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Assessment of Livelihood Security Index among Rural Households in Lucknow District of Uttar Pradesh

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Abstract

This study aims to assess the Livelihood Security Index (LSI) in Lucknow district of Uttar Pradesh to evaluate the overall well-being and resilience of rural households. The index encompassed six key dimensions: economic, social, environmental, health, educational, and habitat security indicators. Through this composite approach, the research identified vulnerable population groups and provided actionable insights for designing targeted development strategies and evidence-based policy recommendations. Additionally, the Aggregate Household Food Security Index (AHFSI) was computed for economically weaker communities to assess their nutritional stability. This metric combined measures of food accessibility, availability, and consumption patterns to establish a comprehensive household food security profile. The empirical findings revealed a composite Household Livelihood Security Index of 0.58 across the study population. Component-wise, the Food Security Index was 0.54, Health Security Index 0.87, Habitat Security Index 0.46, Educational Security Index 0.48, Social Security Index 0.56, and Economic Security Index 0.58. These results provide a diagnostic framework for identifying food insecurity prevalence and inform the design of targeted interventions to enhance nutritional outcomes and livelihood sustainability for marginalized rural populations.

Keywords: Food Security, Economic Security, Health Security, Social Security, Livelihood Sustainability, Rural Households

Introduction

The National Food Security Act, 2013 established a legislative framework obligating state governments to provide income support to eligible households when the central government cannot fulfill requisite foodgrain distribution schedules and timelines. Following this mandate, the government enacted the Food Security Allowance Rules, 2015 (effective January 21, 2015), establishing the operational procedures and administrative mechanisms for disbursement. These regulations prescribe compensation calculations based on the differential between scheduled and minimum support prices, payable within three weeks of the non-delivery event. All states and union territories received implementation directives on February 12, 2015.

The Framework of Food Security System in India

India's food security architecture integrates multiple complementary mechanisms

- Statutory instruments including the National Food Security Act, 2013 (NFSA)
- Targeted benefit schemes such as Antyodaya Anna Yojana (AAY), Below Poverty Line/Above Poverty Line cards, and Annapurna pensions for senior citizens
- Procurement and reserve management of foodgrains at national and state levels
- The Public Distribution System (PDS) network of retail outlets
- School-based nutrition programs and mid-day meal schemes
- Early childhood development centers (Anganwadis)
- Civil society and non-governmental support organizations

The operational chain encompasses agricultural producers, procurement agencies (Food Corporation of India), retail distribution points (PDS shops), institutional partners (schools, development centers), and consumer households.

Status of Food Security System in India

The PDS operates through approximately 500,000 retail fair-price shops ensuring foodgrain access for roughly 800 million citizens, positioning it among the world's largest commodity distribution networks. As of May 2019, approximately 233 million active ration cards were issued, encompassing roughly 80% of all households. States maintain discretion in subsidy delivery mechanisms in-kind grain transfers or cash transfers though India's historical preference has been grain-based assistance. National reserves at March 2020 totaled approximately 77 million metric tons of cereals and 2.25 million metric tons of pulses, exceeding the Food Corporation's mandated buffer storage by more than threefold. Storage infrastructure is widely distributed across state and district agencies, with capacity generally surpassing the three-month minimum requirement of the public distribution system. To mitigate economic hardship from the COVID-19 pandemic, Finance Minister Nirmala Sitharaman announced March 26, 2020 a relief initiative valued at INR 1.7 lakh crore.

Provisions of Pradhan Mantri Garib Kalyan Yojana

- Distribution of 5 kg of wheat or rice and 1 kg of preferred legumes monthly to 80 crore economically disadvantaged individuals
- Monthly deposits of Rs 500 to 20 crore women account-holders under Jan Dhan banking scheme
- Enhancement of MNREGA daily wages from Rs 182 to Rs 202 for approximately 13.62 crore rural workers
- Ex-gratia assistance of Rs 1,000 each to 3 crore individuals in vulnerable demographic categories (senior citizens, widows, persons with disabilities)
- Advance disbursement of Rs 2,000 (April first week) from existing PM Kisan crop support scheme to 8.7 crore farm families
- Provision of resources from Building and Construction Worker Welfare Funds for worker relief

These measures enhanced food commodity accessibility, affordability, and supply chain continuity. Central and state administrative structures maintained oversight of rapid implementation. Several states adopted supplementary measures: Kerala announced universal provision of free rice regardless of poverty classification; state authorities arranged home delivery of nutritional assistance when community feeding centers were shuttered; community health workers distributed meals to 26,000 children in integrated child development service programs.

