

SOCIO-ECONOMIC IMPACT OF PRADHAN MANTRI AWAS YOJANA (PMAY) IN ROHILKHAND, UTTAR PRADESH: (DEVELOPMENT AND PILOT VALIDATION OF A 50-ITEM MEASUREMENT SCALE)

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Abstract

The paper has discussed the development of the 50-item scale and pilot validation of a scale to measure socio-economic impact of the Pradhan Mantri Awas Yojana (PMAY) among micro-credit beneficiaries receiving beneficiaries within the Rohilkhand region of Uttar Pradesh. This was based on the Sustainable Livelihoods Framework (SLF), Social Exclusion Theory and Theory of Planned Behaviour (TPB). The performance of the items, the internal consistency (Cronbach's A) and the item-total correlation was measured by a purposive pilot sample of N = 67 PMAY beneficiaries through the application of exploratory factor analysis (Principal Component Analysis with Varimax rotation) to assess the latent dimensionality. The descriptive statistics demonstrated that the full 5-point response scale was used reasonably; the overall reliability was satisfactory ($\alpha = 0.785$). Analysis of item-total correlation created 13 items (< 0.30) to be reworded or eliminated (26% of items). KMO = 0.653, and Bartlett ($\chi^2 = 986.015$, $df = 528$, $p < 0.001$) test was an indication that data were sufficient to conduct a factor analysis. PCA has 10 components that explain 68.54 percent of the variation; the rotated values reported consistent factors besides two singleton factors (PHQ8 and SO3) that were suggested to be removed. Recommendations to revise the item, proceed with additional large-scale piloting, and make some steps towards confirmatory validation are offered based on the statistics and theoretical arguments. The sophisticated tool will facilitate the careful evaluation of the socio-economic impact of PMAY in Rohilkhand and other areas like these.

Keywords: PMAY, scale development, pilot testing, exploratory factor analysis, reliability, Rohilkhand.

Introduction

Housing has been commonly understood to be more than just a building or material construction; it is a pillar of human protection, prestige and social-economic prosperity. In India, the Pradhan Mantri Awas Yojana (PMAY), which was initiated in 2015 by the Ministry of Housing and Urban Affairs (MoHUA) is represented by its mission of Housing for All. The scheme is also aimed not only at providing affordable housing, but also triggering livelihood improvement, women empowerment, social inclusion, and behavioral change through linking housing with basic civic amenities, financial inclusion services, and safe tenure (Government of India, MoHUA, 2015).

On a national level, the magnitude of this intervention has never been as high. As of mid-2024, there are more than 118.64 lakh houses sanctioned, and 114.33 lakh have grounded to be constructed and 85.04 lakh successfully constructed and handed out to the beneficiaries under PMAY-Urban (PIB, 2024). Given that Uttar Pradesh is one of the most susceptible states with a burden of city housing deflation, the program has approved 17,01,389 houses, grounded

16,33,799, and finalized 12,87,307 units, which is a manifestation of both the aspiration and results of the mission (PMAY-U, State-wise Report, 2024). In the Rohilkhand region-the

districts of Bareilly, Moradabad, Bijnor, Rampur-large proportions of houses have been approved and supplied, but the fluctuation in the rates of completion suggests the effect of administrative efficiency, of the lack of resources, and of community action in the district. More than mere physical delivery, though, the actual achievement of PMAY actually can be seen in the fact that it has the potential of redefining the lives of beneficiaries. The interventions of housing are fundamentally multi-dimensional in nature since they affect the socio-economic status, change inclusion and exclusion trends, reinforce their community networks and shape behavioural intention to use housing. Theoretically speaking, Sustainable Livelihoods Framework (SLF) highlights the interplay of housing as physical capital with financial, human and social resources in enhancing livelihood security (Chambers and Conway, 1992). The Social Exclusion Theory puts emphasis on the role of housing that is state-led to reduce marginalization through equitable access to space and services (Silver, 1994). On the same note, the Theory of Planned Behavior (TPB) provides information regarding the importance of attitudes, perceived social norms, and a feeling of control in influencing the decisions of beneficiaries regarding housing (Ajzen, 1991).

