Analysis of the construction industry perspective on policies, guidelines, and practices to promote affordable housing projects in Tamil Nadu, India

C.S. Narayanan, M.S. Haji Sheik Mohammed*, L. Noorullah

B.S. Abdur Rahman Crescent Institute of Science and Technology, Chennai, India

Corresponding Author Email: hajisheik@crescent.education

Abstract:

This study focuses on the analysis of the construction industry perspective on policies, guidelines, and practices to promote affordable housing projects in the northern coastal region of Tamil Nadu, India. The closed-end questionnaire survey was conducted on the supply side with questions emphasizing government policies, regulatory authority guidelines, and constraints, and the response was obtained on a Likert scale of range 1-5. The variables involved in the study are (i) category of industry respondents, (ii) experience of respondents, and (iii) size of the company. The Statistical Package for Social Sciences (SPSS) 25 was adopted for analysis. The data generated viz. frequency and percentage of respondents in variables, and response to questions in Likert scale ratings and descriptive Univariate analysis were validated through Chi-square test. The ranking of questions/parameters was identified from the obtained mean value to average mean, and accordingly prioritised. It can be concluded that the cluster housing development is a feasible option to promote affordable housing projects in the northern coastal region of Tamil Nadu, considering the high land cost. Providing a single window system for faster approval of housing schemes, and building approvals, adoption of advanced construction technologies/techniques, enhancing the government incentives, conduct of skill development programmes are identified as prime parameters to promote affordable housing projects. The order of preference of implementation concerning policies/guidelines/practices based on questions are Q11 > Q10 > Q7 > Q12 > Q1 > Q8 > Q15 > Q13 > Q4 > Q6 > Q14 > Q3 > Q5 > Q2 > Q9.

Keywords: Affordable housing; housing policies, regulatory guidelines, questionnaire survey; construction industry fraternity; SPSS analysis.

1 Introduction

Housing is an essential human requirement. While economically weaker people in developing countries can afford to spend on low-investment basic needs like food, water, and clothing, it is difficult for them to own a house that requires a higher investment (Kumar, 2015; Patel *et al.,* 2020). Housing has a direct influence on health problems. Overcrowding in dwelling units will also contribute to disease spread. During the recent pandemic, those who had separate restrooms in their housing were able to be self-protected and less susceptible to disease than those who used shared facilities. Thus, it is essential to provide affordable housing with quality basic amenities to people from all economic backgrounds (Mabin, 2020; Firdaus and Ahmad, 2013).

In the present context of India, the surging rise in population and the rapid increase in migration of people from rural to urban areas pose significant housing challenges (Govindarajulu, 2020). The expensive cost of land in urban areas drives up the price of housing. Cost, user preferences, structural characteristics, maintenance and repair, smart technologies, sustainability, built environmental characteristics, time for construction, and operations are all important factors to be considered while proposing affordable housing projects (Warrier *et al*., 2019). Government supply of affordable housing at a lower price than the market price makes the project less attractive for the private developers; however, if the government could join hands to provide better infrastructure facilities such as transportation, then the involvement of private developers would increase (Soederberg, 2017). It was reported that the time and money spent on the Government approval procedure make private-sector houses costly (Ram and Needham, 2016; Alteneiji *et al*., 2020). The lack of financial support available for economically weaker sections to purchase housing also exacerbates the situation (Manoj, 2015).

Housing affordability varies from one person to another depending on their income. According to the Ministry of Housing and Urban Affairs (MOHUA), there are four different categories of housing based on income level in India, namely - Economically Weaker Section (EWS), Low Income Group (LIG), Middle Income Group (MIG) and High Income Group (HIG) types of housing. Among these four, people from the EWS and LIG have more difficulty in owning a house than others. Indira Awas Yojana (IAY), EWS Housing Scheme, National Slum Development Programme, The National Housing and Habitat Policy, Rajiv Awas Yojna, Valmiki Ambedkar Awas Yojana (VAMBAY), Jawaharlal Nehru National Urban Renewal Mission

(JNNURM), and Pradhan Mantri Awas Yojana (PMAY) are some of the housing schemes implemented by the government of India over past years has aimed to provide affordable housing for the common man (Warrier *et al*., 2019). PMAY is currently open to urban residents in the EWS, LIG, and MIG categories (Mary, 2020). The State governments in India have separate departments to provide affordable housing to all economic segments through several initiatives.

