

**DOES PROXIMITY TO WATER BODIES IMPACTS
MARKET VALUES OF RESIDENTIAL
PROPERTIES?
CASE STUDY OF DIYAWANNAWA LAKE AREA**

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ABSTRACT

This study examined the impact of water bodies with a scenic view on residential property values around Diyawannawa lake located within Sri Jayewardenepura Kotte Municipal council (a suburban area of Colombo district). The study employed both primary (structural and environmental data related to properties, different types of benefits generated from water bodies) and secondary data (market evidence) whilst the data analysis included content analysis and a regression analysis (hedonic pricing model). Water bodies with scenic views generate multiple utilities for residents such as observing nature, relaxation, and playing, pleasant views, appreciation of colour and sounds, relationships with family members and neighbors, a place to exercise and cycling, stress relief likewise. According to the study, between 2019-2020, a residential property with a scenic view of 60⁰ or more to Diyawannawa Lake had a premium market value of Rs. 803,433.05 compared to other properties. Furthermore, the residential properties one meter away from such water body showed a decrease in market value of Rs. 23049.65. These findings will raise awareness on the benefits of water bodies with scenic views and it will lead to greater acceptance by residents, developers, local authorities to invest and protect them, which could contribute to overcoming one of the barriers to maintaining such water bodies in good condition.

Keywords: water bodies; residential property; market value

1. INTRODUCTION

One of the most pleasing manifestations in life is the resultant feeling from the sight of a hefty water body (Michael et al., 2002). According to World Urbanization Prospects: 2018 Revision, 55.27% of the population lives in urban areas. Urban parks, forests, water resorts, lakeshores, farmlands, and land use contribute to the well-being of households in those urbanized areas (Baranzini and Schaerer, 2011; Kaplan and Kaplan, 1989). Colombo Commercial City Development Plan (2019-2030) with its water esplanade development strategy aims to revitalize and activate the aqua regions within the city and draw the highest possible investment to the Colombo city. In this background, this study is focused on the impact of closeness to such water bodies on residential property values. For this, residential properties near Diyawannawa Lake, Sri Jayewardenepura Kotte Municipal council (a suburban area of Colombo district) have been taken as the case study. Quality water bodies that provide resultant feeling from the sight are the once which can provide aesthetic values, the capacity to support wildlife, and possess recreational potentials (Dornbusch and Barrager, 1973; Abeysekara, 2014; Kulshreshtha and Gillies, 1993; Mosley, 1989). The residential property value is related to its physical or structural and locational/environmental attributes

(Lang and Jones, 1979). Distance from the water bodies creates a significant effect on property values attributing to the environmental character (White et al. 2010; Völker and Kistemann, 2011). Plentiful research is available identifying the impact of scenic views from water bodies on residential property values. Yet the locational-specific insights (in this case the residential properties around Diyawannawa Lake) can still be useful for particular market operations. The data for the study is based on structured interviews and market data from secondary sources. The collected data were analyzed based on content analysis and regression analysis (hedonic pricing model). This paper is structured into five sections. The first section is devoted to the introduction. The second section reviews the existing literature on water bodies on residential property values while the third section describes the methodology. Section four provides detailed findings and the paper closes in section five with the conclusion. This research can raise residents', developers', local authorities' awareness on investing and protecting the waterfront areas in the urban and suburban areas. Also, it is useful for property appraisers to capture the contemporary value propositions in the residential markets of Colombo district suburbs.

2. LITERATURE REVIEW

For economic, social, psychological, cultural, and environmental reasons, a growing number of people are moving to and living in urban areas (Kumagai and Yamada, 2008). The natural environment has a greater impact on urban life (Kaplan and Kaplan 1989). Due to urbanization, industrialization, and population growth, the availability of environmental assets and amenities has become a vital issue (Kumagai and Yamada, 2008). Alam et al (2014) stated that the undesirable and excess of human activity within the city is disturbing its ecosystem. If the quality of urban life declines due to public and private actions, the urban areas will not be sustainable (Kumagai and Yamada, 2008; Kim and Peiser, 2018).

