



The Six Components of Urban Quality of Life: A Case Study in Khan Dangkao of Phnom Penh City



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សង្ខេប

ការសិក្សាស្រាវជ្រាវមានគោលបំណងដើម្បីពិនិត្យមើលនិងវិភាគអំពីការវាស់វែងនៃគុណភាពរស់នៅជាមួយនិងសហគមន៍នៅក្នុងទីក្រុងនៃរាជធានីភ្នំពេញដែលបានណែនាំដោយ Muhammed & Abubakar (2019) ជាមួយនិងសមាសធាតុដែលជាមូលដ្ឋានចំនួន៦គឺ សុខភាពសាធារណៈ សន្តិសុខ ការអភិវឌ្ឍន៍សហគមន៍ ការអភិវឌ្ឍន៍ខ្លួន បរិស្ថានបរិស្ថាន ធនធានធម្មជាតិ និងសេវាកម្មក្នុងទីក្រុង។ ការស្រាវជ្រាវបានសម្ភាសន៍សរុបចំនួន២៥០ខ្ទង់ផ្ទះ ដែលជាប្រជាជនរស់នៅក្នុងប្រាំបី និងប្រជាជនរស់នៅក្រៅប្រាំបី ដើម្បីប្រមូលទិន្នន័យគុណវិស័យ និងទិន្នន័យបរិមាណវិស័យ និងបានអនុវត្តវិធីសាស្ត្រការចូលរួមក្នុងការប្រមូលទិន្នន័យគុណវិស័យផងដែរ។ ការសិក្សាបានបង្ហាញថាសេវាថែទាំសុខភាពសាធារណៈរបស់ប្រជាជនមានកំរិតទាប ប៉ុន្តែពួកគេមិនអាចទទួលបានសេវាថែទាំសុខភាពពេញលេញ។ ចំពោះសន្តិសុខប្រជាជនរស់នៅក្នុងប្រាំបីមានសុវត្ថិភាពជាងប្រជាជនរស់នៅក្រៅប្រាំបី ប្រជាជនទាំងពីរភាគច្រើនបានជួបប្រទះនូវទម្រង់នៃអំពើហិង្សាមួយចំនួន ប៉ុន្តែមិនមែនជាអំពើហិង្សាធ្ងន់ធ្ងរនោះទេ។ ការស្រាវជ្រាវបានបញ្ជាក់ថាប្រជាជនរស់នៅក្នុងប្រាំបី និងប្រជាជនរស់នៅក្រៅប្រាំបី ចូលចិត្តចំណាយពេលច្រើនក្នុងមួយខែទៅកំសាន្តនៅលំហែតែង។ ចំពោះការអភិវឌ្ឍន៍សហគមន៍ការសិក្សាបានសន្និដ្ឋានថាប្រជាជនរស់នៅក្នុងប្រាំបីមានចូលរួមក្នុងការអភិវឌ្ឍន៍សហគមន៍តិចជាងប្រជាជនរស់នៅក្រៅប្រាំបី។ ភាគច្រើននៃអ្នកឆ្លើយតប បានរីករាយនិងការអភិវឌ្ឍន៍ខ្លួននៅទីតាំងរស់នៅរបស់ពួកគាត់។ អ្វីដែលគួរឱ្យចាប់អារម្មណ៍គឺប្រជាជនរស់នៅក្នុងប្រាំបី

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បានពេញចិត្តនិង ការអភិវឌ្ឍន៍បរិស្ថានរូបវន្តនៅទីតាំងខ្លួនរស់នៅ។ អ្នកឆ្លើយតបភាគច្រើនបានពេញចិត្តជាមួយ ការអភិវឌ្ឍន៍ហេដ្ឋារចនាសម្ព័ន្ធដកជន និងសាធារណៈនៅក្នុងសហគមន៍របស់ពួកគេ។

Abstract

The research study aims to examine and analyze the quality of life and urban communities of Phnom Penh capital city introduced by Muhammed & Abubakar (2019) through the six basic components: health, security, personal development, community development, physical environment, and natural resources, goods, and services. The survey interviewed 250 households of urban residents in Borey and None-Borey for quantitative data and applied participatory approaches for qualitative data. The research finds that the majority of the respondents had good health conditions. However, they were not fully able to access healthcare services. In terms of security, residents in Borey were safer than None-Borey, and most respondents experienced some types of violence's form but not serious violence. The survey also shows that the respondents in Borey and None-Borey residencies enjoyed spending much time per month visiting green spaces. Regarding community development, the research concludes that the residents in Borey were less engaged in community development than in None-Borey. Moreover, most of the respondents were satisfied with their personal development. Interestingly, residents in Borey were more satisfied with the physical environment. Most respondents were satisfied with their communities' private and public infrastructure. The research finding suggests and provides appropriate solutions to the current basic components of quality of life.

