ECONOMIC DEVELOPMENT IN RURAL BIHAR THROUGH PMAY-G: WITH SPECIAL REFERENCE TO FOOD, HOUSING AND CONSUMPTION EXPENDITURE

Sanjay Kumar*
Associate Professor, Department of Economic Studies & Policy, Central University of South Bihar, Gaya, Bihar, India.
sanjay31378@gmail.com

Raviranjan Kumar
Research Scholar, Department of Economic Studies and Policy, Central University of South Bihar, Gaya, Bihar, India.

Abstract
Housing is an initial determinant of household welfare, shaping food security, consumption patterns, and overall economic development. This paper examines the socio-economic impact of the Pradhan Mantri Awas Yojana-Gramin (PMAY-G) in rural Bihar, drawing on a primary survey of 400 beneficiary households across eight Gram Panchayats of Gaya district. Using descriptive statistics, cross-tabulation, and paired sample t-tests, the study evaluates changes in housing conditions, food expenditure, and overall consumption expenditure before and after receiving of PMAY-G benefits. Findings indicate that PMAY-G has substantially improved housing quality, converting kutcha dwellings into pukka houses for the massive majority of beneficiaries, and has generated statistically significant increases in monthly food expenditure, annual clothing expenditure, education and health spending and household income. However, gaps persist in sanitation convergence, kitchen provision, and transparency of implementation. The paper concludes with policy suggestions for enhancing the scheme contribution to rural economic development in Bihar.
***Keywords**: PMAY-G, rural housing, consumption expenditure, food security, Bihar, economic development*

1 Introduction

Housing occupies a central place among the basic needs of human life, ranking alongside food and clothing as prerequisites for a dignified existence (Bharti, 2019). In India, chronic housing deprivation among rural households, particularly those belonging to socially and economically marginalised groups has long constrained broader processes of economic development. The PMAY-G, launched by the Government of India in April 2016 as a restructured successor to the earlier Indira Awas Yojana, seeks to provide pucca houses with basic amenities to all houseless rural households and those living in kutcha and dilapidated dwellings. Beyond its stated objective of "housing for all," the scheme has been positioned as an instrument of inclusive rural development, generating employment in the construction sector and converging with allied schemes such as the Swachh Bharat Mission (SBM-G), the Pradhan Mantri Ujjwala Yojana (PMUY), the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), and rural electrification and drinking water programmes (Gohil & Gandhi, 2019).

Bihar remains one of India's economically less developed states, characterised by high incidence of poverty, low per-capita income, and persistent deficits in housing, health, and sanitation infrastructure despite a relatively strong post pandemic rate of economic growth (Honawad, 2022). Gaya district, classified as one of the country's Integrated Action Plan (IAP) and aspirational districts, exemplifies these structural constraints, with roughly 30 per cent of its population belonging to Scheduled Caste (SC) communities who form the principal target group of PMAY-G (Census of India, 2011). Against this backdrop, the present paper investigates the extent to which PMAY-G has contributed to rural economic development in Gaya district, with particular attention to food expenditure, housing outcomes, and overall consumption expenditure of beneficiary households. Dimensions widely regarded as close indicators of household welfare and standard of living.

The paper proceeds as follows. Section 2 reviews the existing literature on rural housing programmes in India. Section 3 describes the data sources and methodology. Section 4 presents and discusses the empirical results relating to housing, food, and consumption expenditure. Section 5 concludes with policy recommendations.

2 Review of Literature

A substantial body of literature has examined the performance and socio-economic implications of India rural housing programmes, beginning with the Indira Awas Yojana (IAY) and continuing under its successor, PMAY-G. Murali (2022) evaluated the implementation of IAY/PMAY based on primary data collected from beneficiaries in Warangal district and highlighted variation in implementation effectiveness across villages.

Dhanabhakyam and Shobanageetha (2018) examined the socio-economic condition of PMAY beneficiaries in Coimbatore district using percentage analysis, t-tests, ANOVA, and Garret ranking, reporting that female beneficiaries expressed greater satisfaction with the housing programme than male beneficiaries, and that awareness levels varied significantly with beneficiaries educational attainment. In a related case study, Dhanabhakyam and Shobanageetha (2020) further documented the operational experience of PMAY-G implementation at the panchayat level in Kerala.