2.1 Quality Water Body

The quality of the water body is an essential element for a scenic view of a waterfront. Water quality is a multidimensional notion that can be assessed by a variety of procedures. The studies reviewed here are considered in the context of the three scopes of water quality known in an early study as being of most concern to nearby property owners and thus most likely to be capitalized into real estate prices: (i) aesthetics, e.g., water clarity, which declines with increasing eutrophication; (ii) capacity to support wildlife, which can vary with levels of dissolved oxygen, temperature and acidity; and (iii) recreational potential for, e.g., fishing, boating and swimming, which might vary with the appearance or smell of a water body, and plant growth within it (Dornbusch and Barrager, 1973). The effect of urban expansion on surface water bodies in Wuhan, China reported that the reduction, disappearance, and pollution of surface water bodies results in the undervaluation of water bodies and increases the threat for further damages (Ottens & Sliuzas, 2010). Reflection off the water, colour of the water body, algae in the water body, streambank vegetation, and secured banks are the key factors that assess the quality of a water body (Mosley, 1989; Dornbusch and Barrager, 1973). The variation in the reflectance of the water body is determined by the depth of the water, materials present in the water, and the roughness of the water (Mosley, 1989). There are two types of colour in water- apparent and true colour. The apparent colour is the colour when looking at it without removing any suspended and dissolved particles. The apparent colour of the water is measured based on observations (Mosley, 1989). Algae or Algal Blooms can hurt the recreation ability of the water body. Contamination of industrial effluents, domestic sewage, agricultural and livestock wastes, etc. stimulate the growth of algae. Therefore, the absence of algae on the surface of the water body will increase its ability of reflection and colour of the water body to become clear (Dornbusch and Barrager, 1973). Vegetation on stream or water body bank is valuable because the root system of trees and shrubs bind and

hold the banks together, providing shade and shelter, helping to maintain the temperature of the water body, filter sediments and other types of pollutants from runoff water, and add aesthetic value (Mosley, 1989; Dornbusch and Barrager, 1973). The main purpose of securing stream or water body banks is to protect them from erosion and there are different methods used to protect the river, canals, and other types of water bodies' banks (Mosley, 1989; Dornbusch and Barrager, 1973). Water quality indices have various approaches for statistically integrating and interpreting variables and have been frequently utilized for the assessment of water quality. (Said et al. 2004).

2.2 Scenic View

Benson et al (1998) defined scenic view as a residential amenity usually associated with the location of a dwelling site. According to Oxford English Dictionary (2008), the scenic view is referred to as the sight or visual appearance of the natural amenities on a landscape considered in terms of their appearance or visual, especially in a quaint or charming way. Abeysekara (2014), stated that "a scenic view may be from a stationary viewpoint or be seen as one travels along a roadway, waterway, or path. A view may be a sight to a faraway object, such as a mountain, or a nearby object". A scenic view can be expressed as the aesthetic natural environment which provides attractive natural scenery to the dwellers (Maulan, 2006). He further elaborates that the scenic view is a subset of a landscape that is observed from one location that looking ahead of one direction. In generic terms, the scenic view is visual which is generated through observation of both natural and built environments from one focal standpoint that provides an inspiring pleasing view while contributing to the economic value and comfortable enjoyment of the real property. According to Abeysekara (2014), there are several types of scenic views within the city center. Among that the most pleasant view has occurred through the large body of water. The view of the water body generates a beautiful color scheme surrounding the environment.

Premium Value Generation: According to Michael et al (2002) based on the study conducted in Lake Arie, North America, the view is the most significant determinant of home value in addition to square footage and lot size. Many people show a preference for the natural environment over the built environments and this attraction to nature is mostly explained by consumer home-buying behaviors in the middle-income housing residential market in Hong Kong considering Harbor and Mountain. (Jim and Wendy, 2009). Further, he stated that people are willing to pay an additional payment for a pleasant view gifted by natural elements around a house and also those diverse scenic views in cities are valued differently by its residents. According to Baranzini and Schaerer (2011), the size and the view of the natural environment increase rents while the view of the built environment lowers the rent in the classical neighbourhood in Geneva – Switzerland.