1. Introduction

Phnom Penh is the capital city and largest area in Cambodia. It is the center where culture, heritage, economy, industrial activities, politics, and diplomacy are situated. Phnom Penh city's location is unique because of its special geography consists of the confluence of three great rivers, the four arms of the Mekong River, the Tonle Sap Lake, and the Bassac River, in front of the Royal Palace (GGGI, 2019). The capital is divided into 12 districts called Khans; they include Chamkar Mon, DounPenh, Prampir Meakkakra, Tuol Kouk, Dangkao, PoSenChey, Mean Chey, Chhbar Ampov, Russei Kaev, Chrouy Changvar, Sen Sok and Preaek Phnov (MoP, 2019). Cambodia has experienced a significant economic transition under the United Nations Transitional Authority in Cambodia (UNTAC), and the country started opening the door for assistance and investment. As a result, Phnom Penh, the capital city, has grown rapidly and reached double-digit Gross Domestic Product (GDP) growth of around 6% to 7% between the late 1990s and early 2000s (World Bank, 2018a). As a result, Phnom Penh. It had the highest population at 2,129,371 in 2019, followed by neighboring Kandal province, with a population of 1,195,547, and Prey Veng province, with a population of 1,057,428 (MoP, 2019).

Cambodia's strong economic growth caused an economic boom in Phnom Penh, with major investments in the construction sector, including in hotels, restaurants, bars, and high-rise residential and commercial buildings (World Bank, 2017). The Royal Government of Cambodia (RGoC) made the country a lower-middle-income country in 2015, expecting upper-middle income by 2030 and a high-income economy by 2050 (World Bank, 2020). Delux & Socheata (2022), the economy first faced declining

growth in 2020 and a negative of 6.3% in the service sector. Cambodia's economy is expected to meet the growth in 2023 at around 5.4%; in 2024, it will slightly increase to 5.8% and gradually reach 6.1% in 2025 from infrastructure investment and regional trade agreements (World Bank 2023).

Thiel (2011) stated that the land market in Phnom Penh City was quite high compared to Thailand, Malaysia, and Indonesia. In the primary location in Phnom Penh, the price was 3,000 USD per square meter; it was higher in the riverfront zone, with 5,000 USD per square meter in 2007 and 2008. MoEF, (2019) stated on Prakas No. 343 SHV. BK in 2019 regarding the geographical distribution and property values in Phnom Penh. Land prices are separated into two zones, which are zone-1 in the center area of Phnom Penh and zone-2 in the periphery urban Khans. Zone 1 has four khans in central Phnom Penh: Khan Doun Penh, Khan Chamkar Mon, Khan Prampir Meakkakra, and Khan Tuol Kouk. The land prices are set between 1,200 to 4,500 USD. Periphery urban Khans are in zone 2 and consist of 8 khans, namely Dangkao, PoSenChey, Mean Chey, Chhbar Ampov, Russei Kaev, Chrouy Changvar, Sen Sok and Preaek Phnov. There are two price models and 16 types of land. From type 1 to type 15, located along the entrance area in zone 1, the price is between 45 and 1500 USD. Type-16, the land location is at the city's edge along Kandal Provide. The price is lower, between 10 and 200 USD (MoEF, 2019).

Lakes and wetlands within Phnom Penh are important for the urban fabric as recreation sites, supporting local food production, and lakes and wetlands also provide flood protection by keeping rainwater through the monsoon season (STT, 2015). During the 2010s, many huge residential developments occupied wetlands and lakes in central and suburban areas (World Bank, 2017).

Moreover, the city's population has grown, and many large areas of Phnom Penh's main, especially lakes, have been filled into created land for urban development (Doyle, 2012a). This has generated new challenges in this rapidly growing city, from the displacement of low-income communities to concerns about flooding and wastewater management. As Phnom Penh looks towards the future, the city's officials and its residents seek to manage these challenges. Because of the urban sprawl and densification of urban land use as well as the spatial share of urban green spaces, which has quickly declined in Phnom Penh since 2000, these challenges have led to increased flooding problems during the rainy season. Phnom Penh is a modern metropolis dominated by skyscrapers and surrounded by satellite cities (Waibel et al., 2020).

Phnom Penh city has recently experienced environmental changes along with social and economic growth. The change in the social environment in Phnom Penh has been remarkable over the past decade, especially during the 2010s. Public Space and Cultural Heritage Historically, Phnom Penh was rich in parks, green areas, and cultural heritage buildings and sites. However, the city's redevelopment since the 1990s has led to many of the green areas and the city's cultural heritage buildings and sites being destroyed in favor of making the new way for development projects or some heritage buildings being left to decay (GGGI, 2019). The amount of green space and open areas in Phnom Penh has decreased markedly in recent years. According to Phnom Penh's Urban Transport Master Plan 2035, Phnom Penh has much less green area per capita than many other densely populated major cities worldwide. Phnom Penh has only 1.1 m² of green space compared to New York City at 29.2 m² and Tokyo at 5.5 m² per person (JICA-PPUTMP, 2014).

