

Do Below Poverty Line Households in India Belongs to the Poorest Wealth Quintile? Evidence from NFHS-5 Data

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Abstract:

Exact identification of poor household is very essential for the implementation of social and welfare programs in India. The Below Poverty Line (BPL) categorization has long been used by government to target subsidies and welfare schemes for economically deprived populations. However, questions keep regarding whether households identified as BPL actually correspond to poorest section of society in a country. This study examines the relationship between BPL status and household wealth quintile using data from the NFHS-5. The NFHS wealth index, which categorized households into five wealth quintiles based on asset ownership and living conditions, is used as a comparative measure of economic status. Using descriptive statistics and cross tabulation analysis, the study explores the distribution of BPL households across different wealth quintiles and evaluates the extent of mismatch between administrative poverty identification and asset-based wealth classification. The findings reveal that while a substantial proportion of BPL households fall within the poorest wealth quintile, a notable share falls across higher wealth quintile categories, indicating possible targeting errors in poverty identification. Such as discrepancies suggest both inclusion and exclusion errors in welfare program targeting. The study points out the problems with the traditional way of identifying poor people and says that we need better ways of doing it that take into account many different factors. The findings are important for the people who make policy decision and to make sure that poverty alleviation programs in India are fair and effective.

Key-Words: Below Poverty Line, Wealth Quintile, NFHS-5, Poverty Targeting, Extent of Mismatch.

Introduction:

Poverty identification remains a core challenge for social policy making and welfare targeting in India. Government programs designed to reduce poverty and improve living conditions of economically disadvantaged households. One of heavily on the accurate identification of economically disadvantaged household in India is BPL classification. BPL status has historically been used to determine eligibility for various welfare programs, including food subsidies, housing assistance and social protection programs. However, concerns have

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frequently been raised regarding the accuracy and effectiveness of this classification in identifying the truly poorest households. At the same time, alternative approaches for measuring household economic status have been widely used in large scale household survey. The wealth index commonly used in demographic and health surveys provides an asset-based measure of long-term economic status. The wealth index constructed using indicators such as household asset, housing characteristics, access to sanitation and ownership of durable goods. Using statistical techniques households are grouped into wealth quintiles ranging from poorest to the richest categories. The NFHS-5 (2016-19) is one of the most comprehensive household surveys in India. Households are classified into five wealth quintiles. Despite the widespread use of both BPL classification and asset-based wealth indices, the relationship between these two measures remains an important empirical question. Ideally, household identified as BPL should largely correspond to the poorest wealth quintile in survey based economic classification. However, discrepancies may happen due to limitation in administrative targeting mechanism, outdated poverty lists or methodological differences in poverty measurement. Such mismatch can lead to inclusion errors, where non poor household receive benefits and exclusion errors where genuinely poor households are left out of welfare programs. Understanding the extent of this mismatch is essential for improving the effectiveness and fairness of poverty alleviation policies.

This study therefore examines whether households identified as BPL actually belong to the poorest wealth quintile using nationally representative survey data. By comparing administrative property identification with asset based economic classification, the study aim to assess the extent of targeting errors that identification systems in India often suffer from inclusion and exclusion errors and highlight potential gaps in poverty identification mechanisms. In large household surveys, asset-based measure has been widely used as an alternative way to estimate economic status. Rustein and Johnston (2004) developed the wealth index methodology used in DHS. This method uses household assets, housing characteristics and access to basic services to construct an index of long-term economic status through principal component analysis. The wealth index allows households to be grouped into quintiles ranging from poorest to richest and has become a widely accepted proxy for measuring socio economic inequality in situation where reliable income data are unavailable. Accurate identification of poor is a major challenge for social protection policies in developing nations. Many welfare programs rely on administrative poverty classifications, but several studies have highlighted substantial targeting errors in such systems. Banerjee and Duflo (2011) argue that misidentification of beneficiaries can reduce the effectiveness of anti-poverty programs, as benefits may lead to non-poor households while many truly poor households remain excluded. This work highlights the importance of improving targeting mechanisms to ensure that social welfare scheme effectively reach the intended population. In the context of India, several scholars have pointed out the administrative identification of BPL households. Dreze and Sen (2013) noted that the BPL targeting system often suffered from both inclusion errors, where genuinely poor households are not included in welfare programs. These targeting problems reduce the efficiency of social protection schemes and raise concern about the fairness of poverty identification process.