According to guidelines of Indian Standards (IS 8888), it was suggested that altering the dimension or reducing the dwelling size could be a better alternative than compromising the quality of services provided in a building. The main issues quoted in affordable housing were using low-quality materials / technologies by the developers and poor workmanship, which may lead to early repair of the structure, reduced durability of the structure, and increased life cycle cost (Abdul-Rahman *et al*., 2014). Three crucial factors that contribute to the success of affordable housing projects are affordability, availability, and accessibility (Jana *et al*., 2016). Thus, affordability of dwelling units, availability of housing and financial support, and accessibility to educational institutions or workplaces lead to the success of affordable housing projects.

Cluster housing is a type of development in which the dwellings are grouped in relatively close clusters, with the broad open areas in the complex serving as a buffer zone between the development and other land uses. The broad open areas often known as natural reserves, can be used in suburban or even metropolitan areas for environmental recreation purposes. Figure 1 shows the type of clusters specified in the National Building Code of India (NBC, 2016).
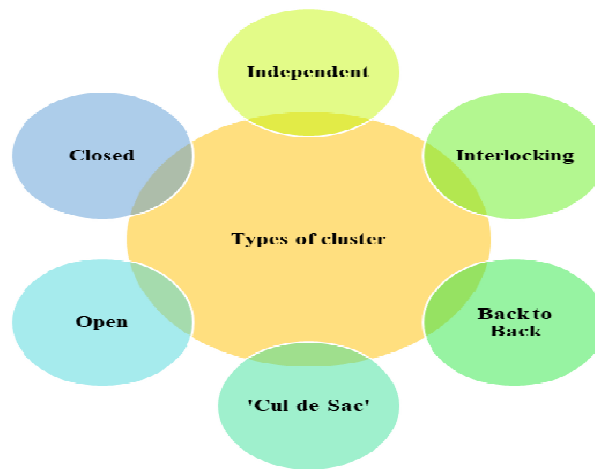

Fig. 1. Type of clusters specified in the NBC 2016

Cluster housing satisfies the three pillars of sustainability, viz. economic, environmental, and social. The construction cost of individual dwelling units will be low, which satisfies the economic aspect. The public open space in cluster housing for recreation purposes would satisfy the environmental aspect (Gujar *et al.*, 2022; Asabere, 2014). People interact more in cluster living than individual dwellings, satisfying the social aspect. Cluster housing has many advantages compared to other types of development. An exclusive setback space is not required for cluster housing, as the pathways around the cluster act as setback space (IS 13727). A higher density of dwellings can be achieved through cluster housing, according to NBC (NBC, 2016). Cluster type of development in large areas shall be the better form of development in the urban area because high density is achievable even with small dwellings size. Thus, the creation of accommodation at affordable prices is a workable reality by opting for cluster housing.

In the global scenario, in Asian countries, the shortage in housing was handled by the implementation of national government policies supporting the private sector to provide low-income housing (Rizvi, 2010; Yap, 2016) to the needy. In South Korea, two local governments modified the public housing policy so that the preferred beneficiaries were only young people. This approach resolved the housing shortage to some extent in these states but not the entire country (Seo and Joo, 2018).

In European countries, the housing types available for people are based on price, viz social housing, affordable housing and housing at the market price, as shown in Figure 2. Eligibility criteria for social housing and affordable housing vary from country to country. Social housing will be cheaper, and housing at market price will be higher than the other two (Austin *et al.,* 2014; Czischke and van Bortel, 2018; Hansson, 2019).
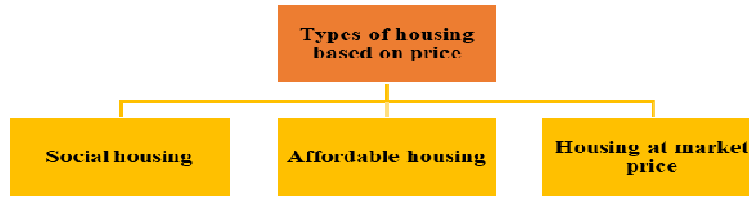
Fig. 2. Types of housing in European countries

In Malaysia, the Government implemented various policies and adopted a Public Private Partnerships (PPP) approach to develop affordable housing. One such effective initiative by the Malaysian government was to earmark the percentage of built area for low-cost housing and control the price of every housing project (Abdul-Aziz and Kassim, 2011; Shuid, 2016). People living in the heart of the city enjoy more infrastructure facilities when compared to those living in suburban areas. High land prices in urban lead to the peripheralisation of affordable housing projects both in the past and present. Due to this, the connection to the centre of the city for education and jobs is difficult for people. The connecting problem also arises due to the lack of proper road and transportation facilities (Jana *et al*., 2016; *Coelho et al.,* 2022).