According to Mercer's 2019 measurement, quality of life has ranked Phnom Penh at 196 out of 231 Cities in the world, and it seems quite low compared to Vientiane, Laos, PDR at 171, and Ho Chi Minh, Vietnam at 153 in Ando-China. In 2019, Cambodia viewed life expectancy at birth, and the total (years) at 70 years was higher than Lao PDR at 68 years, but it appeared lower than Vietnam at 75 years and Thailand at 77 years (World Bank, 2019). Regarding the Human Development Index, Cambodia scored 0.594, which appears as the medium HDI category, positioning at 144 out of 189 countries and territories (UNDP, 2020).

The first problem is the overall satisfaction of Phnom Penh's residents is low. Doyle (2012), people in Phnom Penh city faced an unsatisfied feeling with flooding, which interrupted daily business activities and daily life. Furthermore, it was also viewed as a potential illness created by the stormwater and human waste left over on the street. Mund et al. (2020) find that people need green

space and blue space for recreation, and they require space for exercising and relaxing, releasing the street to fulfill their basic activities after work. However, urban public parks, which had run into, disappeared. Global Green Growth Institute (2019) noted that many critical public spaces, such as city sidewalks, are overtaken by parked cars, motorcycles, and informal vendors, making walking in Phnom Penh extremely difficult and sometimes dangerous.

Secondly, Phnom Penh's residents faced difficulty seeking affordable houses; the market's housing prices appeared very high, and the quality of house space was low. Affordable housing supply seemed to be a shortage in Phnom Penh due to large demand, although there are too many large-scale residential developments in Phnom Penh (World Bank, 2017). Phnom Penh's land price was quite high compared to Thailand, Malaysia, and Indonesia (Thiel, 2011). Moreover, Jensen (2021) shows that construction materials are imported from overseas, so there is no doubt that house prices are very high (Pengly & Tirapas, 2022). Some apartment Shophouse unit spaces in Phnom Penh experience low-quality living conditions, such as hygiene, daylighting, and ventilation.

Thirdly, the problem is the high degree of social, economic, and environmental change in Phnom Penh, affecting the quality of life. Natural resources are described as greenspace and wetlands. Over the past decade, rapid urbanization in Phnom Penh has resulted in many new residential developments in both the center and the edge of Phnom Penh World Bank (2017). This large-scale new city development has been evolving sand filling to natural lakes, rivers, and streams in Phnom Penh, viewed as hard infrastructure. The rapid and unplanned concentration of people in urban areas, especially in Phnom Penh, contributes to environmental degradation, reducing the livelihood and well-being of city dwellers. Social problems affecting everyday life are considered as the traffic conditions and accidents in Phnom Penh that have been worsening in recent years due to the rapid increase of vehicles mainly spurred by the country's vital economic growth (JICA 2014). Moreover, most of the walkways for pedestrians that Phnom Penh citizens need for daily use are unable to be used since it has been occupied by informal businesses and illegal car parking, so people have no choice but to walk along the road that seen as very dangerous for them with high potential road accidents that threaten their life (World Bank, 2017).

The research study examines and analyzes the quality of life and urban communities of Phnom Penh city through the six basic components: health, security, personal development, community development, physical environment, and natural resources, goods, and services. These six components of quality of life are defined by Muhammed & Abubakar (2019). The research findings include the perception of urban residents in

access to public health services, security, and safety, natural resources, goods and services, and community development matters to the quality of life, personal development, and access to the physical environment.

1.1 Conceptual framework of urban quality of life

The term quality of life (QoL) was coined in the US after World War II, and it was first referred to as the so-called “good life” with the meaning of consumer goods. At that time, QoL was defined as the purpose regarding the material of life, such as having a home and cars as their property. QoL’s concept evolved through time and encompassed life satisfaction and the need, aspiration, and involvement in environmental aspects to improve life (De Walden-Gatuszko 1997). Armstrong & Caldwell (2004) stated in their publication the origins of QoL’s concept in the 1970s. QoL is described as the new outcome regarding health care. Moreover, QoL was described as a powerful solution to huge social and medical dilemmas.

