

Creating an Innovative Blueprint for Barangay Development

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Abstract: *This study is focused on the augmentation, extension, and enrichment of knowledge pertaining to the design of a new development plan for Barangay Babuyan in Carrascal, Surigao Del Sur. The central emphasis is placed on the intricate interplay between person-environment relationships, particularly concerning the innovative facilities being designed, notably housing. Through a comprehensive approach, the researchers executed a survey in line with the guidelines established by the Municipal Planning and Development Council (MPDC) of Carrascal.*

As per the MPDC, the designated relocation site encompasses a total area of 100,000 square meters, with each unit boasting a floor space of 48 square meters and an accompanying lot area of 100 square meters. The proposed project involves multifaceted considerations encompassing critical elements such as road network layout, housing design, electrical and water storage tank plans, drainage systems, and provisions for open spaces. This endeavor integrates a range of methodologies including surveying, on-site investigation, data collection, formulation of a novel barangay development plan, and comprehensive cost estimations. The development of a meticulously designed plan stands as a pivotal solution that addresses various aspects of community growth. This design, projected to efficiently accommodate the entire barangay, is rooted in the observation of a positive 2.33% average population growth rate from 1990 to 2015. Furthermore, the chosen relocation site holds the advantage of being hazard-free, exhibiting low susceptibility to landslides. The newly conceptualized barangay development plan is characterized by an easily accessible road network featuring a width of 6 meters. This network is illuminated by energy-efficient 100W solar LED street lights. In tandem, the plan includes a 3.50m x 3.50m water storage tank and an 8m x 6m house design encompassing a bedroom, living area, kitchen, and shared bathroom. The culmination of this proposed study is marked by its high level of acceptance, as it fulfills the requisites set forth by the Local Government Unit (LGU) and is aligned with the aspirations of the residents.

Keywords: blueprint, innovative, barangay, development.

I. INTRODUCTION

Development is a multifaceted process that catalyzes growth, fosters progress, introduces positive changes, and adds various dimensions encompassing the physical, economic, environmental, social, and demographic domains [2]. Relocation, on the other hand, signifies the deliberate act of shifting from one location to another, thereby establishing a new domicile. This process is characterized by permanence and voluntariness, often facilitated through governmental policies and initiatives. Such endeavors encompass extensive community-focused initiatives, entailing the redevelopment and reconstruction of housing, services, and livelihoods within the newly designated relocation site [2]. For the relocation to be deemed essential and justifiable, it is imperative that meticulous attention is devoted to designing and developing the process in a manner that aligns with the distinct needs and rights of the affected community members. This approach is integral to realizing desired outcomes and effectively mitigating substantial risks associated with natural hazards [3, 4]. By intricately integrating community considerations into the relocation strategy, potential adverse impacts are minimized, fostering a more sustainable and harmonious transition.

In 2015, the population statistical survey conducted in barangay Babuyan recorded a total population of 721 residents, with an annual population growth rate of 8.43 percent [5]. Over the subsequent years, the population continued to

expand. However, in 2018, this barangay encountered a series of challenges and calamities. These events prompted the researchers to engage in interviews with local residents. According to one interviewee, the recent conditions in barangay Babuyan are far from safe, particularly during the rainy season, when landslides and mud floods disrupt the area. The adverse impacts of these natural events have led to sleep disturbances and other safety concerns [5, 6, 7]. Presently, the residents of Barangay Babuyan find themselves residing in a temporary relocation site, which, regrettably, also raises safety apprehensions. This site is located in close proximity to a mining area, adding further layers of uncertainty to their living conditions. The community members express a reluctance to be relocated to a distant location that might impede their access to employment and livelihood opportunities [8, 9].

Through this study, the residents' wishes and needs are addressed, culminating in the formulation of a new development plan for their permanent relocation. This process aligns with their aspirations while taking into account their safety and well-being in the context of the shifting landscape of barangay Babuyan. The research extends its scope to encompass the creation of a novel barangay development plan in Babuyan, Carrascal, Surigao Del Sur. This comprehensive plan aims to effectively address and rectify the safety concerns prevalent within the community. The researcher is driven by the objective of conceptualizing and constructing a secure, convenient, and eco-friendly community within a fresh permanent relocation setting. The essence of this research study lies in its aspiration to effectively cater to the community's desired goals and requirements [10, 11, 12, 13].