Gohil and Gandhi (2019) situate PMAY within the broader discourse on affordable housing in India, arguing that the scheme has generated demand for construction materials, labour, and allied services, thereby contributing to employment generation, while also converging with infrastructure programmes for roads, water supply, and sanitation. Bharti (2019) frames housing as one of the three fundamental human needs alongside food and clothing, and situates PMAY-G within India wider commitment to the Sustainable Development Goals and the constitutional guarantee of adequate shelter under Article 21. Kumar and Kumar (2016), examining the linkage between rural housing schemes and human development, emphasised that housing investment carries direct and indirect multiplier effects for local and national economies, and called for complementary provision of drinking water and sanitation to maximise welfare gains from housing schemes.

Employment-generation effects of housing schemes have also received attention. Nayak and Hazarika (2019), studying the urban counterpart PMAY(U), estimated that government expenditure under the programme generated substantial direct and indirect employment, underscoring the potential of housing investment as a broader instrument of economic stimulus, a finding with reasonable parallels for the rural programme. Rao (2019) traced the evolution of rural housing programmes in India from the immediate post-independence rehabilitation of the homeless through to PMAY-G, noting persistent shortfalls between physical targets and achievements during the initial years of implementation.

Studies focusing on housing affordability and adequacy raise cautionary notes regarding scheme design. Shrivastava and Srivastava (2015) argue that affordability remains the central constraint facing in Indian housing sector, particularly for economically weaker households, and that the definition of "affordable housing" itself remains contested. Shinde and Darade (2018) examine cost effective construction technologies, such as rapid wall panels, as a means of reducing construction costs under mass housing programmes, reporting potential cost savings of around 10 per cent relative to conventional construction. Honawad (2022), evaluating PMAY-G in Karnataka in Vijayapura district, similarly argues that housing programmes must be assessed not merely on target achievement but on their capacity to improve beneficiaries living standards.

Taken together, this literature suggests that while PMAY-G and its predecessor schemes have made measurable contributions to reducing rural housing deprivation, questions remain regarding the adequacy of financial assistance, the quality and completeness of dwellings (including provision of kitchens and toilets), the transparency of beneficiary selection, and the extent to which housing improvements translate into sustained gains in food security, consumption, and income. The present study contributes to this literature by providing micro level evidence from Gaya district, Bihar, with specific attention to food, housing, and consumption expenditure outcomes.

3 Methodology

This study adopts a descriptive and analytical research design combining quantitative and qualitative methods. The universe of the study is Gaya district, Bihar, an area classified among the Integrated Action Plan (IAP) and aspirational districts, in which Scheduled Caste households constitute approximately 30 per cent of the population (Census of India, 2011). Within the district four subdivisions, one block is selected from each subdivision, and two Gram Panchayats with the highest number of PMAY-G beneficiaries are selected from each block, yielding a total of eight Gram Panchayats across four blocks: Atri, Barachatti, Manpur, and Tekari.

The sample size is determined using Cochran formula for sample size determination at a 95 per cent confidence level and 5 per cent margin of error, and is then adjusted for the finite population of the district (N = 4,359,700, Census of India, 2011), yielding a required sample of approximately 385 respondents; the study rounded this figure to 400 respondents to strengthen the robustness of the analysis. Block-wise sample allocation is proportionate to population share, and panchayat-wise samples are allocated in proportion to the number of PMAY-G beneficiaries in each panchayat (see appendix).

Primary data is collected through a structured interview schedule administered to 400 PMAY-G beneficiary households, covering household demographic and socio-economic characteristics; housing details, including type of house, size, land

ownership, and additional expenditure on construction; the extent of convergence with allied schemes (SBM-G, PMUY, MGNREGA, and rural electrification); household consumption expenditure across multiple categories before and after receipt of PMAY-G benefits; ownership of consumer durables; and subjective indicators such as satisfaction, safety, dignity, and social inclusion. A pilot test of the interview schedule is conducted in Shivnagar panchayat of Tekari block prior to the main survey, after which the schedule is refined.

Descriptive statistics, cross-tabulation, and measures of central tendency are used to characterise the sample and to describe pre and post intervention conditions. To formally test whether observed differences in household expenditure and income before and after receiving PMAY-G benefits are statistically significant, paired sample correlation and paired-sample t-tests are employed, corresponding to the study hypotheses regarding the scheme association with standard of living and with food, consumption, and cooking fuel expenditure.

