

MONTHLY FOOD CONSUMPTION EXPENDITURE PATTERN OF URBAN, RURAL AND ESTATE HOUSEHOLDS IN SELECTED DISTRICTS OF SRI LANKA (1990 – 2016)

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Abstract

Food consumption expenditure patterns serve as a key indicator of household behavior, as food is the most fundamental component of human sustenance. The purpose of this study is to examine household food consumption expenditure patterns across urban, rural, and estate sectors. The study is descriptive and based on selected districts. The analysis is based on data from the HIES conducted in 1990/91, 1995/96, 2002, 2006/07, 2009/10, 2012/13, and 2016. The study focuses on the Badulla, Kandy, Nuwara-Eliya, and Ratnapura districts, as each encompasses all three sectors and represents at least 5% of the population within each. The final sample comprises 28,319 households: 4,108 urban, 17,667 rural, and 6,544 estate households. The analysis covers ten major food groups comprising 112 food items. Monthly household food expenditure data were utilized, and tabular analysis supported by line graphs was employed to identify trends in the consumption expenditure patterns of each food group across the three sectors. The results revealed that urban households allocate comparatively higher expenditure shares to food groups such as bread, meat, fish, eggs, and milk. In contrast, estate sector households exhibit a higher propensity for rice, wheat flour, and pulses, while rural households show a preference for vegetables and coconut. The findings suggest that income-oriented policies are likely to promote food consumption more effectively than price-related policies in all three sectors.

Keywords: *Expenditure share, Food share behaviour, Tabular analysis*

1. Introduction

The food consumption expenditure pattern is the allocation of total household expenditure among various food commodities, representing the structure and composition of food demand, and serving as an indicator of economic status, nutritional behavior, and changes in consumer welfare. Food consumption has been a subject of extensive research worldwide. It is particularly significant in developing countries, where food expenditures constitute a relatively large share of household income. Studies on food consumption provide important insights for formulating nutrition and food-related policies. They also offer estimates of how food demand responds to changes in prices, income, and taxation policies (Dunne and Edkins, 2005). In Sri Lanka, food consumption has been a key concern not only because of its close link to poverty and food security, but also due to its strong correlation with living standards and household resources. Essentially, the demand for food depends on factors such as population size, dietary habits, and per capita daily calorie intake. At the national level, food requirements are further influenced by the balance between food imports and exports (Kormawa, 1999; Obayelu et al., 2009).

Analysing food consumption expenditure patterns is important because it provides valuable insights into household welfare, nutritional status, and economic development. The way households allocate their income to different food items reflects their income level, price sensitivity, and consumption preferences. As income rises, people tend to spend a smaller share on staple foods and a larger share on high-value and nutritious items such as meat, dairy, and fruits, a phenomenon explained by Engel's Law. For

policymakers, understanding these patterns helps in designing effective food security, nutrition, and poverty alleviation programs. It also guides decisions related to agricultural production, import policies, and price stabilization measures. Moreover, changes in expenditure patterns over time reveal shifts in dietary transitions, urbanization effects, and the impact of economic growth or inflation on household food behaviour (Pavithra et al., 2009; Sharma, 2011; Dawoud, 2014).

A food consumption expenditure pattern describes how and to what extent households spend money on food, often analyzed in relation to income, household composition, and other socio-economic factors. These patterns involve classifying food expenditure by type of food or spending location and can reveal insights into dietary quality, food security, and consumer behavior (Geetha, 2011). Understanding the pattern of food consumption expenditure is crucial for evaluating household welfare, nutritional status, and living standards in Sri Lanka. Since food accounts for a substantial share of total household expenditure, particularly among low and middle-income families, the way households allocate their budgets across different food items provides important insights into their consumption behavior and economic well-being (Jayasinghe et al., 2011). In Sri Lanka, food consumption patterns vary notably across urban, rural and estate sectors due to differences in income levels, market accessibility, cultural preferences and livelihood opportunities. Urban households tend to spend relatively more on processed foods, meat, fish, dairy products and eating out, reflecting higher incomes and greater access to food markets. In contrast, rural households allocate a larger proportion of their expenditure to staple foods such as rice and other cereals, while estate sector households often devote a significant share of their limited income to basic food necessities. These variations highlight disparities in dietary diversity, nutrition and purchasing power across sectors (Ahmad et al., 2015).

From a policy perspective, analyzing food expenditure patterns helps identify the commodities that dominate household budgets and the population groups most vulnerable to food price fluctuations. Such information is vital for designing targeted food subsidies, price stabilization measures, and social safety nets to protect low-income households from food insecurity. From a nutritional viewpoint, understanding how households allocate their food budgets indicates the quality and diversity of their diets. Monitoring these changes over time enables policymakers to assess progress toward national nutrition goals and Sustainable Development Goals (SDGs) related to hunger and health. From a macroeconomic and developmental perspective, food expenditure patterns contribute to the estimation of the Consumer Price Index (CPI), poverty lines, and real income measures. Since food prices have a significant influence on overall inflation in Sri Lanka, knowledge of household spending structures helps improve the accuracy of inflation measurement and poverty analysis. Moreover, sectoral comparisons of expenditure patterns provide evidence of inequality in food access and the differing impacts of economic or climatic shocks on various population groups (Deaton, 2001; Hall, 2001; Flavin, 2003; Zeldes, 2005). Finally, the specific contribution of this study is to form the empirical basis for estimating demand elasticities, including expenditure, own-price, and cross-price elasticities across food groups. These measures are essential for forecasting food demand, evaluating the welfare effects of price or income changes, and guiding agricultural and trade policy decisions.

2. Literature Review

Studies on food consumption expenditure in Sri Lanka are relatively scarce in the published literature. However, a few notable works have examined various aspects of food consumption behaviour and demand analysis over time. The pioneering work in this field was carried out by Jogaratnam and Poleman (1969), who estimated expenditure elasticities for twelve food categories using the semi-log functional form and data from the Consumer Finance Survey (CFS) in 1963. Their results indicated that the percentage of expenditure on starchy staples declined while that on animal products increased with rising income. They also observed that the proportion of total expenditure allocated to food was high but decreased as income increased, and that significant differences existed across sectors and zones in the share of expenditure on food.

Subsequently, Alderman and Timmer (1980) estimated price and expenditure elasticities for eight major food commodities across three expenditure groups, employing a double-log quadratic functional form with data from the Socio-Economic Survey (SES) in 1969/70 and CFS in 1973. Their findings suggested that income elasticities were higher among lower-income groups, and significant differences existed in income elasticities among sectors. Senauer et al. (1986) estimated consumption functions for rice, bread, and the ratio of bread to total cereal consumption for urban Sri Lankan households using a semi-log functional form and data from CFS in 1980/81. Hersi *et al.* (1989) examined food consumption behaviour among urban food stamp recipients in Mount Lavinia using both a socio-economic and a dietary survey. Their findings revealed that malnutrition among food stamp recipients was primarily due to energy inadequacy rather than protein deficiency.

Several other significant studies have explored food consumption and expenditure behaviour in Sri Lanka. Pradhun and Tudawe (1997) examined food consumption patterns using Household Income and Expenditure Survey (HIES) data in 1985/86 and 1990/91 with the Linear Approximation of Almost Ideal Demand System (LA AIDS) model to estimate demand elasticities for eleven food groups. Their results showed that own-price elasticities declined over time, with meat and fruits remaining consistently price elastic, indicating potential benefits for exporters and traders through strategic pricing. Tudawe (2002) analyzed food demand parameters for eleven food groups using the LA AIDS model with HIES 1990/91 and 1995/96 data. The study revealed notable differences in price and income responsiveness among income groups and sectors, and found that income growth primarily increased rice consumption in rural areas, while lower prices had a greater influence in urban areas.

Herath et al. (2007) examined changes in food consumption patterns and demand parameters over the period 1980–2002, employing HIES data from five survey rounds and the Almost Ideal Demand System (AIDS) model. Their findings showed a shift in consumption from starchy to non-starchy foods, with consumers being more responsive to rice price changes than to those of wheat flour. Moving to more recent studies, Nirmali and Edirisinghe (2012) analyzed household demand responsiveness in the Western Province for selected food items rice (samba), dhal, bread, chicken, coconut, milk powder, and sugar using the LA AIDS model. The model was estimated through the Seemingly Unrelated Regression (SURE) approach with data from HIES 2006/07. Their results showed a decline in household calorie availability, suggesting that global food price increases significantly affected food and nutrition security in the study area.