Social mix is a developing concept in affordable housing due to its benefits. The social mix creates interaction among different sections of society (Ryan and Enderle, 2012). Countries like France, Italy, and the Netherlands made policies to implement a social mix in housing projects (Blanc, 2010; Costarelli *et al*., 2019). Social mix may affect the residents' satisfaction level (Tighe, 2010; Kaur and Gupta, 2019; Riazi and Emami, 2018). As residential satisfaction is an essential factor in the success of housing projects (Olanrewaju and Wong, 2020), proper planning and implementing policy according to requirements shall resolve the housing shortage (Koetter *et al*., 2021; Alves, 2022; Mulliner and Maliene, 2013; Wetzstein, 2022), while introducing new concepts like social mix.

In recent times, there has been enormous growth in the metropolitan cities of India in every dimension due to the rapid technological advancement in the global arena. Chennai, the capital of Tamil Nadu, is emerging as the capital of India for medical tourism, automotive, education, engineering, etc., besides its rapid growth in the information technology (IT) sector. This leads to rapid migration of the rural population from other parts of Tamil Nadu and other states, and of late, Chennai is bursting at the steams. Because of this, in the neighbouring areas around Chennai, in particular along the northern coastal region, the urbanisation is happening at a faster rate. This necessitates huge numbers of affordable housing projects, considering the high land cost in these areas. The cluster concept is a viable solution for providing affordable housing to needy people of different categories viz LIG, MIG, and HIG. The private players/developers' role in promoting affordable housing projects is very important for successful implementation. Hence, there is a need to understand the affordable housing policies, regulatory guidelines, and other related constraints to suggest a feasible, affordable housing model. The objective of this study is to (i) conduct a questionnaire survey, (ii) analyse the feedback from the construction industries perspective using SPSS software, and (iii) suggest recommendations for enhancing private firm participation in affordable housing development.

2 Methodology

The various phases involved in the study are:
- ❖ To conduct a questionnaire survey from the construction fraternity.
- ❖ To analyse the responses obtained from the questionnaire in SPSS software.
- ❖ To identify critical parameters on existing policies, guidelines and practices.
- ❖ To offer recommendations for promoting affordable housing projects more largely.

2.1 Questionnaire Survey

The questionnaire with 15 questions emphasising on policies, guidelines, and existing practices on affordable housing was framed after analysing a review of literature for the past 10-15 years, a study of existing government policies & guidelines, and consultation with construction professionals. The questionnaire is emphasising on the following parameters/constraints:

- Need for well-Defined definition for affordable housing
- Adjusted monthly income data to define beneficiaries

- Effective tax benefits to all stakeholders
- Subsidised loans and profit margin regulation for developers
- No dedicated single window approval for affordable housing
- Lack of cumulative incentives for state and central housing policies
- Inaccessibility to microfinance form banking sector
- No relaxation or subsidy for the registration charges and stamp duty for affordable housing.
- Inability to adopt new cost-effective technology by the demand side
- Land titling and land acquisition
- Lack of awareness among the intended stakeholders
- Construction costs and lack of skilled force

The type of questionnaire is closed-ended. The questions were prepared in understandable, simple language so as to obtain responses from the construction industry perspective from the supply side (i.e., engineers, builders, project managers, and consultants) easily. The study area of the survey is in and around Chennai, Tamil Nadu. Likert scale rating 1-5 was adopted to obtain responses (Table 1).

Table 1 Likert scale rating and nomenclature

Likert scale rating				
1	2	3	4	5
Strongly Disagree (SD)	Disagree (D)	Agree (A)	Slightly Agree (SLA)	Strongly Agree (SA)

The variables involved in the study are (i) category of respondents, (ii) experience of respondents, and (iii) size of the company, and are detailed in Table 2. It can be noticed that the maximum responses are received from site engineers (40%), followed by builders (28.7%), project consultants (22.7%), and project engineers (8.7%). In the experience front, maximum respondents possess 10-20 years of experience (42.7%) appreciable response (23.3%) in the 20-30 years category, and minimal response (8.7%) in the year 30-40 years category. There is a good percentage of participation of young professionals in the survey of 25.3%. Considering the size of the company, 44% response from small companies, 41% response from medium companies, and 15% from large construction firms.