4 Results and Discussion

4.1 Sample Profile

Of the 400 sample households, 258 (64.5 per cent) belonged to the Scheduled Caste category, 133 (33.25 per cent) to the Other Backward Class (OBC) category, and 9 (2.25 per cent) to the Economically Weaker Section (EWS) category, reflecting PMAY-G prioritisation of historically disadvantaged groups. The majority of household heads (56.5 per cent) reported a monthly income between Rs. 5,001 and Rs. 10,000, and educational attainment among household heads remained low, with roughly 40 per cent reporting less than one year of effective schooling. Occupationally, casual non-agricultural labour (37.5 per cent) and self-employment in agriculture (20.3 per cent) are the dominant sources of livelihood, underscoring the vulnerability of the beneficiary population to income volatility.

Table 1. Distribution of Sample Households by Block and Social Group

Block	SC	OBC	EWS	Total
Atri	32	19	1	52
Barachatti	55	33	0	88
Manpur	75	15	6	96
Tekari	96	66	2	164
Total	258	133	9	400

Source: Primary survey.

4.2 Housing Outcomes

The impact of PMAY-G on housing conditions is substantial. Prior to receiving assistance, approximately 90 per cent of beneficiary households resided in kutcha houses, with a small number reporting homelessness or residence with relatives. Following the intervention, the entire sample resided in some form of pukka housing: 213 households (53.25 per cent) occupied pukka houses with more than two rooms, 157 (39.25 per cent) occupied pukka houses with one or more rooms, 24 (6 per cent) occupied single room pukka houses, and only 6 households (1.5 per cent) remained in semi-pukka dwellings with tin or asbestos roofing. Around 61 per cent of houses measured between 271 and 600 square feet, and respondent satisfaction with house quality is generally favourable, with 83.1 per cent rating quality as "excellent" or "good."

Table 2. House Type of Beneficiaries after PMAY-G, by Social Group

House type	SC	OBC	EWS	Total
Pukka, more than 2 rooms	132	78	3	213
Pukka, 1 or more rooms	105	47	5	157
Pukka, one room	16	7	1	24
Semi-pukka (tin/asbestos roof)	5	1	0	6
Total	258	133	9	400

Source: Primary survey.

Despite these gains, important gaps in housing completeness remain. Only 33.5 per cent of households reported having a separate kitchen, with the majority continuing to cook in living spaces or in the open; only 40.5 per cent reported a separate toilet or bathroom within the house. Convergence with the Swachh Bharat Mission for toilet construction reached only 32 per cent of households, and among households with a toilet, 65.8 per cent reported the facility as non-functional, indicating continued reliance on open defecation. These findings suggest that while PMAY-G has been highly effective in delivering core structural housing, convergence with complementary sanitation infrastructure has lagged, a gap consistent with concerns raised in the wider literature regarding the completeness of housing delivered under large-scale schemes (Bharti, 2019; Gohil & Gandhi, 2019).

Beneficiaries also experienced substantial additional expenditure on house construction beyond the PMAY-G unit assistance of Rs.

1,20,000 to Rs. 1,30,000, with a mean additional expenditure of approximately Rs. 1,07,180. This additional financing is met principally through institutional loans (32.75 per cent) and household savings (31.25 per cent), with a smaller share drawn from informal moneylenders (16.75 per cent), friends and relatives (15.75 per cent), and asset sales (3.5 per cent). This finding corroborates the argument advanced by Shrivastava and Srivastava (2015) that affordability constraints continue to burden low-income beneficiaries of government housing schemes despite the availability of unit assistance.

4.3 Food Expenditure

Table 3. Mean Household Expenditure Before and After PMAY-G (Rs.)

Expenditure category	Before PMAY-G	After PMAY-G	% change
Food (monthly)	3,960.38	4,799.35	+21.2
Clothing (yearly)	3,065.50	3,706.50	+20.9
House construction/repair (yearly)	5,254.75	1,200.88	-77.2
Education (monthly)	820.50	1,114.25	+35.8
Health (monthly)	2,458.88	2,877.80	+17.0
LPG/cooking fuel (monthly)	1,126.50	1,253.84	+11.3 (n.s.)
Durable goods (annual)	3,117.25	3,604.75	+15.6

Source: Primary survey. n.s. = not statistically significant.