Nimanthika and Edirisinghe (2013) estimated price and expenditure elasticities for fourteen food groups using HIES 2006/07 data and the LA AIDS model. They concluded that own and relative prices, real expenditure, and socio-demographic factors significantly affected dietary choices, and that income-related policies had a strong influence on promoting food consumption. Ratnasiri et al. (2014) investigated the effects of changing income and food prices on food security using Department of Census and Statistics (DCS) data from 2002–2012. Applying a Stone-Geary utility function framework, they assessed vulnerability to food price shocks across urban, rural, and estate sectors. Their findings suggested that food security marginally declined over time, with rising food prices partially offset by income growth. The urban sector appeared most vulnerable to food price shocks, while the rural sector was least affected, and the estate sector fell in between.

Kumari and Nigel (2015) investigated food consumption patterns across different sectors in the Kurunegala Divisional Secretariat Division, based on a sample of 200 households. Employing the AIDS model, they found that the proportion of income spent on food diminished as income increased. Their elasticity estimates for own-price, cross-price, expenditure, and household size revealed key characteristics of household food demand and substitution effects among commodities. Lokuge and Edirisinghe (2015) estimated elasticities for six pulse varieties using HIES 2006/07 data and the LA AIDS

framework. Their study found that household purchasing decisions were influenced by sector, household size, education, child presence, and health conditions such as blood pressure and diabetes. All pulse types except dhal were highly responsive to own prices. Jayasinghe et al. (2015) examined intertemporal trends in food consumption scale economies using HIES data from 1990/91, 2001/02, and 2009/10. By employing an Engel curve specification with demographic controls, they found that equivalence scales declined over time, implying greater economies of food consumption and suggesting that actual poverty rates may have decreased more than conventional estimates indicate.

Wijesekere (2015) analyzed national food consumption patterns from 1985 to 2009 using Food and Agriculture Organization (FAO) food disappearance data. The study found that cereals remained the main source of calories and protein, while fats were primarily derived from vegetable and animal products. The share of calories from protein was below recommended levels. Over time, consumption shifted away from roots, tubers, fruits, and cereals toward sugars, pulses, oils, and animal products, although animal-based calories remained below 8 percent.

Finally, Paraneetharan (2022) examined household food and nutrient elasticities across urban, rural, and estate sectors in the Badulla, Kandy, Nuwara-Eliya, and Ratnapura districts, covering a sample of 13,881 households and 10 major food groups. The study utilized data from the HIES for 2006/07, 2009/10, 2012/13, and 2016, and employed the Modified Linear Approximation of the Almost Ideal Demand System (MLA AIDS) together with the Demand Model for Nutrient Availability (DMNA). The estimation was carried out using Zellner's Iterative Seemingly Unrelated Regression (ISUR) technique. The findings indicated that food expenditure elasticities were relatively high, while own-price elasticities for all food groups were negative, consistent with demand theory. Uncompensated cross-price elasticities were found to be small, reflecting limited dietary diversity among households. Moreover, nutrient expenditure elasticities for energy, protein, and carbohydrates were relatively high, whereas nutrient price elasticities were low and price inelastic.

The primary objective of this study is to examine the consistent patterns of household food consumption expenditure across the main food groups in Sri Lanka's urban, rural, and estate sectors, using descriptive analysis illustrated through line graphs. This study relies on repeated cross-sectional HIES data and unit-value price proxies, which may introduce compositional and quality biases. Aggregation into broad food groups, potential survey classification changes across rounds, seasonality and limited estate subsample sizes can affect precision and interpretation. We mitigate these issues with harmonization rules, trimming of unit values, sensitivity checks using alternate deflators and specifications and by reporting confidence intervals; nevertheless, results should be interpreted as population-level associations for 1990–2016 rather than causal estimates of household behavior under all market conditions.

3. Methodology

The design approach of the HIES was fully adopted in this study. The survey employed a two-stage stratified random sampling technique based on Neyman allocation, covering the Urban, Rural, and Estate sectors. Each district was treated as a primary domain for stratification purposes. The sampling frame consisted of the list of housing units compiled in the 2012 Census of Population and Housing. Data collection was conducted over twelve consecutive monthly rounds using weekly household records. The survey data were gathered through direct interviews using a standardized structured questionnaire.

The household was used as the sampling unit, while the district served as the study area. The selection of study areas was based on two criteria: first, each district must include all three sectors urban, rural, and estate; and second, each sector within the district must represent at least 5% of the district's total population. According to the Economic and Social Statistics of Sri Lanka (2012), which provides

population data by district and sector, only four districts met these criteria Badulla, Kandy, Nuwara-Eliya, and Ratnapura. Consequently, these districts were selected as the study areas for this analysis.

The sample size was determined based on the HIES conducted by the Department of Census and Statistics, Sri Lanka, during the periods 1990/91, 1995/96, 2002, 2006/07, 2009/10, 2012/13, and 2016 in the districts of Badulla, Kandy, Nuwara-Eliya, and Ratnapura. Table 1 presents the distribution of the sample across these districts. As shown, the total number of surveyed households included 6,073 in Badulla, 9,026 in Kandy, 6,045 in Nuwara-Eliya, and 7,175 in Ratnapura, amounting to an aggregate sample of 28,319 households for this study.

Table 2 presents the distribution of the sample by sector. As shown, across the seven HIES survey periods, a total of 4,108 households were selected from the urban sector, 17,667 from the rural sector, and 6,544 from the estate sector. Altogether, 28,319 households were included in the sample for this study.

Microdata was collected from the latest seven HIES mentioned in Table 1. The listed 112 food items in the food category of household expenditure were aggregated to provide ten food groups' monthly food expenditure separately.

Table 1: Number of Survey Sampled Households by Districts

HIES Survey Year	Number of households surveyed				Total
	Badulla District	Kandy District	Nuwara-Eliya District	Ratnapura District	
2016	762	1315	813	1042	3932
2012/13	731	983	791	825	3330
2009/10	743	1010	615	871	3239
2006/07	762	1070	659	889	3380
2002	910	1610	736	1315	4571
1995/96	1119	1588	1488	1216	5411
1990/91	1046	1450	943	1017	4456
Total Households	6,073	9,026	6,045	7,175	28,319

Source: HIES Reports in 1990/91, 1995/96, 2002, 2006/07, 2009/10, 2012/13 and 2016

The main types of food groups used in this study were rice, Wheat flour, Bread, Pulses, Vegetables, Meat, Fish, Egg, Coconut and Milk & Milk Products. Each food group consists of its food items listed in the HIES given below used in this study;

- i. Rice: White Kekulu Normal, White Kekulu Samba, Red Kekulu Normal, Red Kekulu Samba, Samba, Nadu Red, Nadu White, Basmathi and Other Rice
- ii. Wheat flour: Wheat Flour
- iii. Bread: Normal Bread
- iv. Pulses: Gram Dhal, Masoor Dhal, Watana Dhal, Green Gram, Gram, Red Cowpea, White Cowpea, Soya, Soya Meet, Other Pulses
- v. Vegetables: Ash Plantain, Brinjal, Ladies Fingers, Bitter Gourd, Thuba Karivila, Long Beans, Snake Gourd, Ridge Gourd, Pumpkin, Beans, Carrot, Beetroot, Cabbage, Cauliflower, Tomatoes, Leeks, Knol Khol, Capsicum, Winged Bean, Radish, Drumstick, Cucumber, Cooking Melon, Ash Pumpkin, Wild Eggplant, Plate Brush, Kohila Yams, Lotus Stem, Plantain Flower, Ambarella, Raw Mango, Raw Cashew Nuts, Mushroom, Immature Jack, Other Vegetables, Mukunuwanna, Gotukola, Kankun, Kathurumurunga, Spinach, Thampala, Sarana, Kohila Leaves, Onion Leaves, Cabbage Leaves, Other Leaves, Jack & Jack Seed, Bread Fruit, Potatoes, Sweet Potato, Manioc, Kiriala, Innala, Other Yams
- vi. Meat: Chicken, Beef, Mutton, Pork

- vii. Fish: Balaya, Seer, Shark, Paraw, Thalapath, Tuna (Kelawalla), Mullet, Other Large Fish, Sprats, Hurulla, Karalla / Katuwalla, Kumbala / Angila, Salaya / Sudaya, Other Small Fish, Lula, Theppli / Telapiya / Korali, Catla / Rohu, Other Freshwater Fish
- viii. Egg: Hen Eggs
- ix. Coconut: Coconut Nuts
- x. Milk & Milk Products: Cow Milk, Goat Milk, Sterilized Milk, Curd, Yogurt, Condensed Milk, Milk Powder, Infant Milk Powder, Butter, Margarine, Cheese, Milk Packets, Other Liquid Milk

Other types of monthly household data utilized in this study include expenditure on each food group, total food expenditure, total household expenditure, quantities of food items consumed, and prices of food items.