II. METHODS

The project's conceptualization, as depicted in Figure 1, delineates the progression of the study from inception to culmination. Commencing with an initial site visit, the study begins by assessing the location where the project is to be executed. This initial step involves the researchers' firsthand observations and interactions with residents, who provide insights into the prevailing community issues. These insights are supplemented by quantitative data from analogous studies conducted in other locales, thus serving as a foundation for the design process.

Subsequently, a comprehensive survey of the relocation site is undertaken, drawing upon data sourced from the Municipal Planning and Development Coordinator (MPDC) of Carrascal. This survey serves as a vital tool in estimating the extent of the area slated for design. With the acquired data in hand, preliminary designs are meticulously crafted to align with the community's requirements, as stipulated by the Local Government Unit (LGU).

Ultimately, the culmination of the project yields a tangible output: a meticulously designed new barangay development plan for Babuyan, Carrascal, Surigao del Sur. This blueprint encapsulates the culmination of diligent site visits, data analysis, and responsive design formulation.

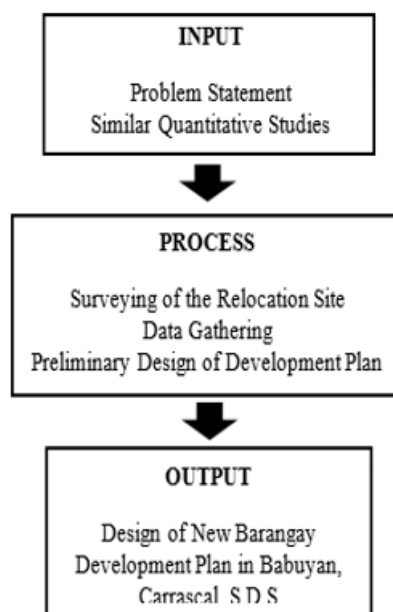


Figure 1.Flowchart of the Study

Figure 2 illustrates the components intended for incorporation within the framework of the envisioned development plan. Thorough and meticulous planning is imperative to ensure that all necessary elements are effectively accommodated. Substantial land allocation is paramount to realizing the objective of crafting a well-structured and aptly designed development.

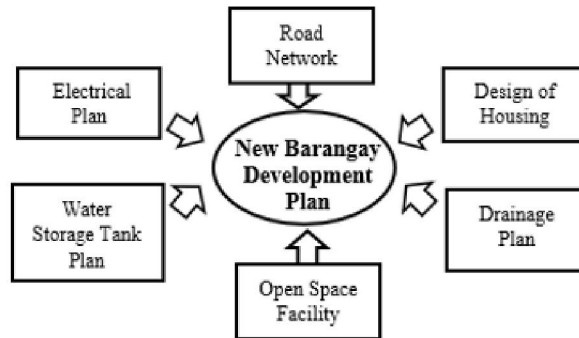


Figure 2.Facilities of the Development Plan

Figure 3 shows the project development flow. The researcher undertakes a survey of the relocation site, made possible through the cooperation and authorization of the Barangay Captain and Council members of barangay Babuyan. Subsequent to this, a field investigation is conducted to ensure the suitability and safety of the identified area as a potential permanent relocation site for the community.

Data collection is facilitated with unwavering support from the Municipal Planning and Development Coordinator (MPDC) of Carrascal, Surigao del Sur. The procured data includes mapping information and precise measurements of the total relocation site area, pivotal for plotting the layout of essential elements such as residences, school structures, roads, drainage systems, and other requisite facilities.

Subsequently, the data amassed by the researcher forms the foundational basis for the formulation of a new barangay development plan for Barangay. Babuyan. This process is succeeded by the arrangement of the proposed barangay development plan's layout, meticulously organized for optimal accessibility.

Following this, the computation of cost estimates for the structures encompassed in the proposed barangay development plan can be undertaken, with the workflow serving as a pivotal guide. This estimation signifies an approximation of the anticipated project costs, derived from available information and pertinent factors.