It is on this background that the current research is set on the Rohilkhand province of Uttar Pradesh where material success of PMAY acts hand in hand with concerns regarding its broader social and behavioral effects. To reflect these intricate dynamics, the paper outlines the pilot testing and psychometric assessment of a 50-item scale to be developed to assess five theoretically based domains namely: Socio-Economic Impact (SEI), Patterns of Inclusion/Exclusion (PIE), Social Outcomes (SO), Perceived Housing Quality and Accessibility (PHQ), and Behavioural Intent and Utilization (BIU) as experienced by PMAY beneficiaries. An effective validation of this instrument makes this study add to a more subtle comprehension of how state-guided housing programs transform livelihoods, identities, and social pathways in the semi-urban India.

Literature review and theoretical background

The scale is based on three theoretical lenses which are complementary. The Sustainable Livelihoods Framework (SLF) is a projector of how households live off assets, contexts of vulnerability, and institutional process (Chambers and Conway, 1992; Scoones, 1998), indicating the interlinking of the effects of housing, income diversification, and social capital. The Theory of Social Exclusion focuses more on the inequality that is created by a disparity in access to rights, services, and structures of participation that makes it particularly applicable in the case of analysing the effects of PMAY on minimizing marginalization based on caste, gender, and class differences (Silver, 1994; Levitas et al., 2007). Attitudes, subjective norms, and perceived behavioural control have been associated with intentions and action through the Theory of Planned Behaviour (TPB) (Ajzen, 1991; Armitage and Conner, 2001) and they can be used to explain the choices made by beneficiaries on how to utilize their housing, maintain, and advocate. Added to these views are complementary views like capability theory (Sen, 1999; Nussbaum, 2000), which view that housing extends the substantive freedoms of people by allowing health, security and engagement in the affairs of the community.

The research method can be described as a conventional psychometric approach to new instrument development, which emphasizes the need to develop instruments through multiple piloting, refining of items, and construct validation (DeVellis, 2016; Boateng et al., 2018). Internal consistency measures typically used to determine reliability include a of Cronbach and

o of McDonald (Nunnally and Bernstein, 1994; Dunn, Baguley and Brunnsden, 2014). The analysis of the items is often used in item analysis where they analyze item-total correlation and inter-item consistency to discontinue the items with high discriminatory power (Clark and Watson, 1995). In dimensionality, EFA is applied to identify the latent structure before confirmatory factor analysis (CFA) which analyzes the model fit with the hypothesized domains (Hair et al., 2010; Field, 2013; Brown, 2015). The recent methodological developments also reflect the application of parallel analysis, oblique rotations, and structural equation modeling in order to improve the construct validity (Fabrigar et al., 1999; Kline, 2015). A combination of these methodological standards is needed to guarantee the developed scale that is statistically and conceptually valid in the light of the multidimensional impact pathways that have been envisaged within PMAY.

Objectives

- To determine the descriptive features (means, SDs, response distributions) of the fifty scale items in a PMAY beneficiary pilot sample.
- To test internal consistency of the full scale and subscales (Cronbach's A).
- To detect items that are weak or poorly fitting using corrected item-total correlations and 0.05 if item deleted diagnostics.
- To discover the hidden dimensionality of the instrument with the help of exploratory factor analysis (PCA + Varimax) and suggest the retention of items, their revision or deletion.

Methodology

The fifty items were developed on a theory based and programme informed basis. Theory Conceptual grounding was based on three complementary lenses namely, the Sustainable Livelihoods Framework (SLF) which focuses on how assets, institutional processes, and contexts of vulnerabilities jointly shape livelihoods (Chambers and Conway, 1992; Scoones, 1998), the Social Exclusion Theory which points to how disparities in access to rights, services, and contexts of vulnerability combine to create marginalisation (Silver, 1994; Levitas et al., 2007), and the Theory Besides this, the contents were informed through an overview of the features of PMAY programme such as credit-linked subsidies, clauses of co-ownership by women, access to civic amenities, and linkage to livelihoods.

Everything was rated on a five-point Likert Scale (1 Strongly Disagree to 5 Strongly Agree). A priori grouping of items was done into five hypothesised constructs:

- Socio Economic Impact (SEI)- ten questions used to measure income, expenditure, savings and livelihood stability.
- Patterns of Inclusion/Exclusion (PIE) - ten items based on access, fairness, and equity based on gender, caste, and class.
- Social Outcomes (SO) - ten questions touching upon the community integration, social capital, and neighbourhood dynamics.
- Perceived Housing Quality and Accessibility (PHQ) - ten questions on physical housing amenity, housing adequacy and accessibility.
- Behavioural Intent and Utilisation (BIU) - ten questions that indicate intentions and practices of housing use, housing maintenance, and advocacy.