The World Health Organization (WHO) in 2012 developed a user manual of World Health Organization Quality of Life (WHOQOL) in the program on mental health. The manual refers to the quality of life as individuals’ perceptions of their position in life in the context of the culture and value systems in which they live and concerning their goals, expectations, standards, and concerns. The concept describes far-reaching, comprehensive ways toward the individual’s physical and psychological health. It also illustrated a level of independent, personal opinions reaching social relationships. Eventually, there was a remarkable component, which is also defined as the concept of quality of life; it is the salient feature of the environment. To what extent is quality of life not only equal to such terms as “health status,” “lifestyle,” “life satisfaction,” “mental state,” or “well-being?” Additionally, WHO’s definition reflects the subjective evaluations the personal assessment to explain the concept of quality of life, which considers many dimensions such as cultural, social, and environmental (WHO, 2012).

Eurostat (2015) viewed the quality of life (QoL) in Europe as a wide-ranging concept, and it is not just economic production and living standards. Moreover, it is characterized by value in living, and it is beyond the purely material aspects; all these components are influenced by the full range of factors. QoL is a multidimensional concept, and a set of indicators was developed. Nine dimensions comprise the quality of life in the framework, and all dimensions can be understood as aspects of economic and social development; in other words, it is GDP. The other eight dimensions are people’s capacity with the ability of people toward people’s needs in the sense of well-being and responding to people’s values. These are associated with people’s capacity

toward people’s needs in the sense of well-being, responding to people’s values and priorities. Lastly, it is related to the overall ‘overall experience of life’, which means the Individual perception of QoL, such as life satisfaction and meaning (Eurostat, 2015).

Quality of Life is also defined by the Organization for Economic Co-operation and Development (OECD) on “How’s life” by measuring well-being. OECD described quality of life as the notion of human welfare (well-being) measured by social indicators rather than by “quantitative” measures of income and production. Many factors raise the quality of life, such as health status, work and life balance, and education and skills. Quality of life also considers civic engagement and governance; it describes social connections and environmental quality. The final point considers the definition stated about personal security and subjective well-being (OECD, 2011). In this research, a definition of Muhammed & Abubakar (2019) is used as the basis for analysis. Urban quality of life is defined by citizens’ enjoyment of important life possibilities such as standard of living, general welfare, and feeling safe and satisfied with life (Muhammed & Abubakar, 2019). The authors adopted the concept from Mitchell et al. (1995), and they concluded with six components regarding quality of life. QoL has six components: health, security, personal development, community development, physical environment, natural resources, goods, and services. The components of health consist of physical health and mental health. Security’s component is referred to housing issues, crime and safety, and personal economic security. The third component is personal development, which is related to individual development through learning and individual development through recreation. Community



Adopted from Muhammed & Abubakar (2019)

Fig. 1: Conceptualizing urban quality of life in Phnom Penh.

development is defined as structure, social network, and political participation. The last of the components is natural resources, goods, and services (Fig. 1). It refers to the natural resources themselves, interests, and social services.

QoL is defined as a citizen’s enjoyment of important life possibilities such as standard of living, general welfare, and feeling of being safe and satisfied with life (Muhammed & Abubakar, 2019). This research’s framework is adopted from Muhammed & Abubakar (2019) that aims to measure and analyze the quality of life in urban communities of Phnom Penh through the six basic components: health, security, personal development, community development, physical environment, and natural resources, goods, and services. The six components of quality of life are interconnected and have a relationship with each other. The physical environment involves public infrastructure and public infrastructure. Similarly, QoL is concerned about Health issues, which are important and consist of Public and Mental health. QoL has heightened safety points: safe commune, Sangkat, and security. Natural resources refer to green space and wetlands, the key issues that Phnom Penh is shrinking due to development. Another perception of QoL is community development, defined as social events and participation. Lastly, QoL is stress control and the need for living satisfaction.

1.2 Study Area and Methodology

The study used both exploratory and descriptive approaches to assess six components of urban quality of life among the residents of Phnom Penh. The research used surveys to collect quantitative data using structured questions, social tools, and participatory approaches. Phnom Penh was chosen in this research since it is the capital city of Cambodia, where the center of culture, heritage, economics, politics, and diplomacy is situated (Table 1, Fig. 2). Over the past decades, it has grown very fast, leading to significant economic, social, and ecological change. Therefore, studying Phnom Penh residents’ urban quality of life becomes important. Phnom Penh is surrounded by Kandal province and consists of 14 khans nowadays. The capital is divided into two main zones: four khans are in the central zone, and ten khans are in the -peri-urban zone surrounding the core zone.

The study focused on two types of living areas within Phnom Penh: Borey and None-Borey. Gabriel (2015), the common use of the term Borey to refer to particular real estate projects seems to date back to the post-independence period and the emergence of New Khmer. The use of this term to designate equipment spaces or residential spaces testifies to a search for new toponymic references, which accompany the emergence of a unique architectural style. Borey is often featured in various

Table 1: Land area and the population of Dangkoa district.

