

The Benefits of Six Storey-Low Rise Residential Building (LRB) in the Province of Nueva Ecija; Evaluation of the Proposed Socialize Housing Project for Low-Income Families

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Abstract: - This study aimed to determine the Benefits of Six Storey-Low Rise Residential Building (LRB) in the Province of Nueva Ecija; Evaluation of the Proposed Socialize Housing Project for Low-Income Families. In Nueva Ecija, the employment of construction machinery in confined spaces, the existence of electricity lines close to the object of the house, and the presence of a substantial amount of bulk soil at the foot of the foundations all hampered the building process. This study utilized a descriptive research design wherein the questionnaire is structured based on the objectives of the study. Sampling is through Slovin formula in obtaining the number of respondents with 100 head of households. The findings revealed that most of the respondents had nuclear family structure having nine or/and more members. Most of them were tertiary level education and employed in industrial occupations. This has the implications of its benefits in terms of: (a) Better Standard of Living; (b) More Space with more FSI (Floor Space Index); (c) Lowers Energy Consumption; (d) Resilient; (e) Escape Plan; (f) Low Cost & Low Maintenance; (g) Community Living; and (h) Higher Resale Value.

Key Words: — *Six Storey, Low Rise Residential Building, Housing.*

I. INTRODUCTION

Within the scope of the housing project, which is a part of the National Housing Authority initiatives, the program for the relocation of citizens from emergency housing started as one of the first. The experience of using recycled materials and structures in the construction of low-rise buildings and structures, in the construction of access roads, within the village roads, makes it possible to significantly lower the cost of constructed housing. This is due to the widespread demolition of buildings and structures as a result of the simultaneous appearance of enormous volumes of construction debris. In parallel, procedures for residents' active involvement in the creation of a comfortable urban environment are developed.

Construction under challenging geological settings with challenging relief and space congestion is a significant issue in urban areas. There are numerous instances of relief situations being successfully used during building at various points in history. The city planners of ancient Greece, the Middle Ages, and the Renaissance were successful in this regard. Urban planning frequently takes the conditions of alleviation into careful account. In the modern world, city planners collaborate with experts from related fields of science and business, such as climatologists, geomorphologists, hygienists, and transport workers, on particular aspects of urban planning in complex relief. The characteristics of complex relief force constant search for new, situation-appropriate solutions. Summarizing the experience of taking into account the relief features in the structure of buildings that provide low construction costs is one of the key responsibilities of urban planning.

The smallest buildings made in considerable quantities are classified as low-rise residential structures. For instance, single-family detached homes typically have between 90 and 180 square meters of enclosed floor space and range from one to three floors in height. The urban row home and walk-up

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apartment complexes are more examples. Due to the low purchasing power of their owners, these forms typically have low unit costs. Since there is a widespread geographic need for this kind of housing, the majority of units are constructed on-site by small, local contractors who use a sparse number of huge machineries. Small builders are better able to withstand these economic fluctuations than huge organizations because the demand for these buildings might vary greatly locally from year to year. Building solutions created for this market take advantage of its cheap unit prices and reliance on manual labor. Many single-family detached homes are "factory-built," which means that substantial portions of the structure are prefabricated and then delivered to the construction site, where additional labor is necessary to complete the finished product.

II. BACKGROUND OF THE STUDY

Designers are influenced by national aesthetic values in contemporary practice. Plans for different residential building styles to be built on challenging terrain are being created. The layout method's typology of housing organizes the variety of housing in a specific region and gives designers the chance to select the best form of home in challenging topographical circumstances. The universal property of the relief is given particular consideration. It is a part of any architectural object that can be seen, as is common knowledge. Architecturally and aesthetically, the intricate relief offers fantastic opportunities to give the city a distinctive, expressive appearance. The newly constructed house is well received and melds seamlessly with its surroundings.