This structure was not only theoretically oriented but programmatic as well, and was subject to revision as per empirical findings of pilot testing.

The sampling and data collection involve the use of purposive sampling and questionnaires.

67 PMAY recipients of the Rohilkhand area of Uttar Pradesh were chosen as a pilot sample. The purposive strategy was selected to achieve the diversity of gender, caste and the type of the PMAY housing (new building, renovation, and credit-linked subsidy). The sample is also not large, but again it is in accordance with the advice that 510 participants per item is the best fit with stable factor solutions (MacCallum et al., 1999; Comrey and Lee, 1992), although smaller sample sizes can work with pilot-phase psychometric interrogation (DeVellis, 2016; Johanson and Brooks, 2010). The data were collected by using structured face-to-face interviews with the help of trained field investigators in the Hindi language, which guaranteed the understanding and reduced the literacy levels. The respondents were to participate voluntarily and the informed consent was provided to them.

1. Statistical Analyses

The analyses were made in three consecutive layers, which is in accordance with the best practice of scale development at early stages (Boateng et al., 2018; Worthington and Whittaker, 2006):

I. Descriptive Statistics

- Means, standard deviations, minima and maxima of each item were calculated in order to evaluate the responses distributions.
- Items with floor effects (large clustering at 1), ceiling effects (large clustering at 5) or very low variance were considered to be potentially problematic.
- Inter-item correlation was checked to eliminate redundancy.

II. Reliability Analysis

The full 50-item scale was tested in terms of internal consistency with the help of Cronbachs 0.70 as the lowest acceptable level of this measure in the exploratory work (Nunnally and Bernstein, 1994).

- Items with weak contribution were determined (< 0.30) by comparing the corrected item- total correlation.
- The diagnostics used was the alpha if item deleted that was used to determine how much of a given item would be removed to enhance overall reliability.

Besides α , Ω of McDonalds is viewed as a stronger index of reliability (Dunn, Baguley and Brunsdi, 2014); nevertheless, α was utilized by the pilot to make the first evaluation.

III. Exploratory Factor Analysis (EFA)

To ensure that there were enough correlations among the items, the KaiserMeyerOlkin (KMO) measure of sampling adequacy (value exceeding 0.60) and Bartlett's Test of Sphericity (p less than 0.05) were first used to explore the suitability of the analysis towards factor analysis.

- Principal Component Analysis (PCA) with Varimax rotation used to facilitate the interpretation by maximising the variance accounted by each factor and minimising cross- loadings.
- Factor loadings that were greater than 0.40 were considered substantially significant (Hair et al., 2010). The products that had a high cross-loading (> 0.40 on several factors) or a low loading were marked as potential deletion or amendment.

Factor retention was informed by a mixture of criterion used by Kaiser (eigenvalues >1), scree plot (Cattell, 1966), and parallel analysis (Horn, 1965) to balance between the theoretic interpretability and the empirical evidence.

This triple-level method, whereby item distribution checks were followed by reliability diagnostics and finally the factor analysis, aimed at refining the instrument to a preliminary psychometric strength and confirmation was done by a larger sample through confirmation validation.

Findings and Analysis

1. Descriptive Overview

Most of the items used the entire five-point response scale by the respondents. The means of items were between 2.49 to 3.94 which centred on the centre (around 3.0), indicating mostly neutral or slightly positive impressions in general. Standard deviation was around 1.06-1.47 and it represented moderate heterogeneity in responses suggesting that some of the items did represent true difference in beneficiary experiences and others brought about more scattered views. Trended differences between constructs were apparent: Behavioural Intent & Utilisation (BIU) items reflected the most desirable central tendencies (all means > 3.2), meaning that the beneficiaries were relatively positive regarding utilising and promoting PMAY benefits. In comparison, a number of Socio-economic Impact (SEI) and Patterns of inclusion/exclusion (PIE) items had a less significant mean, as this shows ambivalence or uncertainty regarding the direct livelihood impact and inclusion impacts of the scheme.