Table 2: Number of Survey Sampled Households by Sectors

HIES Survey Year	Number of households surveyed			
	Urban	Rural	Estate	Total
2016	323	2883	726	3932
2012/13	615	1830	885	3330
2009/10	509	1849	881	3239
2006/07	563	1946	871	3380
2002	579	3339	653	4571
1995/96	562	3300	1549	5411
1990/91	957	2520	979	4456
Total Households	4,108	17,667	6,544	28,319

Source: HIES Reports in 1990/91, 1995/96, 2002, 2006/07, 2009/10, 2012/13 and 2016

Tabular Analysis is used for identifying trends of each food group's consumption expenditure pattern in urban, rural and estate sectors. Since HIES was not provide the actual market prices of food commodities, a proxy of unit values (expenditure/quantity) was used to calculate food prices which was the common practice in the literature (Park et al., 1996; Weliwita et al., 2003). The Weighted Average Price Method (WPM) was applied in this study to estimate the average price of each food groups given in Equation 3.1. The unit values are LKR per kg and the values are in nominal price.

$$P_{wi} = \frac{(C_{1i}P_{1i} + C_{2i}P_{i2} + \dots + C_{ni}P_{ni})}{E_i} \quad (3.1)$$

$i = 1, 2, \dots, k$ in i^{th} food group

C_{1i} = Expenditure of food commodity 1 in the i^{th} group (n in the i^{th} food group)

E_i = Total expenditure of i^{th} food group

P_{wi} = Weighted Average Price of i^{th} food group

In this study, the average unit prices of major food groups and the average annual quantities consumed per household were derived from the HIES data for the urban, rural, and estate sectors. These estimates are presented in Tables 3 and 4, respectively. Furthermore, to provide a clearer understanding of the household food consumption expenditure pattern, the expenditure shares of the main food groups are summarized in Table 5.

Table 3: Average unit price of Food Groups in LKR per Kg

Food Groups	Urban				Rural				Estate			
	2006/7	2009/10	2012/13	2016	2006/7	2009/10	2012/13	2016	2006/7	2009/10	2012/13	2016
Rice	33.56	63.50	62.05	75.31	30.88	59.18	58.07	70.46	33.35	63.35	61.28	76.17
Wheat flour	22.44	43.05	46.00	48.42	20.76	41.77	42.49	46.39	24.82	44.09	47.45	49.56
Bread	43.15	68.99	84.40	85.50	31.14	49.75	61.05	71.97	27.29	43.59	60.82	66.47
Pulses	106.04	192.90	199.79	238.64	104.00	198.37	201.68	249.74	106.35	203.56	207.09	268.69
Vegetables	73.48	93.86	116.15	139.47	70.62	91.35	113.73	134.88	67.23	89.93	111.28	132.81
Meat	122.86	174.53	198.52	258.90	54.60	87.18	109.10	174.73	50.98	73.48	136.31	169.78
Fish	170.72	217.55	287.14	298.42	81.93	135.07	151.40	208.26	48.04	88.38	92.89	112.13
Egg	54.39	85.32	101.03	113.70	42.02	70.02	87.06	107.56	43.09	73.20	91.30	130.31
Coconut	65.59	101.55	137.17	175.98	64.86	99.54	137.49	165.22	68.72	105.03	145.71	184.87
Milk	389.77	528.88	687.73	690.86	288.21	418.50	584.32	607.53	304.83	418.69	622.11	665.10

Source: Author's calculations

Table 4: Consumed Average annual quantity per household of Food Groups in Kg

Food Groups	Urban				Rural				Estate			
	2006/7	2009/10	2012/13	2016	2006/7	2009/10	2012/13	2016	2006/7	2009/10	2012/13	2016
Rice	278.15	291.71	327.40	350.55	397.35	398.79	414.64	427.82	364.78	366.37	366.49	401.24
Wheat flour	35.38	34.13	26.17	22.50	26.96	24.32	18.73	18.68	155.67	133.42	119.77	116.92
Bread	81.73	67.27	38.44	46.78	42.27	34.95	24.32	29.97	34.17	25.22	21.27	24.59
Pulses	33.59	31.35	33.34	38.68	33.26	30.17	34.86	38.23	34.73	32.14	34.98	45.01
Vegetables	133.49	137.83	164.91	180.97	179.13	183.96	192.64	206.45	139.85	150.27	142.63	174.89
Meat	17.27	19.02	19.16	23.57	8.11	8.23	10.44	13.79	7.49	7.65	12.87	17.20
Fish	19.43	20.89	22.19	24.41	11.35	13.01	14.51	17.86	5.76	6.53	7.25	7.94
Egg	11.03	8.91	10.70	11.78	7.35	6.89	8.53	9.71	6.61	6.43	8.08	13.68
Coconut	54.98	51.25	57.50	67.64	67.78	68.04	67.99	75.58	49.28	49.46	48.57	55.50
Milk	27.59	26.84	28.51	32.12	19.27	19.79	20.61	27.06	18.97	19.71	18.92	26.78

Source: Author's calculations

Table 5: Expenditure Share of food groups per household by sectors

Food Groups	Urban				Rural				Estate			
	2006/7	2009/10	2012/13	2016	2006/7	2009/10	2012/13	2016	2006/7	2009/10	2012/13	2016
Rice	0.049	0.071	0.057	0.049	0.097	0.118	0.093	0.082	0.124	0.113	0.101	0.093
Wheat flour	0.007	0.010	0.007	0.004	0.008	0.009	0.007	0.004	0.058	0.054	0.050	0.035
Bread	0.021	0.023	0.013	0.011	0.014	0.012	0.010	0.009	0.014	0.012	0.011	0.009
Pulses	0.016	0.022	0.016	0.016	0.023	0.026	0.022	0.021	0.030	0.034	0.029	0.030
Vegetables	0.038	0.038	0.044	0.039	0.068	0.063	0.067	0.061	0.069	0.063	0.061	0.059
Meat	0.019	0.022	0.018	0.019	0.010	0.011	0.011	0.014	0.013	0.012	0.019	0.020
Fish	0.020	0.020	0.022	0.017	0.012	0.015	0.014	0.015	0.009	0.011	0.009	0.009
Egg	0.004	0.005	0.005	0.004	0.005	0.004	0.005	0.005	0.006	0.005	0.006	0.008
Coconut	0.019	0.021	0.023	0.022	0.033	0.033	0.034	0.032	0.030	0.030	0.032	0.031
Milk	0.042	0.042	0.041	0.032	0.038	0.035	0.041	0.035	0.046	0.037	0.045	0.042

