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Research Article

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ASSESSMENT OF CRITICAL FACTORS AFFECTING THE IMPLEMENTATION OF LOW COST HOUSING CONSTRUCTION INCASE OF WOLAITA SODO CITY

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- **Ethics declarations**

Ethics approval and accordance - Not applicable.

The study was reviewed and approved by the Research Ethics Committee of the Institute of Technology, Arba Minch University, Ethiopia due to the anonymous, minimal-risk, and non-invasive nature of the questionnaire survey. The research was carried out in strict accordance with the institutional guidelines of Arba Minch University and the ethical principles dictated by the Declaration of the Unuversity. Consent to participate- Informed consent was obtained from all 96 individual participants involved in the structured questionnaire survey prior to data collection.

Consent to publish - Not applicable.

- **Competing interests**

Competing interests - Not applicable..

- **Availability of Data and Materials**

The datasets generated and analyzed during the current study are not publicly available because they contain research data that are not deposited in a public repository. However, the data supporting the findings of this study are available from the corresponding author upon reasonable request. The editor may also request access to the data for verification purposes during the review or publication process.

ABSTRACT

Housing is the key to reducing poverty and increasing opportunities for economic growth. The housing problem gets worse year after year due to population growth, high construction costs, and scarcity of construction materials, poor implementation strategies, and lack of

knowledge of construction techniques. Increasing access to low-cost housing is the most cost-effective strategy for reducing poverty and increasing opportunities for economic growth in Ethiopia. However, there are problems with implementation regarding low-cost housing such as; questioning the integrity due to poor investigation of the real problems on the ground, and weak institutional evaluation and monitoring system. This study aims to assess the current practice of low-cost housing, to determine critical factors influencing the implementation of low-cost housing, and to forward remedial solutions for the determined factors to relevant bodies associated with low-cost housing implementation. Both qualitative and quantitative data collection techniques are used in the study. The researcher used the total population purposive sampling technique (concurrent approach) to choose the target population. The data was analyzed and organized by using descriptive statistics, SPSS 20 version, and the relative importance index (RII) method. The study was carried out through a structured questionnaire survey of 96 respondents working on low-cost housing projects in Wolaita Sodo. Respondents were required to rate how 50 factors influencing the implementation of low-cost housing projects concerning importance and frequency of occurrence. The analyses showed that the top 5 groups of factors which have a significant impact on the implementation of low-cost housing projects such as: - Economy factors, $RII=0.7932$, Socio-Cultural factors, $RII=0.7832$, Administration factors, $RII=0.7831$, Technical and Design factors, $RII=0.7760$ and Environmental factors, $RII=0.7709$. Based on the findings, the researcher suggested remedial measures to the relevant bodies associated with low-cost housing implementation. Measurements suggested are Proper planning, appropriate design, use of materials with effective cost and good quality, skilled labor, community participation, government support, and innovative financing system. Therefore, the concerned body has to give proper attention to solving the problems based on the findings of this research.

Keywords: - Low-cost housing, Implementation strategies, influencing factors.

INTRODUCTION

Housing is the second most important human need, after food and water, which are vital to human life and society. Housing is regarded as a crucial development job for reducing urban poverty, improving the lives of slum residents, and bringing about long-term socio-economic

changes. It has a direct and immediate impact on a society's health, educational, economic, environmental, political, and social life. Cost-effective and alternative construction technologies aid in the reduction of construction costs by reducing the number of building materials used and the use of alternative low-energy materials, as well as the reduction of carbon dioxide (CO₂) emissions, and thus aid in environmental protection (Adane, 2012)

The low-cost housing program is being widely implemented in different parts of the country. The program is planned and designed with cost-effective construction techniques. There are arguments on LCH projects being implemented whether it addresses cost or not. In this regard, the study assesses the problems & addresses the factors influencing LCH implementation, and investigates local practice. (Portal, 2015)

In Ethiopia, low-cost construction is growing gradually. Due to the rising cost and availability of materials; the price of construction rises by double digits. For this reason, the cost of construction using conventional building materials and methods is unaffordable for economically vulnerable and low-income populations. Many factors affect the implementation of low-cost housing construction. Lack of effective implementation strategies, poor transfer mechanisms, inadequate supply of affordable land and infrastructure, the inadequacy of housing finance systems, and poor utilization of local building materials and technologies, Such critical factors include inappropriate standards and legislation, insufficient participation of communities in the process of building an asylum and supporting self-help, lack of targeted research and experimental projects, poor use of research results. Assessing critical factors influencing the implementation of low-cost housing construction will have a significant role in contributing to increased housing provision to people with low income. This study find will out the problems, constraints, and challenges to LCH Project and suggest remedial solutions on the implementation of low-cost housing (Fanta & Soressa, 2016).

STATEMENT OF THE PROBLEM

Low-Cost Housing (LCH) Construction is a very challenging endeavor on the part of the project manager (UN-HABITAT, 2011). Various factors such as strong, durability, functionality, aesthetically pleasing, ecologically sound, economically viable, and adaptable materials, and techniques are common knowledge in construction. Therefore, those variables are critical in low-cost construction due to budget constraints.

Population and urban growth rates increase with the demand for housing from time to time in the study area, to satisfy this demand for human beings with low and middle incomes implementation of low-cost housing techniques has been executed. But the program didn't meet its initial targets, which suggests that due to poor implementation problems the low-cost housing projects will not succeed. When compared to other urban cities within the nation, housing is the most significant economic resource for the people of Wolaita Sodo. Thus, an important concern in Wolaita Sodo is making sure there is an appropriate supply and giving low- and middle-income groups access to low-cost housing at a reasonable price.

The researcher saw that there are wide problems related to the implementation of low-cost housing such as; poor implementation strategies, defects on some of the buildings under construction, delay of projects to complete on scheduled time, unfinished structures on the project, poor transfer mechanisms, inadequate supply of reasonably priced land and infrastructure, the inadequacy of housing finance systems, poor utilization of local building materials, lack of support to small-scale construction activities, inappropriate standards, and legislation, inadequate participation of communities in the shelter development process and support to self-help, lack of focused research and experimental projects, poor utilization of research findings.

This research aimed to overcome the knowledge gap by assessing current practices and identifying the best one for low-cost housing projects that can help to fill gaps in knowledge and improve implementation and forwarding remedial measures for successful implementation in Wolaita Sodo, Ethiopia. This initiated the Researcher to conduct the study by determining the current practices, assessing critical factors, and forwarding remedial measures for the successful implementation of low-cost housing. Due to this, Researcher decided to research this issue.