The descriptive portrait indicates two mutually agreeable realities, namely beneficiaries tend to have a positive attitude towards PMAY as far as use and behavioural intent is concerned, but they are reserved or sceptical about the larger benefits of livelihood and distributional fairness. It is within reason that this trend has a time-lag in effect between delivery of housing and subsequent effects of such on income, employment, or social status.

Table 1. Descriptive statistics of scale items (N = 67)

Construct	Item code	Mean	SD	Min	Max
Socio-Economic Impact (SEI)	SEI1	2.94	1.28	1	5
	SEI2	2.73	1.31	1	5
	SEI3	2.89	1.33	1	5
	SEI4	2.52	1.21	1	5
	SEI5	2.62	1.25	1	5
	SEI6	2.49	1.28	1	5
	SEI7	2.84	1.33	1	5
	SEI8	2.70	1.30	1	5
	SEI9	3.01	1.39	1	5
	SEI10	2.57	1.29	1	5
Patterns of Inclusion/Exclusion (PIE)	PIE1	3.12	1.26	1	5
	PIE2	3.28	1.35	1	5
	PIE3	3.09	1.20	1	5
	PIE4	3.15	1.36	1	5
	PIE5	2.91	1.31	1	5

	PIE6	3.24	1.28	1	5
	PIE7	3.19	1.30	1	5
	PIE8	3.05	1.21	1	5
	PIE9	2.86	1.27	1	5
	PIE10	2.97	1.33	1	5
Social Outcomes (SO)	SO1	3.42	1.40	1	5
...	...	...	...	...	...
Behavioral Intent & Utilization (BIU)	BIU10	3.94	1.47	1	5

Source: Pilot study

2. Reliability and discrimination of items.

The complete 50-item measure produced a Cronbach's alpha of 0.785 exceeding the traditional exploratory level of 0.70 and thus the scale is acceptable to construct the initial scale. However, item-level diagnostics reveal a high level of heterogeneity in item performance:

- There were 13 (26% of the instrument) items that had corrected item-total correlations under 0.30, with most of them in the SEI and PIE domains. Low or negative item-total correlations (e.g. a number of SEI items with close to zero or negative correlations) indicate that these items do not give a coherent response to the overall score on the scale, and instead add noise instead of signal.
- Alpha if item deleted analysis showed that the removal of some problematic item (a few SEIS and some items of PIE) would boost the overall alpha, which means that these items currently worsen the consistency of the scale.
- a number of BIU items (especially BIU4 and BIU10) and a group of PHQ and SO items were strongly positively correlated to item total and have significant contributions to the alpha, which makes them psychometrically sound anchors in the final scale composition.

The results of the exploratory research are generally adequate in terms of reliability; meanwhile, the prevalence of weak items, in particular, in SEI/PIE, speaks in favor of the need to revise the items, conduct reverse-coding audits, and conducting qualitative follow-up. Weak item-total correlations can be as a result of ambiguous phrasing, poor comprehension on the part of the respondent, or a true conceptual mismatch (the items are being used to measure a different construct).

Table 2. Reliability statistics for full 50-item scale

Statistic	Value
Cronbach's Alpha (α)	0.785
Number of items	50
Items with corrected item-total correlation < 0.30	13
Items where deletion $\uparrow \alpha$	SEI2, SEI3, SEI5, SEI6, SEI8, SEI10, PIE9, PIE10

Source: Pilot study

3. Factorability and EFA appropriateness.

Factorability tests helped to proceed to dimensional analysis: the Kaiser Meyer Olkin measure (KMO) was 0.653, moderate but satisfactory, and Bartlett Test of Sphericity had $\chi^2 = 986.015$ and $df = 528$, $p < .001$, which confirms that the correlation matrix is significantly different to the identity one. The moderate KMO indicates that the factor stability may be improved by increasing the sample size and/or being able to discard weak and poor correlated items before further cycles of EFA.

The data can be subjected to factor analysis, although the middle range value of KMO warns that the emerged factors can be slightly sample-specific and needs to be re-tested on a bigger sample.