Research Methodology

A multi-phase stratified sampling design was employed to select respondents. From 75 administrative districts, Lucknow district was purposively selected as the state capital and principal urban center of Uttar Pradesh, with limited prior household survey coverage in economically weaker communities. Lucknow district comprises nine administrative blocks. Two blocks (Bakshi ka talab and Itaunja) were selected first purposively based on population concentration of economically vulnerable groups, then validated through simple randomization. Within Bakshi ka talab (185 villages), 3 percent were selected randomly; within Itaunja (112 villages), 5 percent were selected randomly reflecting higher concentration of economically weaker populations. Village selection followed predetermined criteria developed through initial reconnaissance and consultations with

development officials. From the assembled respondent roster, households were ranked by poverty classification and grouped into three categories Below Poverty Line (BPL), Above Poverty Line (APL), and Antyodaya (AAY) based on 2021-22 official designations. From each village stratum, 10 percent of households were randomly enrolled. Primary data collection employed structured household interview protocols; secondary data originated from district and block administrative records, published materials, and research literature.

Analytical Tools and Techniques

Livelihood Security Index

The Livelihood Security Index comprises six livelihood outcome dimensions evaluated across measures of accessibility/availability, quality, and aggregate status. To define component indicators, this analysis consulted the standardized metric catalog of CARE USA Program Division and PHLS initiatives. Each indicator received classification on a five-point ordinal scale, with thresholds calibrated to the local village context. Six security indices (food, economic, health, education, habitat, and social network dimensions) were computed by aggregating individual indicator:

1. Economic security
2. Food security
3. Health security
4. Habitat security
5. Educational security
6. Social network security

Since component measurements employed different scales, standardization to a common 0-1 index framework was necessary. The standardization method followed the approach used in the Human Development Index (UNDP, 2007) and applied by Jeyarajah (2016). Individual component indices were computed using a standard formula yielding values from 0 (minimum observed) to 1 (maximum observed). The Household Livelihood Security Index was calculated by averaging standardized component indices using the formula:

$$HLSI = \sum_{j=1}^J Z_{\text{index}} / J$$

where J = number of indicators

Economic Security: This index reflects the annual net household income of surveyed farmer-households.

Food Security: This index is derived from monthly household food consumption expenditure patterns.

Health Security: This index is based on proximity and accessibility to primary healthcare facility services.

Health security index = $(\sum w_i \times f_i) / \sum f_i$, where $i = 0, 1, 2, \dots, 5$

Accessibility in Km: 0-2km = 5, 2-4km = 4, 4-6km = 3, 6-8km = 2, 8-10km = 1, 10km & above = 0

w_i = weights (0 to 5); f_i = number of farmers

Habitat Security: This index reflects the economic value of

household productive assets, including residential structures.

Educational Security Index: This index captures the educational attainment profile of surveyed agricultural households and is calculated as:

Education index = $(\sum w_i \times f_i) / \sum f_i$, where $i = 0, 1, 2, \dots, 5$

Education attainment: Illiterate = 0, Primary school = 1, Middle school = 2, Metric school = 3,

Twelfth standard = 4, Graduate & above = 5

w_i = weights (0 to 5); f_i = number of farmers

Social Security Index: This index quantifies the degree of participation and information access through social networks and is calculated as:

Social Security Index = $(\sum w_i \times f_i) / \sum f_i$

Social Security status: Access to support from friends/neighborhood = 1, Access to phone = 2, Access to TV = 3, Member at village/block level = 4

w_i = weights (1 to 4); f_i = number of farmers

Results and Discussion

Livelihood Security Index of respondents under weaker section

The Livelihood Security Index serves as a diagnostic metric for evaluating the sustainability of household livelihood strategies and resilience to shocks. Composite indices across food, economic, health, education, habitat, and social security dimensions were computed by aggregating standardized component scores. Index calculations employed standardized indicators grounded in literature review of prior empirical research.

Economic security index

Economic security reflects the adequacy of household income flows and asset accumulation to sustain living standards across time horizons. The computed economic security index for surveyed farmers was 0.58, indicating moderate-level economic resilience (Table 4).

Food security index

Food security was indexed using monthly household food consumption expenditure as the operative measure. The food security index value of 0.54 for the farmer population indicates sub-optimal access to adequate nutrition and dietary diversity (Table 4).

Health security index

Health security encompasses the population's capacity to recognize, avert, and mitigate significant health threats. In this analysis, healthcare facility accessibility was the primary measurement variable. The computed health security index of 0.87 indicates strong-performing healthcare infrastructure in the study region. This favorable outcome likely reflects prioritized public health investment at national level, resulting in primary health center establishment in most gram panchayats throughout the study area. Such proximity reduces healthcare access barriers for the rural farming population of eastern Uttar Pradesh. Nevertheless, a minority of surveyed households reported

insufficient primary care service adequacy for optimal health maintenance.