It should be noted that the development of complex terrain results in an increase in construction costs because monolithic reinforced concrete structures must be set up manually, using construction equipment requires little experience, and using prefabricated reinforced concrete structures due to their massive size is impossible. The negative effects of building location on slopes are related to finding solutions for specific organization and execution issues. The solution to the following issues is greater complexity: ensuring the efficiency of earthmoving and lifting equipment; selecting strategies to shield the construction site from the flow of storm water; and designing access roads.

It is important to emphasize yet another element of how complex relief affects the location of structures on slopes. The threat posed by slope instability is this. When creating construction technologies for landslide slopes, these concerns

should also be taken into consideration. The aforementioned implies that a scientific approach is necessary for building design and construction under complicated terrain conditions. By incorporating fresh creative ideas, the scientific and methodological underpinnings of such design and construction should be strengthened. This outlines the study's goals and purpose.

In Nueva Ecija, the employment of construction machinery in confined spaces, the existence of electricity lines close to the object of the house, and the presence of a substantial amount of bulk soil at the foot of the foundations all hampered the building process. Because of the tight financial constraints, it was chosen to employ pre-used reinforced ribbed slabs to build the building's base and walls. Blocks made of trimmed gas silicate are utilized for the walls. It was decided to rebuild the old garage and use it as a component of the house. To that end, its supporting structures were examined. The study revealed the necessity to fortify the soil beneath the garage's foundations. Short driven piles were employed to reinforce the foundations, and the garage's foundation was "transplanted" to a slab monolithic reinforced concrete foundation.

III. THEORETICAL FRAMEWORK

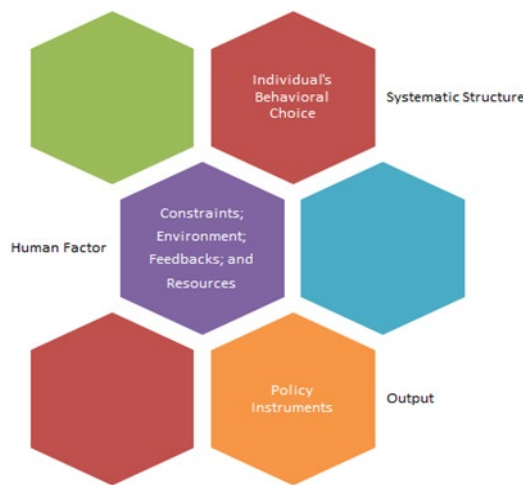
The experience of designing and constructing a low-rise residential building is the subject of the study. The building uses rational reinforced concrete, brick, gas silicate, and other structures to create simplified geometric forms that represent the inner content (functional operations are quickly structured). Such a method of design is typical of the functionalism movement. The term "functionalism" refers to a variety of contradictory styles that appeared in the "new architecture" of different nations following the First World War. Walter Gropius and Ludwig Mies van der Rohe are considered the founders of functionalism. In their works, Gropius and his followers emphasize that the appearance of structures should be determined by the efficient use of time, resources, and money. The development of the plan for the house under discussion was greatly influenced by this opinion.

Additionally, it should be highlighted that a significant alteration to the relief's natural structure would be expensive and would violate the area's overall picturesqueness. Therefore, it makes sense to develop terraces for specific buildings or parts of them in regions where there is a clear bias. They can range in size. Green lines, slopes, and retaining walls can be used as the primary way of interacting the terraces. When buildings

with terraces are erected on a site, it becomes necessary to adapt them to the relief. This problem can be solved by erecting a basement floor, which has a large glass area in the southeast and a northern side with no windows and is underground.

The ground-floor hall and kitchen are functionally connected to the patio. This terrace has the unique advantage of being shielded from the north and north-west winds by the slope and the house that faces the terrace, allowing you to create a comfortable space to unwind even in windy conditions. The terrace's boundaries are strengthened and made more attractive by the trees and bushes that were planted there. Bathrooms and pantries are separate from bedrooms. The first and second floors are where they are located. The second entry to the home is through the vestibule and is accessible from the street (from the second terrace). The garage's entrance is located on the same level. A double-march ladder in the centre of the home connects the heights of all the rooms.

