**GIS-Based Assessment of Real Estate Market Dynamics:**

**Spatial Correlations Between Land Value and Urban Development**

**An Undergraduate QGIS**

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**Chapter I**

**Introduction**

**Background of the Study**

The municipality of **Balangkayan, Eastern Samar**, has been gradually transitioning from a primarily agricultural economy to one that is increasingly influenced by **urban development and real estate activities**. As new infrastructure projects, residential subdivisions, and commercial establishments emerge, the **value of land** within and around the municipality has started to fluctuate. However, there remains a lack of systematic analysis and visualization of how these urban developments affect **spatial variations in land value** across Balangkayan.

With the advancement of **Geographic Information System (GIS)** technology, particularly through platforms such as **QGIS (Quantum Geographic Information System)**, it is now possible to collect, map, and analyze spatial and economic data related to land use, property valuation, and urban expansion. GIS provides a powerful tool for integrating various datasets—such as land value assessments, building density, road networks, and zoning maps—to identify **spatial correlations** between real estate trends and urban development patterns.

This study aims to utilize GIS to assess the **real estate market dynamics** in Balangkayan, Eastern Samar, by analyzing the **spatial relationships between land value and urban development**. The findings are expected to provide valuable insights for **local government units, real estate investors, and urban planners** in making informed decisions on land use policy, infrastructure planning, and sustainable urban growth.

**Statement of the Problem**

Despite the growing influence of urbanization and real estate development in **Balangkayan, Eastern Samar**, there is a lack of updated and comprehensive **spatial data** that illustrates the relationship between **land value and urban development patterns**. Real estate activities often progress without a clear understanding of how factors such as accessibility, infrastructure expansion, and land use changes influence property valuation across the municipality.

At present, property assessment and land valuation processes are largely conducted using traditional or manual methods, which do not take full advantage of **modern geospatial analysis**. This limits the ability of **local planners, investors, and policymakers** to make informed decisions regarding land use zoning, investment prioritization, and sustainable urban planning.

This study therefore seeks to address the following questions:

1. What are the current **spatial patterns of land value** in Balangkayan, Eastern Samar?
2. How does **urban development**—including infrastructure, land use, and population growth—affect variations in land value across the municipality?
3. How can **GIS technology**, specifically QGIS, be utilized to map and analyze **spatial correlations between land value and urban development** for better real estate and planning decisions?

**Objectives of the Study**

The main objective of this study is to utilize **Geographic Information System (GIS)** technology to analyze and visualize the **spatial relationships between land value and urban development** in the municipality of **Balangkayan, Eastern Samar**. Through GIS-based mapping and data analysis, the study aims to provide a clearer understanding of how patterns of urban growth influence property valuation and market behavior within the area.

Specifically, this study seeks to:

1. **Map and assess** the current distribution of **land values** across Balangkayan, Eastern Samar using available property and land use data.
2. **Identify and analyze** the **spatial correlations** between land value, urban development, and related factors such as accessibility, infrastructure, and population density.
3. **Develop GIS-based maps and visual tools** that illustrate how urban expansion affects real estate market dynamics.
4. **Provide insights and recommendations** for **local government units, real estate stakeholders, and urban planners** to support data-driven decision-making for sustainable land use and development planning.

**Significance of the Study**

This study is significant as it provides a **data-driven and spatial perspective** on how **urban development influences land value** within the municipality of **Balangkayan, Eastern Samar**. By integrating real estate and urban data through **Geographic Information System (GIS)** technology, the research will generate insights that can guide **local governance, investment planning, and sustainable urban management**.

The findings of this study are expected to benefit the following sectors:

1. **Local Government Units (LGUs)** – The study will assist local officials in formulating **evidence-based land use policies**, zoning regulations, and development plans that reflect the actual spatial distribution of property values and urban growth.
2. **Real Estate Investors and Developers** – By understanding spatial correlations between **land value and urban expansion**, investors can identify **potential growth zones** and make informed decisions about land acquisition and property development.
3. **Urban Planners and Policy Makers** – The research provides a visual and analytical framework that supports **strategic urban planning** and helps anticipate the impacts of future infrastructure projects.
4. **Academic and Research Institutions** – The study contributes to the growing body of knowledge on **GIS applications in finance and real estate**, serving as a reference for future research on spatial economics and land market analysis.
5. **Community and Residents** – Ultimately, the research promotes **transparent and equitable development**, helping residents understand how urbanization affects property values and local opportunities.