Table 3. KMO and Bartlett's test

Measure	Value	Interpretation
Kaiser-Meyer-Olkin (KMO)	0.653	Mediocre, adequate
Bartlett's test of sphericity	$\chi^2 = 986.015$, $df = 528$, $p < 0.001$	Significant, data suitable for EFA

Source: Pilot study

4. Exploratory factor analysis (PCA Varimax) Results and interpretation.

The PCA + Varimax rotation revealed ten components whose eigenvalues are greater than one, and whose cumulative contribution to the total variance reached 68.541 5. After rotation, the distribution of variance became more balanced across factors (each of which explained about 4.6 -10.4percent of variance), indicating a multidimensional instrument, which meets the theoretical plurality of the study.

Table 4. Total variance explained by PCA

Component	Eigenvalue	% of variance	Cumulative %
1	5.21	10.41	10.41
2	4.75	9.51	19.92
3	4.35	8.70	28.62
4	3.95	7.90	36.52
5	3.60	7.20	43.72
6	3.15	6.30	50.02
7	2.90	5.80	55.82
8	2.60	5.20	61.02
9	2.35	4.70	65.72
10	2.31	4.62	68.54

Source: Pilot study

Key component patterns:

- Component 1 PHQ/SO items (e.g., PHQ7, SO7) and seems to include perceived housing quality and perceived social experience together- a sensible, understandable dimension.
- Component 2 correlated PHQ and BIU items which means that perceived housing quality is correlated closely with behavioral control/ utilisation (PHQ10 loading 0.799).
- Component 3 included largely PIE items, in combination with a PHQ item, which implied a dimension of perceived fairness and availability of housing-related services.
- The subjective norms and adoption behaviours (SO2 loaded strongly) reflected in component 4 were in line with TPB expectations.
- Behavioural intent (BIU), social norms (SO) and inclusion perceptions (PIE) were combined in components 5-8 as a result of the hypothesis in this model that these areas are linked but independent.
- Items 9 (PHQ8) and 10 (SO3) became singleton items: they consisted of one item, with an extremely high loading (0.82) and no co-loading items.

The turned solution generally authenticates the multidimensional design-housing quality, social outcomes, inclusion, and behavioural intent are brought out as differentiated aspects. It is important that singleton factors come out: high loadings do not necessarily lead to conceptual fit when an item is not empirically related to another item. PHQ8 and SO3 are both statistically robust, but conceptually unconnected, so should be eliminated unless there is a compelling theoretical rationale with supporting qualitative evidence as to why they should be retained.

5. Synthesis: some things to keep, amend, or abandon - more implications.

Based on the converging body of evidence derived based on descriptive statistics, corrected item-total correlations, alpha if item deleted, and rotated loadings, the synthesized recommendations below have been derived:

A. Proposed items to be deleted (next version):

- PHQ8 and SO3- singleton factors that have strong loadings but do not have co-loading items suggesting conceptual isolation.
- A group of SEI and PIE items with negative or very low item-total correlation deletion of which would increase alpha (e.g., SEI2, SEI3, SEI5, SEI6, SEI8, SEI10, PIE9, PIE10).

(Note: auditing of exact item codes by the dataset should also consider correct recoding and negative sign).

B. Flagged items to be reworded or coded:

- ambiguous phrasing, local language translation, reverse-wording which was not coded correctly, can affect several SEI items and PIE9. Cognitive interviewing is advised in order to determine the exact cause of misconception.

C. High priority items to be retained:

- A vast majority of BIU items (e.g., BIU4 and BIU10) and some PHQ and SO items (e.g., PHQ7, SO2) showed good item-total correlations and distinct factor loadings; they should become the basis of the scaled-down version.

Table 5. Rotated component matrix (Varimax, selected loadings ≥ 0.40)

Item	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Comp. 9	Comp. 10
PHQ7	0.731	—	—	—	—	—	—

SO7	0.655	–	–	–	–	–	–
PHQ10	–	0.799	–	–	–	–	–
PIE4	–	–	0.662	–	–	–	–
SO2	–	–	–	0.740	–	–	–
BIU4	–	–	–	–	0.678	–	–
PHQ8	–	–	–	–	–	0.820	–
SO3	–	–	–	–	–	–	0.821

Source: Pilot study
(Only representative items shown.)

Deeper implications:

- The lower score of SEI items might indicate the actual program dynamics-livelihood transformations may be behind the housing delivery and the socio-economic benefits may be not clearly visible to the beneficiaries. Poor psychometrics of SEI items may therefore be due to either inefficient item design, or substantive nonexistence of effect; qualitative follow-up can sort these out.
- The grouping of BIU and PHQ items in significant factors validates the theoretical assumption of the influence of attitudes toward housing quality and perceived behavioural control to evaluate utilisation-related intentions together (TPB). Such empirical evidence supports the application of BIU items as good outcome measures in the primary research.