The house in question has a stepped shape to its bulk. In the 1970s and 1980s, such specialized house designs for sloped terrain were adopted, and research by a number of specialists demonstrated that these homes' economic and functional performance indicators are comparable to those of homes constructed on flat land. They can be constructed on the slope's borders and have a shape that closely resembles the relief's layout. In this instance, the residential building's coordination with the scale of the landscape is aided by the partial introduction of the structure into the ground and the division of large volumes into parts. The structure appears as a decorative element in the surrounding natural landscape when seen from the reservoir.



IV. METHODOLOGY

This study aims to determine the benefits of Six Storey-Low Rise Residential Building (LRB) in the Province of Nueva Ecija as an evaluation for the proposed socialize Housing Project for Low-Income Families. More specifically, it will be guided by the following research questions:

- A. How May the Socio-Economic Status of The Family Be Described in Terms Of:
 - Family Structure;
 - Number of Family Members;
 - Ethnic Affiliation;
 - Highest Educational Attainment; and
 - Sources of Income?
- B. What are the perceived benefits of Six Storey-Low Rise Residential Building (LRB) be described along:
 - Constraints;
 - Environment;
 - Feedbacks; and
 - Resources?
- C. What implication can be drawn from the results of the study?

This study will utilize a descriptive research design wherein the questionnaire is structured based on the objectives of the study. Sampling is through Slovin fomula in obtaining the number of respondents. The table below shows the frequency distribution of the samples.

Table.1. frequency distribution of the samples.

Total Number of Families	329,274
Annual average family income (in peso)	121,995
Annual average family expenditure (in peso)	98,289
Annual average family saving (in peso)	23,706
Number of Households	340,158
Average household size	4.87

The household population was 340,158. Applying the Slovin formula with 10% margin of error, the computed sample size was 99.97 or 100. The information which will be obtained from the respondents will be treated by frequency count and percentage for the socio-economic status of the families while average weighted mean will be employed to the benefits of the six-storey low rise residential building.

V. RESULTS AND DISCUSSION

Most of the respondents had the family structure of nuclear family equivalent to 67% of the total sample. Least among them were childless and stepfamily structure. Seventy-one percent of the total sample had 9 family members or/and more while least among them had one to two family members. Seventy-eight percent of the total sample attained tertiary level of education while only two percent attained elementary level. Most of the respondents outsourced the family income through industrial occupation equivalent to thirty-two percent of the total sample while only four percent were engaged into businesses.

Non-nuclear families face a number of issues in addition to single-family zoning. The places where non-nuclear families are permitted to dwell are constrained on both a legal and social level by realtors, landlords, and community members. All of these issues must be resolved in order to provide non-nuclear families with liberty and justice, but the logical place to start is by putting an end to single-family zoning's dominance. The government must make sure that our housing and zoning rules are accommodating for the full diversity of human family configurations and fostering an inclusive environment as civil engineers continue to change and our understanding of the family deepens. Flexibility would be added to home construction by making housing modular, which would include adding entrances and exits, giving small units that are partially detached from common areas, and not presuming that everyone in the house will be a close-knit family. Apartment complexes should be able to accommodate extended families and changes in their life circumstances if the conventional ideal of having a home is no longer the top objective for families.

Families of preference are not frequently a target market for housing development. However, a lot of people who live apart from their families of origin could choose to live with their pals. This social reality could be accommodated in buildings with private portions or apartments mixed in. Cohousing is another useful and reasonably priced solution. Shared spaces are surrounded by small units or houses in cohousing developments.

Cohousing is typically intended for unrelated groups that appreciate community space but who do not interact frequently. For families with multiple generations, the same concept might be modified.