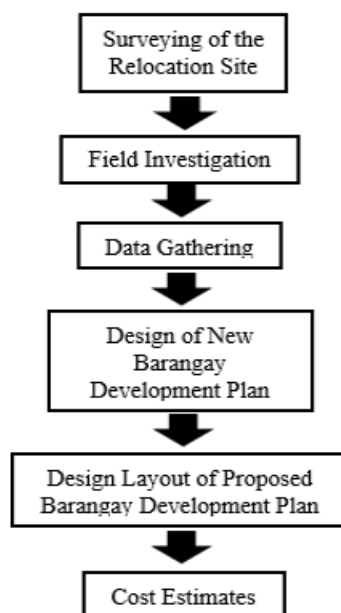


Figure 3. Project Development Flow

2.1 Project Setting

The project is sited at Brgy. Babuyan, Carrascal, Surigao del Sur. The lot area of relocation site is approximately ten (10) hectares.



Figure 4. Location of the Project

2.2 Instruments

This study employs a selection of computer software applications as tools for conducting the research.

Drafting software pertains to computer-aided programs employed for the creation of blueprints across diverse fields, ranging from architecture to bridges and even computer chip design.

Graphic software, offered by Google, provides a versatile platform for both 3D and 2D modeling, well-regarded for its intuitive interface. This software proves particularly advantageous in fields such as architecture, film production, and game design, facilitating the transition from two-dimensional concepts to dynamic three-dimensional structures through an innovative technique involving pushing and pulling.

On a global scale, Structural Design Software emerges as a prominent solution for comprehensive structural analysis and design. Its capabilities encompass an array of analysis methods, spanning from traditional static analysis to cutting-edge approaches like p-delta analysis, geometric non-linear analysis, Pushover analysis (Static-Non Linear Analysis), and buckling analysis. Additionally, it encompasses a spectrum of dynamic analysis techniques, ranging from time history analysis to response spectrum analysis.

The suite of Microsoft Office tools, which includes Microsoft Excel, Microsoft Word, and Microsoft Project, plays an integral role in facilitating the current research endeavors. These applications expedite the creation of reports, construction estimates, PERT-CPM analyses, and related tasks, thus streamlining the processes of documentation and data input. Notably, Microsoft Project aids researchers in estimating costs and establishing a comprehensive work breakdown structure. Furthermore, it offers scheduling functionalities, serving as a cornerstone for monitoring the progress of construction in terms of adhering to planned timelines.

III. RESULTS AND DISCUSSION

To assess the resilience of the proposed relocation site against potential hazards, the hazard maps for landslides and floods in Brgy. Babuyan, Carrascal, Surigao del Sur is depicted in Figure 5, were taken into account. In the figure shown below, the proposed relocation site belongs to the low landslide susceptibility

Figures 6, depict the design of a novel barangay development plan. Encompassing a total land area of 10 hectares or 100,000 sq. m, this plan primarily emphasizes the layout of residences, road networks, electricity infrastructure, and water facilities. Undertaking the task of shaping a 10-hectare expanse into a vibrant and functional community, this development plan represents a blueprint for efficient land utilization and sustainable growth.

