Impact of Government Subsidies on Consumption Idea

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The Household Consumption Expenditure Survey (HCES) is designed to collect information on consumption of goods and services by the households. Information collected in HCES is used for analysing and understanding the consumption and expenditure pattern, standard of living and well-being of the households. This is a comparative analysis to see how household expenditure on eatable items changed before and after the implementation of the Public Distribution Services (PDS). Dataset consists of year 2022-2023.

Population coverage:

- Under-trial prisoners in jails and indoor patients of hospitals, nursing homes etc., are to be excluded, but residential staff therein will be listed while listing is done in such institutions.
- the **floating population** refers to **people without a permanent residence** who are **not included in the survey**
- neither NRI nor their households' servants
- Orphanages, rescue homes, ashrams and vagrant houses are outside the survey coverage.
- Military people not included

Explain why you are studying the impact of government subsidies on food consumption:

Government subsidies on food play a **crucial role in ensuring food security**, reducing poverty, and improving nutrition, particularly for **low-income households**.

- **Ensuring Food Security**: Millions of people in India rely on subsidized food from schemes like the **Public Distribution System (PDS)** and **PM Garib Kalyan Anna Yojana (PMGKAY)**
- **Reducing Hunger & Malnutrition**: Subsidies make essential food items **affordable**, reducing hunger and improving nutrition.

- **Research Questions**:

1. How much do food subsidies contribute to total household food expenditure?
2. Which food items receive the most subsidy support?
3. How does subsidy impact vary across **rural vs. urban** households?
4. How do different **states benefit** from food subsidies?

Based on **PDS efficiency, economic diversity, and urban-rural mix**, I have focused mainly on these states:
> **Tamil Nadu** (Strong PDS, mix of urban & rural)
> **Chhattisgarh** (Strong PDS, rural-dominated)
> **Bihar** (Weaker PDS, low-income)
> **Maharashtra** (Higher-income, urban-heavy)
> **Assam** (Northeast representation)

I have only considered the portion whether the household benefitted from Pradhan Mantri Garib Kalyan Yojana (PMGKY).

For the consumption goods – rice, wheat, coarse grains, sugar, salt, pulses, edible oil and kerosene– consumption from "PDS purchased at subsidized rate", consumption of food grains received free under Pradhan Mantri Garib Kalyan Ann Yojana (PMGKAY).

Pradhan Mantri Garib Kalyan Ann Yojana (PMGKAY) launched by Government of India provides several benefits to the household. Under this scheme following benefits were provided to the household:

1. Cash transfer via DBT by the government to households, women under Jan Dhan Yojana, Divyang, poor pensioners, widows, Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) workers, and farmers.

2. Under the food scheme, 5 kilograms (kg) of rice/wheat, 1 kg of pulse, etc., per person per month in addition to the normal quota of food grains under the NFSA has been provided free to each beneficiary.

Types of Ration Card

Antyodaya Anna Yojana	1
Below Poverty Line (BPL)	2
Above Poverty Line (APL)	3
Priority House Holds (PHH)	4
State Food Security Scheme (SFSS)	5
Others	9
No ration card	0

Type ...	Assam	Bihar	Maharashtra	Tamil nadu	Total
0	2546	4802	4244	1029	12621
1	406	1515	1823	726	4470
2	2330	4304	6596	431	13661
3	164	771	5968	108	7011
4	3071	5669	3958	8495	21193
5	8	66	8	6	88
9	37	57	162	3569	3825
Total	8562	17184	22759	14364	62869

These are the items distributed under PMGKAY:

- ❖ Wheat – 107
- ❖ Rice – 061
- ❖ Pulses – 071
- ❖ Sugar – 074
- ❖ Salt – 073
- ❖ Jowar, Bajra, Maize, Barley, Ragi – 073

Household Type	rural	urban	Total
1	10716	7665	18381
2	10126	20418	30544
3	2232	9615	11847
4	22184		22184
5	35880		35880
6	43626		43626
9	19728	27738	47466
Total	144492	65436	209928