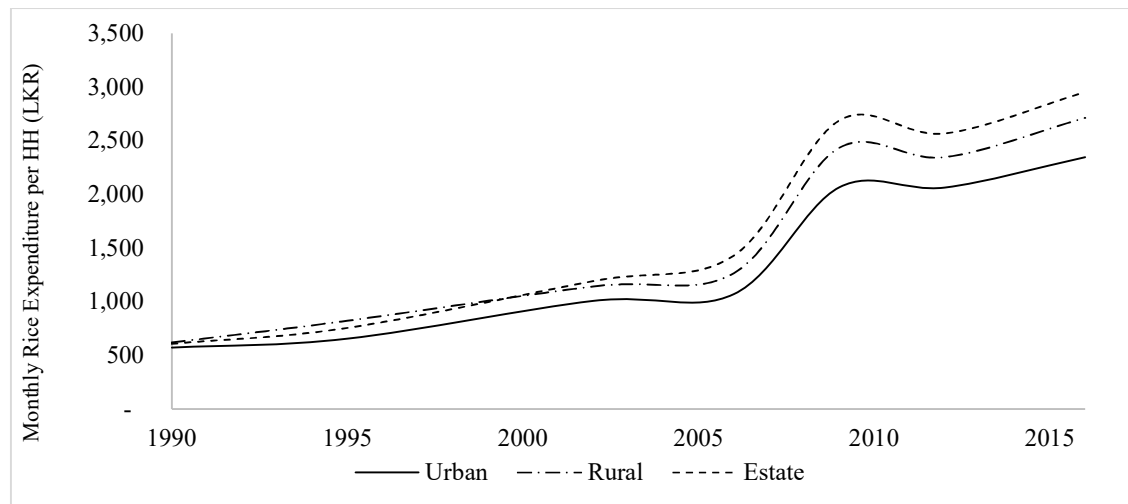
Source: Author's calculations

4. Result and Discussion

The data for the study period were divided into two phases based on an identified structural break. The first dataset, referred to as Phase I, covers the years 1990/91, 1995/96, and 2002, representing a period of relatively lower price escalation among food groups. The second dataset, termed Phase II, includes the years 2006/07, 2009/10, 2012/13, and 2016, characterized by higher price escalation in food groups. Line graphs were employed in the descriptive analysis to illustrate the temporal trends of each food item.

4.1 Rice

Figure 1 illustrates the average monthly household expenditure on rice across the urban, rural, and estate sectors over the study period. As shown in the figure, expenditure on rice exhibited a marginal increase in all three sectors up to 2005, followed by a rapid rise until 2010. Thereafter, it showed a slight decline up to 2012 and gradually increased again through 2016.



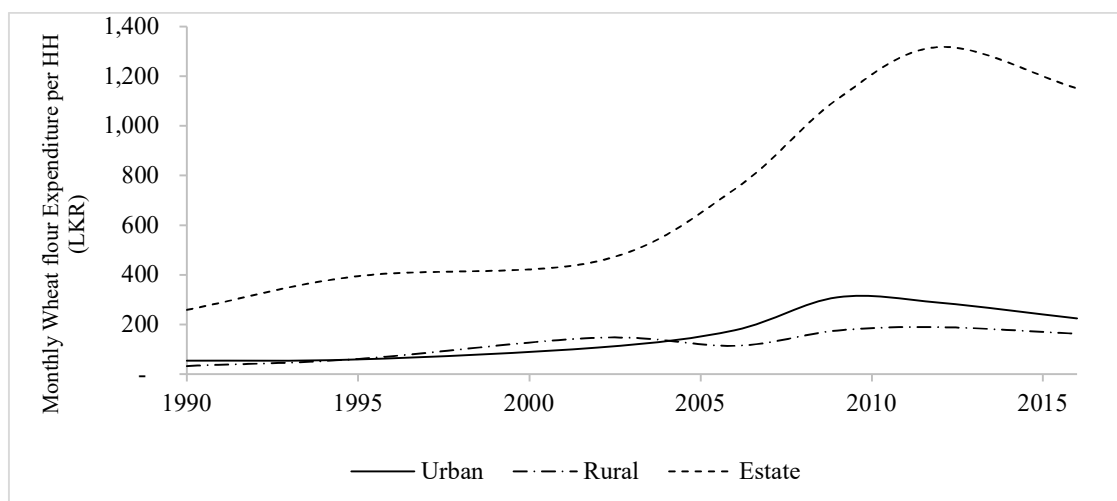
Source: HIES 2016, 2012/13, 2009/10, 2006/7, 2002, 1995/96 and 1990/91

Figure 1: Household Monthly Average Rice Expenditure Pattern

The rapid increase in monthly rice expenditure can be attributed primarily to a corresponding rise in the general price of rice, accompanied by a marginal increase in the quantity consumed (see Table 3 and Table 4). The surge in rice prices reflects the combined effects of fluctuations in global rice markets, variations in domestic production dynamics, and occasional disruptions in supply chains. The modest rise in rice consumption quantities may be explained by persistent dietary preferences, cultural norms, and the limited availability of close substitutes. Overall, the pattern of monthly rice consumption expenditure varied over time due to these interacting factors. Rice occupies a central place as the staple food in Sri Lankan diets and cultural practices, transcending economic fluctuations. Regardless of income or price changes, households continue to allocate a substantial share of their food expenditure to rice, underscoring its indispensable role in daily consumption and cultural tradition. Monthly expenditure on rice was comparatively higher in the estate sector and lower in the urban sector. This pattern reflects differences in consumer behavior, as well as cultural, economic, and demographic characteristics within the study area. Notably, rice expenditure sharply increased across all sectors in 2009/10, followed by a slight decline up to 2012, before rising again through 2016. These fluctuations can be largely attributed to changes in rice prices and the sector-specific dynamics of rice pricing.

4.2 Wheat Flour

Household expenditure on wheat flour has been an important component of overall food consumption since the Second World War, establishing it as a staple in dietary patterns. Figure 2 illustrates the average monthly consumption expenditure on wheat flour across the three sectors. The analysis indicates that expenditure patterns in the rural and urban sectors are relatively similar, whereas the estate sector exhibits higher levels of expenditure. Correspondingly, the quantity of wheat flour consumed is also greater in the estate sector compared to the rural and urban sectors (see Table 4).



Source: HIES 2016, 2012/13, 2009/10, 2006/7, 2002, 1995/96 and 1990/91

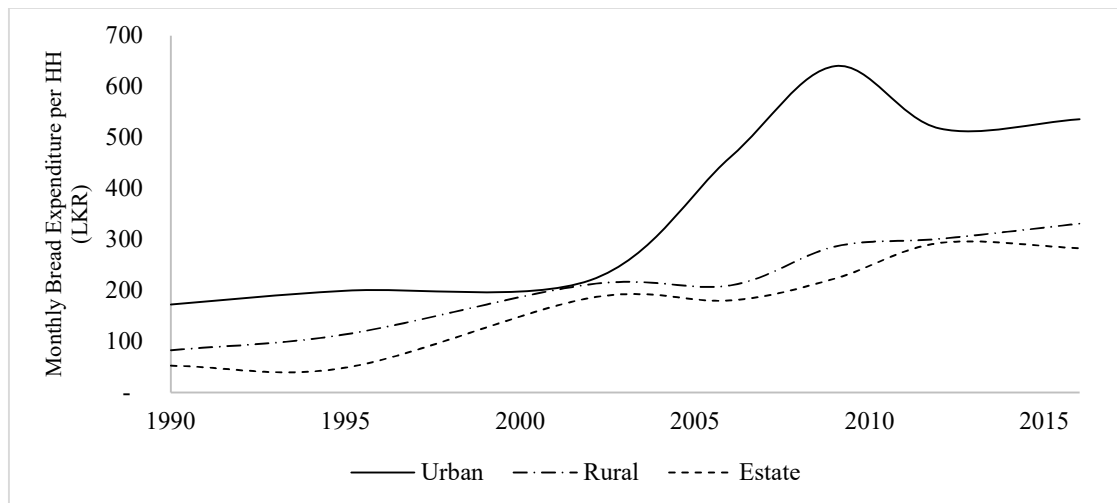
Figure 2: Household Monthly Average Wheat Flour Expenditure Pattern

The estate sector is predominantly composed of Tamil workers of Indian origin, whose consumption habits show a distinct preference for wheat flour-based preparations. In the estate sector, the average monthly expenditure on wheat flour increased during Phase I and the first half of Phase II, before subsequently declining. In contrast, the mean monthly expenditure in the urban and rural sectors remained relatively stable in Phase I, followed by a marginal increase and a subsequent decline. These patterns can be attributed to demographic characteristics, market dynamics, and economic behavior within the study area. The general rise in wheat flour prices is largely associated with the increasing trend in consumption expenditure for this commodity (see Table 3). Rural households, in particular, exhibit lower monthly expenditure on wheat flour due to a longstanding tradition of consuming alternative staples such as rice, millet, and foxtail.