Table 2 Details of designation of the respondents, experience of the respondents & size of the company

Designation	Frequency	Percentage
Project Engineers	13	8.7
Site Engineers	60	40.0
Project Consultants	34	22.7
Builders	43	28.7

Experience	Frequency	Percentage
0-10	38	25.3
10-20	64	42.7
20-30	35	23.3
30-40	13	8.7

Size of company	Frequency	Percentage
Small (Less than 10 employees)	66	44
Medium (10 to 20 employees)	61	41
Large (More than 20 employees)	23	15

2.2 Analysis using SPSS

The response of questionnaire survey was analysed using Statistical Package for Social Sciences (SPSS) 25. The various statistical data obtained which are useful for the interpretation of obtained responses were:

  i.   The frequency of response and percentage of response in each category of questions in the Likert Scale range 1-5.
 ii.   The descriptive analysis data viz, range, minimum, maximum, sum, mean, standard deviation, and variance of each question.
iii.   The data related to variation between observed and expected values in considered variables and posed questions (in Likert Scale).

iv.   The Chi-square statistical data viz. Chi-square value, degrees of freedom (df), and asymptotic significance.

3 Results and Discussion

Table 3 gives the details of responses from respondents on a Likert scale (1-5) in all the questions given in the questionnaire. The parameters viz. frequency, percentage, valid percentage, and cumulative percentage are given for each response under the Likert scale for every question. The questions viz. Q1, Q7, Q14, and Q15 are emphasising on Government policies; questions viz. Q2, Q3, Q4, Q9, Q11, and Q13 deal with regulatory authority guidelines. The general constraints concerning construction technology, financing, construction cost, etc., were addressed through questions Q5, Q6, Q8, Q10, and Q12.

Considering 'slightly agree' to 'strongly agree' as a positive response posed by the respondents for the active/passive nature of questions, question number Q11, which deals with the lack of a single window system for affordable housing projects, was identified as significant concern. Around 83% of respondents agreed that there is a lot of scope for improving government incentives [Q7] for achieving success in affordable housing projects. The necessity to maintain a uniform structure of the framework (65%), and fixing tenure for policy framework (73%) was emphasized by many respondents.

The regulatory guidelines aspect, viz. income data to identify beneficiaries (69%), was supported by respondents. Whereas benefits in professional Tax (74%), provision of subsidised loans (70%), regulations for planned growth (72%), and consideration in registration charges (66%) were emphasized for enhancing patronage towards affordable housing projects. Figure 3 shows the comparison of responses in the Likert Scale for various questions. It indicates 65% to 85% of positive responses for all the questions irrespective of category and nature.

3.1 Descriptive analysis

A descriptive statistic is a summary of statistics that quantitatively describes or summarises features of a collection of information. In this study, Univariate analysis was used, which involves describing the distribution of a single variable, including its central tendency (including the mean, median, and mode), and dispersion (including the range and quartiles of the data-set and measures of spread such as the variance and standard deviation).

Table 4 gives the parameters obtained from the descriptive statistics viz. range, minimum, maximum, sum, mean, standard deviation, and variance for variables used in the study, and responses to questions in the Likert scale. It can be observed that the mean value for variables ranges from 1.71 to 2.17, and for questions, it varies from 2.96 to 3.38. The average mean of 3 variables and 15 questions is 3.01. The questions with a mean value less than 3.01 are with less priority, and more than 3.01 are with higher priority for consideration. It can be noticed that the factors viz. available average income to identify (Q2) genuine beneficiaries, unregulated profit margin of developers (Q5), and need of microfinance for the success of affordable housing projects (Q9) are under less priority for implementation. Whereas factors emphasized through questions Q1, Q3, Q4, Q6, Q7, Q8, Q10, Q11, Q12, Q13, Q14, Q15 are under heigh priority.

Table 3 Details of responses in Likert scale in questions

Nomenc lature	Questions	Likert scale responses	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Q1	The definition in the current policy framework is sufficient to determine the housing affordability at different levels of the economy in a society.	SD	0	0	0	0
		D	33	22.0	22.0	22.0
		A	54	36.0	36.0	58.0
		SLA	51	34.0	34.0	92.0
		SA	12	8.0	8.0	100.0
Q2	The available average monthly income data and its collection procedure is sufficient to determine the genuine beneficiaries.	SD	2	1.3	1.3	1.3
		D	43	28.7	28.7	30.0
		A	71	47.3	47.3	77.3
		SLA	27	18.0	18.0	95.3
		SA	7	4.7	4.7	100.0
Q3	Professional tax benefits to all the stakeholders in the affordable	SD	1	0.7	0.7	0.7
		D	37	24.7	24.7	25.3
		A	73	48.7	48.7	74.0