Household food expenditure rose noticeably following receipt of PMAY-G benefits, with mean monthly expenditure increasing from Rs. 3,960.38 to Rs. 4,799.35. A paired-samples correlation between pre and post intervention food expenditure is strongly positive ($r = 0.823$, $p < .01$), and a paired samples t-test confirmed that this increase is statistically significant ($t = 9.64$, $df = 399$, $p < .001$). This result provides direct evidence that housing security, once achieved, is associated with an improved capacity of rural households to allocate resources toward food consumption, consistent with the broader development literature characterisation of housing as a foundation for improvements in other dimensions of household welfare (Bharti, 2019; Kumar & Kumar, 2016).

4.4 Broader Consumption Expenditure

Beyond food, the study documented statistically significant increases across most categories of household consumption expenditure. Annual clothing expenditure rose from a mean of Rs. 3,065.50 to Rs. 3,706.50 ($t = 11.17$, $p < .001$); education expenditure rose from Rs. 820.50 to Rs. 1,114.25 ($t = 9.77$, $p < .001$); and health expenditure rose from Rs. 2,458.88 to Rs. 2,877.80 ($t = 4.61$, $p < .001$). Expenditure on house construction and repair fell significantly ($t = -12.14$, $p < .001$), reflecting a reduced need for the recurrent kutcha house maintenance that had previously consumed household resources. Expenditure on durable goods rose from Rs. 3,117.25 to Rs. 3,604.75, a difference significant only at the 10 per cent level ($t = 1.78$, $p = .076$). By contrast, expenditure on LPG and cooking fuel showed no statistically significant change ($t = 0.53$, $p = .597$), despite 59.8 per cent of households reporting an LPG connection availed under PMUY; wood remained the dominant cooking fuel for around 40 per cent of households throughout, suggesting that convergence with clean-cooking schemes has not yet translated into a decisive shift in fuel choice.

Table 4. Paired-Samples t-Test Results for Household Expenditure and Income

Pair	t-value	df	Sig. (2-tailed)
Food expenditure	9.64	399	0.000
Clothing expenditure	11.17	399	0.000
House construction/repair	-12.14	399	0.000
Education expenditure	9.77	399	0.000
Health expenditure	4.61	399	0.000
LPG/cooking fuel expenditure	0.53	399	0.597
Durable goods expenditure	1.78	399	0.076
Monthly household income	4.834	399	0.000

Source: Authors' calculation from primary data.

Household income also rose significantly, with mean monthly household income increasing by Rs. 1,919.23 following PMAY-G benefits ($t = 4.834$, $df = 399$, $p < .001$), corroborating evidence that housing security is associated with improved earning capacity, potentially through reduced expenditure on house repair, improved health, or greater engagement in construction-related livelihoods, as suggested by Nayak and Hazarika (2019) in the context of the urban PMAY.

4.5 Social and Subjective Outcomes

The overwhelming majority of beneficiaries reported that home ownership enhanced their sense of dignity and confidence (98.0 per cent), feelings of safety and security (97.3 per cent), and a sense of ownership (96.8 per cent). Female allottees accounted for 59.25 per cent of house registrations, indicating that the scheme design priority for women has been substantially realised in Gaya district, with likely positive implications for women social and economic standing, consistent with the emphasis on women empowerment noted by Gohil and Gandhi (2019). However, evidence of incomplete social inclusion persisted, with 9.8 per cent of households reporting non-participation in community festivals and 11 per cent reporting exclusion from invitations by other communities.

4.6 Governance and Implementation Challenges

Some implementation concerns emerged. While 44.3 per cent of respondents regarded the beneficiary selection process as "very transparent and fair," 13.3 per cent considered it "not transparent and fair," and 28 per cent reported perceived instances of favouritism or corruption. Among the 42.3 per cent of households who reported paying money to intermediaries, the mean amount paid is approximately Rs. 6,642, with a maximum of Rs. 60,000, nearly half the unit assistance amount. These findings align with concerns raised in the literature regarding leakages and intermediary rent seeking in large targeted welfare schemes (Rao, 2019) and point to an area requiring urgent policy attention if the scheme's economic development impact is to be maximised.

