

Food Insecurity and Coping Mechanisms of Migrant and Non-Migrant Households in Kerala

S. Irudaya Rajan, Sunitha S., and Paarvathi J.



Migration & Food Security (MiFOOD)

Paper No. 75

Series Editors: Sujata Ramachandran and Jonathan Crush

Abstract

This study examines food insecurity and household coping mechanisms in Kerala, focusing on food availability and consumption patterns across migrant and non-migrant households. From the Kerala Migration Survey (KMS) 2023 sample, data was collected from a sub-sample of 1289 households across 48 localities in all 14 districts of Kerala in 2024. The study compares different types of households, including emigrant, return emigrant, out-migrant, return out-migrant and non-migrant households. Household income determines purchasing power, which in turn influences dietary patterns and consumption behaviour. The study reveals that a small proportion of households experienced inadequate food availability, reduced meal consumption, and compromised diets. One-third of households showed a notable shift toward fast food and hotel/restaurant consumption. The study documented considerable variation in food insecurity levels among households. While 91.2% of households were food secure, 3.4% were mildly food insecure, 1.6% moderately food insecure, and 3.7% severely food insecure. The analysis also reveals significant variation across household types, with emigrant households exhibiting better food security outcomes. Socio-economic status and migration characteristics influenced food security, and only a few households reported being adversely affected by rising food prices. The findings disclose substantial changes in household food access and food habits, underscoring the need for targeted assistance and livelihood initiatives to secure the short- and long-term stability of household food security by moving beyond a generalised understanding of migration.

Keywords

food insecurity, coping mechanisms, migrant households, non-migrant households, Kerala

Suggested Citation

Irudaya Rajan, S., Sunitha, S., and Paarvathi, J. (2026). Food Insecurity and Coping Mechanisms of Migrant and Non-Migrant Households in Kerala. MiFOOD Paper No. 75, Waterloo.

Authors

S. Irudaya Rajan, The International Institute of Migration and Development, Thiruvananthapuram, Kerala, India: rajan@iimad.org

Sunitha S., The International Institute of Migration and Development, Thiruvananthapuram, Kerala, India: sunitha@iimad.in

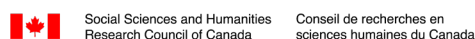
Paarvathi J., The International Institute of Migration and Development, Thiruvananthapuram, Kerala, India: paarvathijayaram@iimad.in

Cover Image

Public distribution centre (ration shop) in Kottayam, Kerala. Photo credit: E.B. Udayan

Sub-Editor: Marika Jeziorek

Production: Bronwen Dachs Muller



Canada



MiFOOD Network
GLOBAL MIGRATION & FOOD SECURITY

This is the 75th Paper in the Working Paper Series published by the Migration and Food Security (MiFOOD) Network, an international network of researchers and organizations that focuses on the linkages between food security and international and internal migration in the Global South (www.mifood.org). The seven-year collaborative MiFOOD project is funded by a Partnership Grant from the Social Sciences and Humanities Research Council of Canada (SSHRC Grant No. 895-2021-1004).

© Authors

Published by the MiFOOD Network at the Balsillie School of International Affairs, Waterloo, Ontario, Canada

Introduction

Food security has been a major global concern for many decades. According to the 1996 World Food Summit, food security is defined as “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” (FAO, 1996). Since food is a basic human need, ensuring food security is a vital investment in the broader security and stability of individuals, households, and communities. Sustainable Development Goal (SDG) 2, “Zero Hunger”, aims to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture by 2030, reflecting the continued importance of attaining food security in the global development agenda. Additionally, global initiatives such as the “International Year of Millets (2023)” have emphasised the importance of dietary diversity in attaining food security (FAO, 2024).

There are six dimensions of food security. First, the availability of adequate amounts of appropriate-quality food produced domestically or imported (including food aid). Second, people’s access to sufficient resources (entitlements) to purchase suitable foods for a healthy diet. Third, the utilisation of food to achieve a state of nutritional well-being, in which all physiological needs are satisfied by a sufficient diet, clean water, sanitation, and medical attention. Fourth, stability, which includes both availability and access. Stability is the steady availability and access to food over time, free from shocks or disruptions (FAO, 2006). Fifth, agency refers to the ability of people and groups to exert some control over their circumstances and to contribute meaningfully to governance processes (Clapp et al., 2022). Sixth, sustainability refers to “food system practices that contribute to long-term regeneration of natural, social, and economic systems, ensuring the food needs of the present generations are met without compromising food needs of future generations” (HLPE, 2020). Approximately 319 million people suffer from acute food insecurity across 67 countries, including India (Moramarco et al., 2025).

Food security has been a pressing problem in India for decades. India ranked 102nd out of 123 countries in the Global Hunger Index 2025, with a score of 25.8 (Scherer et al., 2025). With more than 170 million undernourished people, food insecurity is a core driver of persistent undernourishment in India (Bhutta, 2016; FAO et al., 2025; Haddad et al., 2014). India has responded to these challenges through the National Food Security Act 2013 (NFSA), a major piece of legislation that aims to boost food security and strengthen the Targeted Public Distribution System (TPDS). According to the Department of Food and Public Distribution in the Ministry of Consumer Affairs, the act is intended to cover 75% of the rural population and 50% of the urban population, accounting for approximately 81.35 crores (813.5 million) of the population (as per the 2011 census) (Department of Food and Public Distribution, 2022).

India has established itself as a food surplus nation, achieving record levels of food grain production in recent years (Ministry of Finance, 2023). Thus, the country’s food

insecurity is not driven by low production; rather, chronic food insecurity in India stems from uneven distribution and access, gender inequality, agricultural instability, cultural and social factors, environmental challenges, and declining purchasing power due to high food prices and shrinking incomes in the agrarian and informal sectors (Subbiah et al., 2025; Upadhyay & Palanivel, 2011). Food security outcomes and performance vary significantly across India. The NFSA State Ranking Index attempts to measure various facets of food security and nutrition (Department of Food and Public Distribution, 2022). It assesses NFSA coverage, rightful targeting, and implementation of all NFSA provisions. It analyses the delivery platform, including the distribution and transportation of food grains, last-mile delivery to Fair Price Shops (FPS), and nutrition initiatives. In 2022, Odisha ranked highest in the NFSA State Ranking Index. Uttar Pradesh, Andhra Pradesh, and Gujarat also performed well. These states performed exceptionally well across all metrics and indicators governing NFSA implementation through TPDS. States such as Assam, Meghalaya, and Manipur ranked near the bottom. Kerala ranked in the middle, suggesting that better socio-economic indicators do not always correlate with improved food security performance (Department of Food and Public Distribution, 2022).

These rankings highlight access and implementation issues that vary by region across India. Frequent droughts in the Bundelkhand region of north and central India have caused vitamin deficiencies and limited dietary diversification, leaving most households food insecure (Shakeel & Shazli, 2021). In Assam, rural households rely on food credit and reduced consumption as coping strategies, underscoring the need for more robust food security systems (Hazari & Singh, 2023). Food security measures are needed that are tailored to localised contexts and address discrepancies between lived realities and policy responses (Datta & Rajan, 2024; McKay et al., 2023).

In the context of food insecurity in India, Kerala offers a distinctive and compelling case study for food security research. In 2023, the share of the population that was multidimensionally poor in Kerala was only 0.55%, the lowest among all States and UTs in the country (NITI Aayog, 2023). On 1 November 2025, Kerala was officially declared the first state in India to be free of extreme poverty (The Hindu Bureau, 2025). This outcome resulted from collective efforts and initiatives under the Extreme Poverty Eradication Programme, launched in 2021 and led by the local self-government department. The programme identified the most marginalised households through community-led surveys using multidimensional deprivation indicators, and customised interventions covering food security, health-care, social protection, and livelihoods were delivered, with Kudumbashree and frontline workers playing a crucial role. Kudumbashree is a comprehensive programme launched by the Government of Kerala in 1997 to eradicate poverty and empower women. Its three-tiered community network, Neighbourhood Groups, Area Development Societies, and Community Development Societies, focuses on social development, economic livelihoods, and women’s empowerment.