4.3 Bread

The average monthly household expenditure on bread in all three sectors shows a generally increasing trend (Figure 3), primarily driven by rises in the general price of bread across the sectors (see Table 3). Expenditure on bread is highest in the urban sector, whereas the rural and estate sectors exhibit relatively lower but similar patterns, reflecting lower bread consumption in these areas. The average quantities of bread consumed per household are presented in Table 4. In the urban sector, monthly bread expenditure peaked in 2009/10, followed by a slight decline in 2012, a pattern attributed to changing consumer preferences and economic factors affecting purchasing decisions. Thereafter, expenditure marginally increased, likely due to urban lifestyle patterns. In the estate sector, bread expenditure reached its highest point in 2012 before experiencing a slight decline, whereas in the rural sector, expenditure showed a modest increase from 2006 onward.

The increase in monthly bread expenditure is likely attributable to a combination of factors, including modernization, evolving lifestyles, and prevailing economic conditions, which have collectively reduced the time available for food preparation. Additionally, changing consumer preferences and economic considerations have influenced purchasing decisions, particularly in urban areas. As a result, urban households allocate a larger share of their food budget to bread, which serves as a staple for breakfast and dinner. Variations in expenditure patterns across sectors reflect differences in dietary preferences and economic dynamics, influencing bread consumption among different demographic groups over time.

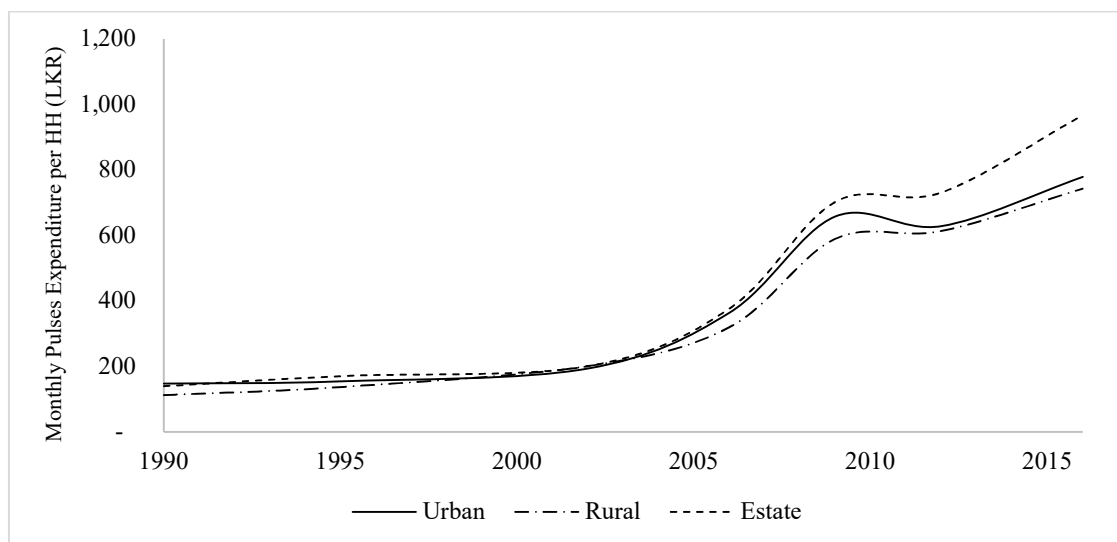


Source: HIES 2016, 2012/13, 2009/10, 2006/7, 2002, 1995/96 and 1990/91

Figure 3: Household Monthly Average Bread Expenditure Pattern

4.4 Pulses

Figure 4 illustrates relatively stable patterns of average monthly household expenditure on pulses across all three sectors throughout the study period. A marginal increase is observed from 1990 to 2005, likely reflecting fluctuations in market prices. From 2005 to 2016, monthly expenditure on pulses shows a rapid upward trend, primarily driven by significant increases in the general price of pulses, along with a modest rise in the quantity consumed (see Table 3 and Table 4).



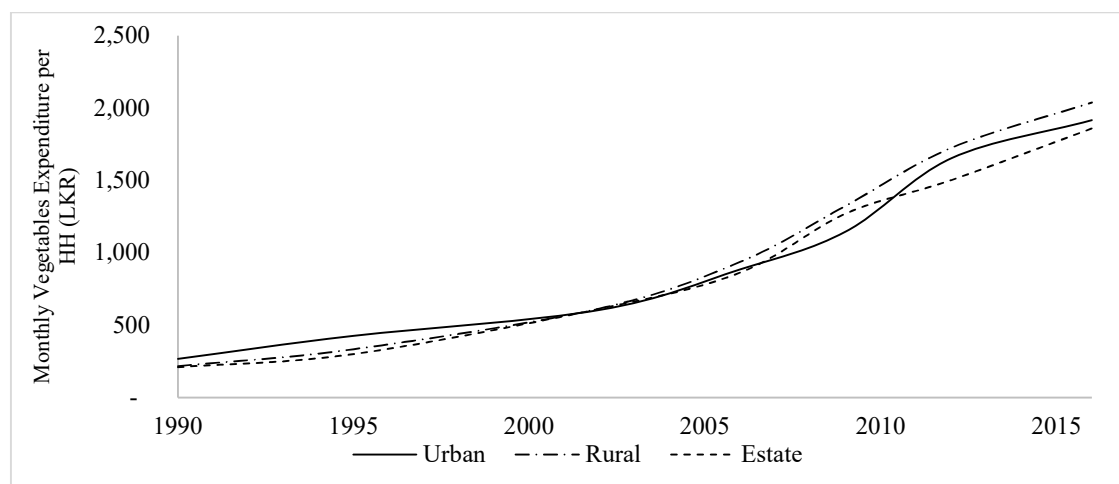
Source: HIES 2016, 2012/13, 2009/10, 2006/7, 2002, 1995/96 and 1990/91

Figure 4: Household Monthly Average Pulses Expenditure Pattern

These patterns indicate that pulses have remained an essential and irreplaceable component of household diets, resulting in increased expenditure despite rising prices. The estate sector exhibits relatively higher expenditure on pulses, reflecting their status as a major staple food in this community. This trend underscores the significance of pulses as a dietary staple, particularly in the estate sector. The observed increase in expenditure over time, driven by both rising prices and sustained consumption, highlights the economic and nutritional importance of pulses, even in the face of potential affordability challenges. These findings provide valuable insights into consumer behavior, market dynamics, and issues related to food security across different demographic sectors during the study period.

4.5 Vegetables

As shown in Figure 5, monthly household expenditure on vegetables exhibited a slight increase over the study period, with a nearly identical trend across all three sectors. This upward trend can be attributed to a modest rise in both the general price level of vegetables and the quantity consumed (see Table 3 and Table 4).