2.3 Residential Property Value

Based on the type the residential properties can be divided into two main types: landed property or condominium property. Landed residential properties typically entail bungalows, semi-detached houses, cluster houses, and terrace houses and condominium residential property consist of properties such as condominiums or apartments which share the common area with other inhabitants. Due to the altering of time, the role of housing changed from a physical fortification of the human being to a device that assists as a community expenditure, an assistant to development, and as an investment (Harris and Arku, 2006). The price of a residential property is determined by the purchaser's assessment of the property's features such as physical features, environment, and local placement. Garrod and Willis (1992), stated that each house represents a unique combination of characteristics. A house consists of structural variables, accessibility variables, neighborhood variables, and environmental variables.

Structural variables are the fabric of each building and the plot upon which it is built. It includes the type of property, type of title-holding, number of bedrooms and bathrooms, land and floor area, number of story's, etc. These factors have a direct impact on the price of a house. Moreover, the quality of the structure such as building material, age of the building, etc. also influences the housing price (O'riordan, 2014; Lake et al, 1998). Accessibility variables are the ease with which local amenities can be reached from the property. Abeysekara (2014), stated that the places having a direct and fast means of transportation to the central business district in the proximity are considered to be more accessible and preferable due to the time, cost, and energy-saving for their necessities. Neighborhood variables describe the characteristics of the area in which the property is located, and census data are a good indicator of these attributes (O'riordan, 2014; Lake et al., 1998). There are different types of environmental attributes studied in past research. Some of them are noise associated with roads, availability of the green area, etc. Residential properties being close to water bodies and the utilities that these properties possess are therefore the environmental attributes associated such residential property.

2.4 Previous Research

Research has been done to analyze the impact of scenic views with water bodies on property values. Findings are often reported in monetary terms and the type, and the quality of views was not specified. Therefore, the comparison between studies is very difficult. Darling (1973) examined the impact of distance from the main three urban water amenities on property values in California. According to his study, the distance from the water park creates a significant effect on property values. Further, he used a dummy variable for the view, but the condition of the view is not elaborated enough. Davies (1974) also examined the factors affecting house prices in England and argued that the view was not a significant determinant of property value. Brown and Pollakowski (1977) examined the value of residential properties located near a lake in Seattle, Washington. They had used two regression models. In both models, they found that longer the distance significantly reduces selling price, and the view was not statistically significant even though it had a positive sign. Rodriguez and Sirmans (1994) used a hedonic pricing model to analyze the impact of view on the value of 194 home sales in Fairfax County, Virginia, and found that a good view adds 8% to the single-family houses. Following the seminal works, many scholars used the hedonic pricing model to examine the impact of scenic views. In 2018, Lu examined the relationship between the view orientation of an apartment and its property value in the context of the Shanghai housing market, using a hedonic pricing model.

Hedonic Pricing Method: The hedonic price refers to the value that has been set according to the attributes or the characteristics of a product that a consumer is willing to pay because of its utility or due to its benefits (Dahal et al., 2019). The term "Hedonic" is used to identify the relationship of the urban residential market with the non-quantifiable attributes of a residential property (Dahal et al., 2019; Lu, 2018; Sander and Polasky, 2009). The scenic view from the water body is one of the quantifiable attributes of residential property. To estimate the quantitative value for the scenic view, the hedonic price model can be used (see for example Dahal et al., 2019; Lu, 2018; Sander and Polasky, 2009). The hedonic price model can be applied in valuation through regression analysis (McConnell, 1990; Lancaster, 1966; Powe et al., 1995; Abeysekara, 2014). In this approach, it reflects the housing price through the structural, neighborhood, locational and environmental attributes where the housing values are determined as the dependent variable.

3. METHODOLOGY

3.1 Context

Diyawanna Lake also known as Parliament Lake is a water body situated in Sri Jayewardenepura Kotte Municipal area within the district of Colombo. It is in the Eastern Suburbs of Colombo situated 5.2 miles from the central area. According to the Department of census and statistics (2012), in Sri Lanka, the total population of the Sri Jayewardenepura Kotte Municipal area accounted for 107,508. The total area of Sri Jayewardenepura Kotte is 17 km² (7 sq mi) out of which 131.21 hectares account for water bodies. Sri Jayewardenepura Kotte Municipal area is one of the fastest developing administrative, commercial and residential areas within the Colombo District being home to many of the country's elite. Surrounding lands of Diyawannawa Lake include commercial, residential, agricultural recreational lands. Houses are primarily of single or two-storied.