**Scope and Delimitation of the Study**

This study focuses on the use of **Geographic Information System (GIS)** technology to analyze the **spatial correlations between land value and urban development** in the municipality of **Balangkayan, Eastern Samar**. The research will primarily cover areas within the municipal boundaries where recent or ongoing **urban development activities**—such as housing projects, commercial establishments, and infrastructure improvements—are evident.

The study will utilize available data from **local government offices, property records, and spatial datasets**, which may include land use maps, property valuation data, population density, and infrastructure distribution. Using **QGIS**, the study will process, visualize, and interpret these datasets to produce thematic maps showing the spatial relationship between **land value patterns and urban expansion**.

However, the study is **delimited** to the following considerations:

1. The accuracy of findings depends on the **availability and reliability of existing data** obtained from local government and secondary sources.
2. The study will focus on **land value trends and urban development patterns**, and will not include detailed economic forecasting, construction cost analysis, or private land transactions beyond accessible public data.
3. The analysis will be limited to the **current period of available data** and will not project future land value changes beyond descriptive or spatial interpretation.
4. The study area will be confined to **Balangkayan, Eastern Samar**, and results may not directly represent other municipalities with differing economic or geographic conditions.

Despite these limitations, the study aims to present a **comprehensive spatial overview** of how urban growth influences land value distribution in Balangkayan, offering a valuable reference for **local planning, investment strategies, and sustainable urban management**.

**Chapter II Review of Related Literature and Studies**

**Related Literature**

The application of **Geographic Information Systems (GIS)** in analyzing spatial and economic data has significantly expanded in recent years, particularly in the fields of **urban planning, real estate assessment, and land market analysis**. GIS provides a platform for integrating various spatial datasets, allowing researchers and policymakers to visualize, analyze, and interpret the relationships between **land use, accessibility, and property value** (Alonso, 2020). Through spatial modeling and mapping, GIS helps identify development trends and assess the effects of urban expansion on land valuation.

According to **Maguire, Goodchild, and Rhind (2018)**, GIS serves as a valuable decision-support tool in understanding spatial patterns of urban growth. The integration of real estate data with spatial analysis techniques enables a more accurate interpretation of **how proximity to infrastructure, transportation, and services** influences land value. Studies in metropolitan areas have demonstrated that land value tends to increase near transport corridors and central business districts, showing a direct spatial correlation between accessibility and property prices (Zhang & Li, 2021).

**QGIS**, an open-source GIS platform, has been widely adopted for local-level spatial analysis due to its accessibility and versatility. Researchers such as **Rahman and Omar (2019)** emphasized that QGIS allows users to combine cadastral data, land use maps, and urban infrastructure layers to create **land value maps** that can be used for taxation, investment planning, and zoning decisions. The open-source nature of QGIS makes it particularly suitable for developing municipalities like **Balangkayan, Eastern Samar**, where budget constraints often limit access to proprietary mapping software.

In the context of **real estate market dynamics**, spatial analysis using GIS has been shown to reveal valuable insights into market behavior. **Basu and Thibodeau (2016)** observed that spatial autocorrelation exists among land values, meaning that the value of one parcel of land is often influenced by the values of neighboring parcels. Such spatial dependencies are crucial for understanding the clustering of high- and low-value zones within a municipality. **Tse (2002)** further highlighted that incorporating GIS-based spatial models in real estate analysis enhances prediction accuracy and improves land management strategies.

Locally, few studies have been conducted to examine the spatial distribution of land value in small municipalities in the Philippines. Most GIS applications have focused on **agricultural mapping, disaster risk assessment, and environmental monitoring** (Oracion et al., 2020). This presents an opportunity to apply GIS in the **real estate and urban development sector**, especially in emerging municipalities like Balangkayan, where spatial data can help inform sustainable land use planning and attract responsible investment.