Source: HIES 2016, 2012/13, 2009/10, 2006/7, 2002, 1995/96 and 1990/91

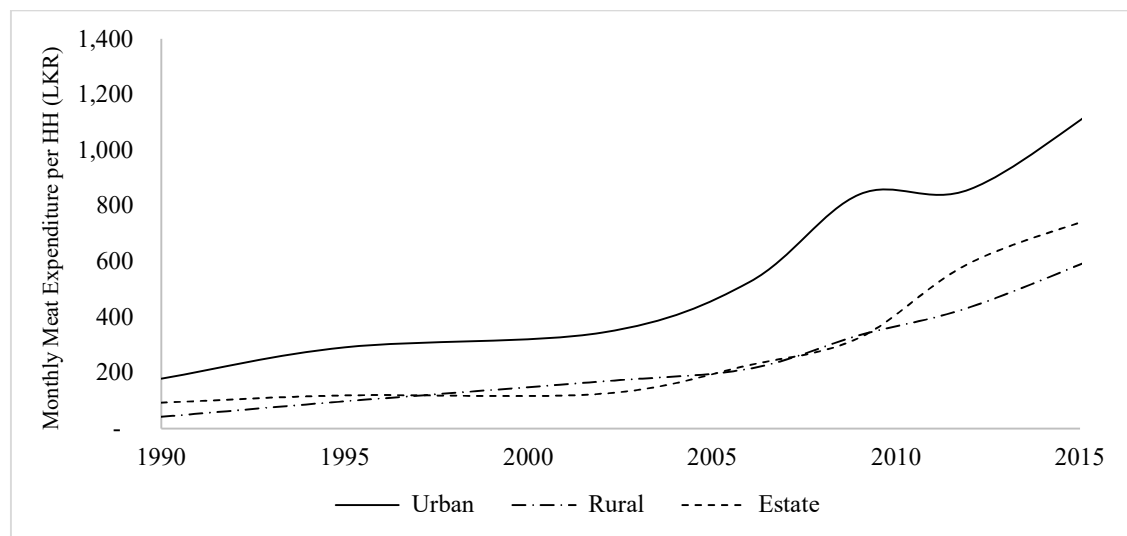
Figure 5: Household Monthly Average Vegetables Expenditure Pattern

Analysis of sectoral consumption patterns indicates higher vegetable expenditure in the rural sector compared to the urban sector, likely reflecting greater consumption quantities driven by rural customs, religious beliefs, dietary preferences, and local agricultural practices. As vegetables are typically consumed as complementary items alongside staples such as rice and wheat flour products, expenditure patterns are broadly similar across sectors, with only marginal differences influenced by household size, population, and sector-specific dietary preferences. Despite these variations, a consistent increase in monthly vegetable expenditure is evident, underscoring the essential role of vegetables in meeting nutritional requirements, shaping market trends, and contributing to overall food security.

4.6 Meat

The average monthly household expenditure on meat shows a consistently increasing trend across all three sectors (Figure 6). This pattern is primarily driven by a rapid rise in meat prices, coupled with a modest increase in the quantity consumed (see Table 3 and Table 4). Analysis of monthly meat expenditure reveals that the rural and estate sectors followed similar patterns until 2010, after which the estate sector exhibited a gradual increase in expenditure. In contrast, the urban sector displayed a more complex trend: a slight rise in expenditure up to 2009, followed by a modest decline between 2010 and 2012, and a subsequent sharp increase. Urban households generally have higher incomes, greater

purchasing power, and stronger preferences for meat products, resulting in relatively higher expenditure compared to rural and estate households. Furthermore, consumption behavior, market dynamics, cultural preferences, and socioeconomic factors collectively influence meat consumption across sectors. In the rural sector, monthly meat expenditure remains relatively low, largely due to religious and cultural dietary restrictions.

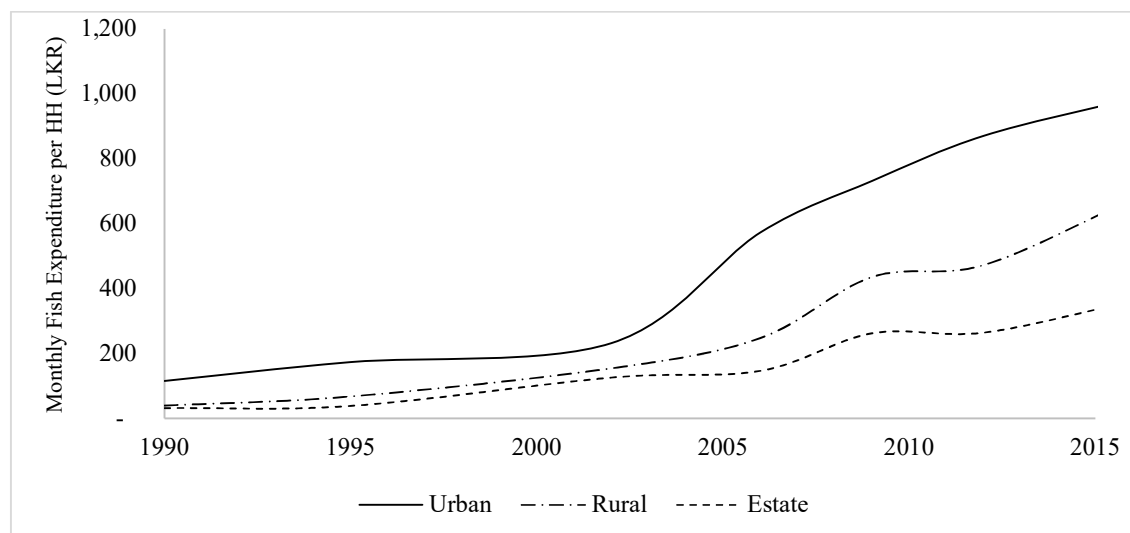


Source: HIES 2016, 2012/13, 2009/10, 2006/7, 2002, 1995/96 and 1990/91

Figure 6: Household Monthly Average Meat Expenditure Pattern

4.7 Fish

The figure below shows that household expenditure on fish exhibits an increasing trend across all three sectors. This rise is primarily driven by a rapid increase in the general price of fish (see Table 3). Among the sectors, urban households demonstrate relatively higher monthly expenditure on fish compared to rural and estate households (see Table 4). Urban households have greater access to a variety of fish products and seafood, contributing to higher consumption levels in this sector.



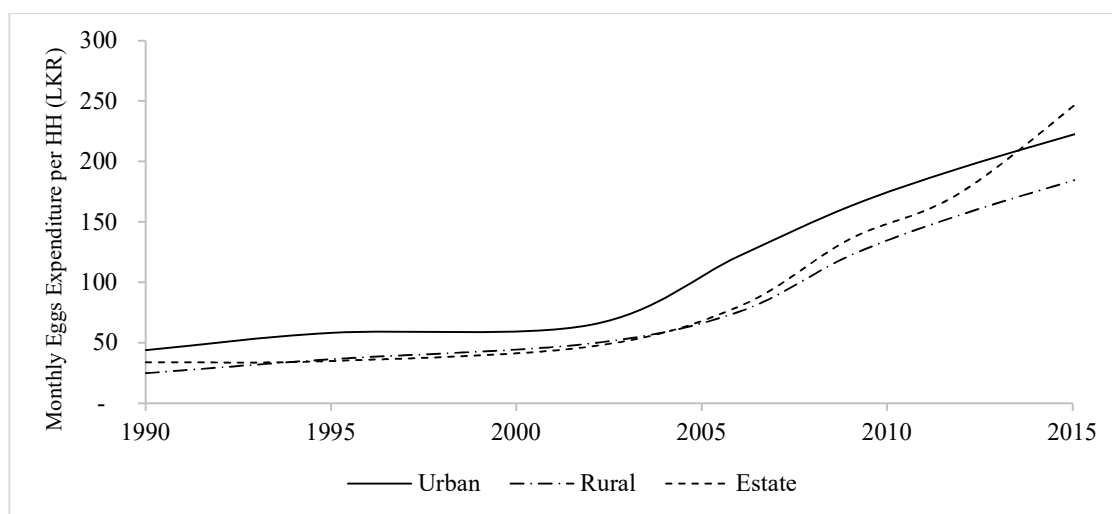
Source: HIES 2016, 2012/13, 2009/10, 2006/7, 2002, 1995/96 and 1990/91

Figure 7: Household Monthly Average Fish Expenditure Pattern

This trend is supported by larger quantities of fish consumed, as well as higher household incomes, greater purchasing power, and better availability of fish markets and processing centers, all of which facilitate increased fish expenditure. In contrast, estate households exhibit lower fish consumption due to limited income and fewer market outlets. Across all sectors, monthly fish expenditure increased sharply from 2003 onwards, largely driven by a rapid rise in sea fish prices following an increase in kerosene prices. Rural and estate households primarily consume freshwater fish, which is generally less expensive than sea fish, resulting in relatively lower monthly expenditure in these sectors.

4.8 Eggs

As illustrated in Figure 8, average monthly household expenditure on eggs across all three sectors exhibited a relatively uniform pattern with a marginal upward trend until 2003, followed by a rapid increase in all sectors.