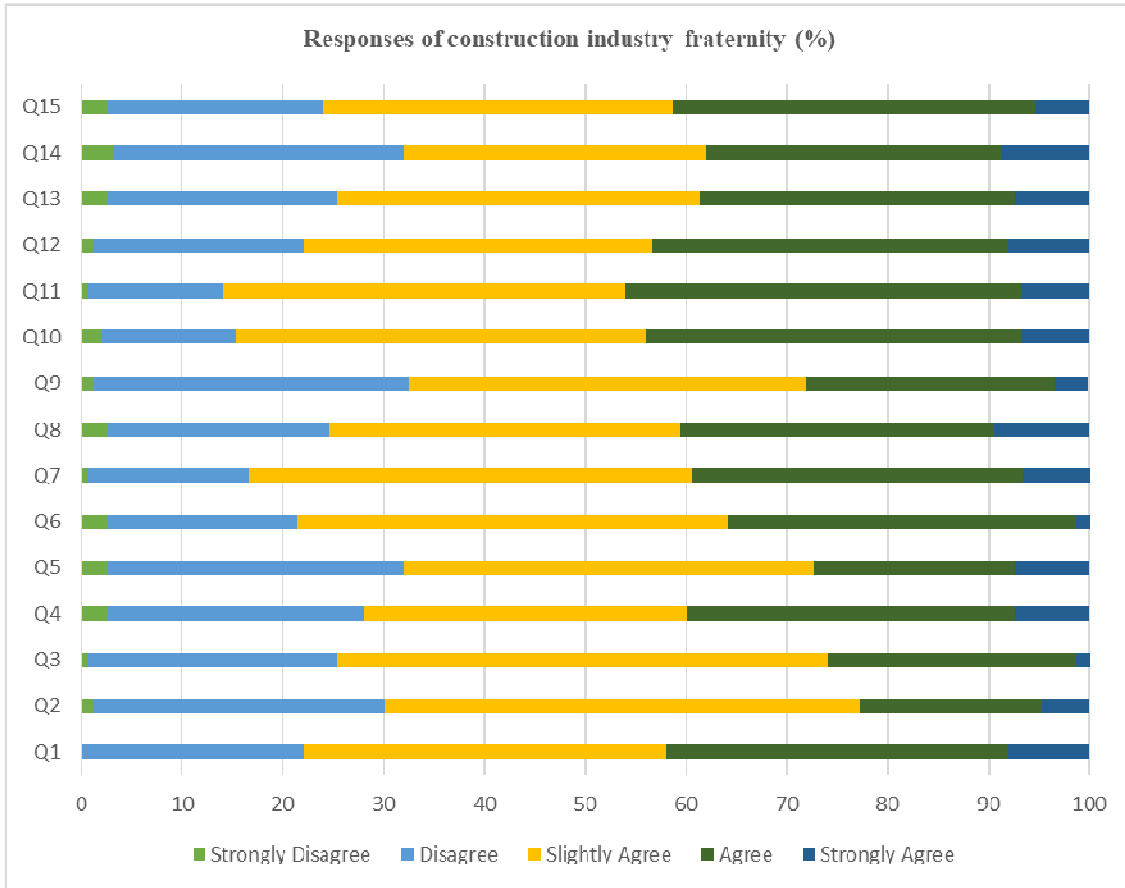| Nomenc lature	Questions	Likert scale responses	Frequency	Percentage	Valid Percentage	Cumulative Percentage
	housing projects will reduce the demand and supply gap.	SLA	37	24.7	24.7	98.7
		SA	2	1.3	1.3	100.0
Q4	Lack of subsidized loans affects the success of affordable housing projects.	SD	4	2.7	2.7	2.7
		D	38	25.3	25.3	28.0
		A	48	32.0	32.0	60.0
		SLA	49	32.7	32.7	92.7
		SA	11	7.3	7.3	100.0
Q5	The unregulated profit margin of the developers affects the success of affordable housing projects.	SD	4	2.7	2.7	2.7
		D	44	29.3	29.3	32.0
		A	61	40.7	40.7	72.7
		SLA	30	20.0	20.0	92.7
		SA	11	7.3	7.3	100.0
Q6	The government incentives for the development of affordable housing projects play an important role in the success of affordable housing projects.	SD	4	2.7	2.7	2.7
		D	28	18.7	18.7	21.3
		A	64	42.7	42.7	64.0
		SLA	52	34.7	34.7	98.7
		SA	2	1.3	1.3	100.0
Q7	There is a lot of scope to renew or improve the government incentives for achieving success in affordable housing projects.	SD	1	0.7	0.7	0.7
		D	24	16.0	16.0	16.7
		A	66	44.0	44.0	60.7
		SLA	49	32.7	32.7	93.3
		SA	10	6.7	6.7	100.0
Q8	Microfinance plays an important role for the success of affordable housing projects.	SD	4	2.7	2.7	2.7
		D	33	22.0	22.0	24.7
		A	52	34.7	34.7	59.3
		SLA	47	31.3	31.3	90.7
		SA	14	9.3	9.3	100.0
Q9	Registration charges and stamp duty play an important role in the growth of affordable housing projects.	SD	2	1.3	1.3	1.3
		D	47	31.3	31.3	32.7
		A	59	39.3	39.3	72.0
		SLA	37	24.7	24.7	96.7
		SA	5	3.3	3.3	100.0
Q10	Adoption to new advanced technologies and construction techniques by the customer is viewed as a strong indicator of success of affordable housing projects.	SD	3	2.0	2.0	2.0
		D	20	13.3	13.3	15.3
		A	61	40.7	40.7	56.0
		SLA	56	37.3	37.3	93.3
		SA	10	6.7	6.7	100.0
Q11	Lack of a single window approach system for all the required approvals causes hindrance in the growth of affordable housing projects.	SD	1	0.7	0.7	0.7
		D	20	13.3	13.3	14.0
		A	60	40.0	40.0	54.0
		SLA	59	39.3	39.3	93.3
		SA	10	6.7	6.7	100.0
Q12	Construction skill development programs can be useful for achieving affordable housing for all.	SD	2	1.3	1.3	1.3
		D	31	20.7	20.7	22.0
		A	52	34.7	34.7	56.7
		SLA	53	35.3	35.3	92.0
		SA	12	8.0	8.0	100.0
Q13	Regulations for planned development are important for achieving affordable housing for all.	SD	4	2.7	2.7	2.7
		D	34	22.7	22.7	25.3
		A	54	36.0	36.0	61.3
		SLA	47	31.3	31.3	92.7
		SA	11	7.3	7.3	100.0
Q14	Uniform skeleton structure for the policy framework will reduce constraints on affordable housing projects.	SD	5	3.3	3.3	3.3
		D	43	28.7	28.7	32.0
		A	45	30.0	30.0	62.0
		SLA	44	29.3	29.3	91.3
		SA	13	8.7	8.7	100.0
Q15	Policy framework tenure is also important for the success of affordable housing projects.	SD	4	2.7	2.7	2.7
		D	32	21.3	21.3	24.0
		A	52	34.7	34.7	58.7
		SLA	54	36.0	36.0	94.7
		SA	8	5.3	5.3	100.0