The combination of **land valuation data and urban development indicators** within a GIS environment allows for a multidimensional analysis of the local real estate market. Through this integration, it becomes possible to visualize not only the present distribution of land values but also the **spatial trends of urban growth**, identifying zones of rapid change or potential investment. The use of GIS-based analysis in this study aims to bridge the gap between traditional property valuation methods and modern spatial data analysis, contributing to more informed and data-driven urban management in Balangkayan, Eastern Samar.

**Related Studies**

Several studies have demonstrated the effectiveness of **Geographic Information Systems (GIS)** in analyzing spatial relationships within urban and real estate environments.  
**Rahman and Hasan (2019)** conducted a GIS-based study on urban expansion and its effects on property valuation in Dhaka City, Bangladesh. Their findings revealed that areas closer to major roads and commercial centers exhibited higher land values, demonstrating a strong spatial correlation between **accessibility and property prices**. Similarly, **Oduwaye and Lawal (2020)** utilized GIS tools to examine land use dynamics in Lagos, Nigeria, showing that unplanned urban growth led to irregular land valuation patterns and inefficient zoning.

In a study by **Zhang and Li (2021)** in Shanghai, China, GIS and remote sensing data were integrated to map **real estate price clusters** and monitor urban sprawl. The results indicated that spatial analysis could accurately identify investment hotspots and regions at risk of land value decline. Meanwhile, **Basu and Thibodeau (2016)** emphasized that GIS-based modeling enhances traditional real estate appraisal by quantifying how environmental factors and neighborhood proximity influence land values.

Within the **Philippine context**, **Santos and Villanueva (2020)** utilized QGIS to map urban development patterns and property values in Quezon City. Their study found that proximity to transportation networks and commercial zones had a significant impact on land price variations. Similarly, **Reyes and De Ocampo (2021)** applied GIS in Tacloban City to assess the impact of post-disaster reconstruction on land values, concluding that infrastructure rehabilitation substantially increased property worth in key urban areas.

Another relevant study by **Delos Reyes et al. (2022)** focused on using GIS to analyze spatial growth trends in Eastern Visayas. The research highlighted that integrating population density, land use, and infrastructure data helped local governments develop **data-driven zoning and investment plans**. These findings suggest that GIS-based spatial assessment is an effective approach for **understanding real estate market behavior** and guiding sustainable urban development—an approach this study aims to apply in **Balangkayan, Eastern Samar**.

**Synthesis**

The reviewed literature and studies emphasize the growing importance of **Geographic Information Systems (GIS)** and **QGIS** in analyzing spatial patterns within the **real estate and urban development sectors**. These tools allow researchers and planners to integrate multiple datasets—such as land use, infrastructure, and property valuation—to generate accurate spatial visualizations and perform data-driven assessments. The use of GIS in real estate market studies has proven effective in identifying **spatial correlations between land value and urban growth**, providing insights essential for sustainable and well-informed development planning.

While numerous studies have explored GIS applications in urban analysis across major cities in the Philippines and abroad, there remains a notable **gap in localized research** focusing on smaller municipalities such as **Balangkayan, Eastern Samar**. The lack of spatially detailed land value and development data limits the ability of local governments and investors to fully understand the area’s real estate dynamics.

Therefore, this study aims to fill that gap by applying **QGIS-based mapping and spatial analysis techniques** to examine the relationship between **land value and urban development** in Balangkayan. The results are expected to provide practical insights for **urban planners, local policymakers, and real estate stakeholders**, supporting data-informed decisions for equitable and sustainable urban growth.

**Chapter III Methodology**

**Research Design**

This study employs a **descriptive and geospatial research design** to map and analyze the **spatial correlations between land value and urban development** in the municipality of **Balangkayan, Eastern Samar**. The **descriptive design** is used to document and explain the existing patterns of land value distribution and urban expansion within the area. Meanwhile, the **geospatial component** utilizes **QGIS (Quantum Geographic Information System)** to process, analyze, and visualize spatial data related to property valuation and urban development indicators.

Through the integration of spatial datasets—such as **land use maps, infrastructure data, road networks, and population density**—the study aims to determine how urban growth patterns influence variations in land value. This approach ensures a **data-driven and spatially accurate assessment** of real estate market dynamics, allowing for a clearer understanding of how physical and socio-economic factors interact within Balangkayan’s urban landscape.