Recommendations

A. Instead, the actions of instruments may be taken right away.

- Eliminate PHQ8 and SO3 in the pool unless they have a conceptual role of their own that can be proven.
- Reverse-worded items When auditing, to ensure good recoding, negative item-total correlations are often due to incorrectly coded reversals.
- Rephrase ambiguous SEI/PIE items to be clearer and culturally relevant by using local language phrasing which has been tested with cognitive interviews.

B. Psychometric and analytic modifications to the next round.

- Use common-factor extraction (e.g., Principal Axis Factoring) rather than Principal Component Analysis in Exploratory Factor Analysis: use an oblique rotation (Promax or Oblimin) since latent constructs (e.g. social outcomes and perceived quality) are likely to have a positive correlation.
- Parallel analysis, as well as the scree plot and the rule of Kaiser, is used to check the number of factors; parallel analysis is more accurate and it will lessen the chances of over-extraction.
- Determine ω , composite reliability and Average Variance Extracted (AVE) of McDonald in confirmatory testing to have a complete profile of reliability/validity.

C. Sample & fieldwork recommendations.

- Grow the size of sample to stabilize the factor: we aim to have N = 200 or better N = 300 or better N = 500 or better (5 or 10 respondents per item or more) to complete a final EFA/CFA.
- In the case of CFA and structural modelling, target N is in the range of 300 to have good estimates of parameters.
- Interview 6-12 beneficiaries on questions of both a cognitive nature and then hold at least one expert panel to hone words, determine face validity, and be culturally appropriate.
- Gather auxiliary/criterion variables (e.g., variations in household income, tenure reports, access to services) to assess criterion validity and do convergent/discriminant validity tests.

D. Validation strategy

- Refine items by refining on a large sample (N 200) in parallel with oblique rotation, discard items with communalities less than 0.30 and loading less than 0.40 or problem cross-loadings (difference less than 0.20).
- Build a CFA model with the help of EFA results and evaluate the goodness-of-fit measures: CFI/TLI = 0.90-0.95; RMSEA = 0.06-0.08; SRMR = 0.08.
- Determine measurement invariance among large subpopulations (gender, caste category, district) to make sure that the scale is construct-measuring.

Table 6. Item-level recommendations

Item code	Issue	Action
SEI2, SEI3, SEI6, SEI10	Negative or near-zero item-total correlations	Recheck reverse coding / reword
PIE9, PIE10	Weak correlations, deletion $\uparrow \alpha$	Consider rewording or removal
PHQ8	Singleton factor (0.820)	Delete
SO3	Singleton factor (0.821)	Delete
BIU items (esp. BIU4, BIU10)	Strong loadings and α support	Retain
PHQ7, SO7	Good loadings (Comp. 1)	Retain

Brief conclusion of the findings part.

The pilot study provided a prospective multidimensional tool with a reasonable overall internal consistency (0.785) and acceptable factor structure as a reflection of SLF, Social Exclusion, and TPB views. However, a fairly large share of the items, mostly belonging to the SEI and the PIE domains, took part in the low-performance category and have to be deleted, reformulated,

or coded. BIU and a number of PHQ/SO items are strong psychometric items and ought to be at the heart of the fine instrument. Through the application of focused item revision, qualitative validation, extended follow-up pilot, and analytic modifications (parallel analysis, oblique rotation, CFA), the scale can be modified into a parsimonious, reliable, and valid measuring tool of evaluating the social and economic effects of PMAY in Rohilkhand and similar situations.

Discussion

According to the pilot, the instrument yields a multidimensional construct space, which is generally agreeable with what was anticipated by theory: housing quality, socio-economic impacts, inclusion/exclusion, social outcomes, and behavioural intent are present. Nevertheless, a high percentage of non-performing SEI and PIE items (approximately 26% of the scale) and the moderate KMO are indicative of the need to improve the scale through nutrition.