Table.2. Socio-Economic Status

Family Structure	Frequency	Percentage
Nuclear Family	67	67.0%
Single-Parent Family	9	9.0%
Extended Family	8	8.0%
Childless Family	1	1.0%
Stepfamily	1	1.0%
Grandparent Family	12	12.0%
Independent Family	2	2.0%
Total	100	100.0%
Number of Family Members	Frequency	Percentage
1 to 2	3	3.0%
3 to 4	6	6.0%
5 to 6	4	4.0%
7 to 8	16	16.0%
9 or/and above	71	71.0%
Total	100	100.0%
Highest Educational Attainment	Frequency	Percentage
Elementary	2	2.0%
Secondary	14	14.0%
Tertiary	78	78.0%
Others	6	6.0%
Total	100	100.0%
Sources of Income	Frequency	Percentage
Business	4	4.0%
Government Compensation	7	7.0%
Industrial Employment	32	32.0%
Private Office Compensation	27	27.0%
Agricultural Occupation	22	22.0%
Others	8	8.0%
Total	100	100.0%

The number of people living in a household has an impact on their consumption habits for products and services that may be distributed among them. One factor contributing to an increase in per capita and total energy demand in residential buildings, including lighting, heating, and fuel for cooking, in industrialized nations is the shrinking household size. Water supply, solid waste disposal, and home appliances are additional products and services that may be impacted by household size. Thus, the indicator keeps track of a crucial component that could have an impact on household consumption in the home market.

The distinctions between the housekeeping notion of a household and the concept of a household as a place to live should be taken into account when examining the relationships between household size, demand for residential services, generation of household trash, and other amenities. Different nations utilize these two ideas.

An alternative definition, known as the "household-dwelling notion," is any group of people who reside together in a single housing unit.

Living quarters are categorized into two main groups:

- Housing units, which are independent, separate dwellings designed for living by a single household, however they may be shared by several according to the housekeeping idea;
- Collective living quarters: According to the housekeeping concept, collective living quarters are independent, physically separate dwellings designed for usage by many households or large groups of people. These accommodations typically include a few shared amenities, like kitchen and bathroom fixtures, bathtubs, living spaces, and dorm rooms. Hotels, different types of accommodation housing, institutes, and camps are among them.

A vital need for each student's success in school is a safe and secure home environment. Students who live in high-poverty areas, in substandard or insecure housing situations, face a well-documented uphill climb to achieving their academic potential. It is true that children from safe and secure home environments do not always reach their academic potential (and some students who do meet their potential do come from unsafe and/or insecure home environments). Many studies looking at the connection between housing and educational achievement are part of a larger literature that looks at how neighborhoods affect a variety of economic, social, and health outcomes for people and families, with educational achievement being one area of study within this larger research field.

Benefits of the constraint of the Six Storey-Low Rise Residential Building (LRB) gained 2.82 average weighted mean and interpreted as moderately beneficial including exemptions and reductions to improvement requirements, deferring costs of required improvements, exemptions and credits/deductions, prepayment or maturity of federally-subsidized mortgages and expiration and termination of subsidy contracts. The environment factor gained 2.72 average weighted mean and interpreted as moderately beneficial in terms of material use, site preparation and use, energy use and emission. The feedback factor gained 2.78 average weighted mean and interpreted as moderately beneficial including more space is more value, more privacy, financial considerations and sustainable living. The resources factor gained 2.81 weighted mean and interpreted as moderately beneficial in terms of being near to market, workplace, amusement, capital vicinity and industrial belt.

Numerous studies have shown that kids from low-income neighborhoods don't perform as well academically as their counterparts from middle- and upper-class neighborhoods. Studies analyzing the educational advantages for kids who leave high-poverty communities with underperforming schools, however, produce conflicting findings. Several important factors, such as the quality of the new neighborhood and school, the reason families moved in the first place, the age of the children when they move, and the length of time they stay in the new situation, all play a significant role in determining whether leaving a high-poverty neighborhood with low-performing schools will result in educational improvements for specific youth.

The choice between high-rise and low buildings presents additional challenge for those purchasing a home. One cannot ignore the advantages of low-rise apartments even though taller flats have a more stunning and captivating appearance.