Area	Population	Household	Commune	Village
197.89 Km2	159,772 people	36,535 households	13	83

Source: MoP 2019

housing options, including flat, shop, and villa-style properties. Some developments also provide residents with a clubhouse, swimming pools, on-site retail such as mini marts, and children’s play facilities. Most Borey developments will have some on-site management that will assist with rubbish collection, upkeep of roads and common areas, and sometimes also help with the electrical or plumbing maintenance for Borey residents (Knight Frank Cambodia). None-Borey in this research refers to residential living areas in the public zone of the city or peri-urban. There are different types of buildings within the city. The residential zone within the capital city, towns, and urban areas is divided into five types: detached low-rise residential zone (village or semi-villages), linked low-rise residential zone (flats or attached houses), medium-rise residential zone, high-rise residential zone, mixed residential zone (RG, 2015, Sub-Degree No.42).

Dangkoa district is divided into 13 communes and 83 villages. The study area of two communes, namely Dangkao and Cheung Aek, is located along the eastern side of Dangkoa and next to Boeung TomPum Lake. Boeung TomPum Lake is considered one of the big lakes in Phnom Penh City; the two communes are part of that wetlands area. Although the two communes are not located in the center of Phnom Penh, they are relatively accommodated, with many populations. The Dangkao commune is the largest area in the district of Dangkao as it is home to 18,153 households, and the population is 76,421 in total, with males 37,109 and females 39,312 (MoP, 2019).

The study focused on two types of living areas within Phnom Penh: Borey and None-Borey. The study compares the urban quality of life in those two living areas. In the Dangkoa commune, the study chose residents in Borey

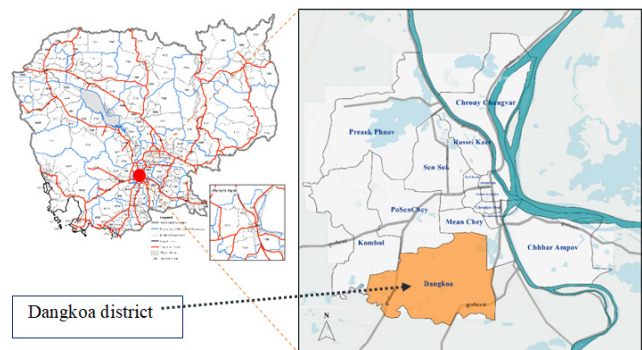


Fig. 2: Map of Phnom Penh city highlighting the study areas.

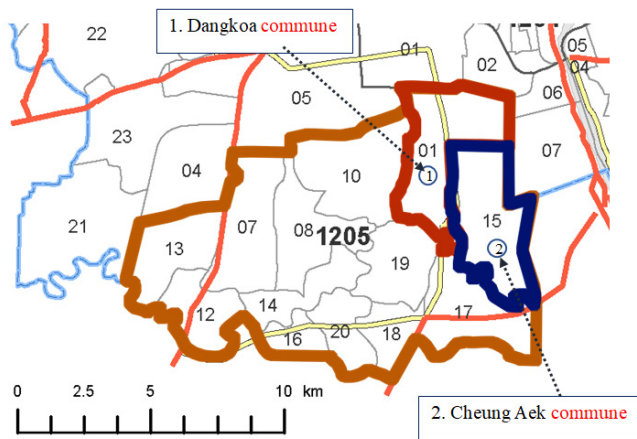


Fig. 3: Map of the study areas in Dangkoa commune and Cheung Aek commune.

to study since this area has more Borey developments than another commune in the Dangkoa district (Fig. 3). Borey New World, located in Sambou Village, Dangkoa commune, conducted the research. There are so many building types and functions within Borey New World. It could be seen that most houses are Chinese shophouses or flat-style houses that cover the Borey. People in the community bought the houses not only for living, but most of the residents also converted to small restaurants, clothes shops, grocery shops, marts, coffee shops, pharmacies, and clinics. Moreover, private schools, public gardens, and a big marketplace are in the center of the Borey for people in the community. In Cheoug Aek commune, the research was considered residents in None-Borey as a case study, located in Cheoug Aek village. All houses in the None-Borey community have mixed building styles, such as villas with a plot of land lot, flat houses, and traditional house styles; all the houses are built with a fence along the street. Most roads are narrow, with unproper, small, or even non-sidewalks on the street. Other functions include shops (groceries, clothes, construction materials, and so on), public schools, private clinics and pharmacies, restaurants and coffee shops, and an improper market constructed along the street. A pagoda with a big land size probably has served as a public space within the community since it has an access road across the pagoda, allowing people to access the daily drive. Cheoug Aek village is one village that still has more wetlands that can be seen on the map that was left out as vacancy land function.