Fig. 3. Comparison of responses in the Likert scale for various questions

Table 4 Parameters obtained from Descriptive Statistics

Details	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation (σ)	Variance (σ^2)
Respondents	150	3	1	4	407	2.71	0.979	0.958
Experience of respondents	150	3	1	4	323	2.15	0.903	0.815
Size of Company	150	2	1	3	257	1.71	0.717	0.515
Q1	150	3	2	5	492	3.28	0.898	0.807
Q2	150	4	1	5	444	2.96	0.842	0.710
Q3	150	4	1	5	452	3.01	0.760	0.577
Q4	150	4	1	5	475	3.17	0.979	0.959
Q5	150	4	1	5	450	3.00	0.948	0.899
Q6	150	4	1	5	470	3.13	0.825	0.680
Q7	150	4	1	5	493	3.29	0.838	0.703
Q8	150	4	1	5	484	3.23	0.984	0.968
Q9	150	4	1	5	446	2.97	0.867	0.751
Q10	150	4	1	5	500	3.33	0.864	0.747
Q11	150	4	1	5	507	3.38	0.825	0.680
Q12	150	4	1	5	492	3.28	0.928	0.861
Q13	150	4	1	5	477	3.18	0.956	0.914
Q14	150	4	1	5	467	3.11	1.027	1.054
Q15	150	4	1	5	480	3.20	0.927	0.859

(**N**- Number of respondents)

3.2 Chi-square test

The Chi-square test is one of the statistical tests used to assess the significant difference between the expected (theoretical) frequencies and the observed (experimental) frequencies in one or more categories. This test is commonly used to test the relationship between categorical variables. The null hypothesis of the Chi-square test is that 'no relationship exists' on the categorical variables in the population (i.e., they are independent). This test is called "goodness of fit" as it calculates how fine the observed distribution of data fits with the expected distribution if the variables are independent. The rejection of null hypothesis depends on the differences between the observed and expected values.