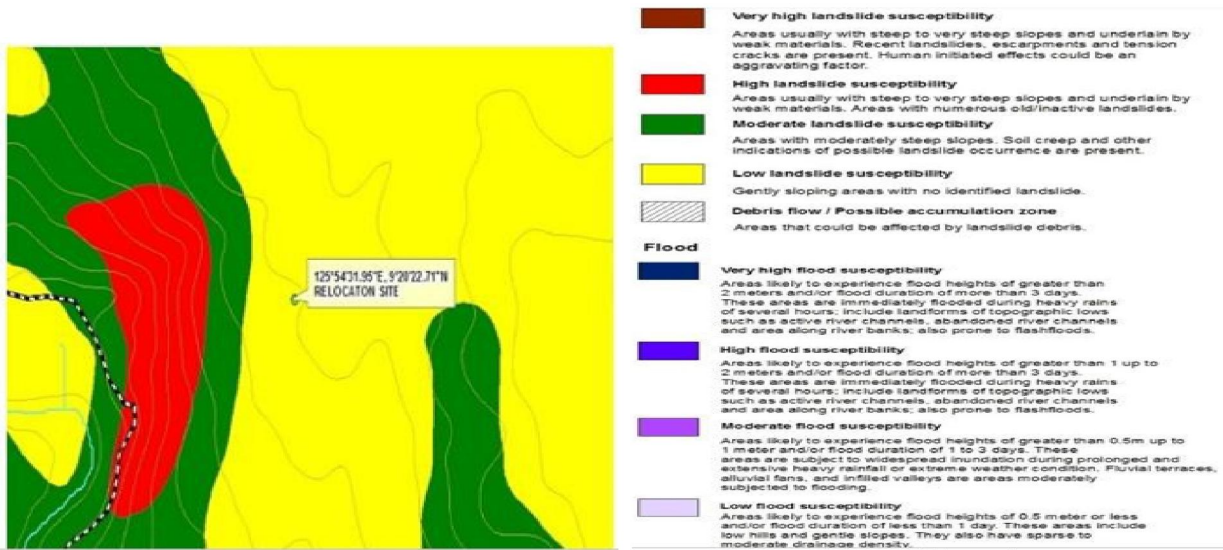
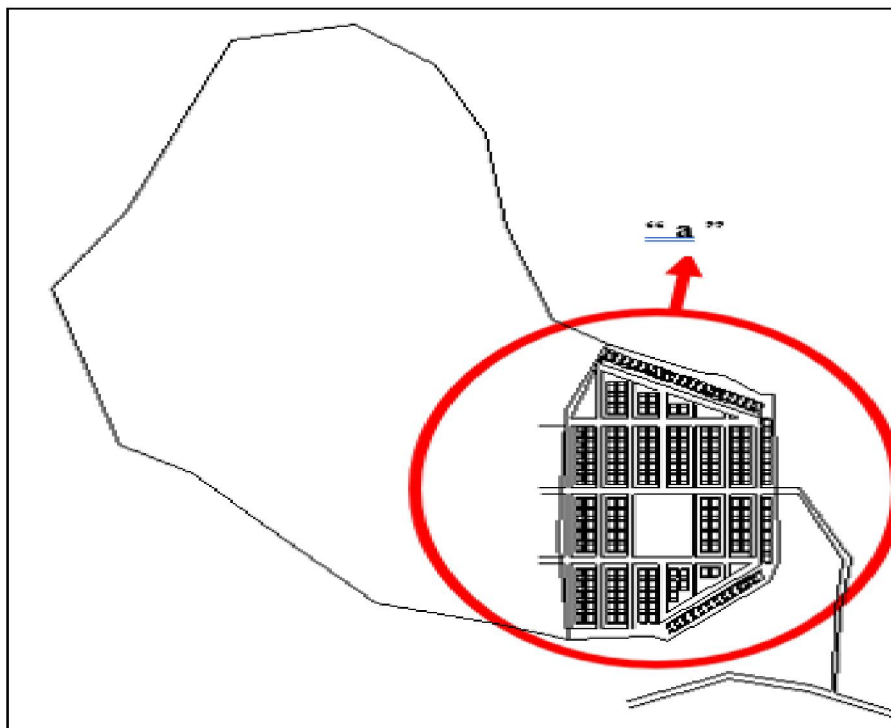


Figure 5.Hazard Map

With careful consideration of the unique characteristics and needs of the area, the plan aims to strike a balance between residential, recreational, and essential infrastructure components. By harmoniously blending residential zones, recreational facilities, green spaces, and necessary utilities, the envisioned development aspires to create a cohesive and well-connected living environment. This plan seeks to enhance the property's value by crafting a harmonious ecosystem where residents can thrive, interact, and coexist in a thoughtfully designed landscape that promotes quality of life and community well-being. Having a development plan is of paramount importance as it provides a strategic framework and roadmap for organized growth, sustainable progress, and effective resource management in various contexts, including urban planning, community development, and project execution.