Source: HIES 2016, 2012/13, 2009/10, 2006/7, 2002, 1995/96 and 1990/91

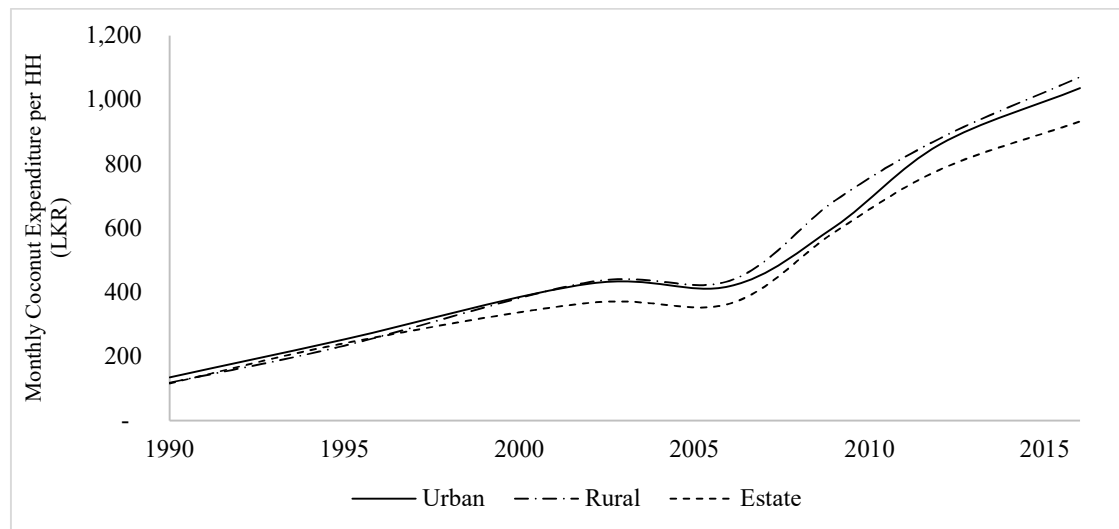
Figure 8: Household Monthly Average Egg Expenditure Pattern

This rise was driven by a modest increase in egg prices and a smaller increase in the quantity consumed (see Table 3 and Table 4). Although egg consumption quantities declined in 2009/10, significant price increases in all sectors led to higher expenditures. Monthly egg expenditure in the estate sector was notably high in 2016, as eggs serve as an important protein source and are consumed more in this sector due to lower purchasing power. Overall, expenditure on eggs was relatively higher in the urban sector and lower in the rural sector, reflecting differences in dietary preferences, lifestyle patterns, economic conditions, and cultural factors. Lower egg consumption in rural households may also be influenced by religious customs and the prevalence of on-site poultry farming, which reduces dependence on commercially purchased eggs.

4.9 Coconut

Analysis of household monthly expenditure on coconuts reveals a generally consistent pattern of marginal increase. This trend is primarily driven by a rapid rise in coconut prices and a slight increase in consumption quantities (see Table 3 and Table 4). A notable deviation occurred in 2005, when monthly expenditure on coconuts declined across all sectors, likely due to a temporary drop in prices. The rural sector exhibits relatively higher coconut expenditure, reflecting increased use in traditional curry preparations and greater accessibility to coconut trees in rural areas. In contrast, urban and estate households generally purchase coconuts from markets, with the estate sector showing lower expenditure, likely due to dietary preferences and the availability of alternative food sources. Overall, these trends

illustrate the influence of market dynamics, consumption behaviors, and cultural factors on dietary choices across the urban, rural, and estate sectors. Fluctuations in coconut expenditure further highlight how households adjust spending in response to changing market conditions and evolving consumption patterns.

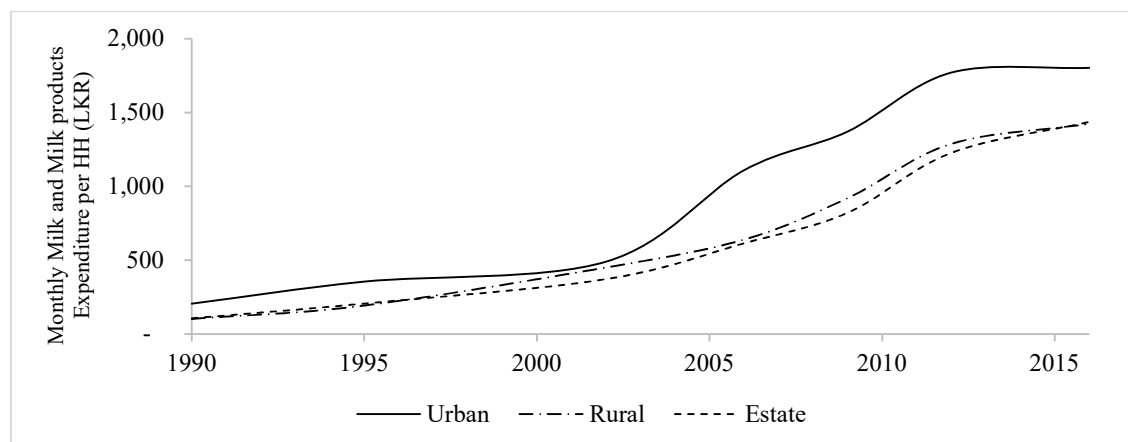


Source: HIES 2016, 2012/13, 2009/10, 2006/7, 2002, 1995/96 and 1990/91

Figure 9: Household Monthly Average Coconut Expenditure Pattern

4.10 Milk and Milk Products

Figure 10 illustrates the monthly household expenditure patterns on milk and milk products. Expenditure exhibited a marginally increasing trend until 2002, followed by a rapid rise across all three sectors. This increase was primarily driven by the rising general prices of milk and milk products (see Table 3). The quantity of milk and milk products consumed was higher in the urban sector, while consumption in the rural and estate sectors was relatively similar. Consequently, monthly expenditures in the rural and estate sectors followed comparable increasing patterns (see Table 4).



Source: HIES 2016, 2012/13, 2009/10, 2006/7, 2002, 1995/96 and 1990/91

Figure 10: Household Monthly Average Milk and Milk Products Expenditure Pattern

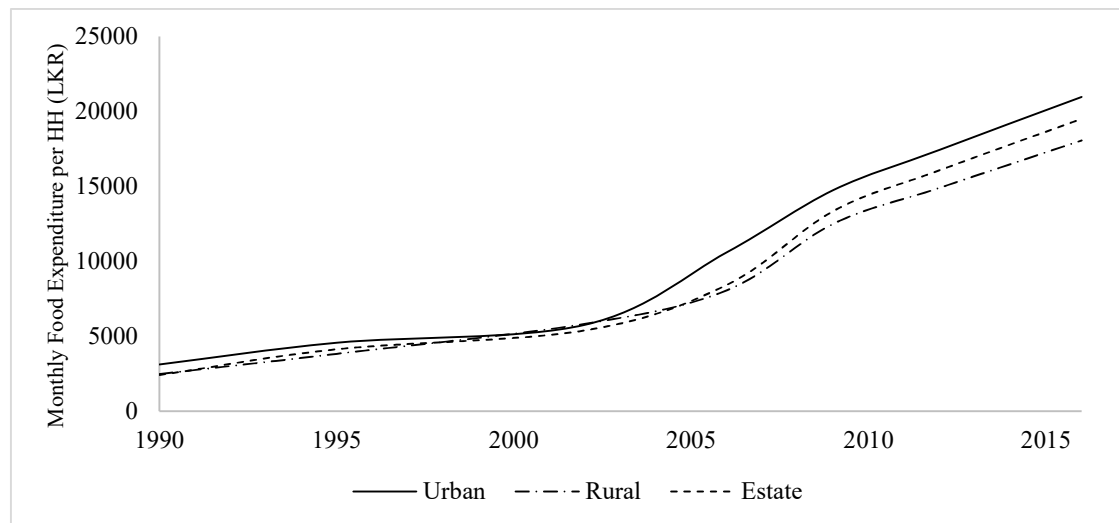
Analysis of monthly household expenditure on milk and milk products indicates higher consumption levels in the urban sector. This disparity is likely driven by increased consumption quantities and the convenience of readily available packaged milk in markets, which facilitates faster meal preparation.