RESEARCH QUESTIONS

- What are the current practices of low-cost housing implementation?
- What are the critical factors influencing low-cost housing project implementation?
- What are remedial measures for successful implementation of low-cost houses?

SPECIFIC OBJECTIVES

- To assess current practice of low-cost housing project in Wolaita Sodo.
- To determine the critical factors influencing low-cost housing project implementation.

- To determine remedial measures for the successful low-cost housing implementation.

SIGNIFICANCE OF THE STUDY

This research has great importance to various stakeholders in the construction and housing industries. Developers have the opportunity to gain a comprehensive understanding of the factors influencing the implementation of low-cost housing solutions, which will allow them to develop measures improving low-cost housing implementation in the area. Potential homeowners will gain insight into what factors to consider when choosing the ideal affordable home. The study will help the researchers working on housing to build a better environment. In this respect, it is useful for architects, contractors, designers, planners, engineers, consultants, and others to enhance human comfort in city.

SCOPE OF THE STUDY

The study bounded in Wolaita Sodo town especially the low-cost housing projects sites such as; Dairy, Ofa Sere, Aroge Arada, and Gandaba areas of project. It will take time and effort to cope with all aspects of low-cost housing projects because they are quite complex. That's why, this study pursued to assess the current practices of low-cost housing implementation, identify the critical factors influencing low-cost housing implementation, and forward remedial measures for successful implementation of low-cost housing in Wolaita Sodo, Ethiopia.

LIMITATIONS OF THE STUDY

The study was limited by lack of sufficient documented data according to housing in the study area and restricted to the selected site for analysis of implementation issue that focuses on the stated objectives due to time and budget limitations. And also, lack of cooperation of stakeholders to fill questionnaires and give information.

RESEARCH METHOD

DESCRIPTION OF THE STUDY AREA

Wolaita Sodo is the main town and administrative center of the Wolaita zone in the Southern Nation, Nationality, and People Region. The latitude and longitude of this city is 6°54'N and 37°45'E and its altitude is between 1,600 and 2,100 meters (5,200 and 6,900 ft.) above sea level.

Located at 380 k, m from Addis Ababa to the South-West. Based on the 2018 Population Projection by the CSA, the town has a total population of 254,294 with an area of 35,382.5 hectares.

RESEARCH DESIGN

A descriptive and explanatory research strategy was utilized in this study. The main goal of descriptive research is to describe the data in its present condition. The research goes on to explain and evaluate the factors that affect the implementation of low-cost housing in building projects that have an impact on the implementation strategy for the successful implementation of low-cost housing.

The objective of the research was achieved by the methodology of the study: Survey (site observation, Literature review, and Questionnaires. The study used both quantitative and qualitative research approaches. In the quantitative approach, this study collects and analyzes numerical data to make a prediction and measure the variables. In the qualitative research approach, the study collects, analyzes, and interprets non-numerical data. The data acquired in this way was used to analyze the critical factors affecting the implementation of low-cost housing in Wolaita Sodo. Finally, a conclusion and recommendation are drawn out based on the data analysis result and discussion.

STUDY POPULATION

The targeted population consists of all low-cost housing projects in Wolaita Sodo town. There are four project sites such as: - dairy site, Ofa sere site, the Aroge arada site, and Gandaba. 74 low-cost housing projects are found in those four project sites. Therefore, the target population for this research work becomes 74 low-cost housing projects.

SAMPLING TECHNIQUES

Respondents in the population of the study shall be the number of contractors, consultants, community users, and professionals at different level which are involved in low-cost housing projects in Wolaita Sodo. There are 74 low-cost housing projects within four project sites. Therefore, the total population becomes 74, which is simple to address the respondents. As a result, the sample for the study included 96 respondents. 74 as clients (representatives from each project), 4 as a consultants group, and 18 as a contractors group (3 GC-III, 3 IV, 4 VI, 3 VII, and 5 BC-V). Within the Purposive sampling technique, the total population sampling

technique (conscuss approach) is applied to select target respondents. According to their category, profession, experience, designation, and like.

The study analysis was also carried out for identifying and Assessment of representative areas in Wolaita Sodo. Since the data of this research is qualitative and quantitative, surveying and interviews, and observation are done. In addition, as the quantitative data is numerical so accuracy and imperative work will be done. The case that, researcher used census approach is when less in population, easy to address, and the researcher knows that the target population fulfills his/her demands.

STUDY VARIABLES

DEPENDENT VARIABLE:

- Low-cost housing construction project management.

INDEPENDENT VARIABLES:

- Factors associated with implementation strategy, construction technology, techniques, and methods.

DATA COLLECTION TOOLS

This study focuses on low-cost housing projects in Wolaita Sodo Town. The main instruments for the collection of data were structured surveys that are questionnaires, interviews, direct observation, & analysis of documents. To insure the data quality, reliability and validity are terms used to evaluate the quality of research, indicating how well a method, technique, or test measures something. Proof of validity and reliability are prerequisites for ensuring the integrity and quality of the collected data. Reliability concerns the extent to which a measurement of a phenomenon provides stable and consistent results. It was mostly related with consistency internal consistency, which is determined by the Cronbach alpha coefficient, which is the most significant aspect of qualitative research.

Equation 1 Cronbach's Alpha Formula

$$\alpha = \frac{N * \bar{\bar{C}}}{(\bar{V} + (N - 1) * \bar{C})}$$

Where: - N = number of items

$\bar{\bar{C}}$ = average covariance between item pairs, $\bar{V}$ = average variance

The validity of research refers to the degree of compliance with the requirements of scientific research methods in the process of producing research results. It is required for any type of research. Validity refers to how well the collected data covers the actual research area.

DATA ANALYSIS PROCEDURE

Both qualitative and quantitative data analysis methods have been used in this research. On the other hand, quantitative data analysis is the process of tabulating, interpreting, and summarizing experimental and numerical data to describe or generalize a population from a sample. The study uses the relative importance index (RII) method to ordinals arrange variables in terms of importance and agreement and will be tabulated and ranked using SPSS

RESULTS AND DISCUSSIONS

In this chapter, the results of the research and analysis used in the study are briefly described and analyzed. It is organized into different sections, each of the findings regarding the variables that influence the implementation of low-cost housing, as well as recommendations on how to improve its implementation. In addition, it compared the findings of other researchers and the practices of other countries with the elements that influence the implementation of low-cost houses in housing projects.