Table 5 exhibits the variation between observed and expected values concerning (i) variables considered in the study and (ii) response to various questions under the Likert scale. It can be observed from Table 5(a) that participation of project engineers is significantly less, and overwhelming participation (60%) from the site engineers. In the case of the experience of respondents, significantly increased participation from the 10-20 years category, whereas poor patronage (13%) from 30-40 years category. From the size of the company, it can be inferred that there was less participation from large companies (23%) but an appreciably increased percentage from small and medium-sized companies. The significant variation from expected to observed values was noticed for all the questions, irrespective of nature and type, in at least more than 2 ratings on Likert scale. This exhibits the relationship among variables and is dependent to each other.

Table 6 gives the Chi-Square test statistics viz. Chi-square values, df, and asymptotic significance which are generated for the variables involved in the study, and for various questions in the questionnaire. The cells with expected frequencies less than 5, are in more than 30%, indicates the violation of assumption of the Chi-square test. The observation in Table 6 exhibits that all the cells possess expected frequencies of more than 5 in tested variables / questions. If the p-value or asymptotic significance, of the Chi-square in all the tested parameters are less than 0.05 (i.e., $p < 0.05$) indicate a statistically dominant relationship among the variables. In general, p-value is tested at 5% level of significance, and is called alpha. The p-value (0) in Table 6 is less than the alpha value (0.05) for all the questions/variables considered in the study, and ensure its statistically significant nature. Moreover, the assumption of Chi-square test, i.e., the number of observations in each level/category of the variable is at least 5, is also validated. The observed cell frequencies in Tables 5 and 6 are 37.5, 50 and 30, which are greater than 5, and ensures the study's validity.

Table 5 Variation between observed and expected values in the study parameters

5(a). Category of respondents, experience of respondents and size of company

Details	Category	Observed N	Expected N	Residual N
Respondents	Project Engineer	13	37.5	-24.5
	Site Engineer	60	37.5	22.5
	Project Consultant	34	37.5	-3.5
	Builders	43	37.5	5.5
Experience of respondents	0-10	38	37.5	0.5
	10-20	64	37.5	26.5
	20-30	35	37.5	-2.5
	30-40	13	37.5	-24.5
Size of Company	Small	66	50.0	16.0
	Medium	61	50.0	11.0
	Large	23	50.0	-27.0

5(b). Response to questions

Questions	Response in Likert scale	Observed N	Expected N	Residual N	Questions	Response in Likert scale	Observed N	Expected N	Residual N
Q1	SD	0	0	0	Q9	SD	2	30.0	-28.0
	A	54	37.5	16.5		D	47	30.0	17.0
	SLA	51	37.5	13.5		A	59	30.0	29.0
	SA	12	37.5	-25.5		SLA	37	30.0	7.0
	Total	150				SA	5	30.0	-25.0
Q2	SD	2	30.0	-28.0		Total	150		
	D	43	30.0	13.0	Q10	SD	3	30.0	-27.0
	A	71	30.0	41.0		D	20	30.0	-10.0
	SLA	27	30.0	-3.0		A	61	30.0	31.0
	SA	7	30.0	-23.0		SLA	56	30.0	26.0
	Total	150				SA	10	30.0	-20.0
Q3	SD	1	30.0	-29.0		Total	150		
	D	37	30.0	7.0	Q11	SD	1	30.0	-29.0
	A	73	30.0	43.0		D	20	30.0	-10.0
	SLA	37	30.0	7.0		A	60	30.0	30.0
	SA	2	30.0	-28.0		SLA	59	30.0	29.0
	Total	150				SA	10	30.0	-20.0
Q4	SD	4	30.0	-26.0		Total	150		
	D	38	30.0	8.0	Q12	SD	2	30.0	-28.0
	A	48	30.0	18.0		D	31	30.0	1.0
	SLA	49	30.0	19.0		A	52	30.0	22.0
	SA	11	30.0	-19.0		SLA	53	30.0	23.0
	Total	150				SA	12	30.0	-18.0
Q5	SD	4	30.0	-26.0		Total	150		
	D	44	30.0	14.0	Q13	SD	4	30.0	-26.0
	A	61	30.0	31.0		D	34	30.0	4.0
	SLA	30	30.0	0		A	54	30.0	24.0
	SA	11	30.0	-19.0		SLA	47	30.0	17.0
	Total	150				SA	11	30.0	-19.0
Q6	SD	4	30.0	-26.0		Total	150		
	D	28	30.0	-2.0	Q14	SD	5	30.0	-25.0
	A	64	30.0	34.0		D	43	30.0	13.0
	SLA	52	30.0	22.0		A	45	30.0	15.0
	SA	2	30.0	-28.0		SLA	44	30.0	14.0
	Total	150				SA	13	30.0	-17.0
Q7	SD	1	30.0	-29.0		Total	150		
	D	24	30.0	-6.0	Q15	SD	4	30.0	-26.0
	A	66	30.0	36.0		D	32	30.0	2.0
	SLA	49	30.0	19.0		A	52	30.0	22.0
	SA	10	30.0	-20.0		SLA	54	30.0	24.0
	Total	150				SA	8	30.0	-22.0
Q8	SD	4	30.0	-26.0		Total	150		
	D	33	30.0	3.0					
	A	52	30.0	22.0					
	SLA	47	30.0	17.0					
	SA	14	30.0	-16.0					
	Total	150							