5 Conclusion and Policy Suggestions

The evidence from Gaya district demonstrates that PMAY-G has made a substantial and statistically verifiable contribution to rural economic development in Bihar. Nearly all sample beneficiaries transitioned from kutcha to pukka housing, and this transition is accompanied by significant increases in food expenditure, clothing expenditure, education expenditure, health expenditure, and household income, alongside strong positive subjective outcomes relating to dignity, safety, and ownership. These findings support the view, echoed throughout the reviewed literature, that housing security functions as a foundation from which broader gains in household welfare and consumption can follow (Bharti, 2019; Gohil & Gandhi, 2019; Kumar & Kumar, 2016).

At the same time, the study identifies persistent gaps that limit the scheme full developmental potential: incomplete convergence with sanitation and clean cooking-fuel schemes; continued additional financial burden on beneficiaries for house completion; corruption and intermediary rent seeking in a substantial minority of cases; and incomplete social inclusion for some beneficiary households. On this basis, the paper offers the following policy suggestions.

First, unit assistance should be periodically revised in line with the rising cost of construction materials and labour, since the current allocation (Rs. 1,20,000 to Rs. 1,30,000) requires substantial supplementary financing that pushes many households toward debt. Second, disbursement schedules should be made timelier and more predictable to prevent construction delays and cost overruns. Third, the role of intermediaries in beneficiary selection, geo-tagging, and instalment release should be reduced through greater use of technology enabled, direct to beneficiary processes, including a user-friendly mobile application for tracking application status. Fourth, convergence with the Swachh Bharat Mission and Pradhan Mantri Ujjwala Yojana requires strengthening at the last mile, with explicit incentives or follow-up support to ensure that sanctioned toilets remain functional and that LPG connections translate into sustained fuel use transitions. Fifth, quality control mechanisms, including regular inspection and third-party audit, should be institutionalised to address the minority of households reporting dissatisfaction with house quality. Finally, future research should adopt a longitudinal design to track beneficiaries over a longer time horizon, examine gender distinguished impacts in greater depth, and enable comparison of PMAY-G socio-economic impact across states and districts, thereby strengthening the evidence base available to policymakers engaged in rural housing and development planning in Bihar and beyond.

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Appendix

❖ Appendix A: Cochran formula for calculating Sample Size for Infinite Population:

$$S = \frac{Z^2 pq}{e^2} \quad \text{..... 1}$$

$$S = \frac{(1.96)^2(.5*.5)}{(0.05)^2} = 385$$

Here,

1. Z implies the abscissa of the normal curve that cuts off an area α at the tails (1 - α equals the desired confidence level, e.g., 95%, Z = 1.96).
2. e is the desired level of precision (e.g. 5%, 0.05).
3. p is the estimated proportion of an attribute that is present in the population, and q is 1-p (p = .5, q = 1-p = .5).
4. Sample size for unknown population is S.

Finite Population sample size (n) for Gaya district, which population (N) is 4359700 (census, 2011).

$$n = \frac{S}{1 + \frac{S-1)}{N}} \quad \text{..... 2}$$

$$n = \frac{385}{1 + \frac{(385-1)}{4359700}} = 384.966123 = 385$$ in round figure. So, we have taken 400 samples from Gaya district to finalise the study.

Where, n is the sample size and N is the population size.

Table A1. Selection of Panchayats and Sample size on the basis of highest number of beneficiaries of PMAY-G at Panchayat level							
District	Block	Panchayat	Number of Beneficiaries	% Share in respective blocks	Panchayat wise sample size	% in total sample	Sample Size (total)
Gaya	Manpur	Usri	957	53%	51	12.8%	96
		Kaiya	872	47%	45	11.3%	
	Atri	Tetua	827	55%	29	7.2%	52
		Dhusari	668	45%	23	5.7%	
	Barachatti	Bumer,	1631	52%	46	11.5%	88
		Kahudag	1469	48%	42	10.5%	
	Tekari	Khanetu,	667	53%	86	21.5%	164
		Shivnagar	573	47%	78	19.5%	
Total	4	8	7,654		400	100%	400

Source: Author's own