Respondent's Category and Response Rate

Table I Respondents category & Respondents rate

No	Respondents Group	Distributed	Returned	Rate of returned (%)
1	Contractors	14	12	86
2	Consultants	4	4	100
3	Clients	78	58	74
Total		96	74	77

Source: Own Survey, 2023

In the above Table 1 among the **respondents** 86% indicated the contractor's side, 100% consultant's side, and 74% client's side response rate. Totally 96 questionnaires prepared were distributed to respondents and 74 is returned which comprised a valid 77% out of the target respondents in the study area as shown in the Table below.

Table II Position of Respondents

No	Category	Freq	Percent (%)
1	Project Manager	12	16

2	Office Engineer	8	11
3	Site Engineer	20	27
4	Resident Engineer	12	16
5	Others (Client's supervisor, Project coordinators, Designers)	22	30
Total		74	100

From the questionnaires designed and distributed, to collect data regarding the critical factors influencing the implementation of low-cost housing construction projects in Wolaita Sodo the results obtained are analyzed here under. The respondents are composed of the project manager, office engineer, site engineer, & resident engineer, and others (supervisor of the client, project coordinators, and designers). Project Managers 16%, Office Engineer 11%, Site Engineer 27%, Resident Engineer 16% and others (Client Supervisors, Project Coordinators, Designers) 30% at various levels. Respondents were contacted directly at the project site to identify some issues to address the questionnaire requirements in this research study and also to ensure the credibility and reliability of the findings.

Respondent's Year of Experience

Table III Respondent's Year of Experience

No	Year of Experience	Frequency	Percent (%)
1	1-2 years	8	11
2	2-5 years	16	22
3	5-10 years	21	28
4	10-15 years	18	24
5	15-20 years	11	15
Total		74	100.0

11% of respondents had experience in low-cost housing construction projects for 1 to 2 years, while 22% have experience for 2 to 5 years, and 28% have worked in low-cost housing projects for 5 to 10 years, 24% of respondents have experienced between 10 to 15 years, while 15% have experienced between 15 to 20 years as shown in Table 3 above.

Respondent's Level of Education

Table-IV Respondents' Level of Education

No	Educational level	Frequency	Percentage, %
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2	Diploma	6	8
3	BSc Degree	49	66
4	Master's Degree	19	26
Total		74	100.0

About 8% of respondents have a diploma level, 66% have a bachelor's degree, and 26% of respondents have a master's degree, as shown in Table 4.

Current practice of low-cost housing construction in Wolaita Sodo

This section aimed to evaluate and analyze the current practice of low-cost housing construction on the topic of awareness of the low-cost housing program.

To assess current practice, the study begins by asking respondents about their awareness of the low-cost housing program as shown in the table below. The survey shows that all respondents (96) know the current practice of low-cost housing.

Table-V Respondent's awareness of low-cost housing program

No	Descriptions	Frequency	Percent, (%)
1	Respondents who are aware	96	100
2	Respondents who are not aware	0	0

As shown in Table 4-5 above, all respondents are aware of low-cost housing initiatives.

Identification of Influencing Factors of LCH Project Implementation

The results of this study provided an indication of the Relative Importance Index (RII) & Ranking of factors affecting the implementation of low-cost housing in low-cost housing construction projects in the Wolaita Sodo project locations. Table 4-6 below shows a summary of the relative importance index (RII) of the five main group factors and their corresponding ranking.

Table-VI RII and Ranked of Group of Factors in Implementation of LCH

Rank	A group of factors affects low-cost housing	RII	Rank
1	Economy group	0.7932	1 st
2	Socio-Cultural group	0.7832	2 nd
3	Administration group	0.7831	3 rd
4	Technical and Design group	0.7760	4 th
5	Environmental group	0.7709	5 th

As described in Table 4-6, five major Groups are categorized under factors influencing the implementation of low-cost housing in the study area. These were Economy factors with RII= 0.7932 ranked 1st, Socio-Cultural factors with RII=0.7832 ranked 2nd, Administration factors with RII=0.7831 ranked 3rd, Technical and Design factors with RII=0.7760 ranked 4th and Environmental factors ranked 5th with RII=0.7709. The study identifies that cost-effective housing implementation cultural practices, lack of awareness, and supplying less knowledge about the low-cost housing concept were contributory problems. Poor integration is also another problem in the Implementation of low-cost houses caused by the employing inexperienced contractors and unqualified SMEs. It causes a waste of material and financial resources and requires time to rework. It also affects the price of houses due to increased time/inflation/ and material consumption (Adabre, M.A & Chan, A, 2019).

Economy groups

Economic groups ranked 1st with RII=0.7932 from five groups of factors as indicated in above Table 4-6 based on individual factors identified in the project.

Table VII Summary of Economy Groups

Rank	Economy groups	RII	Rank
1	Market competition holds back low-cost housing adoption	0.8432	5 th
2	High land registration cost and acquisition of a building permit	0.8297	6 th
3	Lack of financial incentives	0.7946	18 th
4	Ineffective mortgage system/ financial mechanism	0.7892	21 st
5	High capital/investment cost	0.7865	24 th

The above Table 4-7 shows the Market competition holding back low-cost housing adoption ranked 1st in the Economy factors group, with RII= 0.8432 & 5th among all 50 factors influencing the Implementation of low-cost housing construction. The high cost of land registration and acquisition of building permits ranked 2nd with RII =0.8297, & 6th among all 50 factors being identified. Lack of financial incentives ranked 3rd with RII = 0.827, and 18th among all 50 factors, Ineffective mortgage system/ financial mechanism ranked 4th with RII = 0.7892, & 21st among all factors identified and High capital/investment cost ranked 5th in this group and 24th among all 50 factors. Stakeholders should perform their activities properly to improve the Economical barriers to housing construction projects for successful implementation.

Socio-Cultural groups

Out of the five groups of factors, the socio-cultural groups are ranked second with an RII of 0.7832.

Table VIII Summary of Socio-Culture Groups

No	Socio-Cultural groups	RII	Rank
1	Lack of social responsibility to improve low-cost housing development	0.8649	2 nd
2	Insufficient opportunities for of low-cost housing development Culture	0.8135	8 th
3	Weak treatment in the distribution of low-cost housing within society	0.8108	10 th
4	Weak community Participation in low-cost housing implementation	0.8000	16 th
5	Cultural sensitivity toward low-cost housing development	0.7946	18 th

Socio-Cultural factors are ranked 2nd with RII=0.7832 from (5) groups of factors. The sociocultural group of factors has 5 sub-factors which are ranked according to the relative importance index (RII) value. The study identified key influencing factors of low-cost construction techniques. Under Socio-Cultural factors: Lack of social responsibility to improve low-cost housing development, Insufficient opportunities for the development of low-cost housing Culture, Weak treatment in the distribution of low-cost housing within society, Weak community Participation in the implementation of low-cost housing and Cultural sensitivity towards low-cost housing development are included. Any Socio-Cultural problems would tend to reduce the output of low-cost housing project implementation.