Table 1: Accessibility to primary (Basic) Health Care Centre of respondents under weaker section

Accessibility (Distance in Km)	Index
0-2	86
2-4	33
4-6	31
6-8	—
8-10	—
10 & above	—
Total	150

Health Security Index: 0.87

Habitat security index

Habitat security connotes household access to appropriate residential shelter and associated amenities supporting health, sanitation, and protection from environmental hazards (Saini, 2020). The habitat security index computed to 0.46 for the surveyed farm population, indicating relative shortfalls in dwelling adequacy and infrastructure quality within the study communities.

Educational security index

Education constitutes a fundamental determinant of livelihood security. Household education profiles, educational institution availability, and education-related expenditure are primary factors influencing household security across educational dimensions. Based on farmer educational attainment classifications, the computed educational index was 0.48. The respondent distribution reveals 17 farmers with university degrees, followed by 22 with 12th-standard completion, 31 with high school completion, 35 with middle school completion, 27 with primary schooling, and 18 with no formal education. A notable finding is that most farmer households prioritize enrollment in private educational institutions, despite geographic distance requiring greater household resource investment.

Table 2: Education Levels of respondents under weaker section

Literacy Status	Index
Illiterate	18
Primary School	27
Middle School	35
High School	31
Twelfth Standard	22
Graduate & above	17
Total	150

Educational Security Index: 0.48

Social security index

Social security reflects household capacity to engage with social networks and information systems supporting sustainable livelihood strategies through risk mitigation and resource access. Social networks encompass participation in farmer organizations, cooperatives, self-help groups, and community institutions. Additional determinants include friend/family support access and communication technology penetration. Analysis of farmer social network participation patterns (Table 3) reveals 27% participation in gram panchayat governance, 18% at block administrative level, 40% with television access, 27% reporting friend/neighborhood support networks, and 39% with mobile phone access. The computed social security index of 0.56 indicates that the majority of surveyed households

maintain linkages to at least one social network institution.

Table 3: Social Security Status of respondents under weaker section

Particulars	Index
Access to support from friends/neighborhood	27
Access to phone	39
Access to TV	40
Member at village level	27
Member at the block level	17
Total	150

Social Security Index: 0.56

Table 4: Livelihood Security Index of respondents under weaker section

Indicators	Index
Economic Security	0.58
Food Security	0.54
Health Security	0.87
Habitat Security	0.46
Educational Security	0.48
Social Security	0.56
Household Livelihood Security Index	0.58

Household livelihood security index

The composite household livelihood security index integrates six security dimensions: economic, food, health, habitat, educational, and social security. A holistic assessment computed the overall livelihood security measure.

In the present analysis, the computed overall index value for surveyed farmers was 0.58. Results presented in Table 4 demonstrate that food and economic security dimensions achieved comparable moderate-range values proximate to habitat security performance. Health, education, and social security dimensions exhibited higher security levels. Among the six component indices, health security demonstrated the strongest performance within the study region.

Summary and Conclusion

Food security within the Indian context presents persistent paradoxes reflective of development challenges. Food availability hinges upon domestic agricultural production volumes; food accessibility depends upon population purchasing power; food stability encompasses system resilience and shock absorption capacity ensuring consumption adequacy during normal and crisis periods; and food utilization incorporates nutrition absorption alongside access to potable water, medical services, and sanitation infrastructure (Tripathy and Mishra, 2011) [4]. This analysis presents a comprehensive diagnostic of food security conditions within Lucknow district of Uttar Pradesh, examining availability, stability, accessibility, and utilization dimensions comprehensively.

The empirical investigation reveals several key findings. Household demographic composition reflects relatively large family sizes, generating elevated dependency ratios and resource pressures. The computed overall livelihood security index of 0.58 indicates moderately-secured livelihoods with partial vulnerability exposure. Food and social security dimensions demonstrated relatively stronger performance attributable to public welfare program access, whereas economic security and employment stability remained comparatively weak. Households demonstrating diversified income sources, higher educational attainment, and institutional support access exhibited notably superior livelihood security profiles relative to marginal and land-poor households. Findings underscore the importance of

strengthening income-generating activities and livelihood diversification mechanisms to expand livelihood security among rural populations.

The Livelihood Security Index analysis reveals that the majority of study area households maintained low-to-moderate livelihood security status, principally attributable to constrained income levels, restricted employment accessibility, and inadequate basic service infrastructure.

Suggestions

Effective governance requires institutional mechanisms preventing storage loss, minimizing public distribution system leakage, ensuring targeted program beneficiary access, addressing malnutrition, establishing equitable farm produce valuation, enforcing accountability for regulatory violations, curtailing preventable food loss, guaranteeing food access as a fundamental right, expanding storage capacity, and implementing rational agricultural pricing policies. Comprehensive legal frameworks, when rigorously enforced, ensure efficient food utilization and enhance population health status. Transitioning from a nation with widespread malnutrition to one achieving nutritional adequacy and health security requires sustained policy commitment and implementation fidelity.

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