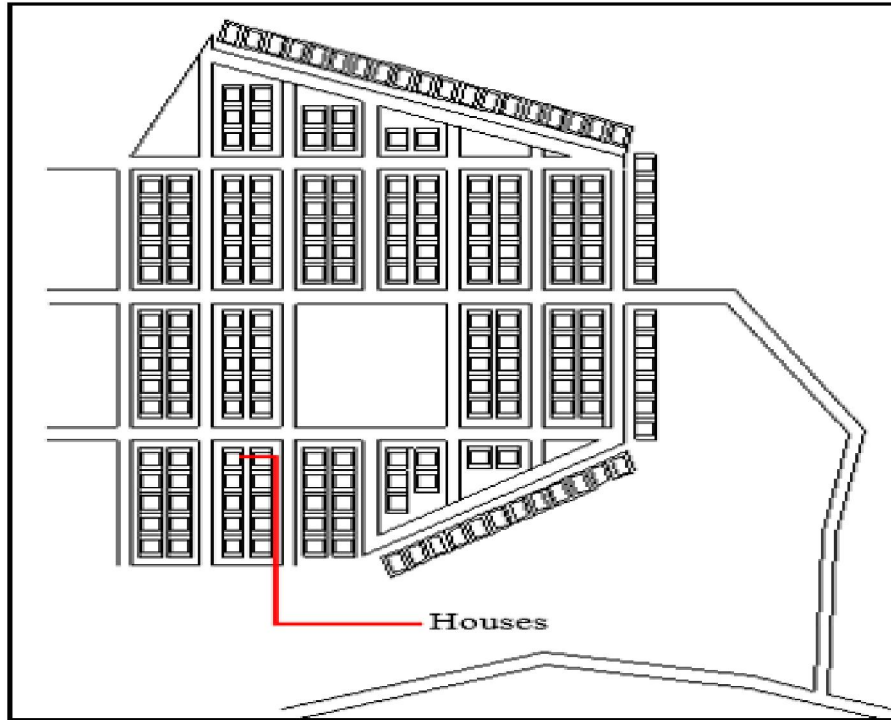


Figure 6. Development plan

Water Facility Design

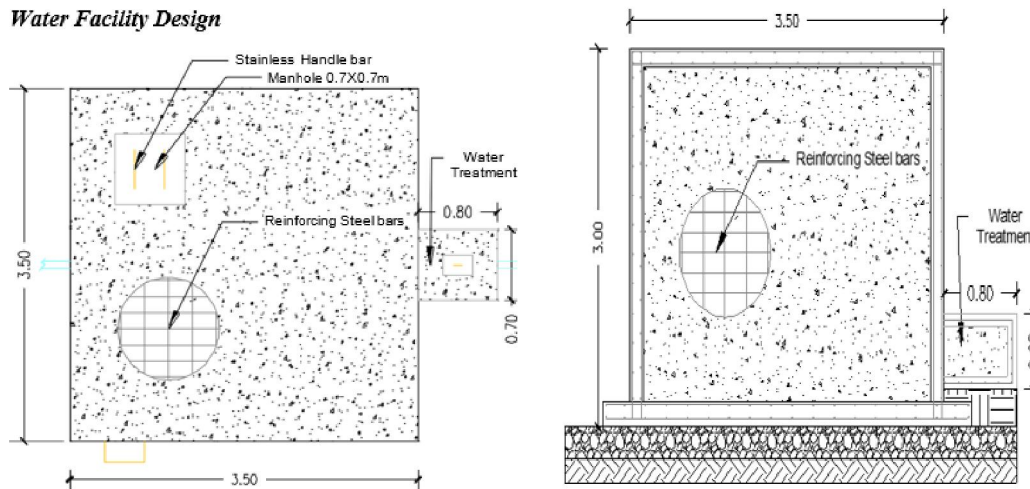


Figure 7. Water Storage Plan

Step into the inviting realm of a medium one-storey house, where practicality and comfort intertwine in a harmonious living space. This architectural gem strikes a balance between efficient design and the aspiration for an aesthetically pleasing sanctuary. As we embark on this journey, let's delve into the nuances of a single-level abode that caters to diverse needs while radiating a sense of warmth and functionality.