NFHS-5 provides an asset-based wealth index that has been widely used to analyze socio economic inequality and household living condition in India. Comparisons between administrative poverty lists and survey-based wealth classifications can provide potential mismatch between official poverty identification and actual economic status. Existing studies describe mainly inclusion and exclusion error in BPL identification, but given limited attention to the possible causes of mismatch and effectiveness policy measures. This gap highlights the need for a more analytical approach to understand both the determinants and policy outcomes.

Objectives:

1. To show the distribution of BPL households across different wealth quintiles in India using NFHS-5
2. To assess the extent of mismatch of BPL among various wealth quintile household by identifying inclusion and exclusion error
3. To examine the relationship between BPL household and Household wealth quintile by using data NFHS-5

Hypothesis:

H0: There is no significant association between BPL card ownership and wealth quintiles

H1: There is a significant association between BPL card ownership and wealth quintiles

Database & Methodology:

The study based on the secondary data extracted from NFHS-5 (2016-2019) is nationally representative household survey conducted in India. The survey was implemented by IIPS (International Institute of Population Science), India under the guidance of The Ministry of Health and Family Welfare (MoHFW). StataMP 17 has used for the data processing. In this study has used the dependent variable is household wealth quintile, which categorized into 5 part and independent variable BPL status. Total 601,509 households surveyed in India. Excluded the missing frequency is 1060.88 households which is 0.18% of total households surveyed. In this study has used the 600448 household frequencies by excluding missing frequency 1061 households by leaving aside the decimal value in India.

The study employs quantitative statistical techniques to analyse the relationship between BPL status and wealth quintiles. Frequency and percentage distribution are used to examine the proportion of BPL households across different wealth quintile in India. Cross tabulation is used to compare BPL status with wealth quintiles categories to identify the extent of mismatch. Two types of targeting error have calculated. That is Inclusion Error and Exclusion Error.

Inclusion Error (%) = Total number of non-poor households with has a BPL card * 100/Total no of household with has a BPL card.

Exclusion Error (%) = Total number of poor households with not has a BPL card * 100/Total no of actual poor households.

Several Organisation and Economist are widely used the formula for calculation the errors. To test the null hypothesis, a chi-square test has applied to examine whether the association between BPL status and wealth quintile is statistically significant. Cramer’s V statistical technique has used to measure strength of association between categorical variables.

Result and Discussion:

The table no.1 presents a percentage of household distribution with not has a BPL card in total 100% of not has a BPL card across the wealth quintiles in India. The study is revealing that a clear socio-economic gradient and notable inter-state variation. The proportion of households without a BPL card increases with rising wealth status. The richer and richest quintiles suggesting relatively better exclusion. However, significant disparities exist across the states such as Uttar Pradesh (31.07%), Bihar (14.14%) and West Bengal (10.19%) shows the meaningful proportions of the poorest household lacking BPL card, indicating serious exclusion error in welfare targeting. Similarly, Madhya Pradesh and Odisha have also relatively high percentage among poorer section, flowing gaps identification mechanisms. Other side states like Kerala and Tamil Nadu demonstrate comparatively lower exclusion among the poorest, suggesting for effective targeting. Higher share of non-BPL households in richer quintiles in states as Maharashtra and Gujrat indicate the relatively appropriate exclusion of affluent groups, some inclusion error may still persist in middle categories. These finding highlights persistent regional inequality and inefficiencies in the BPL identification system where both exclusion of deserving poor and potential misclassification across wealth groups remain critical concern for policy intervention.