Administration groups

Out of the five groups of factors, the Administration groups are ranked third with an RII of 0.7831 as shown in Table 4-6.

Table IX Ranked Administration groups

No	Administration groups	RII	Rank
1	Inadequate government participation	0.8649	2 nd
2	Lack of Established coordinating & supportive authority	0.8595	4 th
3	Weak land allocation toward low-cost housing development	0.8108	10 th
4	Weak administrative cooperative consciousness collaborations.	0.8081	12 th
5	Lack of clear leadership and roles among project parties	0.8027	14 th

According to Administration groups, the above factors are specified in that manner. Therefore Stakeholders and government organs are counseled to participate in project

implementation for improving cost-efficient techniques. They should be more interested in conformance to project specifications to overcome disputes, communication barriers, & insufficient correlation with contractors and construction facilitators.

Technical and Design Groups

Out of the five groups of factors, the Technical and Design groups are ranked fourth with an RII of 0.7761. In a typical low-cost housing construction project Technical and Design is a problem because it negatively affects low-cost housing in various ways and becomes a source of disputes between owners and suppliers.

Table X Summary of Technical and Design Group

No	Technical and Design groups	RII	Rank Total
1	Inadequate monitoring and maintenance of rework incidents	0.8757	1 th
2	Lack of professional expertise in low-cost housing construction	0.8270	7 th
3	Lack of Quality and availability of regular documentation	0.8081	12 th
4	Complex and traditional design	0.8027	14 th
5	Lack of knowledge of low-cost housing construction techniques	0.7946	18 th

From the Technical and design groups, Inadequate monitoring and maintenance of rework incidents ranked 1st among overall factors with RII= 0.8757. While Lack of professional expertise in low-cost housing construction is ranked 2nd with RII=0.8270 from the technical and design factor and 7th from the overall factors. Lack of Quality and availability of regular documentation ranked 3rd and 12th from whole factors RII=0.8081. Complex and traditional design ranks 4th with an RII of 0.8027 and 14th from the overall factors. Lack of knowledge of low-cost housing construction techniques ranked 5th with RII=0.7946 and 18th from whole factors.

Environmental groups

Housing construction is affected by unfavorable weather seasons and climatic conditions. The environmental group of factor rank five RII of 0.7709 from five groups. This indicated that the low housing construction in the project was less affected by environmental factors.

Table XII Ranked Environmental groups

No	Environmental groups	RII	Total Rank
1	Unsuitable land-use plan	0.8135	8 th

2	Inadequate encouragement of environmental assessment and protection	0.7973	17 th
3	Shortage of land availability within the town	0.7892	21 th
4	Uncomfortable Climate condition	0.7811	27 th
5	lack of effective Environmental improvement in the low-cost housing environment	0.7757	31 th

Unsuitable land-use plan ranked 1st in this group and 8th from total factors and RII of 0.8135, inadequate encouragement of environmental assessment and protection ranked 2nd in this group with RII of 0.7973 & 17th from total factors. Shortage of land availability within in town ranked 3rd in this group RII of 0.7892 and 21st, Uncomfortable Climate condition ranked 4th in this group RII of 0.7811 and 27th, and lack of effective Environmental improvement towards low-cost housing environment ranked 5th in this group RII of 0.7757 and 31st from total factors.

Top Ten Critical factors influencing the Implementation of LCH

The results of the research provided an indication of the Relative Importance Index and Rank of Factors Influencing the Implementation of low-cost housing Construction Projects in Wolaita Sodo.

Table XIII Top ten ranked Critical factors highly influence Implementation

No	Critical Factors Influencing the Implementation of low-cost housing Construction in the LCHDP	RII	Rank
5	Inadequate monitoring and maintenance of rework incidents	0.8757	1 st
7	Lack of social responsibility to improve low-cost housing development	0.8649	2 nd
3	Inadequate government participation	0.8648	3 rd
4	Lack of Established coordinating & supportive authority	0.8595	4 th
1	Market competition holds back low-cost housing adoption	0.8432	5 th
2	High costs of land registration and acquisition of a building permit	0.8297	6 th
6	Lack of professional expertise in low-cost housing construction	0.827	7 th
9	Unsuitable land-use plan	0.8139	8 th
8	Insufficient opportunities for the dev't of low-cost housing Culture	0.8135	9 th
10	Inadequate encouragement of environmental assessment and protection	0.7973	10 th

Table 4-12 indicates the top ten (10) ranked critical factors that highly affected the low-cost construction in the study area. There is Market competition holding back low-cost housing adoption with RII= 0.8432 and High land registration cost and acquisition of building permit with RII=0.8297 on Economic factors, Inadequate government participation with RII=0.8649 and Lack of Established coordinating & supportive authority with RII=0.8595 on Administration factors, Inadequate monitoring and maintenance of rework incidents with RII= 0.8757 and Lack of professional expertise in low-cost housing construction with RII=0.8270 on Technical and Design factors, Lack of social responsibility to improve low-cost housing development with RII=0.8648 and Insufficient opportunities for the development of low-cost housing Culture with RII=0.8135 on Socio-Cultural factors, Unsuitable land-use plan with RII=0.8139, and Inadequate encouraging of environmental assessment and protection with RII=0.7973 on Environmental factors.

Identified practice of low-cost housing construction in Wolaita Sodo

Implementation of low-cost housing has been a significant challenge for governments and developers due to several factors such as insufficient access to finance, limited infrastructure, and inadequate policies. Some practices that have been successful in implementing low-cost housing in Wolaita Sodo:

Use of locally available materials: can significantly reduce housing costs. These materials are easily available and cheaper than imported materials.

Partnership with private developers: Governments can partner with private developers to build affordable housing units. Developers can provide funding and technical expertise, and governments can provide land and infrastructure.

Community-based approach: By involving the community in the planning and construction process, we can reduce costs and ensure that housing is built to meet the needs of the community. This approach also helps create a sense of ownership and pride among community members.

Government Subsidies: Governments can provide subsidies to housing developers and buyers to make affordable housing more affordable. These subsidies help bridge the gap between building costs and prices people can afford.

Microfinance: Microfinance institutions can provide loans to people without access to traditional banking services. This helps them build affordable houses.

Overall, the evaluation of the current practice of low-cost housing implementation in Wolaita Sodo shows that a multi-branched approach including partnership, community involvement, and government support needs to be improved.