3.2 Methods

This research is to study the impact of proximity to quality water bodies on residential property values by applying a hedonic pricing model with special reference to Diyawannawa Lake. Thus we required collecting data regarding the resident's utility of quality water body and market data on residential property prices. The required primary data was collected in the year 2020 by employing researcher's observation and structured interviews. In addition, secondary sources such as databases of the Government Valuation Department, Sri Jayewardenepura Municipal Council, and the Land Registry records was also used in the study. The research population is the detached residential properties or householders facing the Diyawannawa Lake among which 35 householders were selected to conduct the structured interview. Researcher's observation was used to ascertain the 'quality' of water from the naked eye and to witness the various utilities that residents have from Diyawannawa lake. These structured interviews questioned the respondents about various utilities they obtain from the Diyawannawa Lakefront and the details of their property (Table 1). 65.7% of the respondents were male and 34.3% of the respondents were female. 77.14% of the respondents are private-sector employees and 22.86% of householders are engaged in the public sector. The secondary sources were used to collect market value data of the residential properties. Residents' utility on water bodies was understood by analyzing the structured interview with content analysis. The impact of the proximity to the lake on property values is analyzed through regression analysis.

3.3 Data Profile

Table 1: Data Profile

Property Serial No.	Extent (Perches)	Storeys	Floor area (Sq.Ft.)	Distance to Battaramulla town (KM)	Age of the property	Distance from the Lake (M)	Bedrooms	View	Bathrooms	Market Value (Rs.)
1	14	1	2000.00	3.9	16	60.00	2	(30° - 60°)	2	0,800,000.00
2	14	1	2000.00	3.4	15	30.00	2	(120° - 180°)	1	2,000,000.00
3	16	1	2000.00	3.8	10	40.00	2	(60° - 120°)	2	7,200,000.00
4	14.46	1	2000.00	3.7	4	50.00	2	(60° - 120°)	2	8,005,400.00
5	15	1	1800.00	3.1	6	30.00	3	(120° - 180°)	2	8,360,000.00
6	18	1	2000.00	4	10	60.00	2	(30° - 60°)	2	1,200,000.00
7	17	1	2000.00	3.2	10	30.00	2	(120° - 180°)	2	1,350,000.00
8	19	1	1800.00	3.7	20	40.00	3	(120° - 180°)	1	2,710,000.00
9	15	2	4200.00	4	8	100.00	3	(30° - 60°)	3	2,740,000.00
10	17	2	3100.00	3.85	9	30.00	3	(120° - 180°)	2	4,050,000.00
11	19	1	1800.00	3.2	12	30.00	3	(120° - 180°)	1	7,320,000.00
12	16.2	2	2940.00	3	6	30.00	3	(120° - 180°)	2	7,408,000.00
13	14	2	4500.00	3.9	6	40.00	2	(60° - 120°)	3	8,350,000.00
14	14.7	3	3700.00	3.3	3	30.00	3	(120° - 180°)	3	9,244,000.00
15	17	1	2800.00	3.5	4	25.00	4	(120° - 180°)	2	9,300,000.00
16	15.5	2	3500.00	3.1	7	25.00	4	(120° - 180°)	2	9,550,000.00
17	19	1	2500.00	3.6	5	30.00	4	(120° - 180°)	3	0,000,000.00
18	14	2	5000.00	4.1	4	200.00	4	(30° - 60°)	3	0,500,000.00
19	17	2	3100.00	3.5	3	30.00	4	(120° - 180°)	3	0,790,000.00
20	18	2	3000.00	3.1	6	30.00	4	(60° - 120°)	4	1,200,000.00
21	13.5	2	5000.00	3.6	5	25.00	3	(120° - 180°)	3	3,750,000.00