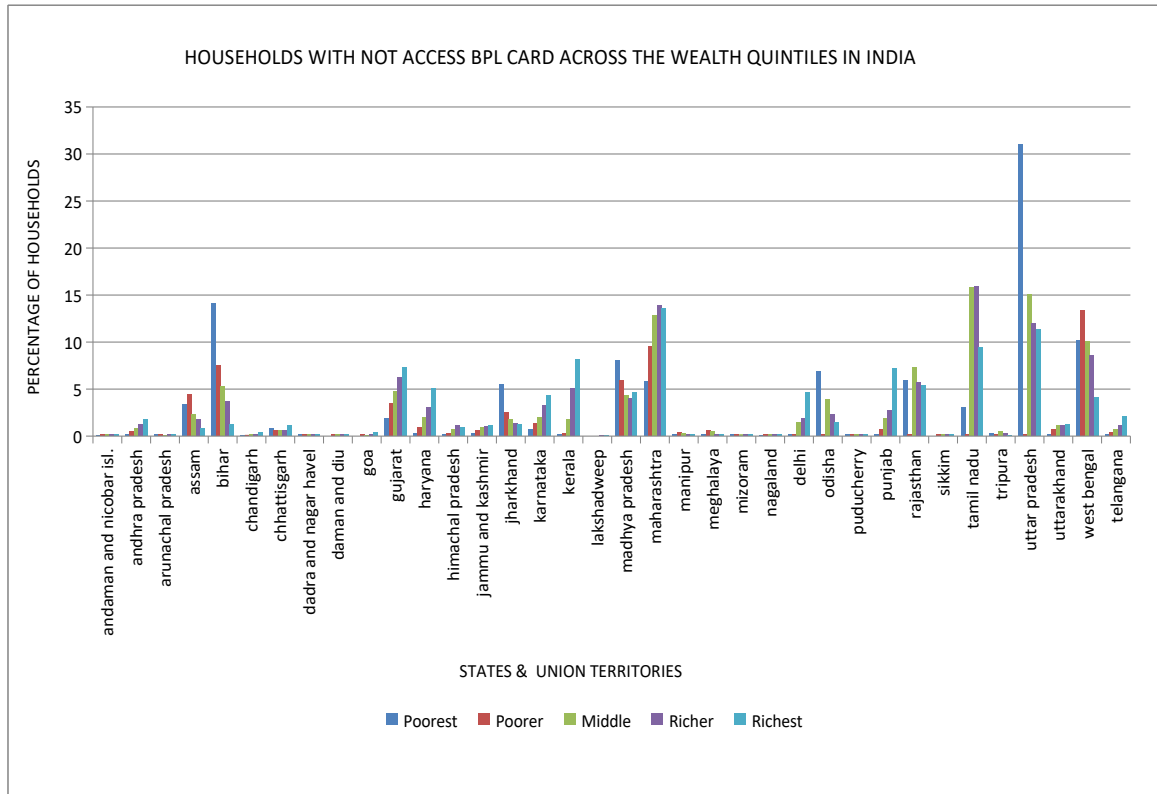
Table No. 1						
Households Percentage with No BPL Card across the Wealth Quintiles in India						
States and Union Terr.	Poorest	Poorer	Middle	Richer	Richest	Total
Andaman And Nicobar Isl.	0.01	0.03	0.05	0.07	0.06	0.05
Andhra Pradesh	0.17	0.49	0.81	1.24	1.73	1.02
Arunachal Pradesh	0.1	0.1	0.12	0.11	0.04	0.09
Assam	3.35	4.39	2.36	1.81	0.84	2.29
Bihar	14.14	7.56	5.34	3.7	1.3	5.52
Chandigarh	0.01	0.02	0.04	0.07	0.38	0.14
Chhattisgarh	0.84	0.64	0.59	0.66	1.17	0.81
Dadra And Nagar Havel	0.04	0.04	0.04	0.04	0.03	0.04