Identified Causes of Poor Implementation of Low-Cost Housing Construction

According to the finding from the discussion on a questionnaire the major causes of the low-cost housing construction projects are identified and described. There has been insufficient monitoring and evaluation of program processes and built projects, including all stakeholders, especially the beneficiaries.

According to LCHDP the main challenges and constraints are identified as a lack of efficient professionals, lack of institutional management, lack of effective implementation strategies, problems in housing finance for the poor, lack of practical skills in construction technology, and inadequate financial and human resources (ERMED, 2016).

The central identified causes of the poor implementation are the problem of construction management, project management problems, lack of good implementation strategies, and poor integration of organization structures and collaboration of all stakeholders. The following are derived from questionnaires, suggestions, and recommendations from the respondents.

Poor Communication between Stakeholders: My view in research studies is that communication between stakeholders is poor. Good communication is an essential tool in the building construction industry to build relationships between supervisors and construction stakeholders. Proper communication and teamwork between contractors and subcontractors and generally within the involved parties is essential.

Construction management and project management: this leads to insufficient supervision and follows the work progress and is one of the causes of poor implementation of low-cost construction very influencing factor in low-cost housing. This shows that the contractor is not following the progress of the project properly & consultant and LCHDP will delay following up on the result this highly affects the housing construction. Poor inspection and monitoring systems of government projects are the causes. Delay of contractors on project execution can be improved through proactive planning on alternative financial sources, effective and efficient management of resources including appropriate disbursement of advance using cost management, and application of timely knowledge-based decisions.

Lack of integrated infrastructure provision, planning, and design: during my study, there are insufficient power supply and infrastructure facilities during the construction process. Power is crucial in the construction industry anywhere to conduct. Infrastructure facilities cause construction project success and failure. This is during roofing construction and for housing unit installation because of integrated infrastructure planning and design problems that could happen.

Lack of effective implementation of strategy of low cost construction : The government has announced clear new policies on housing, implementation methods and targets to provide affordable housing in millennium goals and GTP plans as well in line to low-cost house construction, clear gap about implementation & building process interests and operational methods between consultants, LCHDP office and local contractors as it desires the following are the some causes of poor implementation in low cost construction; unfinished structures, poor transfer mechanisms, no cost effectiveness, inadequate supply of affordable land and infrastructure, inadequacy of housing finance systems, poor utilization of local building materials and technologies, lack of support to small-scale construction activities, inappropriate standards and legislation, inadequate participation of communities in shelter development process and support to self-help, lack of focused research and experimental projects and poor utilization of research findings.

Remedial measures for successful low-cost houses implementation in Wolaita Sodo

To achieve the main objective of the study, it is necessary to analyze the current practices and key factors of low-cost housing, and then take improvement measures for the successful implementation of low-cost housing in Wolaita Sodo.

Stakeholders in the housing industry, both professionally and organizationally, play an important role in improving the implementation of low-cost housing. Therefore, it is important to investigate who is responsible for the various roles. Respondents were asked to rate the company's ability to facilitate and promote the effective implementation of low-cost housing.

Here are some remedial measures for the successful implementation of low-cost housing: -

Successful implementation of low-cost housing requires proper planning. Planning should consider location, cost, design, and materials used.

The design of the house should be appropriate and functional to meet the needs of the residents. The design should minimize construction costs without compromising the safety and durability of the structure.

Using local materials is economical and environmentally sustainable. Using local materials means they are readily available and low-cost in the region.

Achieving low-cost housing requires skilled workers such as carpenters, masons, and electricians. The presence of skilled workers is essential for a smooth and efficient construction process.

Low-cost housing projects require the participation of the target community during the implementation of the project. Involving the community ensures that the project meets the needs of the community and creates a sense of ownership.

Governments should provide support in terms of policies, incentives, and subsidies to make low-cost housing projects reasonable and sustainable.

Innovative financing options such as microfinance, cooperatives, and community-based financing help low-income households obtain affordable housing.

By implementing these improvements, low-cost housing can sustainably and cost-effectively meet the housing needs of low-income households.

CONCLUSIONS

The results of the questionnaire survey, the data collected, and the main discussion of the findings were described in the previous section according to the literature review. The conclusion is obtained from the research results to come up with recommendations and possible future research areas related to various factors influencing the implementation of low-cost housing projects. In general, to improve the effective implementation of low-cost housing, and to construct houses with effective quality and cost for the community, the stakeholders must identify and recognize the influence of critical factors influencing the implementation of low-cost construction.

This study identified 50 factors affecting the implementation of low-cost housing construction based on the perceptions of various respondents, project managers, construction supervisors, engineers, and others who participated in low-cost housing construction projects in Wolaita Sodo as ranked based on their relative severity.

Critical factors highly influencing low-cost house implementation are Inadequate monitoring and maintenance of rework incidents with RII= 0.8757 ranked 1st, Lack of social responsibility to improve low-cost housing development with RII= 0.8649 ranked 2nd, Inadequate government participation with RII= 0.8648 ranked 3rd, Lack Established coordinating & supportive authority with RII= 0.8595 ranked 4th, Market competition hold back low-cost housing adoption with RII= 0.8432 ranked 5th and Lack of professional expertise in low-cost housing construction with RII= 0.8270 ranked 6th.

Therefore, it is concluded that monitoring and maintenance of rework incidents had been compromised which highly affects the implementation of low-cost housing. It delays the project, reduces productivity, and wastes time that needs to be considered. Most safety issues are ultimately due to human error. But most importantly, the projects they work on create a safer work environment, and are better equipped to learn from incidents and understand the root causes of incidents to prevent further problems from occurring. The main causes of rework were related to implementation issues such as process control, faithfulness to procedures, subcontractor management, design, and material availability and suitability. Several checks and improvements can be made during the project to reduce the risk of rework and potential incidents in this area. However, the contractors are always looking for a profit from their projects to sustain their contracting level. The rest of the above-mentioned factors such as: - Lack of social responsibility to improve low-cost housing development, Inadequate government participation, Lack of Established coordinating & supportive authority, Market competition holding back low-cost housing adoption, and lacking professional expertise in low-cost housing construction are interconnected with the socio-cultural and administrative factors which must be given proper attention in the low-cost construction projects.

The questionnaire and suggestion and other researchers identified the causes of poor implementation of low-cost housing construction are: poor communication between stakeholders, construction management and project management, lack of integrated infrastructure provision, planning and design process, and lack of effective implementation strategy of low-cost housing construction. Evaluating and assessing the factors influencing the cost efficiency of using low-cost housing technologies in the Ethiopian construction

industry should be encouraged and highly implementing low-cost housing is very supportive of the community.

Recommendations

Based on the finding and conclusion of the study, the following solutions were suggested for the concerned bodies to handle the problems in the study area.