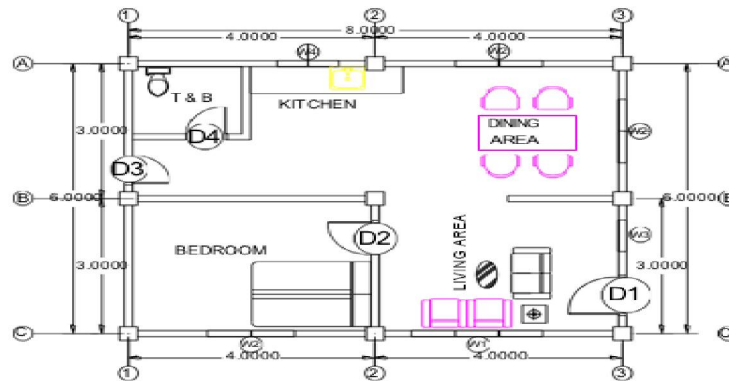


Figure 8. Floor Plan of the Project

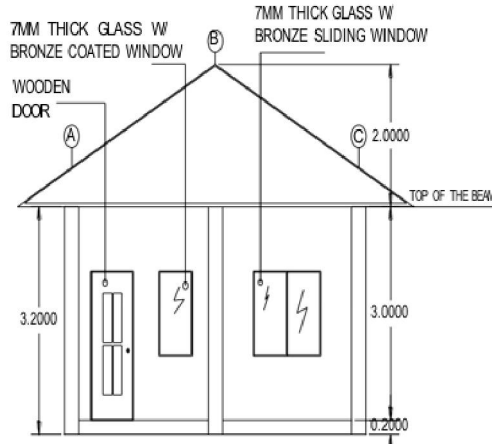


Figure 9. Elevation of the Project

Introducing an innovative water storage tank design—a solution engineered to efficiently address water supply challenges. This design embodies meticulous engineering and sustainability principles, aiming to optimize water storage capacity while minimizing environmental impact and maximizing resource efficiency. Through this design, we endeavor to ensure a consistent and reliable water supply for various applications, contributing to the overall well-being and functionality of the community or facility it serves. From figure 9 shown above, the dimension of water storage tank is 3.50m x 3.50m with 0.80m x 0.70m attached water treatment box. From the top view it is planned with a 0.70m x 0.70m manhole with stainless handle bar. From figure shown above, the total height of proposed water storage tank is 3 m from natural grade line to the top of the design.



Figure 10. Perspective view of the project

Introducing the panoramic perspective view of a dynamic township development—a visionary concept that encapsulates a harmonious integration of residential, commercial, and recreational spaces. This aerial visualization offers a glimpse into a meticulously planned community, where architectural innovation, green landscapes, and modern amenities converge to create a vibrant and self-sustaining urban environment. Through this perspective, we embark on a journey to explore the potential of a comprehensive township design that enriches lives, fosters connectivity, and paves the way for a thriving future. The illustration in Figure 10 above depicts the newly developed barangay in Babuyan, Carrascal, Surigao del Sur, featuring a network of 200 typical houses seamlessly connected by accessible roadways

IV. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

- The barangay Babuyan in Carrascal, Surigao del Sur has witnessed a consistent rise in its population. This upward trend is evidenced by an average growth rate of 2.33%, signifying an increment from an average population of 503 between 1990 and 2015, culminating in a recorded 180 households during the 2019 survey.
- Based on a comprehensive analysis of the landslide and flood hazard map provided by the Mines and Geosciences Bureau, the researcher firmly establishes that the proposed relocation site boasts a safe status. Categorized under a low susceptibility level concerning landslides, the site is identified as encompassing gently sloping areas with no documented instances of landslide occurrences.
- The researcher introduces a thoughtfully crafted blueprint for a new barangay development plan in Babuyan, Carrascal, Surigao del Sur. Within this blueprint, key elements have been meticulously addressed: a road network comprising two lanes, each with dimensions of 3 meters; an innovative electricity design employing solar LED street lights; a water facility strategically centered around a main water storage tank for the community's water supply; and, finally, the blueprint incorporates the design of standardized 8m x 6m houses, each featuring a well-appointed layout encompassing a bedroom, living area, dining area, kitchen, and a communal toilet and bath.
- Following a comprehensive evaluation through surveys, the researcher concludes that the proposed new barangay development plan garners high levels of acceptance. This conclusion is based on a computed grand mean of 1.81, derived from an evaluation encompassing aspects of applicability, efficiency, and sustainability.

4.2 Recommendation

- To have a wide space vacancy for the relocation site in increasing of population after 10 years from now.
- To have an additional water storage tank to allocate more houses at a rapid time.

V. ACKNOWLEDGMENT

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