In *rural areas* a household will belong to any one of the following seven household types

| self-employed in agriculture	1
self-employed in non-agriculture	2
regular wage/salary earning in agriculture	3
regular wage/salary earning in non-agriculture	4
casual labour in agriculture	5
casual labour in non-agriculture	6
others	9

For *urban areas*, the household types are:

self-employed	1
regular wage/salary earning	2
casual labour	3
others	9

Household Type ●1 ●2 ●3 ●4 ●5 ●6 ●9
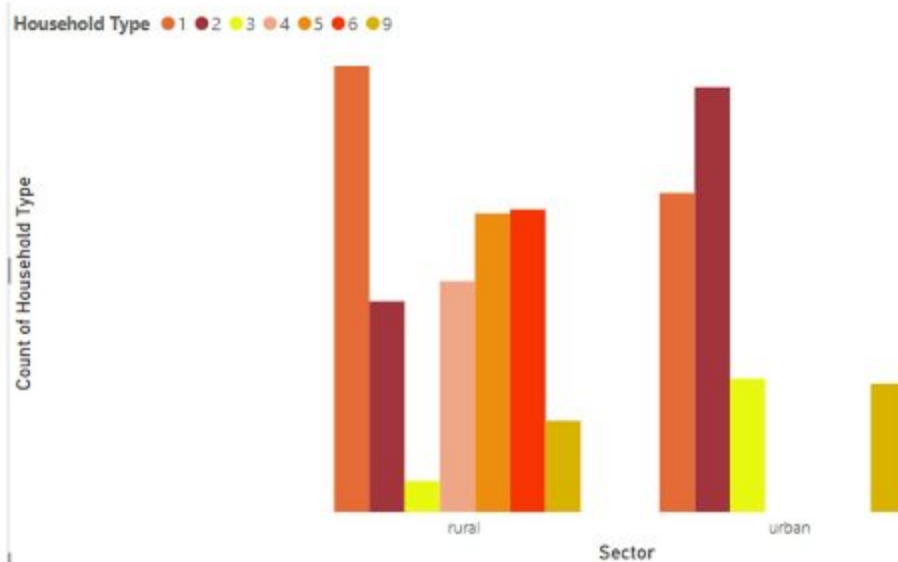
High	Moderate	Low
Andhra Pradesh	Madhya Pradesh	Assam
Chhattisgarh	West Bengal	Uttar Pradesh
Kerala	Punjab	(empty)
Odisha	Gujarat	Jharkhand
Tamil Nadu	Maharashtra	Bihar
Telangana	Rajasthan	Northeast States
(empty)	Haryana	(empty)

Insights from the data:

> High PDS Utilization Rate (70%) as significant portion of households rely on the PDS for their food needs.

> **81.37%** of rural households use PDS, compared to **51.13%** of urban households

> **15,628 rural households** and **13,254 urban households** benefited from the PMGKAY scheme.

> More households are enrolled in PDS compared to non-PDS.

> Assam, Bihar, Chhattisgarh, Maharashtra, and Tamil Nadu have high PDS enrolment.