Daman And Diu	0	0.03	0.03	0.04	0.03	0.03
Goa	0	0.06	0.12	0.23	0.39	0.19
Gujarat	1.91	3.48	4.75	6.29	7.3	5.17
Haryana	0.25	0.9	2.03	3.05	5.11	2.67
Himachal Pradesh	0.08	0.32	0.77	1.09	0.98	0.73
Jammu And Kashmir	0.26	0.63	0.93	1.02	1.17	0.87
Jharkhand	5.48	2.56	1.79	1.38	1.2	2.21
Karnataka	0.75	1.4	1.95	3.31	4.37	2.66
Kerala	0.06	0.3	1.78	5.11	8.12	3.8
Lakshadweep	0	0	0	0.01	0.01	0.01
Madhya Pradesh	8.07	5.91	4.35	4.06	4.62	5.17
Maharashtra	5.83	9.52	12.83	13.85	13.6	11.69
Manipur	0.15	0.41	0.34	0.19	0.08	0.22
Meghalaya	0.21	0.56	0.46	0.21	0.07	0.27
Mizoram	0.03	0.04	0.09	0.14	0.15	0.1
Nagaland	0.13	0.04	0.22	0.15	0.06	0.16
Delhi	0.03	0.04	1.5	1.94	4.62	2.05
Odisha	6.93	0.04	3.95	2.36	1.49	3.51
Puducherry	0.03	0.04	0.15	0.21	0.19	0.15
Punjab	0.16	0.74	1.87	2.75	7.17	3.11
Rajasthan	5.98	0.04	7.35	5.69	5.35	6.39
Sikkim	0	0.04	0.09	0.11	0.03	0.05
Tamil Nadu	3.09	0.04	15.79	15.97	9.45	11.14
Tripura	0.25	0.04	0.51	0.33	0.12	0.36
Uttar Pradesh	31.07	0.04	15.11	11.97	11.33	16.71
Uttarakhand	0.23	0.69	1.12	1.14	1.3	0.97
West Bengal	10.19	13.33	10.09	8.56	4.07	8.61
Telangana	0.15	0.45	0.69	1.13	2.05	1.05

Total	100	100	100	100	100	100
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Source: Calculated by Author by using NFHS-5 (2019-21) Data

Figure No. 1



Source: Author's Work based on the table no. 1

Table no. 2 showing the percentage distribution of households with has a BPL card in total 100% of BPL card ownership across the wealth quintiles in India. The study is revealing that concentration of BPL card ownership among economically disadvantages groups, although notable inconsistencies persist across state. A higher proportion of BPL card holders is observed in the poorest quintile states such as Bihar (24.61%), Uttar Pradesh (13.27%) and Madhya Pradesh (11.31%) in India indicating relatively better targeting toward the poor. The presence of considerable percentage of BPL card holders in richer and richest quintile state like Andhra Pradesh, Karnataka, Telangana, Maharashtra, suggest significant inclusion error, where non poor households are benefiting from welfare provisions. Telangana state share increases steadily from 2.36% in poorest to 14.78% in the richest quintile, highlighting the misclassification issue. West Bengal state shows a significant proportion of BPL card holders even in the middle and richer4 quintiles, indicating leakage in the system. On other side relatively lower representation of richer groups is the states like Odisha and Assam suggest comparatively better exclusion non poor households. Overall finding the indicates that while BPL targeting mechanisms in India are partially effective in reaching poorer households, substantial inclusion error and inter-state disparities undermine the efficiency of welfare distribution, emphasizing the need for improved identification and monitoring system.