22	20.4	2	2850.00	3.6	12	25.00	4	(120° - 180°)	2	3,825,000.00
23	16	2	4000.00	3.5	2	30.00	5	(120° - 180°)	3	4,000,000.00
24	20.66	2	6200.00	3.9	7	30.00	5	(120° - 180°)	4	5,544,000.00
25	18	3	8500.00	4.2	7	300.00	5	(30° - 60°)	2	4,650,000.00
26	17	2	8900.00	4.1	4	100.00	6	(30° - 60°)	3	9,700,000.00
27	15	1	2000.00	3.9	17	60.00	2	(30° - 60°)	2	3,200,000.00
28	14.4	1	2000.00	3.7	5	50.00	2	(60° - 120°)	2	7,856,000.00
29	13	1	2000.00	4	10	60.00	2	(30° - 60°)	2	9,200,000.00
30	24	2	3100.00	3.5	3	30.00	4	(120° - 180°)	3	8,290,000.00
31	13	2	5000.00	3.6	5	25.00	3	(120° - 180°)	3	2,500,000.00
32	13	1	2000.00	4	10	60.00	2	(30° - 60°)	2	39,265,000.00
33	14	2	4200.00	4	8	100.00	3	(30° - 60°)	3	50,540,000.00
34	14.46	1	2000.00	3.7	4	50.00	2	(60° - 120°)	2	48,005,400.00
35	17	2	3100.00	3.5	3	30	4	(120° - 180°)	3	60,790,000.00

Source: (Field survey, 2020)

4. FINDINGS

4.1 Diyawannawa Lake as a scenic view

The nature of water in Diyawannawa Lake and its quality as a scenic view was observed by researchers following five criteria which can be mobilized for naked eye judgments. As literature highlighted those criteria were: (i) Reflections off the water (ii) Colour of the water (iii) Algae in the water body (iv) Streambank or water body bank vegetation and (v) Secured banks.

As per the observations (Figure 1), Diyawannawa lake is showing a very high degree of reflection off the water with a satisfactory level of the apparent color of the surface water. And also, it is noted that the Diyawannawa lake is mostly free from water algae which increases the recreation ability of the lake having no proximity to any contaminated industrial effluents, domestic sewage, agricultural, and livestock wastes. Most of the edges and the banks of Diyawannawa Lake are filled with managed vegetation invested by respective authorities. The banks of the Diyawannawa Lake is also secured from erosion using different water bank securing methods.

Figure 1: Scenic View of Diyawannawa Lake to the residential property from the naked eye



Source: (Authors, 2020)

4.2 Resident's Utilities & Perceptions towards the Diyawannawa Lake

The structured interviews highlighted that Diyawannawa lake provides several benefits to the residents. The pleasant view and appreciation of colour and sounds of the lake enable the residents to experience the aesthetic nature of the lake, which ultimately improves the psychological well-being of the residents.

“Whenever I have free time, I go near the lake and spend time looking at it. The calmness of this lake makes me happy.” (Respondent -19)

“We placed few windows facing this lake because it is good to see such an environment daily.” (Respondent -9)

“I go near the lake and look at the blue water and listen to the sounds of tree leaves that are made by the wind” (Respondent -14)

Beginning with the psychological impact, the lake offers several opportunities to enhance the physical well-being of its residents. The following quotes “I come here with my children to let them play (Respondent 50)”, “I go jogging before going to the office. Because I have obesity (Respondent 17)”, “I go cycling with my friends around the lake (Respondent 11)” exposed by the respondents shows that the lake provides an ample space for the residents to involve in physical activities such as exercising, cycling, playing, etc. that ensures the physical well-being.

The improvements in social relations within the residents are the most important benefit out of the springs of benefits from the lake. The nature and the calmness enable healthy conversations to happen between family members and with the neighbours. Respondent (2) shared “In the evening, my husband and I go for a walk around the lake. At that time, we are discussing things that were happened during the day”. Another respondent (51) shared “I can spend time with my neighbours when I go jogging in the morning”. This evidence the contribution of the lake towards the improvement of society.

“I sell thambili and kola kanda here. Through that, I can earn a sufficient income by selling them to the people who come here. (Respondent, 22) Creation of job opportunities that helps the economy is also possible by the lake. In addition, the Provision of a livable environment in the urban structure is a vital benefit. “At noon it is really hot these days. But near the lake it is not. Due to trees and water, it is not that hot”. (Respondent -50) “The lake is a help for these trees to grow. I think these trees can help us to live amidst the pollution in the city”. (Respondent – 49). The presence of a lake with trees growing around it can add a significant impact to this unpleasant environment. Any person who sees a glimpse of the scenic view of Diyawanna lake situated in an urban area can feel that difference.