Despite Kerala's reputation for robust social programmes, it is heavily reliant on other states for food imports. Only 15% of the state's total food grain requirements are produced within its borders, and it relies heavily on vegetable imports from neighbouring states (Kerala State Planning Board, 2017). As income is a key factor in accessing food, this reliance also produces disproportionate vulnerabilities, leaving low-income households with the least ability to withstand price shocks or supply interruptions (Sajan & Ruby, 2025). Kerala's food system excludes inter-state migrants. Food security entitlements remain largely inaccessible to interstate migrants in Kerala, despite the "One Nation One Ration Card" (ONORC) policy, mainly due to poor interstate portability, low awareness, problems with Aadhaar-ration linkage, and administrative obstacles (Khadar et al., 2025; Tumbe & Jha, 2024). Aadhaar is a 12-digit unique identity number issued to Indian residents by the Unique Identification Authority of India (UIDAI) that verifies a person's identity using biometric and demographic data.

Furthermore, Kerala is a unique case where high socio-economic indicators coexist with high rates of non-communicable diseases, and it is often referred to as the "diabetic capital" due to the high prevalence of diabetes in the state (Anjana et al., 2023; Soman et al., 2025; Thankappan et al., 2010). This pattern is often linked to the nutrition transition and to shifts in food consumption and lifestyle patterns (Kumar et al., 2022; Sathish et al., 2017). The cost of living in the state is also rising quickly, especially food prices. Kerala had the highest retail inflation rate of any Indian state, at 9.05% in September 2025 (Ministry of Statistics and Programme Implementation, 2025).

Other challenges are emerging in Kerala's food system. Like other parts of India, the state's rapid, uneven urbanisation has increased food insecurity, driven by the displacement of agricultural livelihoods and growing reliance on volatile food markets. This shift has pushed diets toward processed foods and created a dual burden of obesity and malnutrition (Choithani et al., 2024). Fast-food chains have become increasingly accessible and socially desirable, frequently displacing traditional food habits (Kumar et al., 2022). Combined with climate change and frequent floods, these trends increase the state's susceptibility to price fluctuations and supply shocks.

As a "food-deficit state", Kerala's Public Distribution System (PDS) plays a crucial role in ensuring food security. Before introducing the targeted system in 1997, Kerala was the only state in India with nearly universal PDS coverage. In 2022, Kerala had 91.43 lakh (9.143 million) ration card holders (Kerala State Planning Board, 2022). Based on economic criteria, the PDS provides subsidised rice, wheat, sugar, and kerosene to targeted households through a network of fair price shops, also called ration shops. Kerala's PDS is often praised for its effective digitisation of PDS user data, comparatively lower leakages, consistent supply, and enhanced household targeting (Masiero, 2015; Rajput & Rajan, 2023).

In addition to the well-implemented PDS, Kerala implements various other subsidy programmes and schemes to improve

food and nutritional security. These include Government of India-sponsored, nationwide schemes such as the Mid-Day Meal scheme, which provides schoolchildren with nutritious lunches, and the Integrated Child Development Services Mission, which provides supplemental nutrition to pregnant women and young children (Baiju, 2014; Jayalakshmi & Jissa, 2017). The state has also experimented with community kitchens, or "Janakeeya Hotel," which use volunteers from the Kudumbashree network to provide affordable meals (Johnson et al., 2020).

Migration and Food Security in Kerala

Kerala has a long history of international and internal migration. According to KMS 2023, the number of emigrants is estimated at 2.2 million, and Kerala holds 21% of NRI deposits in India, a figure that has remained consistent since 2019. The migrant population from Kerala is dominated by individuals moving to the Gulf Cooperation Council (GCC) countries, especially to the United Arab Emirates (UAE) and Saudi Arabia, motivated by employment opportunities and improved standards of living (Rajan & Pattath, 2022a, 2022b; Rajan & Zachariah, 2019; Zachariah et al., 2001a, 2001b). Alongside international migration, Kerala also experiences large inflows of inter-state migrants, especially from West Bengal, Odisha, and Assam, who come in search of employment across sectors such as construction, manufacturing, and hospitality (Peter et al., 2020). Kerala also experiences high out-migration. According to KMS 2023, approximately 4.7 lakh (0.47 million) people from Kerala are out-migrants, with the highest number from Palakkad (55,601). Karnataka emerges as the top destination for 45.2% of out-migrants, followed by Tamil Nadu (16.6%) and Maharashtra (10.5%). International and internal migration streams affect Kerala's food systems differently.

The economic consequences of this migration history and food security are closely linked. Remittances sent by international emigrants constitute approximately 23.3% of the Net State Domestic Product (NSDP) (Rajan, 2024). Households that receive remittances typically have higher purchasing power, and most of the amount is spent on consumption and food security, along with education and healthcare, which also facilitate dietary shifts toward processed and convenience foods (Basu & Rajan, 2018; Batra & Sharma, 2025). Large remittance inflows have improved household food resilience and affordability in Kerala, but have also reduced local food production and shifted diets towards processed foods (Rajan et al., 2024). A study conducted among return emigrants from the Gulf in Kerala found that food insecurity, which is shaped by income, occupation, and housing conditions, had gendered dimensions, with female migrants vulnerable to limited food variety, whereas male migrants were vulnerable to both food variety and quantity (Rajan et al., 2024).

Migration has also broadly influenced Keralites' changing food habits. The increased prevalence of restaurants and eateries serving international cuisines, including Arabic cuisine, reflects Kerala's migration history and shifting food preferences (Thampi & Priya, 2023). However, migration

does not necessarily provide stable incomes for all migrant households, implying that their food security experiences also differ. This discrepancy shows how migration can protect some households' food security while exacerbating the structural vulnerabilities of others.

Research Objectives and Questions

This study provides a comparative analysis of migrant and non-migrant households by examining the food consumption patterns, dietary diversity and food security outcomes. Such an assessment is especially important for Kerala, as this migration-driven economic transition has produced distinct economic profiles between households with and without migrant members. This could affect household food security, depending on migration status and income level. The study assesses how migration shapes food security and nutritional outcomes across different household types.

The study adopted these key objectives: (a) to examine socio-economic characteristics and expenditure patterns of international and internal migrant-sending and non-migrant households in Kerala; (b) to measure the level of food insecurity among these various household types in Kerala; and (c) to identify the coping mechanisms adopted by households to address their food insecurity through their adaptive food consumption patterns. These objectives were addressed using the following questions:

1. What is the share of food expenditure in total household consumption for migrant and non-migrant households?
2. How do dietary diversity and protein intake differ between migrant and non-migrant households?
3. How does socio-economic status influence household consumption patterns?

4. What factors are associated with food insecurity in migrant and non-migrant households?
5. How do the coping strategies differ between migrant and non-migrant households?
6. What is the role of the public distribution system in ensuring food security?

Data and Methodology

This study took a thematic approach, with food security being one of its central themes. The samples were drawn from the Kerala Migration Survey (KMS) 2023, conducted by the Gulati Institute of Finance and Taxation (GIFT), Thiruvananthapuram, Kerala, with technical support from the International Institute of Migration and Development (IIMAD), Thiruvananthapuram, Kerala and financial support from the Department of Non-Resident Keralites Affairs (NORKA), Government of Kerala. Prior to this study, a similar study was conducted in 2022-2023 among female migrant workers returning from Gulf Cooperation Council countries. The samples were drawn from the Kerala Migration Survey 2018 and the Return Emigrant Survey 2021 (Rajan et al., 2024; Rajan, 2024). However, the current study is at the household level and examines how food security differs between households with migrants and those without.