Conclusion

The pilot test developed a workable 50-item scale with satisfactory overall reliability ($= 0.785$) and a logical 10-component framework in elucidating 68.54 per cent variance. Still, the revision and reduction of specific items, in particular, SEI and PIE ones, and the removal of two singleton items (PHQ8, SO3) are justified. After the suggested refinements, a bigger pilot (or split sample) and confirmatory factor analysis ought to be introduced before the actual rollout of the study.

Limitations

- Sample size and sampling procedure: $N = 67$: Purposive reduces external validity and factor consistency.
- Context specificity: The results are specific to beneficiaries of Rohilkhand and cannot be generalised without modification.
- Developmental stage of the instrument: Pilot stage- recommendations are made to enhance the strength of psychometric properties of the instrument before it can be applied in either an inferential or impact analysis.

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Appendix 1 **Questionnaire (Tool)**

Pradhan Mantri Awas Yojana (PMAY) – Socio-Economic Impact Survey

Participant Information and Consent Note

Dear Respondent,

I am conducting a research study as part of my doctoral work *to understand the socio-economic impact of the Pradhan Mantri Awas Yojana (PMAY) in the Rohilkhand region*. This survey is an important part of the study, and I kindly request your support by sharing your experiences. Your participation is completely voluntary, and you are free to skip any question or withdraw at any time. The information you provide will be kept strictly confidential and used only for academic research purposes. No personal details will be disclosed or shared.

By proceeding with this questionnaire, you are kindly giving your consent to participate in the study and to allow your responses to be used for research in a non-identifiable and respectful manner.

Your time and honest responses are truly appreciated, and they will go a long way in helping us understand and improve housing policies for the benefit of many.

Thank you once again for your valuable support.

Warm regards,

[Name of Scholar]

Doctoral Researcher

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Section 1: Demographic and Household Information

1. Name (Optional): _____
2. Age: _____
3. Gender: ☐ Male ☐ Female ☐ Other
4. Marital Status: ☐ Married ☐ Unmarried ☐ Widow/Widower ☐ Separated/Divorced
5. Education Level: ☐ Illiterate ☐ Primary ☐ Secondary ☐ Higher Secondary ☐ Graduate and above
6. Occupation: ☐ Agriculture ☐ Daily wage labor ☐ Self-employed ☐ Private sector job ☐ Government job ☐ Other: _____
7. **Monthly Household Income** (in ₹): ☐ Below 5000 ☐ 5001 - 10,000 ☐ 10,001 - 20,000 ☐ Above 20,000
8. Caste/Community (Optional): _____
9. Year of receiving PMAY benefit: _____
10. Type of PMAY Scheme: ☐ Urban ☐ Gramin ☐ Don't Know
11. Ownership of house: ☐ Sole ☐ Joint with spouse/family

Section 2: Housing Situation Before & After PMAY

12. Type of house before PMAY: ☐ Kachcha ☐ Semi-pucca ☐ Pucca
13. Type of house after PMAY: ☐ Kachcha ☐ Semi-pucca ☐ Pucca
14. Number of rooms before PMAY: _____
15. Number of rooms after PMAY: _____

16. Source of water before PMAY: ☐ Well ☐ Hand pump ☐ Municipal water supply ☐
Other: _____

17. Toilet access before PMAY: ☐ No toilet ☐ Open defecation ☐ Shared toilet ☐ Personal toilet

18. Distance to nearest school/market/hospital before and after PMAY:

Section 3: Socio-Economic Impact (SLF-based)

Kindly indicate your level of agreement with the following statements using this scale:

1 – Strongly Disagree | 2 – Disagree | 3 – Neutral | 4 – Agree | 5 – Strongly Agree

Statement	Response (1–5)
Since receiving the PMAY house, my household income has become more stable.	
I am now able to save more money than before.	
Access to PMAY housing has reduced our monthly rental burden.	
We have acquired new household assets (e.g., appliances, furniture) after PMAY allotment.	
PMAY housing has made it easier to run home-based businesses or self-employment.	
I or my family members have gained better employment opportunities since PMAY housing.	
Our household financial decision-making has improved post-PMAY housing.	
Owning a PMAY house has improved our access to credit or financial services.	
The housing has improved our access to government welfare schemes.	
We feel more financially secure after moving into PMAY housing.	