The contractor must appoint a project manager and a construction supervisor who have sufficient management ability to supervise the low-cost housing business project and promptly resolve any problems that arise during the project.

Sufficient construction materials must be delivered to the project site before starting the project. Materials should be stored in a convenient location, easily accessible, and close to the project to avoid material wastage during rework.

Contractors must also provide strong assistance and support to ongoing worker training. To achieve more efficient production in house building, it is necessary to hold training sessions and regular meetings with the workers to understand their problems of the workers.

To improve efficiency and cost-effectiveness, all technical tasks of the project should be assigned and trained to experienced personnel. In addition, maintaining moral support and competition between employers and workers will also have a significant impact on the construction of low-cost housing.

The construction of low-cost housing is the key direction of the government to accelerate the growth and transformation of low- and middle-income housing in the country. Without cost-effective housing techniques, the continuous development and growth plans will not meet the national goals. Therefore, improvement in low-cost technology plays a major role in building low-cost housing with quality and cost-effectiveness.

The implementation of strict laws and regulations to support the availability of productive labor in the construction of low-cost housing should be considered the main concern of governments. In this regard, the government's policy should encourage and give more attention to formal technical training programs & internships.

It improves implementation strategies and helps local contractors overcome financial and liquidity challenges. Improving implementation strategies for low-cost housing construction should benefit Ethiopian contractors, consultants, employers, and policymakers.

Furthermore, the results of this study will help to improve low-cost housing programs in the Ethiopian construction industry by focusing and acting on the most important factors that are believed to affect the efficiency of low-cost housing construction.

Future Suggestions for further studies

More research is needed for further assessing and measuring critical factors influencing low-cost housing construction to improve effective implementation. This study focused on assessing the current practice of low-cost housing implementation, determining important elements influencing the implementation of cost-effective house construction, and forwarding remedial measures for the successful implementation of low-cost housing in Wolaita Sodo. Therefore, further studies are needed to improve low-cost housing implementation by using effective strategies and techniques regarding low-cost housing in other areas of Ethiopia.

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APPENDIX

QUESTIONNAIRE

ASSESSMENT OF CRITICAL FACTORS INFLUENCING LOW COST HOUSING PROJECT IMPLEMENTATION: A CASE OF BUILDING PROJECT IN WOLAITA SODO, ETHIOPIA

Dear Respondents, This questionnaire is designed to make a study on, Assessment of Critical Factors Influencing the Implementation of Low Cost Housing Projects: A Case of Building Project in Wolaita Sodo, Ethiopia. This study will be conducted for partial fulfillments of the requirements for M.Sc. degree in Civil Engineering (Construction Technology & Management). The main objectives of the study are identifying the critical factors influencing the implementation of low cost housing construction. It will also give insight on pattern, possible remedial measures for successful implementation of low-cost houses in Wolaita Sodo.

I recognize that you being a professional having vast experience in the field, your response to the questionnaire will be a great contribution to my study. You are just required to tick in the appropriate choice/s for your response. I assure the confidentiality of all responses and your

responses will be used only for academic purpose. I am grateful to you for sparing your valuable time. I will appreciate every point that you will raised, every single point has its own value in my thesis works achievement and contribute to the improvements in low cost construction is incredible. If you have any questions please call on my

Mobile No: _____ or Email: _____

Thank you for your Cooperation!

Appendix-I

SECTION ONE: - GENERAL INFORMATION

I. Questionnaire for Stakeholders, please tick the appropriate box and write.

1. Organization Name:

2. Your position in the organization:

3. On what discipline your company engaged for in the construction of Low Cost Housing Construction?

☐ Contractor

☐ Consultant

☐ Wolaita Sodo Municipal and Construction office

☐ Material Supplier

☐ Micro and Small Enterprises

☐ Professionals or Resident

☐ Other, specify: _____

4. What is your area of specialization in the construction sector (contractor, consultants, Wolaita Sodo Municipal and Construction office)

☐ Building sector

☐ Plumbing works

☐ Finishing works

☐ Road construction

☐ Electrical Installation

☐ All infrastructure works

☐ Subcontract works

☐ Supervision

☐ Electrical Installation

☐ All infrastructure

☐ Other, specify: _____

5. For how many years does your organization engaged in the construction sector?

- ☐ 1-2 years
 ☐ 2-5 years
 ☐ 5-10 years
☐ 10-15 years
 ☐ 15-20 years
 ☐ More than 20 years,
☐ Other specify: _____

6. For how many years does your organization engaged in the low-cost housing construction?

- ☐ 1-2 years
 ☐ 2-5 years
 ☐ 5-10 years
☐ 10-15 years
 ☐ 15-20 years
 ☐ Morethan 20 years
☐ Other specify: _____

7. Which of the following grades qualifies your company?

GC=General Constructor BC=Building Constructor

- ☐ GC 1
 ☐ GC 2
 ☐ GC 3
 ☐ GC 4
 ☐ GC 5
 ☐ GC 6
 ☐ GC 7
☐ BC 1
 ☐ BC 2
 ☐ BC 3
 ☐ BC 4
 ☐ BC 5
 ☐ BC 6
 ☐ BC 7
☐ Others _____

8. How much project cost do you have at hand?

- ☐ Less than 10 million
 ☐ 10 million
 ☐ 10-20 million
☐ 20-30 million
 ☐ 30-50 million
 ☐ More than 50 million

9. How many active building projects do you have at hand?

- ☐ Less than 5 projects
 ☐ 5-10 Projects
☐ 10-20 Projects
 ☐ Greater than 20 Projects

10. Please indicate your education level

- ☐ None educated
 ☐ Diploma or Level
☐

- ☐ Bachelor Degree
 ☐ Master's Degree
☐ PhD degree
 ☐ Specify others: _____

11. What is your position in your Construction Company or consulting office or Low Cost Housing Project?

- ☐ Project Manager
 ☐ Daily laborer
 ☐ Foreman
 ☐ Mason
☐ Resident Engineer
 ☐ Construction Supervisor
 ☐ Office Engineer
☐ Superintendents
 ☐ Site Engineer
 ☐ Specify others: _____

II. Questions related to Low Cost Housing Construction Project

1. How do you describe the effect of current practice of low cost housing construction in accomplishment of your projects with in planned time and cost?

- ☐ Very high effect
 ☐ Average effect
 ☐ Little effect
☐ High effect
 ☐ Very little effect

2. What factors are highly influencing the implementation of low cost housing construction as your suggestion?

3. What is your suggested possible remedial measurement for successful implementation of low cost housing program?

4. Considering the rural-urban migration and population growth trend, do you think housing problem in Wolaita Sodo will be solved by low cost housing construction only?