Of the 500 localities covered by KMS 2023, 48 were randomly selected to ensure representation across all 14 districts of Kerala and to include both migrant and non-migrant households. Each locality comprised 40 households, and the survey was intended to cover 1,920 households. However, due to household relocations and refusals to participate, the final number of surveyed households was 1,289 (Table 1). The study was conducted in November and December 2024. Households were divided into five categories based

District	Surveyed localities	Number of households approached	Number of households surveyed	Not surveyed	Response rate
Thiruvananthapuram	6	240	78	162	32.5
Kollam	4	160	77	83	48.1
Pathanamthitta	2	80	64	16	80.0
Alappuzha	2	80	56	24	70.0
Kottayam	2	80	53	27	66.3
Idukki	2	80	57	23	71.3
Ernakulam	5	200	119	81	59.5
Thrissur	5	200	146	54	73.0
Palakkad	4	160	133	27	83.1
Malappuram	5	200	175	25	87.5
Kozhikode	4	160	144	16	90.0
Wayanad	1	40	37	3	92.5
Kannur	4	160	101	59	63.1
Kasaragod	2	80	49	31	61.3
Total	48	1,920	1,289	631	67.1

on migration status. Households with no history of moving to another location are classified as non-migrant. Emigrant households have at least one person living in another country. Return emigrant households have at least one person who went abroad and then returned to live in the household. Out-migrant households have at least one person living in other states of India, and return out-migrant households have at least one person who moved to other states in India and then returned to Kerala (Table 2). The KMS classified households by priority, with international migrants first, followed by internal migrants. If a household includes both international migrants and international return migrants, it is considered an emigrant household. The hierarchy of household definitions is as follows: emigrant, return emigrant, out-migrant, and return out-migrant (Zachariah & Rajan, 2015).

Study Results

The study employed a comparative analytical framework to assess the extent of food insecurity and the coping mechanisms used by migrant and non-migrant households. It also used the Household Food Insecurity Access Scale (HFIAS) to measure the extent and severity of household food insecurity. Developed by the Food and Nutrition Technical Assistance (FANTA) project, the HFIAS comprises nine questions that assess domains of food insecurity, including anxiety and uncertainty about the food supply and insufficient food intake (Coates et al., 2007). The nine items were coded as never (0), rarely (1), sometimes (2) and often (3). Based on the responses, a continuous HFIAS score ranging from 0 to 27 is computed, with higher scores indicating greater severity associated with inadequate access to food and lower scores indicating less frequent experiences of food insecurity. The household Food Insecurity Access Prevalence (HFIAP) classification algorithm was applied to classify households into four categories for analysis: food-secure, mildly food-insecure, moderately food-insecure, and severely food-insecure (Coates et al., 2007). Of the 1289 households, 91.2% were classified as food secure, 3.4% as mildly food insecure, 1.6% as moderately food insecure and 3.7% as severely food insecure.

A Socio-economic Index (SEI) was constructed to assess household economic status using Principal Component Analysis (PCA) based on selected durable assets, including car, taxi, lorry, scooter, cycle, basic mobile, smartphone, CRT television, flat-screen television, refrigerator, washing machine, oven, computer, internet connection, air conditioner, and inverter. These durable assets show how wealthy a

household is over time. This is more reliable than recalling a household's income. Durable assets provide a clearer picture of long-term wealth, which is preferable to the bias and volatility inherent in the recall of household income (Vyas & Kumaranayake, 2006). All asset variables were coded as 1 for owned and 0 for not owned. The factor scores derived from the first principal component ranged from negative to positive values, with lower scores indicating poorer socio-economic conditions and higher scores indicating better-off households. For analytical purposes, the scores were categorised into low, medium, and high socio-economic groups based on the mean and standard deviation. Households with scores below the mean were classified as low socio-economic status; those with scores between the mean and the mean + SD were classified as medium socio-economic status; and those with scores greater than the mean + SD were classified as high socio-economic status.

Socio-economic Profile of Participant Households

Household size varied significantly across migration categories. Emigrant households had the largest household size (Mean=5.0; SD=2.1), followed by return emigrant households (Mean=4.4; SD=2.1). Non-migrant and return out-migrant households had smaller household sizes (Table 2).

Return emigrant and out-migrant households also have larger household sizes, with mean sizes of 4.4 and 4.0, respectively. The higher average household size may reflect the extended family structures or dependents supported by remittances. The overall mean household size of 4.1, with a standard deviation of 1.9, indicates moderate variability.

Non-emigrant households surveyed reported an average monthly income of ₹27,969 (USD328.02), slightly below the overall mean household income of ₹28,653 (USD336.04) (Table 3). Emigrant households have the highest average monthly income at ₹32,327 (USD379.13), followed by out-migrant households at ₹31,287 (USD366.93). These results confirm that remittances increase incomes among migrant households. The average monthly incomes of return-emigrant and return-out-migrant households are ₹27,470 (USD322.17) and ₹28,217 (USD330.93), respectively. This suggests a slight decline relative to migrant households, possibly due to the loss of remittances upon homecoming. Although comparatively high standard deviations across all categories indicate significant income variation within each category, median income across the household group varies significantly between emigrant and non-migrant households.

Table 2: Average Household Size by its Type

Type of household	N	Mean	Std. Deviation
Non-migrant	865	3.8	1.8
Emigrant	177	5.0	2.1
Return Emigrant	157	4.4	2.1
Out-migrant	54	4.0	1.5
Return Out-migrant	36	3.7	1.8
Total	1289	4.1	1.9

Household Type	Numbers	₹ (USD)		
		Mean	Std. Deviation	Median
Non-migrant	865	27,969 (328.02)	24,903 (292.06)	20,000 (234.56)
Emigrant	177	32,327 (379.13)	27,964 (327.96)	25,000 (293.20)
Return emigrant	157	27,470 (322.17)	23,640 (277.25)	20,000 (234.56)
Out-migrant	54	31,287 (366.93)	28,198 (330.71)	22,500 (263.88)
Return out-migrant	36	28,217 (330.93)	19,441 (228.00)	22,500 (263.88)
Total	1,289	28,653 (336.04)	25,222 (295.80)	20,000 (234.56)

Household Type	Low	Medium	High	Total
Non-migrant	31.6	50.2	18.3	100.0
Emigrant	11.3	46.3	42.4	100.0
Return emigrant	9.6	54.8	35.7	100.0
Out-migrant	13.0	48.1	38.9	100.0
Return out-migrant	22.2	44.4	33.3	100.0
Total	25.1	50.0	25.0	100.0

Household Type	Yellow	Pink	Blue	White	Total
Non-migrant	8.4	31.3	25.7	34.6	100.0
Emigrant	5.7	32.6	30.9	30.9	100.0
Return emigrant	11.6	36.8	18.1	33.5	100.0
Out-migrant	13.5	30.8	26.9	28.8	100.0
Return out-migrant	5.6	33.3	41.7	19.4	100.0
Total	8.5	32.2	26.0	33.3	100.0

The socio-economic index (SEI) by household type shows that non-migrant households are concentrated in the lower socio-economic tier, whereas households linked to migration have higher socio-economic status (Table 4). Non-migrant households are the most socio-economically disadvantaged, with nearly one-third (31.6%) in the low SEI category. In contrast, emigrant households occupy the strongest socio-economic position, with 42.4% in the high SEI group. International migration and remittances contribute significantly to economic advancement for migrant households. Return emigrant households also show favourable outcomes, with the majority concentrated in the medium (54.8%) and high (35.7%) SEI categories. Return out-migrant households occupy a comparatively lower position, with 22.2% in the low SEI category; however, their status remains better than that of non-migrant households.