Table 6 Chi-Square test statistics

		Respondents	Experience of respondents	Size of Company	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
Chi-Square		30.640a	34.907a	22.120b	30.000a	105.733c	119.067c	59.533c	73.133c	103.467c	97.800c	57.133c	86.267c	95.533c	102.733c	70.733c	63.933c	50.133c	74.133c
df		3	3	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Asymptotic significance		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 37.5.

b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 50.0.

c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 30.0.

Table 7 gives the ranking of questions (after analysis of feedback received through questionnaire in SPSS) for priority implementation by state / central governments, and construction fraternity to promote affordable housing schemes in a big way.

Table 7 Ranking of questions for priority implementation

Questions	Q11	Q10	Q7	Q12	Q1	Q8	Q15	Q13	Q4	Q6	Q14	Q3	Q5	Q2	Q9
Rank	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

4 Summary & Conclusions

4.1 Summary

The observations from the study for possible implementation are summarised as follows:

- ✓ **Land for affordable housing –** The government shall release exclusive land for affordable housing projects preferably in municipal limits, and also identify the potential peripheral lands into the development limits of the city.
- ✓ **Relaxation in norms for affordable housing** – The regulatory authorities shall explore relaxation in floor area ratio (FAR), and density norms to promote affordable housing development. The government shall bring amendment in zoning provision of master plan at regular intervals emphasizing on allocation of land for affordable housing.
- ✓ **Infrastructure facilities** – The government shall provide adequate road connectivity with emphasize on social infrastructure to promote affordable housing projects, and to emulate as habitable and vibrant communities.
- ✓ **Exclusive approval process for affordable housing** – The existing project approval process needs further augmentation. The accelerated approval process with feasible norms make an affordable housing projects more attractive for the developers.

- ✓ **Alignment of central and state government policies** – The state government policies can be explored for aligning with central government policies. This ensures availing benefit of central government incentives while in compliance with state government policies.
- ✓ **Augmentation of microfinancing schemes** – The state and central governments can create conducive environment for low income categories towards affordable housing projects by offering microfinancing with feasible norms, and other incentives.
- ✓ **Rationalising registration charges and stamp duties** – The registration charges, and stamp duties shall be rationalised / exempted based on categories of houses (i.e., LIG, MIG, and HIG) to create demand for affordable housing projects.
- ✓ **Advanced technologies for affordable housing** – The housing developers shall invest in innovative construction practices / technologies to construct mass housing projects so that to provide the same to the occupants at a subsidised cost.

4.2 Conclusions

Based on the questionnaire survey and further analysis of data using SPSS, the following specific conclusions are drawn:

- ❖ The cluster housing development is still a feasible option to promote affordable housing projects in the Northern Coastal region of Tamil Nadu, considering the high land cost.
- ❖ Providing a single window system for faster approval of housing schemes and building approvals, adoption of advanced construction technologies/techniques, enhancing the government incentives, conduct of skill development programmes are identified as prime parameters to promote affordable housing projects.
- ❖ The parameters related to (i) identifying the genuine beneficiaries, (ii) regulating the profit margin of developers, and (iii) the significance of the reduction in registration and stamp duties were arrived at as the least preference for implementation in the near future.
- ❖ It is found that questions Q1, Q3, Q4, Q6, Q7, Q8, Q10, Q11, Q12, Q13, Q14, Q15 has higher priority for adaptation, and questions Q2, Q5, Q9 possess less priority.
- ❖ The order of preference of implementation with respect to policies / guidelines / practices based on questions are Q11 > Q10 > Q7 > Q12 > Q1 > Q8 > Q15 > Q13 > Q4 > Q6 > Q14 > Q3 > Q5 > Q2 > Q9.

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