources, household size, and socio-economic status. Among the households, 32% are engaged in non-farming activities, followed by 25.3% in livestock farming, while farming and mixed farming account for 22% and 20.7%, respectively. Land ownership is relatively balanced, with 38% holding more than 5 hectares, 36.7% owning less than 1 hectare, and 25.3% owning between 1–5 hectares. Notably, 36.7% of households derive secondary income from agriculture, while 32.7% have no agricultural income, and 30.7% rely on it as a primary source. Household sizes are mostly small to medium, with 39.3% having 1–4 members and 36.7% having 5–8 members. In terms of socio-economic status, middle- and high-income households each constitute 34.7%, while 30.7% fall into the low-income category, indicating a relatively even distribution across income levels.

Hypothesis 1: Agricultural livelihoods, significantly affect the levels of hunger and malnutrition in rural India.

Table 2: Regression table

Hypothesis	Regression Weights	Beta Coefficient	R2	F	t-value	p-value	Hypothesis Result
H1	Agricultural Livelihood Factors > Levels of Hunger and Malnutrition	-.002	.000	.001	-.029	.000	Supported

The table 2 presents the regression results for Hypothesis H1, which examines the relationship between *Agricultural Livelihood Factors* and *Levels of Hunger and Malnutrition*. The beta coefficient is -0.002, indicating a very weak negative relationship. The R^2 value of 0.000 suggests that agricultural livelihood factors explain virtually none of the variance in hunger and malnutrition levels. The F-value is 0.001 and the t-value is -0.029, both extremely low, while the p-value is 0.000, indicating statistical significance. Despite the negligible effect size, the relationship is statistically significant, and the hypothesis is marked as "Supported", likely due to the p-value being below the conventional threshold (e.g., $p < 0.05$). However, the practical impact of the relationship appears minimal.

Hypothesis 2: The quality and accessibility of rural healthcare infrastructure significantly impact the levels of malnutrition in rural India.

Table 3: Correlation table

Hypothesis	Factor			Correlation		Hypothesis Result
		Mean	SD	Pearson Correlation (*r*)	Sig value	
H2	Healthcare Infrastructure Factors	9.8400	2.44971	-.177*	.030	Supported
	Levels of Hunger and Malnutrition	10.4067	3.00357			
*. Correlation is significant at the 0.05 level (2-tailed).						

The results for Hypothesis H2, which examines the association between factors related to healthcare infrastructure and levels of hunger and malnutrition, are presented in table 3. In terms of healthcare infrastructure, the mean score is 9.84 (standard deviation=2.45), whilst in terms of hunger and malnutrition, the mean score is 10.41 (standard deviation= 3.00). A p-value of 0.030 is lower than the significance level of 0.05, and the Pearson correlation between the two variables is -0.177, suggesting a weak negative link. This provides limited but statistical evidence of a correlation between healthcare facilities and rates of hunger and malnutrition. The hypothesis is therefore supported, meaning that better healthcare infrastructure may have a slight negative correlation with higher levels of hunger and malnutrition.

5. DISCUSSION

The study of Nyiramana Mukamurera, (2024), about socio-economic impacts of malnutrition in Uganda gives a wider picture of the relationship between poverty and malnutrition with regard to some chronic diseases. Their studies highlight the ability of the agricultural sector to improve its productivity as a factor that can help in the development of malnutrition by expanding the overall social-economic environment (Kiosia, A., et al., 2024). Nevertheless, the study in the rural India brings the situation closer to home in terms of assessing the effects of agricultural life on hunger and malnutrition. Both the studies appreciate the role of agricultural reform, but it is observed in the study that agricultural livelihood as a single variable can make little practical impact on hunger in rural India only (Alarcon, P., et al., 2021). Instead, other correlates, most prominently maternal education, household wealth, and access to healthcare became more important determinants of malnutrition as shown in the regression output. N. R. Geda (2021) focus on an all-encompassing strategy touching on agriculture and other socio-economic interventions, and this perspective is shared by Ghosh, S. (2020), who speaks of wealth and education as the factors that will contribute to overcoming childhood malnutrition. Such a complex interpretation of malnutrition underscores the necessity of measures of diverse types to help decrease malnutrition among rural populations (Brown, M. E., et al., 2020).