Kerala uses four major types of ration cards, which reflect the economic eligibility of households and determine access to subsidised food grains through the Public Distribution System (PDS). Yellow cards are issued to the poorest households and are known as Antyodaya Anna Yojana (AAY) cards. Under the National Food Security Framework, AAY cards include widows, older adults without support, and vulnerable persons. However, implementation gaps, such as e-KYC (Know Your Customer in an electronic form

called e-KYC is a method of verifying beneficiaries' identity electronically using the personal data stored in official identification documents), mismatches or inclusion-exclusion errors, can lead to exclusion from the priority list, which can affect their food security. Pink cards are issued to priority/ below poverty line (BPL) households. Blue cards are issued to above-poverty-line (APL) households with some subsidy. White cards are issued to general households (APL) who do not qualify for subsidies and are in the non-priority non-subsidised (NP-NS) category (Government of Kerala, n.d.).

Here, the distribution of ration cards shows clear economic differentiation based on migration status. Non-migrant households demonstrate stronger economic stability, as indicated by a higher proportion of white cards (Table 5). Among emigrant households, 61.7% fall in the APL category (Blue and white cards combined), indicating relatively better economic status. Out-migrant households exhibit a relatively higher share of yellow cards (13.5%), whereas return emigrant households show a larger share of pink cards (36.8%). Along with the other eligibility criteria, individuals diagnosed with terminal illnesses are also included under the pink card category. Although blue cards are classified under the above poverty line (APL) category, they include socially vulnerable individuals such as widows and persons living alone, even when their income does not reflect APL status.

Household Food Spending

The average monthly food expenditure across all households is ₹7,251 (USD85.04) (SD = ₹5,002) (USD58.66) (Table 6). Out-migrant households reported the highest food spending, followed by emigrant households at ₹7,299 (USD85.61), whereas return emigrant households recorded the lowest at ₹7,161 (USD83.99). The high standard deviations among out-migrant and non-migrant households indicate considerable inequality in food spending within these groups. In other words, these groups include both low- and high-spending households, indicating greater inequality in food consumption.

The average share of food in total household expenditure is around 49% across all household types, indicating that about half of total household expenditure in Kerala is spent on food (Table 7). Return emigrant households have the highest food share (50%), followed by out-migrant households (49.4%). Studies have shown that as household income increases, the proportion of income spent on food decreases, even if the absolute amount spent on food rises (Deaton & Muellbauer, 1980; Rathnayaka & Revoredo, 2026). Thus, a lower share of total expenditure on food generally indicates improved economic well-being.

Per capita monthly food expenditure varies across household types. Return out-migrant households have the high-

est per capita food expenditure, with a mean of ₹2,480.6 (USD29.09) (Table 8). Out-migrant households show a large standard deviation, reflecting diverse economic situations. In contrast, emigrant households report the lowest mean per capita food expenditure at ₹1,677.4 (USD19.67). Although emigrant households report higher overall food consumption expenditure, the lowest per capita expenditure is attributable to larger household sizes in this cohort. More individuals share the available resources, reducing per-person consumption expenditure.

Household Food Purchase Decisions

Household food purchase decisions are shaped by ongoing negotiations between costs and benefits. Evidence from rural Kerala indicates that affordability is the most important factor in food decisions, followed by husbands' and children's preferences, whereas health concerns and chronic diseases are given less importance (Daivadanam et al., 2015). Likewise, the Friedman Test results indicate which factors most influence household food purchase decisions across household types (Table 9). The results show how different household types prioritise purchase decisions of food products by quality, quantity, brand, and price. All household types prioritise the quality of food products, while brand is the least preferred factor, except among return out-migrant households, where price ranks lowest. The test results are statistically significant ($p < 0.005$) across all household types.

Table 6: Total Food Expenditure by Household Type

Household Type	Numbers	Mean ₹ (USD)	Std. Deviation ₹ (USD)
Non-migrant	865	7230.1 (84.79)	5202.7 (61.02)
Emigrant	177	7299.3 (85.61)	4115.0 (48.26)
Return emigrant	157	7161.2 (83.99)	4907.2 (57.55)
Out-migrant	54	7722.2 (90.55)	5379.6 (63.09)
Return out-migrant	36	7208.3 (84.54)	3977.4 (46.65)
Total	1,289	7251.2 (85.04)	5001.9 (58.66)

Table 7: Share of Food Expenditure in Total by Household Type

Household Type	Numbers	Mean	Std. Deviation
Non-migrant	865	48.7	19.7
Emigrant	177	48.6	18.7
Return emigrant	157	50.0	18.1
Out-migrant	54	49.4	16.6
Return out-migrant	36	48.8	19.0
Total	1,289	48.9	19.2

Table 8: Per-Capita Food Expenditure by Household Type

Household Type	Numbers	Mean ₹ (USD)	Std. Deviation ₹ (USD)
Non-migrant	865	2288.0 (26.83)	1984.5 (23.27)
Emigrant	177	1677.4 (19.67)	1123.9 (13.18)
Return emigrant	157	2042.0 (23.95)	1840.4 (21.58)
Out-migrant	54	2375.2 (27.86)	2711.4 (31.80)
Return Out-migrant	36	2480.6 (29.09)	1649.9 (19.35)
Total	1,289	2183.2 (25.60)	1910.5 (22.41)

Household Type	Key Food Purchase Considerations	Mean Rank	Rank	Chi-Square	P-value
Non-migrant	Quality	2.0	1	352.542	0.000
	Quantity	2.5	2		
	Brand	3.0	4		
	Price	2.5	3		
Emigrant	Quality	2.0	1	72.88	0.000
	Quantity	2.6	2		
	Brand	2.9	4		
	Price	2.6	3		
Return emigrant	Quality	1.9	1	89.564	0.000
	Quantity	2.6	3		
	Brand	2.9	4		
	Price	2.6	2		
Out-migrant	Quality	1.9	1	34.261	0.000
	Quantity	2.6	3		
	Brand	3.1	4		
	Price	2.5	2		
Return out-migrant	Quality	1.9	1	17.471	0.001
	Quantity	2.5	2		
	Brand	2.6	3		
	Price	2.9	4		

Across all household types, food quality was consistently rated the top priority and the most influential factor in purchasing decisions, with brand and price relatively less important. Irrespective of brand names, participants emphasised quality, quantity and reasonable prices. Return emigrant and out-migrant participating households ranked food prices as the second most important attribute after quality, reflecting greater sensitivity to cost. In contrast, non-migrant, emigrant, and return out-migrant households focused more on quantity (ranked second) than on price, indicating a focus on adequacy and sufficiency. Overall, regardless of brand name, households prioritised quality, followed by quantity and price.

The results show that households make food purchasing decisions based on the perceived quality of food products rather than brand reputation or even price. It also implies that households were concerned about obtaining food they considered safe, nutritious and of good standard, which supports the utilisation dimension of food security. Because three of the five household types ranked quantity second, this suggests they are also concerned about having enough food to meet their household's needs. Ranking price after quantity suggests that while affordability matters, households may be willing to pay higher prices if they believe the food offers better quality or sufficient quantity. However, a lower price ranking does not necessarily rule out economic constraints. The emphasis on quantity suggests a concern for ensuring sufficient food intake, supporting the availability and access aspects of food security. The low ranking of food brand suggests that households are more concerned

about the intrinsic characteristics of food products than about marketing or brand loyalty.