Yes ☐ No ☐

5. Do you get the housing policy effective in providing low cost housing?

Yes ☐ No ☐

6. How do you see the effect of land policy on providing low cost housing?

☐ Very high effect ☐ High effect ☐ Average effect

☐ Little effect ☐ Very little effect

SECTION TWO: THE CURRENT PRACTICES OF LCH IMPLEMENTATION

No	Parameters	Level of awareness		
		Highly Aware	Aware	Not Aware
1	Use of locally available materials			
2	Partnership with private developers			
3	Community-based approach			
4	Government Subsidies			
5	Microfinance			

Put (√) according to their level of awareness highly Aware, Aware and Not Aware.

SECTION THREE: FACTORS INFLUENCING THE IMPLEMENTATION OF LCH

Please indicate to what extend for the following factors influencing the implementation of low-cost housing in your project (5-Very high effect, 4-High effect, 3-Average effect, 2-Little effect, and 1-Very little effect).

No.	Factor Influencing the implementation of Low-cost Housing Construction	Measurement scale				
		1	2	3	4	5
FACTORS RELATED TO ECONOMY						
1.	High capital/investment cost					
2.	Lack of public funding to support adoption of low-cost housing strategies/technologies					
3.	Lack of financial incentives					
4.	High cost of building/construction materials and technologies					
5.	Ineffective mortgage system/financial mechanism					

6.	High cost of land registration and acquisition of building permit					
7.	Market competition hold back low-cost housing adoption					
8.	Extra cost and time for low-cost housing construction					
FACTORS RELATED TO ADMINISTRATION						
1.	Slow and unmanageable administrative processes in certifying and policy achieving					
2.	Lack of Leadership skills on project management					
3.	Delays in government's approval process					
4.	Lack of an inclusive codes or policy package to guide action regarding low-cost housing					
5.	Lack of collaborative integration within leadership and roles among stakeholders					
6.	Lack of clear leadership and roles among project parties					
7.	Weak land allocation systems towards low cost housing development					
8.	Lack Established coordinating & supportive authority					
9.	Slow process in certificating and policy authorization for construction low-cost housing					
10.	Lack of education and training					
11.	Inadequate government participation					
12.	Lack of administrative cooperative consciousness collaborations					
FACTORS RELATED TO TECHNICAL AND DESIGN						
1.	Lack of integrated design and management					
2.	Lack of methodologies and tools to define and measure low-cost					

	housing					
3.	Lack of professional stakeholders in low-cost housing					
4.	Lack of knowledge on low cost housing construction techniques					
5.	Lack of professional expertise in low cost housing construction					
6.	Difficulty in pre-project planning					
7.	Inadequate monitoring of rework incidents					
8.	Complex and traditional design					
9.	Lack of Quality and availability of regular documentation					
FACTORS RELATED TO SOCIO-CULTURE						
1.	Lack of equal distribution of low-cost housing within society					
2.	Lack of social integrity in climate change and natural resource protection					
3.	Insufficient community Participation in the implementation of low-cost housing					
4.	Fear of social responsibility to improvement low-cost housing implementation					
5.	Ensuring community participation during delivery					
6.	Fear and risk in the adoption of new technology					
7.	Inadequate participation in housing design and information sharing among stakeholders on low-cost housing strategies (wide communication gap)					
8.	Cultural sensitivity towards low-cost housing development					
9.	Inadequate public facilities and difficulties to infrastructural development					
10.	Income inequality (weak income growth among most households)					

11.	Negative culture towards mortgage / loans for housing					
12.	Inadequate expertise for low-cost housing					
13.	Lacking opportunities for the development of low-cost housing Culture					
FACTORS RELATED TO ENVIRONMENT						
1.	Uncomfortable Climate condition					
2.	Unsuitable land-use plan					
3.	Inadequate encouraging of environmental assessment and protection					
4.	lack of effective Environmental improvement towards low-cost housing environment					
5.	Ensuring good accessibility and location					
6.	Shortage on land availability within town					
7.	Lack of knowledge and interest on reusing materials or components for new housing					
8.	Lack of sustainable waste management					

Appendix-II

SECTION FOUR: - INTERVIEW QUESTIONS

1. How is the communication system between parties (Contractors, Consultants, IHDP and Medium and Small-Scale Enterprises (MSEs) and other parties and all actors are communicated to implement the low-cost housing construction?

2. How the low-cost housing construction is managed?

3. How is the participation and contribution of consultants, contractors, medium and small-scale enterprises to the low cost housing projects?

4. What measures is your organization employing to ensure that the factors suggested affect the implementation of low cost housing program positively?

5. What implementation strategy needed to achieve low cost constructions to the targeted goal?

6. What are the consequences of poor implementation of low cost housing construction?

7. What are your biggest worries to provide low cost housing in Woliata Sodo (if any)?

8. What changes would you like to see as far as practice of low cost housing in Woliata Sodo is concerned (if any)?

9. Is the integrated housing construction policy being implemented as per the program constructed in Wolaita Sodo? Yes ☐ No ☐

10. If you tick No in what way you think to be the construction progress should improve?

11. Thank you for completing the questionnaires and discussion questions,

Would you like an electronic copy of the study? Yes ☐ No ☐

May you be contacted to discuss your replies further? Yes ☐ No ☐

If you replied 'Yes' to any of the above questions, please complete the following:

Name (Optional):- _____

E-mail:- _____

Tel. No: - _____

ANNEX

Table 4-13 Identification of all Factors Influencing the implementation of Low Cost Housing

ASSESSMENT OF CRITICAL FACTORS INFLUENCING LOW COST HOUSING PROJECT IMPLEMENTATION: IN CASE OF WOLAITA SODO, ETHIOPIA															
No	Factor Influencing Low Cost Housing Implementation	Measurement scale					W	N	A	ΣW	RII	Rank for each RII	RII Average	Total Rank	Rank for RII Average
		1	2	3	4	5									
FACTORS RELATED TO ECONOMY															
1	High capital/investment cost	2	4	18	23	27	74	74	5	291	0.7865	5 th		24 th	
2	Lack of public funding to support adoption of low-cost housing strategies/technologies	2	6	24	14	28	74	74	5	282	0.7622	8 th		39 th	
3	Lack of financial incentives	1	7	24	3	39	74	74	5	294	0.7946	3 rd		18 th	
4	High cost of building/construction materials and technologies	2	2	33	7	30	74	74	5	283	0.7649	7 th		37 th	
5	Ineffective mortgage system/financial mechanism	1	6	25	6	36	74	74	5	292	0.7892	4 th		21 st	
6	High cost of land registration and acquisition of building permit	1	2	20	13	38	74	74	5	307	0.8297	2 nd		6 th	