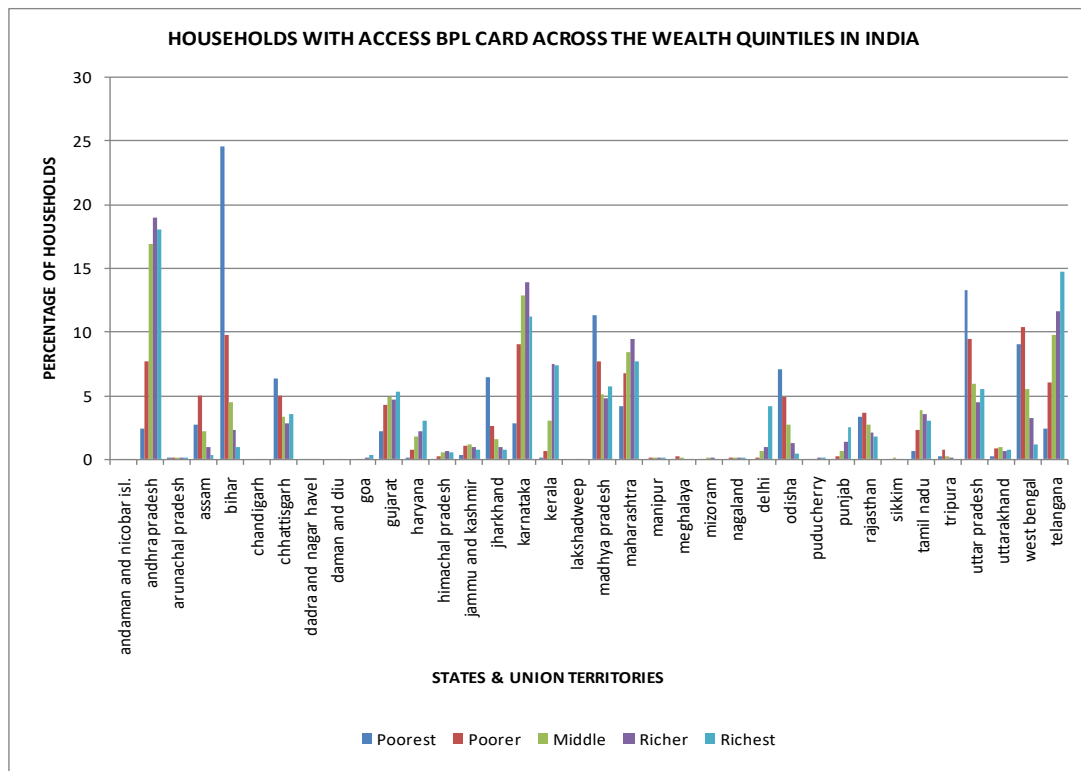
Table No. 2

Households Percentage with BPL Card across the Wealth Quintiles in India						
States and Union Terr.	Poorest	Poorer	Middle	Richer	Richest	Total
Andaman And Nicobar Isl.	0	0.01	0.02	0.02	0.02	0.01
Andhra Pradesh	2.4	7.72	16.97	18.98	18.1	10.88
Arunachal Pradesh	0.08	0.13	0.13	0.09	0.07	0.1
Assam	2.68	4.98	2.14	0.98	0.37	2.68
Bihar	24.61	9.78	4.45	2.26	0.95	10.96
Chandigarh	0	0	0	0.01	0.04	0.01
Chhattisgarh	6.31	5.01	3.31	2.78	3.51	4.52
Dadra And Nagar Havel	0.01	0.02	0.01	0.01	0.01	0.01
Daman And Diu	0	0	0	0.01	0	0
Goa	0	0.02	0.03	0.09	0.27	0.05
Gujarat	2.23	4.3	4.84	4.71	5.26	3.96
Haryana	0.14	0.77	1.81	2.19	3.01	1.22
Himachal Pradesh	0.03	0.24	0.54	0.62	0.48	0.33
Jammu And Kashmir	0.33	1.05	1.19	0.97	0.7	0.83
Jharkhand	6.42	2.62	1.56	0.9	0.71	3.05
Karnataka	2.84	9.09	12.83	13.96	11.17	9.08
Kerala	0.09	0.62	3	7.43	7.41	2.63
Lakshadweep	0	0	0	0.01	0.01	0
Madhya Pradesh	11.31	7.67	5.14	4.8	5.67	7.53
Maharashtra	4.2	6.8	8.41	9.47	7.66	6.92
Manipur	0.02	0.14	0.16	0.11	0.08	0.1
Meghalaya	0.06	0.19	0.15	0.06	0.04	0.11
Mizoram	0.02	0.05	0.09	0.08	0.05	0.06
Nagaland	0.03	0.12	0.11	0.09	0.09	0.09
Delhi	0	0.08	0.6	0.98	4.18	0.63