Diversity in Food Consumption

Dietary diversity is a key indicator of diet quality and household food security. Several studies in South Asia show that food-insecure households are more likely to have lower dietary diversity scores than food-secure households. A study of rural households in Jammu, northern India, found that food-insecure households consumed less protein-rich food (Langer et al., 2024). A separate study of rural households in Bangladesh found that food insecurity was strongly correlated with low dietary diversity, particularly among households without remittances, those excluded from social programmes, and those with low incomes. In migrant and non-migrant households, differences in income, remittances, and livelihood strategies can therefore influence food consumption patterns and dietary diversity (Ali et al., 2022).

A one-way ANOVA (analysis of variance) was conducted to examine whether the Food Diversity Index differed by household migration type (Table 10.1). Results showed a statistically significant effect of migration status on the household food diversity index, $F(4, 1284) = 9.846, p < .001$. Emigrant and return-emigrant households had significantly higher food diversity index scores than non-migrant households. No significant differences were observed among the remaining household categories. Findings indicate that international migration (both current and return) is associated with greater household dietary diversity (Table 10.2).

Protein Consumption Score (PCS)

Adequate intake of high-quality protein is vital for human food security (Coles et al., 2016). The ANOVA test was carried out to examine whether the mean Protein Consumption Score (PCS) differed significantly across five household types (Table 11.1). The findings revealed a statistically significant variation in protein consumption scores across household migration types ($F(4, 1284) = 9.944$, $P\text{-value} < .001$). Post-hoc analysis indicated that emigrant households had significantly higher protein intake than non-migrant households (Table 11.2). Return emigrant households also demonstrated significantly greater protein consumption than non-migrant households. Migration is thus associated with improved household dietary quality. Increased dietary awareness, exposure to global food cultures, and additional resources through remittances may contribute to better nutritional practices.

Household Food Management and Coping Mechanisms

Household food management refers to the strategies households employ to access, acquire, distribute and consume food. In this study, food management practices

included sharing meals with others outside their household, purchasing food online, using the ration card to obtain subsidised food grains, consumption of millets, experiences of food adulteration and food poisoning from fast food consumption. In the context of food security, sharing meals can reflect households' capacity to support others without resource constraints. Sharing meals with non-relatives may indicate relative food security and economic well-being. Food sharing may also function as a system of reciprocity in which households exchange food aid with one another and with non-relatives. They may continue sharing food in difficult situations because it helps build social connections and ensures future reciprocity. Meal sharing with non-household members is generally low across all household types (Table 12). However, migration status significantly shapes hospitality patterns. Out-migrant and return out-migrant households have the highest levels of food sharing, which indicates that migration experiences reinforce community reciprocity and broaden social networks. In contrast, return emigrant households exhibit the lowest levels of meal-sharing behaviour. More socially active households, especially those that host celebrations and social interactions, tend to serve food to non-household members more often. In some cases, households also provide free meals to the poor and

Table 10.1: ANOVA – Food Diversity Index

	Sum of Squares	df	Mean Square	F	Sig.
Between groups	2.096	4	.524	9.846	.000
Within groups	68.350	1,284	.053		
Total	70.447	1,288			

Table 10.2: Post-Hoc Test - Games-Howell

(I) HH Type	(J) HH Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Non-migrant	Emigrant	-.10273*	0.02038	0.000	-0.1587	-0.0467
	Return emigrant	-.06887*	0.01973	0.005	-0.1231	-0.0146
	Out-migrant	-0.04505	0.03165	0.615	-0.1341	0.044
	Return out-migrant	-0.09322	0.03888	0.138	-0.2045	0.0181

* The mean difference is significant at the 0.05 level

Table 11.1: ANOVA - Protein Consumption Score

	Sum of Squares	df	Mean Square	F	Sig.
Between groups	247.833	4	61.958	9.944	0.000
Within groups	8000.116	1284	6.231		
Total	8247.949	1288			

Table 11.2: Post-Hoc Test - Games-Howell

(I) HH Type	(J) HH Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Non-migrant	Emigrant	-1.18033*	0.22407	0.000	-1.7963	-0.5644
	Return emigrant	-.65811*	0.19846	0.009	-1.2038	-0.1124
	Out-migrant	-0.36866	0.34448	0.821	-1.3375	0.6002
	Return out-migrant	-0.89644	0.45047	0.290	-2.1869	0.3940

the sick seeking treatment at government medical colleges or hospitals, as well as to their caregivers, reflecting cultural practices of charity and social support.

Household strategies related to food access also vary by migration category (Table 13). Out-migrant households show the highest adoption of online purchasing (24.1%), reflecting better digital access and greater exposure to urban consumption patterns. In contrast, non-migrant households have the lowest online usage, indicating persistent digital barriers. Moreover, online food delivery services remain largely concentrated in urban areas and are limited in rural areas, further restricting access for these households.

The ration card remains the most widely used support mechanism, with high usage across almost all household types, underscoring strong reliance on the PDS for food security. Return emigrant, non-migrant and out-migrant households exhibit the highest levels of ration card use, indicating strong dependence on subsidised food grains. However, return out-migrant households show significantly lower usage (66.7%). Many of these households include aged members, which may limit their access to ration shops or their consistent use of the PDS. Notably, around 33% of return out-migrant and 13% of emigrant households do not possess a ration card. Among households with ration cards, all except return-out-migrant households reported using the ration shop to procure food at least once in the 30 days before the survey (98%). In Kerala, the provision of ration cards is not limited to economic vulnerability; they also consider other factors, including living arrangements, asset ownership, occupation, and social vulnerability, such as being an older person, a widow, or a person with a disability. This does not mean that all these households are poor.

Experiences of food adulteration were relatively rare across all household types. Food adulteration is the process of lowering food quality by adding inferior or harmful substances or depleting vital nutrients (Anagaw et al., 2024). However, emigrant and return-emigrant households report slightly higher rates of adulterated food. Most of the cases they reported involved fish, fruits, and vegetables. Return emigrants and emigrant households often compare local food quality with what they experienced abroad, making them more sensitive to perceived quality issues. Moreover, their greater reliance on market-based and commercial food chains increases the likelihood of encountering adulterated food. Food poisoning incidents from consuming fast food are also higher among emigrant and return-emigrant households compared to non-emigrant households. Food adulteration and food poisoning are not directly related to coping strategies, but they are indirectly linked, as economically constrained households may seek cheaper, lower-quality food options, thereby increasing their exposure to contaminated food products.

Millet consumption indicates a preference for nutritionally rich foods that contribute to dietary diversity and resilience. Results show that millet consumption varies by migration status. Non-migrant households report the lowest level of millet consumption, which may reflect limited dietary diversification or lower exposure to health-oriented food trends. In contrast, emigrant and return emigrant households show substantially higher levels of millet consumption. Their greater exposure to global health trends, awareness of nutritious food choices, and greater purchasing power may contribute to this pattern. Return out-migrant households also report high millet consumption, suggesting that migration increases awareness and adoption of healthier grains.

Table 12: Meals Served to Non-Household Members in the Last 30 Days prior to the Survey

No of Meals	No.	1-5	6-20	21+	Total
Non-migrant	74.3	15.3	7.2	3.2	100.0
Emigrant	70.1	20.3	7.9	1.7	100.0
Return emigrant	78.3	17.2	3.8	0.6	100.0
Out-migrant	61.1	22.2	11.1	5.6	100.0
Return out-migrant	66.7	16.7	11.1	5.6	100.0
Total	73.5	16.5	7.1	2.9	100.0

Table 13: Household Strategies for Managing Food Consumption and Access by Migration Category

Migrant Type	Purchased food online	Procured food through Ration Card	Experienced food adulteration	Had food poisoning in the past year from consuming fast food	Consumed millets at home
Non-migrant	11.2	90.9	3.8	4.5	25.8
Emigrant	17.5	87.0	6.8	12.9	41.2
Return emigrant	13.4	91.1	7.0	17.7	38.9
Out-migrant	24.1	90.7	1.9	8.3	29.6
Return out-migrant	16.7	66.7	5.6	7.1	41.7
Total	13.0	89.7	4.6	7.9	30.1

Household Food Security

Food Security Index

Household Food Insecurity Access Prevalence (HFIAP) varied significantly by migration category ($\chi^2 = 23.036$, $p = .027$) (Table 14). Emigrant households had the highest level of food security (98.3%), followed by return emigrant (95.5%) and out-migrant (90.7%) households. In contrast, a relatively higher share of non-migrant and return out-migrant households experienced food insecurity, indicating greater economic and dietary vulnerability. Households with emigrants or return emigrants had better food security than non-migrant and return out-migrant households, suggesting that the advantages associated with migration may diminish after returning home from other provinces. Household migration status was statistically significantly related to household food insecurity.