Shankar Ngcamu, B. S., and Chari, F. (2020) focused on the topic of drought which affects food security and indicated the role of environmental factors that may cause malnutrition. Their investigation implies that drought escalates hunger and malnutrition through loss of access to food, which is unevenly distributed among groups of people who are less vulnerable than others (Lieber, M., et al., 2022). The present study differs in this regard, because it considers healthcare infrastructure as the possible influence factor causing the malnutrition levels in rural India. Whereas Agostoni, C., et al., (2023) concentrate on environmental stressors, the results in the given study show that there is the statistically significant, yet

weak, negative correlation between the level of hunger and malnutrition and the quality of healthcare infrastructure. This brings a new dimension to the current discussion on malnutrition because it implies that small changes to healthcare access levels may help to address the malnutrition burden. On the same note, Kanwal et al. (2021) reported that drought exacerbates malnutrition, yet the role of healthcare systems in alleviating malnutrition in the face of drought cannot be ignored. The findings of Roy, D., et al., 2025) can be supplemented by the necessity to eliminate regional disparities and improve the healthcare infrastructure to address the challenge of malnutrition.

6. CONCLUSION

The pivotal role between socio-economic and malnutrition in India rural cases underlines the significance of agricultural livelihoods and healthcare facilities in the appearance of malnutrition. Although agricultural livelihoods have little influence, access to healthcare is stated to be one of the critical elements in overcoming the problem of malnutrition which restates the international opinion of the importance of healthcare in mitigating nutritional disorders. The results support the case of multi-pronged solutions, such as the role of enhanced healthcare and socio-economic measures, and policy intervention to influence the patterns of disparities on regional grounds. Such recommendations protect against malnutrition and meet the SDG 2 targets and set an example in other similar settings. Studies in the future should address the connection between the environment and health care systems involved to improve nutrition successes of the rural populations.

6.1. Implications for the study

The implications of the study are important, in terms of guiding the policy and interventions of dealing with hunger and malnutrition in rural India. The results will help in the identification of the underlying socio-economic determinants of food security and malnutrition, despite the presence of agricultural livelihoods, absence of healthcare infrastructures, and less household wealth. Such observations are important in establishing specific policies and sustainable development initiatives to ensure special needs of the rural people are catered. Also, the focus made by the study on healthcare access adds to the realization that the improvement of healthcare infrastructure is an essential aspect of the elimination of malnutrition. The findings of the study can inform policy types in governments and non-governmental agencies to develop food security based strategies that can advance the outcomes of public health and attainment of the nutrition-related SDGs.

6.2. Limitations for the study

One of the main limitations of the study is that the impact of the money on the rural households was observed in a sample of a small subset of the households in India potentially overemphasizing the socio-economic status across all rural areas in India. Although the study was keen on investigating on agricultural livelihoods and healthcare infrastructure, it did not delve much on other potential factors, which include cultural practices and local policies of the government. Moreover, the application of self-reported data via questionnaire can result in biasness due to the idea that the respondents may either underestimate or overestimate some information, especially income or health-associated practices. Moreover, the scale and character of the study are cross-sectional, thus, the results cannot be used to make any causal findings, since the implications on long run interventions and dynamics are lacking. The sample size in the study may be considered infinitesimal and future studies may include longitudinal studies to comprehend the inputs of the impact of socio-economic factors changing with time to the malnutrition in rural India.

6.3. Recommendation for future study

In future studies, it is suggested that the impact of socio-economic factors on malnutrition should be broadened through the use of longitudinal data and discussing how agricultural practices, healthcare provision, and climate change interact. To investigate the issue, studies may also evaluate the influence of governmental policies and local intervention and their efficiency in rural settings with different socio-economic background. Also, it would be important to look further into state-level discrepancies in malnutrition based on the socio-economic factors which are peculiar to each state. Future study by mixing methods can offer further context to the multifaceted causes of malnutrition by elaborating on quantitative and qualitative data, which, in turn, can be

used to inform policy-making on the region-specific level.

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