4.3 Regression Analysis of factors affecting market value of the residential property

Table 2: Description of Variable

Variable	Description of variable	Source	Type of variable
MV	Market value of the residential property	Market value collected through government valuation department, local authority details & individual valuers.	Dependent
X ₁	Extent of the Land	Questionnaire	Independent
X ₂	Floor Area	Questionnaire	Independent
X ₃	Age of Building	Questionnaire	Independent
X ₄	Number of Bedrooms	Questionnaire	Independent

X ₅	Number of Bathrooms	Questionnaire	Independent
X ₆	Distance to Central Business district (Battaramulla town)	Google Map	Independent
X ₇	Nature of View of Lake	Questionnaire, Researcher's observation	Independent
X ₈	Distance from lake to Property	Google Map	Independent

Source: (Field survey, 2020)

4.3.1 Correlation among the Variables

Altogether there are twelve (12) independent variables used for the regression models to find out the interrelationship of the independent variables. All variables express their correlation among each other by less than 0.9. So, there was no multi-correlation issue.

Table 3: Table of Correlation

		Market value of the property
Extent of land (Perches)	Pearson Correlation	.541**
	Sig. (2-tailed)	.001
Number of storeys	Pearson Correlation	.654**
	Sig. (2-tailed)	.000
Floor area	Pearson Correlation	.854**
	Sig. (2-tailed)	.000
Distance from CBD (Battaramulla Town) (Km)	Pearson Correlation	.121
	Sig. (2-tailed)	.488
Nature of the view	Pearson Correlation	-.116
	Sig. (2-tailed)	.507
Age of the building (Years)	Pearson Correlation	-.426*
	Sig. (2-tailed)	.011
Distance from water body (M)	Pearson Correlation	.362*
	Sig. (2-tailed)	.033
Market value of the property	Pearson Correlation	1
	Sig. (2-tailed)	
Number of bedrooms	Pearson Correlation	.861**
	Sig. (2-tailed)	.000
Number of bathrooms	Pearson Correlation	.468**
	Sig. (2-tailed)	.005
View to the water body from the property	Pearson Correlation	. ^c
	Sig. (2-tailed)	.

Source: (Field survey, 2020)

4.3.2 Market Value as a Dependent Variable

In the model, the market value has been taken as the dependent variable. The regression was run with all the independent variables. As per Table 4, the R Square was 0.981 and adjusted R square is above 90% indicating that data fitness of the model was very high.

Table 4: Model Summary

Model	R	R Square	Adjusted Square R	Std. Error of the Estimate	Durbin-Watson
1	.993 ^a	.986	.981	1,900,021.28936	1.657
a. Predictors: (Constant), Extent of land (Perches), Floor area, Age of the building (Years), Number of bedrooms, Number of bathrooms, Distance from Main Town Centre (Battaramulla Town, Km), Nature of the view, Distance from a water body (M).					
b. Dependent Variable: Market value of the residential property					

Source: (Field survey, 2020)

Table 5: Fitness of the Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	6528102134866733.000	8	816012766858341.600	226.037	.000 ^b
Residual	93862103400696.160	26	3610080900026.775		
Total	6621964238267429.000	34			
a. Dependent Variable: Market value of the property					
b. Predictors: (Constant), Number of bathrooms, Distance from a water body (M), Extent of land (Perches), Distance from Main Town Centre (Battaramulla Town) (Km), Age of the building (Years), Floor area, Nature of the view, Number of bedrooms					

Source: (Field survey, 2020)

The p-value is 0.000 which is less than 0.05 which indicated that the fitness of sample data to the model was meaningful, statistical and that the regression equation was effective.

4.3.3 Significance of the individual independent variable to the Market Value

According to Table 6, the significance level of T-test of all coefficient was smaller than 10% which indicate the corresponding coefficient had significance influence. Six of ten independent variables (Extent of land, Distance from CBD, Distance from water body, Floor area, Age of the building and number of bathrooms, Nature of view and type of interest) entered were significant at 0.05 or better.