Factors of Food Insecurity

Household food security was assessed using the Household Food Insecurity Access Prevalence (HFIAP) indicator developed by FANTA, which classifies households into categories based on responses to nine questions. These were combined into a binary outcome: food secure versus food insecure (mildly, moderately, or severely food insecure). Under the HFIAP criteria, a household that worries rarely about lacking enough food and reports no other experience of food insecurity is classified as food secure, even if its HFIAS score is above zero. Thus, HFIAP applies a stricter threshold for classifying households as food insecure than a definition based on any positive HFIAS score. The sample profile shows that 91.2% of households are food secure, while 8.8% are food insecure (Table 15). The prevalence of food insecurity (8.8%) is comparable to that reported in other studies using the standard HFIAP categories.

We used binary logistic regression to assess the main factors associated with household food security. The dependent variable is household food security status, derived from the HFIAP classification and coded as 0 = food secure and 1 = food insecure, with the latter combining mildly, moderately, and severely food insecure households. The model includes the following categorical independent variables: type of ration cards (reference category (RC): Yellow and Pink cards), food diversity index (RC: Low diversity), socio-economic index (RC: Low), household type (RC: Non-migrant Household), and whether affected by food price changes (RC: Not affected). Regarding the ration card type, 36.9%

of households hold yellow or pink cards. Food diversity is low in 52.1% of households. Half of households fall into the medium socio-economic index category. Household type is dominated by non-migrant households. A large majority of households report not being affected by food price fluctuations, whereas 13.5% are affected.

Overall, the logistic regression model fits the data well (Table 16.1). The omnibus model test is statistically significant, $\chi^2 (10) = 173.023$, $P < 0.001$. The model demonstrates moderate explanatory power, with Cox & Snell $R^2 = 0.126$ and Nagelkerke $R^2 = 0.280$, suggesting that the predictors account for a meaningful proportion of variation in household food security. The model's classification accuracy is high at 90.8% (Table 16.2).

The regression coefficients (B values) represent the change in log-odds relative to the reference category, while the odds ratio, $\text{Exp}(B)$, provides an intuitive measure of effect size. Values greater than 1 indicate higher odds of food security than the reference category, and values less than 1 indicate lower odds.

Ration card type is significantly associated with food security (Table 16.3). Compared with households holding yellow and pink cards, those with blue cards have almost twice the odds of being food secure ($\text{OR}=2.026$, $p=0.014$), and those with white cards have slightly more than double the odds ($\text{OR}=2.407$, $p=0.021$). Households without a ration card also have higher odds of being food secure ($\text{OR}=4.040$, $p=0.014$). Food diversity does not have a statistically significant effect in this model, and evidence for a direct effect is weak. The socio-economic index is marginally significant. Households in the medium category have 1.65 times the odds of being food secure compared with the low socio-economic category ($p=0.040$). The high socio-economic category is not statistically significant. This result indicates that higher socioeconomic status is associated with lower odds of household food insecurity.

International migrant households have about twice the odds of being food secure compared with non-migrant households ($\text{OR}=2.081$), and this association is statistically significant ($p=0.046$). International migration may provide households with purchasing power and stability, thereby enhancing food security. However, internal migrant households do not differ significantly from non-migrant households. One of the model's strongest findings concerns price fluctuations. Households affected by rising food prices have

Table 14: Food Security Status among Household Types

HFIAP	Non-migrant	Emigrant	Return emigrant	Out-migrant	Return out-migrant	Total
Food secure	89.2	98.3	95.5	90.7	86.1	91.2
Mildly food insecure	3.8	1.1	3.2	3.7	5.6	3.4
Moderately food insecure	2.0	0.6	0.6	1.9	2.8	1.6
Severely food insecure	5.0	0.0	0.6	3.7	5.6	3.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
Pearson Chi-Square	23.036	p-value	0.027			

substantially lower odds of being food secure. Households affected by price increases have only about 11% of the odds of being food secure compared with households not affected by price increases (OR = 0.114, $p < 0.001$), which is 89% lower odds. Price increases disproportionately affect vulnerable households, limiting their ability to purchase adequate and nutritious food.

The logistic regression results identify the key factors associated with household food security. Price vulnerability emerges as one of the most important factors of household

food security followed by ration card type. Households affected by rising prices have lower odds of being food secure, underscoring that inflation and market instability directly worsen food access, especially among economically weaker households. Differences across ration card categories show that yellow- and pink-card holders have lower odds of being food secure than blue-, white-, and no-card holders. Regarding migration, international migrant households have higher odds of being food secure, and this association is statistically significant. This result suggests a potential

Table 15: Sample Characteristics of Households

Dependent Variable	Number	Share (%)
HFIAP Score		
Food Insecure	113	8.8
Food Secure	1176	91.2
Total	1289	100.0
Independent Variables		
Types of Ration Card		
Yellow and Pink (RC)	476	36.9
Blue	393	30.5
White	287	22.3
No Ration card	133	10.3
Food Diversity Index		
Low (RC)	672	52.1
Moderate	445	34.5
High	172	13.3
Socio-Economic Index		
Low (RC)	323	25.0
Medium	644	50.0
High	322	25.0
Household Type		
Non-migrant households (RC)	865	67.1
International migrant households	334	25.9
Internal migrant households	90	7.0
Price Affected		
No (RC)	1115	86.5
Yes	174	13.5
Total	1289	100.0
<i>Note: RC – Reference Category</i>		

Table 16.1: Logistic Regression Model Fit

Model	χ^2	Df	p-value	Cox & Snell R ²	Nagelkerke R ²
Step 1	173.023	10	<0.001	0.126	0.280

Table 16.2: Classification Table of Logistic Model

Observed	Predicted Not Secure	Predicted Food Secure	% Correct
Not Secure	7	106	6.2
Food Secure	13	1163	98.9
Overall Accuracy			90.8

Table 16.3: Household Food Insecurity: Binary Logistic Regression					
Predictor	Ref Category	B	S.E.	Sig.	Exp(B)
Ration Card Type				0.007	
Blue	Yellow and Pink	0.706	0.286	0.014*	2.026
White		0.878	0.381	0.021*	2.407
No ration card		1.396	0.565	0.014*	4.040
Food Diversity Index				0.033	
Moderate	Low	-0.441	0.246	0.073	0.644
High		0.590	0.431	0.171	1.804
Socio-economic Index				0.072	
Medium	Low	0.498	0.242	0.040*	1.646
High		0.746	0.428	0.081	2.108
Household Type				0.046	
International migrant households	Non-migrant	0.733	0.367	0.046*	2.081
Internal migrant households	HH	-0.478	0.410	0.243	0.620
Price Affected					
Yes	No	-2.173	0.227	<0.001**	0.114
Constant		2.196	0.220	<0.001	8.985
Note: Significant level * $p < 0.05$; ** $p < 0.001$					

role for remittances in boosting a household's purchasing power and nutritional stability. Moreover, while international migration appears to positively influence food security, this association is not uniform across migration types. Medium socio-economic status is significantly associated with higher food security, while the effects of food diversity and high socio-economic status are weaker and less consistent. The relationship between migration and food security depends on the type of migration, duration, and stability of income flows to the households.