7	Market competition hold back low-cost housing adoption	2	4	10	18	40	74	74	5	312	0.8432	1 st		5 th	
8	Extra cost and time for low-cost housing construction	1	10	22	10	32	75	74	5	287	0.7757	6 th		31 st	
		12	41	176	94	270	593	592	40	2348	6.3459		0.7932		1 st
FACTORS RELATED TO ADMINISTRATION															
1	Slow and unmanageable administrative processes in certifying and policy achieving	3	11	25	9	26	74	74	5	266	0.7189	11 st		47 th	
2	Lack of Leadership skills on project management	3	12	31	7	21	74	74	5	253	0.6838	12 nd		49 th	
3	Delays in government's approval process	1	4	30	5	34	74	74	5	289	0.7811	7 th		27 th	
4	Lack of an inclusive codes or policy package to guide action regarding low-cost housing	3	1	36	9	25	74	74	5	274	0.7405	10 th		42 nd	
5	Lack of collaborative integration within leadership and roles among stakeholders	2	1	29	15	27	74	74	5	286	0.7730	8 th		33 rd	
6	Lack of clear leadership and roles among project parties	2	6	21	5	40	74	74	5	297	0.8027	5 th		14 th	

7	Weak land allocation systems towards low cost housing development	1	1	27	9	36	74	74	5	300	0.8108	3 rd		10 th	
8	Lack Established coordinating & supportive authority	3	4	12	4	51	74	74	5	318	0.8595	2 nd		4 th	
9	Slow process in certificating and policy authorization for construction low-cost housing	3	1	27	11	32	74	74	5	290	0.7838	6 th		26 th	
10	Lack of education and training	2	2	32	7	31	74	74	5	285	0.7703	9 th		35 th	
11	Inadequate government participation	1	2	17	6	48	74	74	5	320	0.8649	1 st		2 nd	
12	Lack of administrative cooperative consciousness collaborations	3	4	21	5	41	74	74	5	299	0.8081	4 th		12 nd	
		27	49	308	92	412	888	888	60	3477	9.3973		0.7831		3 rd
FACTORS RELATED TO TECHNICAL AND DESIGN															
1	Lack of integrated design and management	1	1	31	18	23	74	74	5	283	0.7649	7 th		37 th	
2	Lack of methodologies and tools to define and measure low-cost housing	2	9	44	8	11	74	74	5	239	0.6459	9 th		50 th	
3	Lack of professional stakeholders in low-cost housing	1	10	21	6	36	74	74	5	288	0.7784	6 th		30 th	

4	Lack of knowledge on low cost housing construction techniques	1	7	24	3	39	74	74	5	294	0.7946	5 th		18 th	
5	Lack of professional expertise in low cost housing construction	2	8	14	4	46	74	74	5	306	0.8270	2 nd		7 th	
6	Difficulty in pre-project planning	1	15	30	7	21	74	74	5	254	0.6865	8 th		48 th	
7	Inadequate monitoring of rework incidents	1	2	15	6	50	74	74	5	324	0.8757	1 st		1 st	
8	Complex and traditional design	2	2	17	25	28	74	74	5	297	0.8027	4 th		14 th	
9	Lack of Quality and availability of regular documentation	1	2	26	9	36	74	74	5	299	0.8081	3 rd		12 nd	
		12	56	222	86	290	666	666	45	2584	6.9838		0.7760		4 th
FACTORS RELATED TO SOCIO-CULTURE															
1	Lack of equal treatment in the distribution of low-cost housing within society	2	2	24	8	38	74	74	5	300	0.8108	3 rd		10 th	
2	Lack of social integrity in climate change and natural resource protection	1	1	43	10	19	74	74	5	267	0.7216	13 rd		45 th	
3	Insufficient community Participation in the implementation of low-cost housing	2	7	20	5	40	74	74	5	296	0.8000	4 th		16 th	

4	Fear of social responsibility to improvement of low-cost housing implementation	1	3	13	11	46	74	74	5	320	0.8649	1 st		2 nd	
5	Ensuring community participation during delivery	3	2	30	8	31	74	74	5	284	0.7676	10 th		36 th	
6	Fear and risk in the adoption of new technology	2	4	28	2	38	74	74	5	292	0.7892	6 th		21 st	
7	Inadequate participation in housing design and information sharing among stakeholders on low-cost housing strategies (wide communication gap)	1	3	41	4	25	74	74	5	271	0.7324	12 nd		44 th	
8	Cultural sensitivity towards low-cost housing development	2	2	16	35	20	75	74	5	294	0.7946	5 th		18 th	
9	Inadequate public facilities and difficulties to infrastructural development	1	1	31	15	27	75	74	5	291	0.7865	7 th		24 th	
10	Income inequality (weak income growth among most households)	1	4	37	4	28	74	74	5	276	0.7459	11 st		41 st	
11	Negative culture towards mortgage / loans for housing	1	2	35	4	32	74	74	5	286	0.7730	9 th		33 rd	
12	Inadequate expertise for low-cost housing	2	1	32	6	33	74	74	5	289	0.7811	8 th		27 th	

13	Insufficient opportunities for the development of low-cost housing Culture	2	5	19	8	40	74	74	5	301	0.8135	2 nd		8 th	
		21	37	369	120	417	964	962	65	3767	10.1811		0.7832		2 nd
FACTORS RELATED TO ENVIRONMENT															
1	Uncomfortable Climate condition	2	1	32	6	33	74	74	5	289	0.7811	4 th		27 th	
2	Unsuitable land-use plan	2	5	19	8	40	74	74	5	301	0.8135	1 st		8 th	
3	Inadequate encouraging of environmental assessment and protection	2	6	20	9	37	74	74	5	295	0.7973	2 nd		17 th	
4	lack of effective Environmental improvement towards low-cost housing environment	2	2	32	5	33	74	74	5	287	0.7757	5 th		31 th	
5	Ensuring good accessibility and location	1	1	47	2	23	74	74	5	267	0.7216	8 th		45 th	
6	Shortage on land availability within town	1	3	31	8	32	75	74	5	292	0.7892	3 rd		21 st	
7	Lack of knowledge and interest on reusing materials or components for new housing	2	7	25	18	22	74	74	5	273	0.7378	7 th		43 rd	
8	Lack of sustainable waste management	1	12	22	13	27	75	74	5	278	0.7514	6 th		40 th	
		13	37	228	69	247	594	592	40	2282	6.1676		0.7709		5 th