> The majority of beneficiaries come from **Bihar and Chhattisgarh**, where dependence on PDS is historically strong.
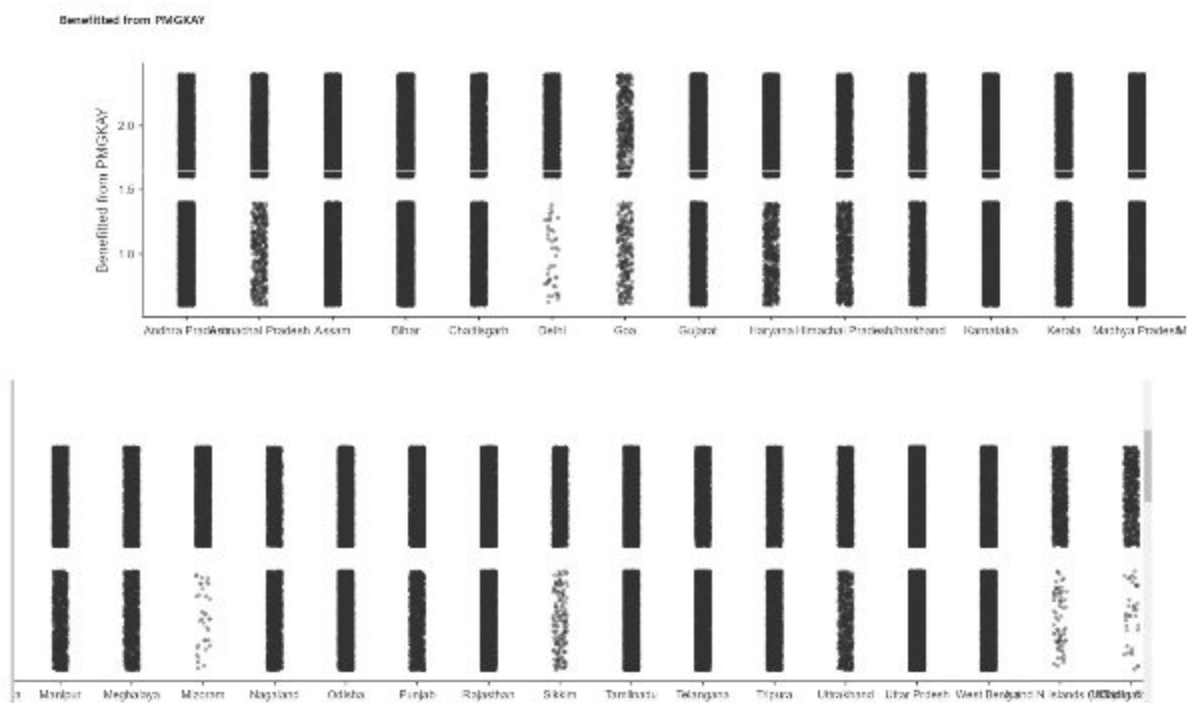
> Each black dot represents an individual or household that benefitted from PMGKAY, categorized by state on the X-axis.

> The distribution of dots indicates how beneficiaries are spread across different states.

>Since most states have a dense cluster of dots at both 1 and 2, it suggests that PMGKAY beneficiaries are present in both rural and urban areas.

>If a state has more dots in the 1-section (Rural) compared to the 2-section (Urban), it means more beneficiaries are in rural areas.

> Conversely, if a state has more dots in the 2-section (Urban), the urban population has a higher share of beneficiaries.

>In some states (like Mizoram, Sikkim, and Andaman & Nicobar Islands), the scatter appears sparser, indicating fewer recorded beneficiaries.

>Bihar, Uttar Pradesh, Tamil Nadu, Chhattisgarh and West Bengal have a high concentration of dots, indicating a large number of beneficiaries.

>Assam has significant participation, suggesting strong reliance on PDS.

We define the Null Hypothesis as

Null Hypothesis (H₀):

- There is **no association** between the sector (urban/rural) and whether a household procures items using a ration card.
- In other words, the proportion of households using a ration card is the **same** for both urban and rural households.

Alternative Hypothesis (H₁):

- There **is an association** between the sector (urban/rural) and ration card usage.
- In other words, the proportion of households using a ration card **differs** between urban and rural areas.

Interpretation of the Chi-Square Test Results:

* Since $p < 0.001$, we reject the null hypothesis (H₀).

* This means there is a significant association between household location (urban/rural) and ration card usage.

* Rural households use ration cards significantly more than urban households.

* Since the **Chi-Square value is large**, this suggests a **strong association** between the sector (urban/rural) and the likelihood of procuring items using a ration card.

* Since the p-value is **very low**, the result is **highly significant**, meaning this pattern is unlikely due to chance.

Contingency Tables

Contingency Tables

sector	Whether hhd procured item using ration card		Total
	yes	no	
rural	125318	29696	155014
urban	51683	55049	106732
Total	177001	84745	261746

χ^2 Tests

	Value	df	p
χ^2	30344	1	< .001
N	261746		

References:

- National data archive – Household consumption Expenditure 2022-2023
  https://microdata.gov.in/nada43/index.php/catalog/central/about