Table.3. Benefits of Six Storey-Low Rise Residential Building (LRB)

Constraint	AWM	Description
Exemptions and Reductions to Improvement Requirements	2.89	Moderately Beneficial
Deferring Costs of Required Improvements	2.67	Moderately Beneficial
Exemptions and Credits/Deductions	2.85	Moderately Beneficial
Prepayment or maturity of federally-subsidized mortgages	2.84	Moderately Beneficial
Expiration and termination of subsidy contracts	2.87	Moderately Beneficial
<i>Average</i>	2.82	Moderately Beneficial
Environment		
Material Use	2.91	Moderately Beneficial
Site Preparation and Use	2.67	Moderately Beneficial
Energy Use	2.62	Moderately Beneficial
Emissions	2.66	Moderately Beneficial
<i>Average</i>	2.72	Moderately Beneficial
Feedbacks		
More space is more value	2.60	Moderately Beneficial
More privacy	2.78	Moderately Beneficial
Financial Considerations	2.94	Moderately Beneficial
Sustainable Living	2.78	Moderately Beneficial
<i>Average</i>	2.78	Moderately Beneficial
Resources		
Near Market	2.81	Moderately Beneficial
Near Workplace	2.81	Moderately Beneficial
Near to Amusement	2.70	Moderately Beneficial
Near to Capital Vicinity	2.93	Moderately Beneficial
Near to Industrial Belt	2.81	Moderately Beneficial
<i>Average</i>	2.81	Moderately Beneficial

While there are undoubtedly many considerations before making a final choice, such as cost, location, facilities, etc., choosing the type of structure comes out on top. Low rise structures, as the name implies, have fewer floors and flats with fewer residents. In contrast to high-rise buildings, low-rise structures typically have four or fewer storeys, with two to three apartments on each floor. High-rise and occasionally skyscraper buildings are those with more than six stories.

In comparison to high-rise flats, low-rise buildings offer greater privacy and are more amenable to negotiating rent and utilities. Additionally, residents of these buildings choose them because they provide them with more usable space and improved access to the entry and exits.

Nowadays, people attempt to stay away from densely populated residential areas. The social alienation is the new normal, especially in the wake of the COVID-19 pandemic, and it has an impact on housing trends as well. Home buyers want calm in the societies that provide them with open spaces and healthier air because they are tired of the stone jungles, which have a shortage of open space. The ratio of a covered floor's area to the area of the land on which a structure is situated is known as the floor space index (FSI). When an area's FSI is constrained, developers must construct low-rise structures. Additionally, the low-rise buildings have more usable space, resulting in bigger spaces than the high-rise structures.

In the event of a disaster, none of us are oblivious of the fires and high-rise building collapses. High-rise buildings have longer evacuation times and greater collapse risks. There is easy access to the street from residential structures that are low to mid-rise. Additionally, the exits are closer to the ground, which makes them safer for evacuation.

Policymakers and other designers now have a potent new tool in their arsenal to combat growing housing costs. The global response to the housing issue has a long-standing weakness that the low-rise housing concept seeks to correct. Despite planners' best efforts to promote higher-density residential development, the endemic low-density nature of the local urban fabric has hindered reformers and presented logistical and political difficulties. As populations increase and there is less space to absorb them, most cities are expanding vertically. To satisfy the rising demands of home purchasers from various income categories, developers are progressively creating high-rise apartment buildings in both the budget and luxury segments.

In response to this issue, engineers and architects are developing low-cost, simple-to-build housing typologies that maximize potential units per acre, take advantage of the city's current low-rise scale, and activate the ground plane for social interaction and environmental preservation. Buyers have to decide between high-rise and low-rise buildings when buying a house. While it can seem that taller apartments are more inviting, low-rise apartments also have their benefits.

According to specialists in urban construction, the growth of satellite townships will raise demand for low-rise apartments in

the upcoming years. In addition, a stated poll indicates that the low-rise construction design appears to have gained traction, with these apartments making up 28 percent of projects. Low-rise structures have fewer occupants than high-rise ones, giving them greater privacy and utility and rent flexibility. The fact that these structures give them more usable space and better access to the entrances and exits is another reason why residents of the strata that has been economically privileged favor them. The task of designing or modifying urban surroundings to accommodate this rapidly expanding population falls on city planners and developers. Because they enhance space efficiency, accommodate more people per square meter, and prevent urban expansion, many individuals think that bigger, more densely packed skyscrapers are the way to go.