The research was conducted in Phnom Penh, the capital city, and Dangkoa district was purposively selected as the study area. In the commune level, the two communes, Dangkoa and Cheung Aek, were chosen as the commune study, conducted in the villages in Dangkoa commune and Cheung Aek commune. At the household level, purposive and systematic sampling designs were used for the research. The study collected 125 households, divided into 62 males and 62 females,

Table 2: Households of Dangkoa and Cheung Aek, sample size's calculation.

No.	Commune	Population	Sample size	Male	Female
1	Dangkoa	18,153 households	124	62	62
2	Cheung Aek	2,987 households	123	61	62
	Total	21,140 households	247	123	124

equally males. A systematic sampling design will be used to select the households by selecting every three families.

The formula proposed by Yamane (1967) was employed for the data sampling design. Each commune used the formula to calculate the sample size with 9% for sampling error. According to the Minisrr of Planning in 2019, there are 18,153 households in Dangkoa commune and 2,987 in Cheung Aek commune. There are 21,140 households in both communes. By Calculating using Yamane (1967), the result of the sample size is 247 households, which are 123 male and 124 female.

The research collected primary and secondary data. Both quantitative and qualitative data were collected. While a household survey using a structured questionnaire will be used for quantitative data, a case study will be applied for qualitative data.

Secondary data sources were collected from different sources of publication, including reports, books, journals, research articles, and relevant academic websites. Furthermore, some documents were gathered from institutions and the government sector, such as the Municipality of Phnom Penh, district and commune-level authorities, and the ministry of Urban Planning and Management. Other relevant stockholders also needed to be considered to collect the information, such as the Built4people team from the project called Enhancing Quality of Life that s been done in Phnom Penh. Moreover, some related information was from the Asian Vision Institute (AVI) through the TECHO 100 Villages project. The secondary data was collected to determine the relationship between the six components of urban quality of life and local people, housing issues, and understanding perception through social, economic, and environmental change over the past decade within selected districts.

Primary data was collected from *reconnaissance surveys, household surveys, key informants, and social mapping*.

The reconnaissance survey was the initial data collection stage, including visiting the field study, identifying the sample size to plan a field interview, and determining the time and administrative procedures for conducting the field survey. Field observation was conducted, including house environment, living

environment, and urban planning in the selected district.

Household surveys were structured questionnaires to collect information from households in all villages in the Dangkoa commune. The research used face-to-face interviews in households to collect accurate data. Questionnaires in English were translated into the Khmer language during the interview session. In the household survey, one hundred twenty-four households are sampled and divided equally by 62 males and 62 females.

Key informants, including government and non-government agencies, were designed to collect data. The discussion was conducted with key city, district, commune, and village stakeholders. The municipality chief and officers, the chief of district and commune, council members, and village chiefs were very important for data collection. Furthermore, relevant NGOs exist, such as the Asian Vision Institute (AVI) and local NGOs like build4people.

Group discussions were conducted in group meetings among community people to explore deeper and relevant information regarding urban quality of life in the selected area.

Social mapping was important information on the villages, commune, and district-relevant objectives that were collected from relevant local authorities and social mapping of the selected area. Through social mapping, the drawing of the map with key information was collected from the commune offices together with the commune's chief and village leaders. The social mapping was about important information such as pagoda, village public spaces, schools, hospitals, shopping malls, living and wetlands, and lake zones within the district. Moreover, social mapping collected some urban problems within the selected area (Fig. A1 and A2).

The study was analyzed employing both qualitative and quantitative data analysis. Qualitative analysis was done by collecting qualitative information through a key informant and group discussion from key stockholders such as government and non-government agencies to analyze the general situation of urban quality of life in the selected area regarding the six components. For quantitative data analysis, the Statistical Package for Social Science software (SPSS Version 26) was used primarily for data processing and analysis of the results of household surveys. The data from the household survey were managed through the process of coding and cleaning, data entry, and data analysis. The study analysis used statistical methods such as frequency, mean, standard deviation, minimum and maximum, etc. In addition, the analysis would be illustrated in cross tables and charts to present the proposition of respondents.

The research applied the following statistical analysis: (1) T-test (ANOVA) Independent-Sample T-test to compare the mean scores of two groups (the group living in Borey and group non-Borey) on the given variable (living

Table 3: Association between serious health problems and health problems.

Attribute	Serious health problem				X2	p-value
	n	Yes	No			
Health problem	Yes	95	16	79	27.890a	0.000***
	No	155	0	155		
	Total	250	16	234		

Note: *** Perfectly significant at the 0.00 level.

condition and environment). (2) Chi-square was employed to test the association of two categorical variables: (1) stress control, (2) acceptance of housing conditions, and (3) traffic congestion. (3) Correlation analysis was used to determine the relationship between the satisfaction of Phnom Penh residents living in Borey and non-Borey with six components of quality of life, such as health, security, and participation in social events. (4) The Weighted Average index was used to rate living satisfaction on living conditions such as housing conditions, traffic congestion, and access to public and private services. The five scales are (1) highly agree; (2) agree, (3) moderate; (4) disagree; (5) strongly disagree.