Table 6: Regression with market value as an independent variable

Model	Variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
(Constant)		15942135.165	5520348.833		2.888	.008
Extent of land (Perches)	X ₁	2585963.581	185829.196	.465	13.916	.000

Distance from CBD (Battaramulla Town) (Km)	X ₆	-3958342.088	1687386.460	-.093	-2.346	.027
Distance from water body (M)	X ₈	-23049.654	11202.345	-.090	-2.058	.050
Nature of the view	X ₇	803433.059	742879.365	.051	1.082	.289
Floor area	X ₂	6957.536	400.413	.880	17.376	.000
Age of the building (Years)	X ₃	-519884.776	108630.497	-.164	-4.786	.000
Number of bedrooms	X ₄	396937.780	621349.429	.031	.639	.529
Number of bathrooms	X ₅	-2593908.939	724172.556	-.137	-3.582	.001

a. Dependent Variable: Market value of the property

Source: (Field survey, 2020)

4.3.4 Contribution of proximity to quality water bodies and Scenic View

As per the results of the above table, the market value increased by Rs. 803,433.05 when the view of the lake increased by one unit (around 60°) and the market value decreased by Rs. 23,049.65 when the distance from the water body increased by one meter. According to the results of the regression analysis (hedonic pricing), the proximity to quality water bodies and scenic views have a positive influence to increase the market value of the nearby residential property.

Created Regression Model

$$MV = 15942135.165 + 2585963.581X_1 - 3958342.088X_6 - 23049.654X_8 + 803433.059X_7 + 6957.536X_2 - 519884.776X_3 + 396937.780X_4 - 2593908.939X_5$$

5 CONCLUSION

This research investigated whether the Diyawannawa lake (water body) as a scenic view impacted on surrounding residential property market values. Findings show that Diyawannawa lake is a 'quality' water body that provides social, economic, physical, psychological, and aesthetic utilities to the surrounding residential area. The regression model developed based on hedonic pricing worked out for 35 residential properties shows that the residential properties with a scenic view of 60° or more towards Diyawannawa Lake records a premium market value of Rs. 803,433.05 between the period of year 2019 -2020. This is indicative that the proximity to "quality" water bodies can generate premiums for market value of residential properties. On this basis, the study informs valuers that the waterfront scenic view is a factor affecting residential property values in Colombo suburbs, architects, developers, and planners to consider this aspect in planning and designing housing and settlements and, local authorities to pay attention in investing in improving and managing the waterfront areas of the residential locality.