Policy Implications

Kerala state has consistently expanded food subsidies for its residents through the PDS by supplying essential food grains and offering reasonably priced fruits, vegetables, and other products through HortiCorp- and Supplyco-run Triveni stores (Mathew & Sany, 2024). These interventions have played a major role in moderating price fluctuations and protecting low-income households from sharp increases in essential commodity prices. Despite these efforts, periodic price spikes indicate the need for stronger market regulation and improved oversight of market chains. Expanding the basket of essential commodities available at subsidised prices would further strengthen Kerala's food security framework and reduce household vulnerability to price shocks.

Studies have shown that remittances from migrants contribute significantly to household welfare, including access to food and livelihood security (Owusu & Crush, 2024; Zingwe et al., 2023). However, the study's evidence shows that not all migrant households enjoy these benefits equally. Return-emigrant, out-migrant, and return-out-migrant households remain excluded from the state-subsidised food

security framework. Therefore, targeted support should be extended to return-emigrant and out-migrant households that may lack stable income and access to social safety nets. Apart from a generalised view of migration and development policies, there should be differentiation among types of migration and the specific vulnerabilities associated with them. While the PDS remains a critical support mechanism in enhancing food security, the variations in its accessibility and utilisation across household types suggest the need for better targeting methods. Return migrants, who may experience an income shock after migration ends, could be prioritised using a more flexible approach to eligibility criteria, which will enable them to access subsidised food more effectively. There is a need to promote financial inclusion for these migrant households and facilitate remittance utilisation programmes to convert these resources into sustained welfare improvements.

Conclusion

This paper examines the relationship between migration and food security and explores how different types of migrant households vary in food access, consumption, and vulnerability. The paper integrates a conceptual framework that divides households into distinct categories based on migration type and direction to examine large-scale primary data from Kerala, one of the most migration-intensive states in India. The key insight that emerges from the analysis is that migration alone is not sufficient to guarantee household food security. International migration is associated with improved food security status, but these benefits are unevenly distributed across migrant household categories. In particular, out-migrants, and return out-migrants are more vulnerable. Vulnerability to food price shocks is a decisive threat to household food security, and this problem is more

pronounced among poorer households. The dependence on subsidised food rations under the Public Distribution System highlights its importance as an essential institution for ensuring food security. At the same time, disparities in access to and utilisation of resources across various types of households need to be addressed. Tracing the dynamics of socio-economic determinants across households by migration type requires longitudinal data to capture changes in household conditions over time. Kerala's existing social security framework, including the PDS, should be made more sensitive to the life-cycle challenges faced by its mobile population.

References

- Ali, M., Raihan, M. J., Siddiqua, T. J., et al. (2022). Factors associated with low and medium household dietary diversity compared with high dietary diversity among marginalised households in rural Bangladesh: Findings from a Suchana baseline survey. *BMJ Open*, 12(11), e062143.
- Anagaw, Y. K., Ayenew, W., Limenh, L. W., et al. (2024). Food adulteration: Causes, risks, and detection techniques—review. *SAGE Open Medicine*, 12, 20503121241250184.
- Anjana, R. M., Unnikrishnan, R., Deepa, M., et al. (2023). Metabolic non-communicable disease health report of India: The ICMR-INDIAB national cross-sectional study (ICMR-INDIAB-17). *The Lancet Diabetes & Endocrinology*, 11(7), 474–489.
- Baiju, K. C. (2014). Role of Integrated Child Development Services (ICDS) Program in early childhood care vis-a-vis human development: A micro-level study in Kerala, India. *Journal of Governance and Development*, 10(1), 241–264.
- Basu, B., & Rajan, I. (2018). Investment expenditure behaviour of remittance-receiving households: An analysis using Reserve Bank of India data. *Migration Letters*, 15(3), 303–320.
- Batra, P., & Sharma, A. (2025). International migration and dietary diversity of left-behind households: Evidence from India. *Food Security*, 17(3), 543–557.
- Bhutta, Z. A. (2016). What does India need to do to address childhood malnutrition at scale? *Social Science & Medicine*, 157, 186–188.
- Choithani, C., Jaleel CP, A., & Rajan, S. I. (2024). Rural-urban transition and food security in India. *Global Food Security*, 42, 100780.
- Clapp, J., Moseley, W. G., Burlingame, B., et al. (2022). Viewpoint: The case for a six-dimensional food security framework. *Food Policy*, 106, 102164.
- Coates, J., Swindale, A., & Bilinsky, P. (2007). *Household Food Insecurity Access Scale (HFIAS) for measurement of household food access: Indicator guide* (Version 3). Food and Nutrition Technical Assistance Project, Academy for Educational Development.
- Coles, G. D., Wratten, S. D., & Porter, J. R. (2016). Food and nutritional security requires adequate protein as well as energy, delivered from whole-year crop production. *PeerJ*, 4, e2100.
- Daivadanam, M., Wahlström, R., Thankappan, K. R., et al. (2015). Balancing expectations amidst limitations: The dynamics of food decision-making in rural Kerala. *BMC Public Health*, 15(1), 644.
- Datta, A., & Rajan, S. I. (2024). Internal migration and development in India. *Indian Journal of Human Development*, 18(1), 7–19.
- Deaton, A., & Muellbauer, J. (1980). *Economics and consumer behaviour*. Cambridge University Press.
- Department of Food and Public Distribution. (2022). *State Ranking Index for NFSA: Creating resilient food systems to optimise the delivery of benefits*. Ministry of Consumer Affairs, Food & Public Distribution, Government of India. https://www.microsave.net/wp-content/uploads/2022/08/NFSA_2022.pdf
- Food and Agriculture Organisation of the United Nations (FAO). (1996). *Rome Declaration on World Food Security and World Food Summit Plan of Action*. FAO.
- Food and Agriculture Organisation of the United Nations (FAO). (2006). *Food security* (Policy Brief No. 2). Food and Agriculture Organisation of the United Nations.
- Food and Agriculture Organisation of the United Nations (FAO). (2024). *International Year of Millets 2023: Final report*. FAO.
- FAO, IFAD, UNICEF, et al. (2025). *The state of food security and nutrition in the world 2025: Addressing high food price inflation for food security and nutrition*. FAO, IFAD, UNICEF, WFP, & WHO.
- Government of Kerala. (n.d.). Civil Supplies Department, Public Distribution System in Kerala. <https://civilsupplieskerala.gov.in/index.php/content/index/about-department>
- Haddad, L. J., Nisbett, N., Barnett, I., et al. (2014). *Maharashtra's child stunting declines: What is driving them? Findings of a multidisciplinary analysis*. Institute of Development Studies. <https://hdl.handle.net/10568/149784>.
- Hazarika, U., & Singh, D. V. (2023). Analysis of food security status and coping strategies of rural households in Assam, India. *International Journal of Environment and Climate Change*, 13(9), 1106–1112.
- HLPE. (2020). *Food security and nutrition: Building a global narrative towards 2030* (HLPE Report 15). High Level Panel of Experts on Food Security and Nutrition.
- Jayalakshmi, R., & Jissa, V. T. (2017). Nutritional status of Mid-Day Meal Programme beneficiaries: A cross-sectional

study among primary schoolchildren in Kottayam District, Kerala, India. *Indian Journal of Public Health*, 61(2), 86–91.