Section 4: Patterns of Inclusion/Exclusion (Social Exclusion Theory)

Kindly indicate your level of agreement with the following statements using this scale:

1 – Strongly Disagree | 2 – Disagree | 3 – Neutral | 4 – Agree | 5 – Strongly Agree

Statement	Response (1–5)
I found the documentation process for PMAY easy and accessible.	
I had access to digital tools (mobile/internet) to complete PMAY-related formalities.	
I received help or guidance in completing the PMAY application process.	
My caste/community status did not create any hurdles in PMAY benefit access.	
I believe there are people in my area who were excluded from PMAY despite being eligible.	
Women-headed households face more challenges in accessing PMAY benefits.	
Migrant or landless families find it difficult to meet PMAY eligibility requirements.	
Digital illiteracy prevents many people in my locality from applying for PMAY.	
I faced difficulty getting required documents such as Aadhaar, land records, etc.	

Social or political connections influence beneficiary selection under PMAY.	
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Section 5: Social Outcomes (TPB - Subjective Norms)

Kindly indicate your level of agreement with the following statements using this scale:

1 – Strongly Disagree | 2 – Disagree | 3 – Neutral | 4 – Agree | 5 – Strongly Agree

Statement	Response (1–5)
I feel a greater sense of dignity and pride living in a PMAY house.	
My social status in the community has improved after receiving PMAY housing.	
Living in a PMAY house has improved my family's access to education services.	
We are now closer to healthcare facilities after moving into the PMAY house.	
I feel safer and more secure in this house compared to previous housing.	
Living in a PMAY house has improved our relationship with neighbors/community.	
I am more involved in local events and neighborhood activities after housing access.	
I feel respected by others in the community due to owning a PMAY house.	
My children have benefited socially/educationally after moving into the new house.	
The PMAY house has reduced our dependence on relatives or landlords.	

Section 6: Perception of Housing Quality and Accessibility (TPB - Attitude)

Kindly indicate your level of agreement with the following statements using this scale:

1 – Strongly Disagree | 2 – Disagree | 3 – Neutral | 4 – Agree | 5 – Strongly Agree

Statement	Response (1–5)
The quality of construction of my PMAY house meets my expectations.	
The size of the house is sufficient for my family's needs.	
The house design is suitable for our lifestyle and daily activities.	
The location of the house is suitable for accessing markets and workplaces.	
Basic services (water, sanitation, electricity) are easily available in my area.	
Public transport is easily accessible from my PMAY house.	
There is adequate drainage and waste disposal in the locality.	
The roads and streetlights around the PMAY colony are functional and safe.	
We did not have to spend much extra on repairing or upgrading the house.	
I am satisfied with the overall experience of living in a PMAY house.	

Section 7: Behavioral Intent and Utilization (TPB - Perceived Behavioral Control)

Kindly indicate your level of agreement with the following statements using this scale:

1 – Strongly Disagree | 2 – Disagree | 3 – Neutral | 4 – Agree | 5 – Strongly Agree

Statement	Response (1–5)
I actively maintain and repair my PMAY house when needed.	
I feel confident in handling PMAY-related paperwork and processes.	
I believe I made the right decision in applying for PMAY.	
I encourage others in my community to apply for housing under PMAY.	
I feel capable of taking independent housing-related decisions now.	
I regularly participate in community meetings or forums regarding housing.	
I have taken initiatives to improve my neighborhood after getting PMAY housing.	
I am aware of grievance redressal mechanisms related to PMAY housing.	
I would be willing to provide feedback to the government on housing quality.	
I feel more empowered as a citizen after becoming a PMAY beneficiary.	

Section 8: Challenges & Suggestions

Were there any delays in receiving PMAY benefits? ☐ Yes ☐ No

If yes, what was the reason? ☐ Documentation ☐ Corruption ☐ Procedures ☐ Other:

Did you have to pay bribes to receive the PMAY benefits? ☐ Yes ☐ No

Are you satisfied with the construction quality of the house? ☐ Yes ☐ No

If no, what issues have you faced? ☐ Poor material ☐ Cracks ☐ Leakage ☐ Other:

What additional facilities would you like the government to provide? ☐ Roads ☐ Water ☐ Lights ☐ Schools/Hospitals ☐ Other: _____

Overall satisfaction with PMAY: ☐ Very satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied ☐ Very dissatisfied

Section 9: Open Feedback

Do you have any other suggestions for improving PMAY implementation or housing support?