ACKNOWLEDGMENT

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REFERENCES

- Abeysekera, D.K., 2014. *Effect of Scenic View on Residential Property Values: Application of Hedonic Pricing Model. Special Reference to Millennium city-Athurugiriya* (Doctoral dissertation, university of Sri Jayewardenepura, Gangodawila, Nugegoda).
- Alam, R., Shirazi, S.A., Zia, M.B.S. and Bhalliand, M.N., 2014. Spatial distribution of urban green spaces in Lahore, Pakistan: A case study of Gulberg Town. *Pakistan Journal of Science*, 66(3), pp.277-81.
- Baranzini, A. and Schaerer, C., 2011. A sight for sore eyes: Assessing the value of view and land use in the housing market. *Journal of Housing Economics*, 20(3), pp.191-199.
- Benson, E.D., Hansen, J.L., Schwartz, A.L. and Smersh, G.T., 1998. Pricing residential amenities: the value of a view. *The Journal of Real Estate Finance and Economics*, 16(1), pp.55-73.
- Brown, G.M. and Pollakowski, H.O., 1977. Economic valuation of shoreline. *The review of Economics and Statistics*, pp.272-278.
- Dahal, R.P., Grala, R.K., Gordon, J.S., Munn, I.A., Petrolia, D.R. and Cummings, J.R., 2019. A hedonic pricing method to estimate the value of waterfronts in the Gulf of Mexico. *Urban Forestry & Urban Greening*, 41, pp.185-194.
- Darling, A.H., 1973. Measuring benefits generated by urban water parks. *Land economics*, 49(1), pp.22-34.
- Davies, G., 1974. An econometric analysis of residential amenity. *Urban studies*, 11(2), pp.217-225.
- Department of Census and Statistics., 2012. *Census of Population and Housing*, Colombo: Ministry of Finance and Planning
- Dornbusch, D.M. and Barrager, S.M., 1973. *Benefit of water pollution control on property values* (Vol. 1). US Government Printing Office.
- Garrod, G.D. and Willis, K.G., 1992. Valuing goods' characteristics: an application of the hedonic price method to environmental attributes. *Journal of Environmental management*, 34(1), pp.59-76.
- Harris, R. and Arku, G., 2006. Housing and economic development: The evolution of an idea since 1945. *Habitat International*, 30(4), pp.1007-1017.
- Jayasekare, A.S., Herath, S., Wickramasuriya, R. and Perez, P., 2019. The price of a view: Estimating the impact of view on house prices. *Pacific Rim Property Research Journal*, 25(2), pp.141-158.
- Jim, C.Y. and Chen, W.Y., 2009. Value of scenic views: Hedonic assessment of private housing in Hong Kong. *Landscape and urban planning*, 91(4), pp.226-234.
- Kaplan, R. and Kaplan, S., 1989. *The experience of nature: A psychological perspective*. Cambridge university press.
- Kim, S.K. and Peiser, R.B., 2018. The economic effects of green spaces in planned and unplanned communities. *Journal of Architectural and Planning Research*, 35(4), pp.323-342.
- Kulshreshtha, S.N. and Gillies, J.A., 1993. Economic evaluation of aesthetic amenities: a case study of river view 1. *JAWRA Journal of the American Water Resources Association*, 29(2), pp.257-266.
- Kumagai, Y. and Yamada, Y., 2008. Green space relations with residential values in downtown Tokyo—implications for urban biodiversity conservation. *Local Environment*, 13(2), pp.141-157.
- Lake, I.R., Lovett, A.A., Bateman, I.J. and Langford, I.H., 1998. Modelling environmental influences on property prices in an urban environment. *Computers, Environment and Urban Systems*, 22(2), pp.121-136.
- Lancaster, K.J., 1966. A new approach to consumer theory. *Journal of political economy*, 74(2), pp.132-157.

- Lang, J.R. and Jones, W.H., 1979. Hedonic property valuation models: are subjective measures of neighborhood amenities needed?. *Real estate economics*, 7(4), pp.451-465.
- Lu, J., 2018. The value of a south-facing orientation: A hedonic pricing analysis of the Shanghai housing market. *Habitat International*, 81, pp.24-32.
- Maulan, S., Shariff, M.K. and Miller, P., 2006. Landscape preference and human survival well-being. *Sustainable Tropical Design Research and Practice*, 1, pp.24-31.
- McConnell, K.E., 1990. Double counting in hedonic and travel cost models. *Land Economics*, 66(2), pp.121-127.
- Michael, B., Vicky, S. and Michael, S., 2002. Residential real estate prices: a room with a view. *Journal of Real Estate Research*, 23(1-2), pp. 129-138.
- Mosley, M.P., 1989. Perceptions of New Zealand River scenery. *New Zealand Geographer*, 45(1), pp.2-13.
- O'riordan, T., 2014. *Environmental science for environmental management*. Routledge.
- Oxford English Dictionary., 2008. scenic view. In *Oxford English dictionary*.
- Powe, N.A., Garrod, G.D. and Willis, K.G., 1995. Valuation of urban amenities using an hedonic price model. *Journal of property research*, 12(2), pp.137-147.
- Sander, H.A. and Polasky, S., 2009. The value of views and open space: Estimates from a hedonic pricing model for Ramsey County, Minnesota, USA. *Land Use Policy*, 26(3), pp.837-845.
- Urban Development Authority., 2019. *Colombo Commercial City Development Plan 2019–2030*, Colombo, Sri Lanka: Urban Development Authority – Sri Lanka.
- Völker, S. and Kistemann, T., 2011. The impact of blue space on human health and well-being–Salutogenetic health effects of inland surface waters: A review. *International journal of hygiene and environmental health*, 214(6), pp.449-460.
- White, M., Smith, A., Humphries, K., Pahl, S., Snelling, D. and Depledge, M., 2010. Blue space: The importance of water for preference, affect, and restorativeness ratings of natural and built scenes. *Journal of environmental psychology*, 30(4), pp.482-493.