Johnson, L. T., Thakur, H., & Gupta, A. (2020). *Women engaging with markets from positions of strength: An exploratory understanding of Kudumbashree women's food service enterprises* (RULSG Lateral Studies Series on Kudumbashree No. 9). Centre for Development Studies. <https://cds.edu/wp-content/uploads/2014/10/RULSG-Kudumbashree9-min.pdf>

Kerala State Planning Board. (2017). *Economic Review 2017*. Government of Kerala. https://spb.kerala.gov.in/economic-review/ER2017/web_e/index.php

Kerala State Planning Board. (2022). *Fourteenth Five-Year Plan 2022-27*. Government of Kerala.

Khadar, N. M., Bijulal, M. V., & Noushad, P. P. (2025). Interstate migration and food security in Kerala, India: Unraveling interdependencies, challenges, and policy imperatives. *Interdisciplinary International Journal of Advances in Social Sciences, Arts and Humanities*, 2(1), 135–143.

Kumar, G. S., Kulkarni, M., & Rath, N. (2022). Evolving food choices among the urban Indian middle-class: A qualitative study. *Frontiers in Nutrition*, 9, 844413.

Langer, B., Gupta, R. K., Kumari, R., et al. (2024). Food insecurity and its association with dietary diversity: A cross-sectional study in rural households in Jammu. *Indian Journal of Community Medicine*, 49(1), 70–75.

Moramarco, S., Buonomo, E., Andreoli, A., & Palombi, L. (2025). Tackling global malnutrition and hunger in the final push toward the 2030 Agenda. *Nutrients*, 17, 3059.

Masiero, S. (2015). Redesigning the Indian food security system through e-governance: The case of Kerala. *World Development*, 67, 126–137.

Mathew, D. M., & Sany, N. (2024). *Relevance of Supplyco and its operations in Kerala's current scenario*. Centre for Public Policy Research. https://www.cppr.in/wp-content/uploads/CPPR_Relevance-of-Supplyco-and-its-Operations.pdf

McKay, F. H., Sims, A., & van der Pligt, P. (2023). Measuring food insecurity in India: A systematic review of the current evidence. *Current Nutrition Reports*, 12(2), 358–367.

Ministry of Finance. (2023, January 31). India's foodgrains production touched a record of 315.7 million tonnes in 2021-22. Press Information Bureau, Government of India. <https://www.pib.gov.in/PressReleasePage.aspx?PRID=1894899®=48&lang=2>

Ministry of Statistics and Programme Implementation. (2025, October 13). Consumer Price Index numbers on base 2012=100 for rural, urban and combined for the month of September, 2025. National Statistics Office, Government of India. <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2178447®=48&lang=2>

NITI Aayog. (2023). *National Multidimensional Poverty Index: A progress review 2023*. NITI Aayog.

Owusu, B., & Crush, J. (2024). Migrant remittances, food security, and translocal households in the Ghana-Qatar migration corridor. *African Human Mobility Review*, 10(3), 155–177.

Peter, B., Sanghvi, S., & Narendran, V. (2020). Inclusion of interstate migrant workers in Kerala and lessons for India. *The Indian Journal of Labour Economics*, 63(4), 1065–1086.

Rajan, S. I. (2024). Migration and development: New evidence from the Kerala Migration Survey 2023. *Migration and Development*, 13(2), 139–175.

Rajan, S. I., Heller, A., & John, A. (2024). Food security among female migrant workers in Kerala returning from the Gulf Cooperation Council countries. *Global Food Security*, 41, 100773.

Rajan, S. I., & Pattath, B. (2022a). Distress return migration amid COVID-19: Kerala's response. *Asian and Pacific Migration Journal*, 31(2), 176–189.

Rajan, S. I., & Pattath, B. (2022b). What next for the COVID-19 return emigrants? Findings from the Kerala return emigrant survey 2021. In *India Migration Report 2021* (pp. 181–195). Routledge India.

Rajan, S. I., & Zachariah, K. C. (2019). *Emigration and remittances: New evidences from the Kerala Migration Survey, 2018* (Centre for Development Studies Working Paper No. 483). Centre for Development Studies.

Rajput, K., & Rajan, S. I. (2023). Visibilising invisible population: e-Shram Portal and essentiality of internal migration database in India. *Journal of Social Inclusion Studies*, 9(1), 82–94.

Rathnayaka, S. D., & Revoredo-Giha, C. (2026). Household food expenditures and dietary diversity in Mexico: The role of income, urbanization, and region. *Journal of Agricultural and Applied Economics*, 58(2), 286–305.

Sajan, S., & Ruby, S. (2025). Effect of social and economic factors on food consumption pattern of people in Kerala. *Management Researcher*, 31(2), 122–132. <https://www.imdrtvm.com/article/imdr-article-1754820023.pdf>

Sathish, T., Kannan, S., Sarma, S. P., et al. (2017). Seven-year longitudinal change in risk factors for non-communicable diseases in rural Kerala, India: The WHO STEPS approach. *PLOS ONE*, 12(6), e0178949.

Scherer, S. F., Wecker, K., Schneider, R., et al. (2025). *2025 Global Hunger Index 20 years of tracking progress: Time to recommit to zero hunger*. Welthungerhilfe, Concern Worldwide, & Institute for International Law of Peace and Armed Conflict.

Shakeel, A., & Shazli, T. (2021). Coping strategies and struggle against food insecurity: The case of district Banda in Bundelkhand region, India. *GeoJournal*, 86(4), 1721–1742.

Soman, K., Bhaskar, A., Devi, M. G., et al. (2025). Prevalence of peripheral neuropathy in type 2 diabetic adults in central Kerala: A cross-sectional study. *Indian Journal of Medical Research*, 161(6), 710–717.

Subbiah, G., Ramalakshmi, R., Rajanbabu, R., et al. (2025). Food security in India: Policy challenges, systemic gaps and sustainable pathways. *International Journal of Management and Development Studies*, 14(7), 28–34.

Thampi, A. D., & Priya, M. G. (2023). From traditional to continental to inter-continental and back in search of the roots: A culinary journey of the typical Malayalee. *International Journal of Gastronomy and Food Science*, 32, 100723.

Thankappan, K. R., Shah, B., Mathur, P., et al. (2010). Risk factor profile for chronic non-communicable diseases: Results of a community-based study in Kerala, India. *The Indian Journal of Medical Research*, 131, 53–63.

The Hindu Bureau. (2025, November 1). Kerala declared free from extreme poverty, first State to do so. *The Hindu*. <https://www.thehindu.com/news/national/kerala/kerala-declared-free-from-extreme-poverty-first-indian-state-to-do-so/article70228620.ece>

Tumbe, C., & Jha, R. K. (2024). One nation, one ration, limited interstate traction: Migration and PDS portability in India. *Urbanisation*, 9(1), 87–103.

Upadhyay, R. P., & Palanivel, C. (2011). Challenges in achieving food security in India. *Iranian Journal of Public Health*, 40(4), 31–36.

Vyas, S., & Kumaranayake, L. (2006). Constructing socio-economic status indices: How to use principal components analysis. *Health Policy and Planning*, 21(6), 459–468.

Zachariah, K. C., Mathew, E. T., & Rajan, S. I. (2001a). Impact of migration on Kerala's economy and society. *International Migration*, 39(1), 63–87.

Zachariah, K. C., Mathew, E. T., & Rajan, S. I. (2001b). Social, economic and demographic consequences of migration on Kerala. *International Migration*, 39(2), 43–71.

Zachariah, K. C., & Rajan, S. I. (2015). *Researching international migration: Lessons from the Kerala experience*. Routledge India.

Zingwe, D. E., Banda, A. E., & Manja, L. P. (2023). The effects of remittances on household food nutrition security in the context of multiple shocks in Malawi. *Cogent Food & Agriculture*, 9(1), 2238440.