Odisha	7.1	4.85	2.71	1.24	0.47	4.1
Puducherry	0.01	0.02	0.06	0.09	0.16	0.05
Punjab	0.02	0.22	0.67	1.39	2.54	0.63
Rajasthan	3.31	3.65	2.72	2.07	1.8	2.95
Sikkim	0	0.02	0.11	0.06	0.01	0.04
Tamil Nadu	0.66	2.33	3.81	3.49	3.05	2.42
Tripura	0.2	0.69	0.24	0.07	0.02	0.29
Uttar Pradesh	13.27	9.5	5.92	4.48	5.5	8.66
Uttarakhand	0.21	0.82	0.92	0.64	0.7	0.63
West Bengal	9.02	10.43	5.54	3.23	1.1	7.05
Telangana	2.36	6.08	9.79	11.65	14.78	7.41
Total	100	100	100	100	100	100

Source: Calculated by Author by using NFHS-5 (2019-21) Data

Figure No. 2



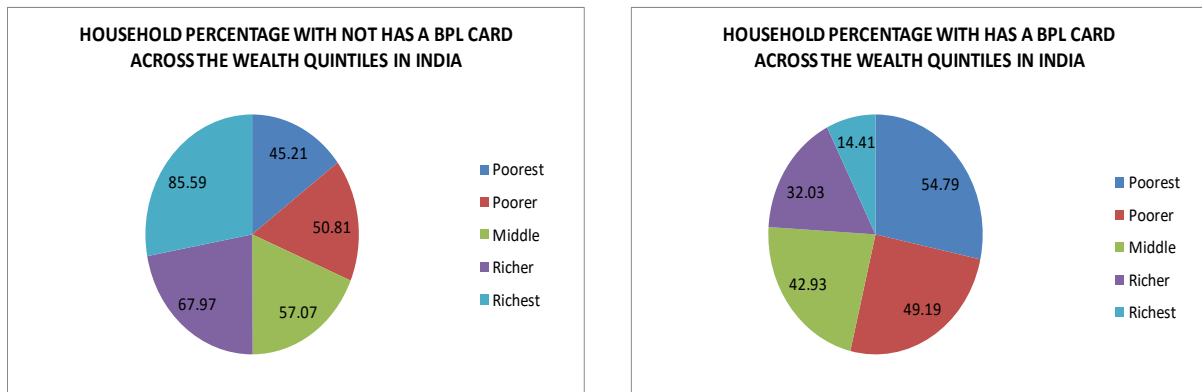
Source: Author’s Work based on the table no. 2

Table No. 3

Distribution of BPL Households across Wealth Quintiles in India						
Households has a BPL card	Poorest	Poorer	Middle	Richer	Richest	Total
No	55,087.64	60,095.02	67,951.85	81,973.66	1,03,260.70	3,68,368.80
No Percentage	45.21	50.81	57.07	67.97	85.59	61.35
Yes	66,767.39	58,176.97	51,121.79	38,631.36	17,381.77	2,32,079.30
Yes Percentage	54.79	49.19	42.93	32.03	14.41	38.65
Total	1,21,855	1,18,272	1,19,073.60	1,20,605	1,20,642.44	6,00,448.10
Total Percentage	100	100	100	100	100	100

Source: Calculated by Author by using NFHS-5 (2019-21) Data.

Figure No. 3



Source: Author's Work Calculation for Extent of Mismatch

Table No. 4

Status of BPL	Percentage
Poorest BPL	66,767.39
Non-Poorest BPL	1,65,311.89
Total BPL	2,32,079.30

Extent of Inclusion Error	71.23077845
Extent of Exclusion Error	45.21

Source: Calculated by Author by using NFHS-5 (2019-21) Data

Table no. 4 showing that by Using NFHS-5 (2019-21) data, the results show high mismatch in BPL identification with most BPL households belonging to non poor groups. A relatively smaller share belongs to the poorest category and a large proportion of non poorest groups. The inclusion error is very high, 71.23%, suggesting that a large number of non poor households are incorrectly included in BPL lists, while the exclusion error is also significant, 45.21%, representing near about half of the genuinely poor households are excluded from welfare coverage. This indicates poor targeting where non poor are included and many poor are excluded from the access of a BPL card. These findings highlight a serious inefficiency in poverty targeting mechanism, implying the existing identification criteria fail to accurately capture the most vulnerable populations. This mismatch can weaken the effectiveness of social welfare programs and call for improved to ensure the correctness of mismatch.