2. Results and Findings

2.1 Accessing to public health services

According to the Chi-square test, there was a significant association between health problems and serious health problems ($p\text{-value} = 0.000$). Most respondents (66.2%) did not have serious health problems; they had normal conditions (Table 3).

Although both types of residents were healthy, all healthcare places seemed essential for them. Table 4 shows that the pharmacy was the most popular place with a moderate need for healthcare services. For other areas, such as health centers, referral hospitals, hospitals, private clinics, and private hospitals, Khmer traditional healers rarely or never visit. According to t-test analysis, it was significant that residents in None-Borey moderately called pharmacies more than those living in Borey. Residents in Borey visited Khmer traditional healers less than those in Borey because it was very significant ($p\text{-value} = 0.004$).

Overall, the distance of all these healthcare facilities compared to residents living in Borey and None-Borey is explained in Table 5. The pharmacy was the nearest distance, about 1.53 km, and the hospital was almost 16.0 km, which was very far among all healthcare places. Healthcare centers and referral hospitals were 3.78 and 4.66 km, respectively. The private hospital was likely not too far from the living area, about 2.68 km. Moreover, overall, Khmer traditional healers were far from all healthcare places. Based on the T-test, the distance of hospitals to the respondents in the two districts was very

Table 4: Places to visit for healthcare center services.

Attribute	Borey		None-Borey		Overall		p-value
	(n = 125)		(n = 125)		(n = 250)		
	WAI	OA	WAI	OA	WAI	OA	
Health center	0.82	N	0.79	R	0.80	R	0.134
Referral hospital	0.83	N	0.83	R	0.83	N	0.810
Hospital	0.70	R	0.72	R	0.71	R	0.290
Private clinic	0.69	R	0.66	R	0.68	R	0.225
Private hospital	0.67	R	0.67	R	0.67	R	0.948
Pharmacy	0.62	R	0.55	M	0.58	M	0.004**
Khmer traditional healer	0.96	N	0.92	N	0.94	N	0.002**

Notes: WAI = weight average index measured on a five-point scale [very often (VO) = 0.00-0.20, often (O) = 0.21- 0.40, moderate (M) = 0.41-0.60, rarely (R) = 0.61-0.80, never (N) = 0.81-1.00]. OA = Overall assessment.

*Significance at the 0.05 level.

** Very significant at the 0.01 level.

*** Perfectly significant at the 0.00 level

Table 5: Distance of residents to types of healthcare service.

Attribute (Km)	Borey	None-Borey	Overall	p-value
Health center	3.63	3.93	3.78	0.382
Referral hospital	4.78	4.54	4.66	0.505
Hospital	15.45	16.28	15.86	0.011**
Private clinic	2.86	2.51	2.68	0.242
Private hospital	3.10	3.19	3.14	0.759
Pharmacy	1.64	1.42	1.53	0.184
Khmer traditional healer	10.91	12.67	11.79	0.572

Note: ** Very significant at the 0.01 level

substantial (p -value = 0.11) derived from the residents living in None-Borey (16.28 km) and the residents residing in Borey (15.45 km).

2.2 Ensuring security and safety

The occurrences of these incidents were asked to understand the current status of both types of residencies. According to Table 6, overall, all of these incidences, such as family violence, theft by pickpocketing, gambling, illegal drug circulation and drug trafficking, gangster activities, violation of law, traffic accidents, and street robbery, were viewed as rare to have happened in the community. On the other hand, the cases of these problems, for an instant, women and children trafficking, illegal use of the weapon as well as murders and rapes, are illustrated as never happening in the neighborhood. Although gambling and violation of the law rarely occurred in the community based on (p -value = 0.000), the two types of houses were very different. It means gambling and the violation of the law occurred more often among residents living in Borey.

Gangster activities also happened more in respondents living in None-Borey than people living in Borey (p -value

= 0.001). Additionally, even though traffic accidents rarely occurred in the two communities. The survey shows that traffic accidents happened more in the area of None-Borey than in Borey (p -value = 0.004), which was very significant. Even though illegal drug circulation and drug trafficking seemed rarely to happen in the types of houses (p -value = 0.022). So, illicit circulation of drugs and drug trafficking were more occurring in None-Borey’s community than in Borey’s community. Street robbery was more likely to happen in the None-Borey zone than in the residents in Borey (p -value = 0.00).

The Chi-square test was conducted on the two types of residents regarding the violation’s seriousness and experiences of violation forms, such as emotional and physical violence. The analysis shows a relationship between experience of any violation and serious violation (p -value = 0.000). The survey shows that the residents had experience of any form of a breach, but they were not serious. The residents living in Borey and None-Borey felt emotionally and physically good and never had any worst experiences of violation (Table 7).