Across all three sectors, consumption quantities rose sharply in 2016, reflecting changing dietary preferences and improved availability and accessibility of dairy products. These patterns underscore the influence of market dynamics, consumption behaviors, and economic factors on dietary choices throughout the study period. Fluctuations in monthly expenditure further highlight how households adjust spending in response to variations in prices, market conditions, and product availability.

4.11 Monthly Food Expenditure

Figure 11 illustrates household monthly food expenditure patterns across the urban, rural, and estate sectors. Between 1990 and 2002, food expenditure showed a similar and marginally increasing trend across all sectors. After 2002, overall monthly food expenditure rose rapidly in all three sectors.

The observed upward trend in monthly household food expenditure can be attributed to two main factors: a rapid rise in the general price of food commodities and a modest increase in the quantity of food consumed. Higher food prices necessitated that households allocate a larger share of their budgets to food purchases. Additionally, changing dietary preferences and increases in household size contributed to these consumption patterns. Food expenditure trends were generally consistent and comparable across all sectors, reflecting similar responses to market dynamics and economic factors, such as inflation. Variations in agricultural production and global market conditions likely influenced the general price of food commodities, thereby shaping household expenditure patterns. Overall, the analysis highlights the interplay between market conditions, pricing dynamics, and consumption behavior, collectively determining food expenditure across urban, rural, and estate sectors throughout the study period.



Source: HIES 2016, 2012/13, 2009/10, 2006/7, 2002, 1995/96 and 1990/91

Figure 11: Household Monthly Average Food Expenditure Pattern

4.12 Food Shared Behaviour

Table 6 presents data on food-sharing behaviour across the urban, rural, and estate sectors for the years 2006/07, 2009/10, 2012, and 2016, based on information obtained from the Household Income and Expenditure Surveys.

A comparison of food-sharing behavior across the three sectors indicates a marginal increase in 2009/10, followed by a gradual decline up to 2016. The estate sector exhibits the highest levels of food-sharing behavior, reflecting its position as the sector with the lowest average income. In contrast, the urban sector shows a relatively lower food expenditure share, as households allocate a larger portion of their

budgets to non-food items such as transportation, housing rent, medical expenses, and utilities. Limited options for non-food expenditures in rural and estate households likely contribute to their higher food-sharing behavior.

Table 6: Food Share Behaviour

Sectors	2006/7	2009/10	2012/13	2016
Urban	0.2385	0.2748	0.2513	0.2187
Rural	0.3105	0.3303	0.3065	0.2835
Estate	0.3902	0.3948	0.3672	0.3390

Source: Author's calculations

Overall, these trends reflect the interplay of economic conditions, cost-of-living variations, and sector-specific factors that shape household food expenditure patterns and the proportion of income devoted to food.

5. Conclusion and Policy Implications

An analysis of household monthly average consumption expenditure across ten food groups reveals distinct spending patterns among the sectors. Urban households allocate a comparatively larger share of their expenditure to food groups such as bread, meat, fish, eggs, and milk. In contrast, the estate sector shows higher spending on rice, wheat flour, and pulses, while rural households display a preference for vegetables and coconut. Food groups such as meat, fish, and milk account for a relatively larger share of total expenditure across all sectors. Overall, total monthly food expenditure is highest in urban areas and lowest in rural areas. This pattern reflects both a rise in the general prices of the ten food groups—partly influenced by the internal conflict—and increases in consumption of staples such as rice and protein-rich foods like meat during the study period.

Food consumption expenditure patterns vary across the urban, rural, and estate sectors, reflecting differences in socio-economic conditions and relative price structures. In Sri Lanka, household food expenditure is influenced by a range of factors, including dietary habits, cultural customs, economic activity, religious beliefs, ethnic composition, cooking methods, lifestyle patterns, and traditions. While rural and urban households are likely to respond similarly to changes in income and prices, estate households allocate their income differently compared to equivalent households in the rural sector, reflecting sector-specific economic and social dynamics.

This study identifies clear sectoral differences in household food consumption expenditure. The per capita food expenditure as a percentage of total household expenditure is highest in the estate sector and lowest in the urban sector. However, in absolute terms, per capita food expenditure is greatest in the urban sector and lowest in the estate sector. The analysis also confirms that the proportion of income allocated to food declines as household income increases, consistent with Engel's Law.

The findings indicate that, in addition to income and prices, several other factors can prevent households from fully realizing the nutritional value of food items. These include religious and cultural restrictions, traditional food practices and tastes, local availability of food in nearby markets, limited awareness of nutrition and health, cooking methods, and lifestyle patterns. With respect to animal-based sources of nutrition, estimated expenditures on meat, milk and milk products, and eggs are relatively high, suggesting that policies focused on increasing household cash income may be more effective in improving access to these foods across all three sectors. To enhance milk production, the adoption of high-yielding dairy cows under intensive management systems is recommended. Meat production and distribution outlets should be developed in proximity to households in all sectors. Additionally, women—particularly in rural areas can be engaged in producing milk products such as yoghurt, packaged milk, and ghee. Given

the availability of agricultural land in the rural sector, suitable areas can also be utilized for cattle, goat, sheep, poultry, and piggy farming to increase the availability of animal-based foods.

Furthermore, the government can play a key role in promoting meat production by making direct investments in meat and milk production or by providing incentives to the private sector to increase the availability of animal-source foods across all three sectors. Ensuring consistent market availability of meat can be achieved through well-organized marketing channels, supported by the development of processing centers, cold storage facilities, and modern transportation infrastructure. These measures would not only enhance supply but also improve accessibility for households. The findings suggest that income-oriented policies are likely to be more effective than price-related interventions in promoting food consumption, indicating that increasing household income has a greater impact on improving food consumption patterns than controlling prices.

Recommendations

Policy Formulation for Food Price Stability: The government should implement policies that stabilize food prices, especially for staple foods like rice, wheat flour, and pulses. Programs could include subsidies for essential food items, improved supply chain management, and regulations on price fluctuations in local markets. This could help mitigate the impact of rising prices on household expenditure and improve food security among vulnerable populations.

Promotion of Diverse Food Sources; Encourage diversification of food consumption by promoting alternative staples and nutritious foods beyond rice and wheat flour. This could involve educational campaigns targeted at rural and urban households to raise awareness of the nutritional value of legumes, vegetables, and other local crops. Such initiatives can help alleviate pressure on staple foods and enhance dietary diversity.

Support for Local Agriculture: Increase support for local farmers through grants, technical assistance, and access to credit. Enhancing local production can reduce dependency on imported food and strengthen food security. For example, investments in infrastructure to improve transportation and storage of agricultural products can lower post-harvest losses and stabilize supply.

Targeted Assistance for Low-income Households: Develop targeted assistance programs for low-income households, especially in rural and estate sectors where food expenditure shares are higher. These programs can include food stamps, direct cash transfers, or community kitchens that provide meals at reduced costs. Enhancing income support for these households can alleviate financial stress and improve nutritional outcomes.

Regular Monitoring of Food Expenditure Patterns; Establish a framework for regular monitoring and evaluation of household food expenditure patterns. This should include the collection of data on food prices and consumption behavior across different sectors to better understand changing trends. Continuous analysis will provide insights necessary for responsive policies and programs.

Improvement of Market Access: Improve market access for rural and estate households by creating local markets or cooperative buying groups. This could enhance bargaining power and lower prices for consumers while ensuring farmers receive fair compensation for their products. Connecting farmers directly with consumers can also foster a better understanding of seasonal availability and pricing strategies.

Nutritional Education Programs: Establish nutritional education programs in schools and communities that emphasize balanced diets, the importance of fruits and vegetables, and the health implications of different types of food. These programs should include cooking workshops to showcase how low-cost, nutritious meals can be prepared, thereby changing consumption habits.

Address Cultural and Social Factors: Recognize and address the cultural factors influencing food consumption behavior, especially in the estate sector, where dietary preferences may heavily favor traditional practices. Engaging with community leaders and stakeholders can help tailor interventions that respect cultural norms while promoting healthy dietary choices.

By implementing these recommendations, stakeholders can work toward enhancing food security, improving dietary diversity, and mitigating the impact of rising food prices on household expenditure across different sectors.

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