Table No. 5

Calculation of Chi-Square Test for Showing the Relationship between BPL household and Households wealth Quintile by Using NFHS-5

Wealth Quintiles	No BPL		Yes BPL
	Observed Value = 55087.64		Observed Value = 66767.39
Poorest	Expected Value € =74756.80267		Expected Value € =47098.19733
	Chi square =5175.127162		Chi square =8214.266408
	Observed Value =60095.02		Observed Value =58176.97
Poorer	Expected Value € =72558.66862		Expected Value € =45713.33138
	Chi square =2140.9232		Chi square =3398.183485
	Observed Value		Observed Value

	= 67951.85		=51121.79
Middle	Expected Value €		Expected Value €
	=73050.44207		=46023.15793
	Chi square		Chi square
	=355.8587784		=564.8471363
	Observed Value		Observed Value
	=81973.66		=38631.36
Richer	Expected Value €		Expected Value €
	=73989.94039		=46615.05961
	Chi square		Chi square
	=861.4654714		=1367.357675
	Observed Value		Observed Value
	=103260.7		=17381.772
Richest	Expected Value €		Expected Value €
	=74012.90945		=46629.53055
	Chi square		Chi square
	=11557.89252		=18345.27113

Source: Calculated by Author by using NFHS-5 (2019-21) Data

All Quintiles Sum of Final Chi-Square Value	Degree of freedom (df)
$\chi^2 = 51981.19296$	$(r-1)(c-1) = (5-1)(2-1) = 4$

Extremely significant association between households with a BPL card and different wealth quintiles. The calculated chi-square value is 51981.2 is extremely higher than the critical value (18.67) at 4 degrees of freedom. It's indicating that a highly statistically significant result at $p < 0.001$. Therefore, the null hypothesis is rejected and this suggests a strong association between possession of a BPL card and wealth quintiles. The distribution is not random. BPL card ownership varies significantly across different economic groups. Ideally, BPL cards should be concentrated among the poorest households but such a strong association may also reflect issue like inclusion and exclusion errors in identification process. This implies that non poor households may be receiving BPL benefits while some actual poor households are deprived. Revealing inefficiency in targeting and the need for better policy implementation and actual beneficiary identification mechanism.

Cramer's V calculation for measure the strength of association between BPL status and wealth quintiles in India.

$$V = \sqrt{\frac{\chi^2}{N*(k-1)}} \quad \text{Where, } \chi^2 = 51981, N= 600448, k=2 \text{ (The smaller dimension is no of col.)}$$

$$V = \sqrt{\frac{51981}{600448*(2-1)}} = 0.2942 \text{ or } 0.30 \text{ in two decimal values.}$$

The chi square test indicates a highly significant association between BPL status and wealth quintiles. However, the study chosen the large sample size of household, Cramer's V= 0.294 or much closed to 0.30. This value indicates that a moderate strength of association between the categorical variables. This implies that although BPL classification is significantly related to economic status, notable mismatch still exists across the wealth quintiles in India.

Conclusion:

The study examined whether households identified as BPL in India is truly belongs to poorest wealth quintiles by using NFHS-5 data. The findings reveal a significant mismatch between BPL status and actual economic condition interpreted earlier in the study. Now addressing the identified research gap, most of the studies related to poverty are moves beyond descriptive assessment by highlighting the likely role of socio-economic disparities, administrative limitation and regional variation in contributing to the mismatch. In addition to socio economic and administrative factors, political influence at the local level may play a role in shaping BPL identification. Practices such as patronage, vote bank politics and elite capture can potentially lead to the inclusion of non-poor households and exclusion of deserving beneficiaries. However, this dimension requires further empirical investigation. Another important factor contributing to mismatch may be the underreporting of annual income during the certification process. Since BPL eligibility is often linked to self-declared and locally verified income, households has may intentionally report that lower annual income levels to qualify for benefits, leading to the inclusion of relatively better-off households in the BPL category. The overall study underscores the urgent need for improving targeting mechanisms through the more transparent and dynamic identification way. Strengthening policy design, enhancing the effectiveness of poverty alleviation programs and its implementation can help to minimize inclusion and exclusion error, ensuring that welfare benefits reach the truly economical deprived population in India.

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