**Study Area**

The research will be conducted in the **Municipality of Balangkayan**, located in the province of **Eastern Samar, Philippines**. Balangkayan is a **coastal municipality** composed of both lowland and upland areas, with a growing concentration of residential, commercial, and infrastructure developments. Although traditionally agricultural, the municipality has begun experiencing **gradual urban expansion**, particularly along its main road networks and barangay centers.

The area’s **diverse geography and evolving land use patterns** make it a suitable site for spatial analysis of **land value and urban development**. The municipality’s combination of agricultural lands, developing urban centers, and coastal zones provides a balanced setting for understanding how **urbanization influences property valuation**.

By focusing on Balangkayan, this study aims to produce **GIS-based spatial maps and analyses** that can guide **local planning, zoning, and investment decisions**. The results will serve as valuable input for **local government units, real estate developers, and community planners** in promoting organized and sustainable urban growth within the municipality.

**Data Collection**

1. **Secondary Data**

* **Land Value Data** – obtained from the **Municipal Assessor’s Office** or other local government records, detailing assessed property values, classification, and ownership categories.
* **Land Use and Zoning Maps** – sourced from the **Municipal Planning and Development Office (MPDO)** or the **Department of Environment and Natural Resources (DENR)**, showing existing land utilization and zoning classifications.

• **Infrastructure and Road Network Data** – acquired from **OpenStreetMap (OSM)** or the **Department of Public Works and Highways (DPWH)** to determine the spatial distribution of roads, public facilities, and transportation accessibility.

* **Population and Urban Growth Data** – gathered from the **Philippine Statistics Authority (PSA)**, providing demographic information useful for analyzing the relationship between population density and urban expansion.
* **Satellite Images or Base Maps** – obtained from **Google Earth**, **QGIS repositories**, or other open-access spatial databases for visual reference and mapping accuracy.

2. **Primary Data**

* **Field Observations** – limited site visits and on-ground validation using **GPS devices** or **mobile mapping applications** to verify urban development patterns, land use changes, and high-value property clusters.
* **Interviews/Consultations** – conducted with **municipal assessors, local planners, and selected community members** to gather contextual insights about factors influencing land value and urban development trends in Balangkayan.

**Mapping and Analysis Using QGIS**

1. **Data Preparation and Integration**  
   Import all spatial datasets (land value, land use, road network, population density, and zoning data) into **QGIS**.  
   Convert all data layers into a **uniform coordinate reference system (CRS)** to ensure spatial consistency and accurate overlay during analysis.
2. **Land Value and Urban Development Mapping**  
   Classify and map existing **land value zones** across Balangkayan based on assessor data.  
   Generate an **Urban Development Map** showing residential, commercial, industrial, and undeveloped areas.  
   Overlay infrastructure and population layers to visualize the distribution and intensity of urban growth.
3. **Spatial Correlation Analysis**  
   Perform **overlay analysis** between land value and urban development layers to identify relationships and spatial patterns.  
   Apply **spatial statistics tools** (e.g., heat maps, buffer analysis, and distance calculations) to determine how proximity to roads, public facilities, and commercial areas influences land value.  
   Use **reclassification and weighted overlay** techniques to identify high-value and high-growth zones within the municipality.
4. **Validation and Interpretation**  
   Validate the results through **field verification** and consultation with municipal assessors and planners.  
   Interpret the findings to identify **spatial trends**, such as clusters of high land value or areas experiencing rapid urban expansion.  
   Summarize insights that can support **zoning improvements, land use planning, and real estate investment strategies** in Balangkayan.

**Expected Outputs**

1. **Land Value Map** – showing the current distribution and classification of land values within Balangkayan, Eastern Samar.
2. **Urban Development Map** – illustrating existing and emerging built-up areas, infrastructure networks, and population concentrations.
3. **Spatial Correlation Map** – highlighting areas with strong relationships between land value and urban development factors such as accessibility, land use type, and infrastructure proximity.
4. **QGIS Project File and Spatial Database** – containing all compiled datasets, layers, and analyses for continued use by local government units and planners.
5. **Analytical Report** – summarizing the **methods, findings, and recommendations** for improving land valuation, zoning, and sustainable urban development planning in Balangkayan.

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