VI. IMPLICATION

The task of designing or modifying urban surroundings to accommodate this rapidly expanding population falls on city planners and developers. Because they enhance space efficiency, accommodate more people per square meter, and prevent urban expansion, many individuals think that bigger, more densely packed skyscrapers are the way to go.

6.1 Better Standard of Living

Low-rise structures have fewer occupants than high-rise ones, giving them greater privacy and utility and rent flexibility. The fact that these structures give them more usable space and better access to the entrances and exits is another reason why residents of the strata that has been economically privileged favor them. Nowadays, people make an effort to avoid settling in densely populated places. Social estrangement has become the new norm, particularly in the wake of the COVID-19 pandemic, which has an effect on housing trends.

6.2 More Space with more FSI (Floor Space Index)

The FSI is the proportion of a covered floor's (sometimes referred to as the built-up area) area to the area of the plot of land on which a structure is situated. Developers must build low-rise structures if the FSI of the area is restricted. Additionally, low-rise structures offer more usable space than high-rise structures, creating rooms with more space.

6.3 Lowers Energy Consumption

A low-rise building guarantees that your property will experience temperate weather. As you ascend, the temperature of the air decreases and the average wind speed increases. Taller buildings are consequently susceptible to greater hours

of direct sunshine and harsher winds. As a result, as we ascend, our energy consumption for heating and cooling increases.

6.4 Resilient

A low-rise building is more earthquake-proof than a high-rise building. Additionally, getting to a secure area in a low-rise building is simpler and quicker because lifts are typically not in use during natural catastrophes.

6.5 Escape Plan

The higher population density of a tall building can be an issue in an emergency or dangerous circumstance. Controlling a fire, for instance, is a challenging undertaking since fear often results in the untimely evacuation of all building occupants. One has ample time and room to safely leave if one lives in a low-rise structure.

6.6 Low Cost & Low Maintenance

Due to cheaper building expenses for the builder, low-rise apartments are often less expensive than high-rise flats. Because less equipment is needed for upkeep, low-rise structures provide cheaper maintenance expenses for both developers and inhabitants.

6.7 Community Living

Although we all desire a certain amount of solitude in our lives, it is unsettling to live in a complex without any friendly neighbors who could come to our aid in an emergency. A low-rise building offers sufficient privacy and facilitates social interaction due to the smaller area

6.8 Higher Resale Value

A low-rise building will almost probably fetch a greater price if one decides to resell your home in the future. Low-rise apartments can offer superior resale value because they are less expensive and have a larger chance of price growth than high-rise flats.

VII. CONCLUSIONS AND RECOMMENDATIONS

Low-rise construction has long been popular. Due to property searchers' adaptation to city living, its demand has decreased over time, although it has always existed in the real estate market. The independence, resale value, and simplicity of utilizing the amenities, among other factors, have maintained the demand. However, there are also some drawbacks. Since the most recent flood, which required an immediate evacuation, there has been an ongoing surge in demand for the low-rise building. However, the choice has its own set of benefits and

drawbacks; the advantages of purchasing or building a low-rise house are greater than the drawbacks, particularly in relation to the low cost of construction and upkeep, which has caught the attention of both buyers and builders.

The present increase of low-rise residences is mostly caused by the small population density and dearth of green space in major cities. Low-rise structures have fewer floors and fewer households, which results in a quieter lifestyle and limited access to the project's facilities. Additionally, in the post-COVID-19 world, reduced population density guarantees less social interaction, which is a crucial factor in choosing a residence in the new normal. High-rise residences could be challenging for elderly people to live in. Typically, as we age, we get apprehensive around heights and quick movements. As a result, low-rise residential buildings are preferable over high-rise ones.

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