2.3 Access to natural resources, goods, and services

T-test was used to compare the mean of the two types of living communities concerning understanding the relationship between frequencies of their visiting and the green space as well as the distance of green space and the two types of living places. Table 8 shows that people living in Borey and None-Borey visited the green space almost five times. In addition, green space as the public space was about 5.25 km in average distance with the two types of living locations. Comparing both types of living locations and green spaces (shared space) was very significant (p -value = 0.007). It means that the location of people living in None-Borey was further than that of residents living in None-Borey, regarding distance, about 6.54 and 3.97 km, respectively.

Table 6: Incidents occurring in the neighborhood.

Attribute	Borey		None Borey		Overall		p-value
	(n = 125)		(n = 125)		(n = 250)		
	WAI	OA	WAI	OA	WAI	OA	
Family violence happens in your neighborhood	0.76	R	0.73	R	0.75	R	0.105
Theft by pickpocketing happening in your community	0.68	R	0.65	R	0.66	R	0.278
Theft by snatching bag and phone happening in your community	0.66	R	0.66	R	0.66	R	0.952
Gambling happening in your community	0.75	R	0.64	R	0.70	R	0.000***
Illegal drug circulation and drug trafficking happening in your community	0.81	N	0.75	R	0.78	R	0.022*
Illegal use of weapon	0.85	N	0.83	N	0.84	N	0.206
Gangster activities	0.71	R	0.62	R	0.67	R	0.001**
Murders	0.92	N	0.87	N	0.90	N	0.005**
Rapes	0.91	N	0.86	N	0.88	N	0.002**
Women and children trafficking	0.92	N	0.91	N	0.92	N	0.364
Violation of law	0.76	R	0.65	R	0.71	R	0.000***
Traffic accidents	0.69	R	0.62	R	0.66	R	0.004**
Street robbery	0.74	R	0.66	R	0.70	R	0.005**

Notes: WAI = weight average index measured on a five-point scale [very often (VO) = 0.00-0.20, often (O) = 0.21- 0.40, moderate (M) = 0.41-0.60, rarely (R) = 0.61-0.80, never (N) = 0.81-1.00].

OA = Overall assessment.

*Significance at the 0.05 level.

** Very significant at the 0.01 level.

*** Perfectly significant at the 0.00 level.

Correlation analysis illustrated in Fig. 4 was conducted to explore the relationship between the distance of green space and the frequencies of two types of residents going to green space to understand more deeply. The analysis shows no relationship between the two variables ($p\text{-value} = 0.210$). The residents went to the green space frequently per month, and it did not matter about the distance of green space from both types of residents.

Fig. 5 describes activities for leisure in the two types of residencies in the green space. The largest proportion of residents (77.6%) from two kinds of residents went to green spaces (public spaces) for relaxing, and others (37.2%) were doing sports activities. The smallest percentage was in the green space for picnics, and they also went there for public events.

2.4 Community development matters to quality of life

All respondents were asked about their participation in community development. Fig. 6 shows that 79.6% of both types of residents were involved in community development. The residents living in None-Borey participated in community development 86.4% more than residents in Borey, which was 72.8%.

The research also considered the gender aspect for the analysis of community development. The survey shows that 78.4% of the respondents participate in community development, derived from male respondents (80.8%) and female respondents (78.4%) (Fig. 7).

2.5 Access to personal development

Fig. 8 shows that 85.6% of both types of residents were satisfied with their personal development. The proportion of people living in Borey was slightly larger than that of people living in Borey (89.6%) and Non-Borey (81.6%).

Fig. 9 reveals that 85.6% of the respondents were satisfied with personal development; it was 82.4% for male respondents and 88.8% for female respondents. The residents were also looking for places to settle down where they could seek personal development. Personal development has helped to promote job opportunities. At the same time, the properties that were accessible for personal development may have high costs, and most residents could not afford them.

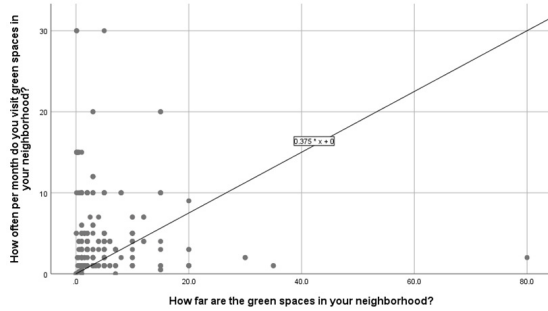
2.6 Accessing the physical environment

Fig. 10 demonstrates that 75.6% of the respondents at the two types of residencies were satisfied with their physical

Table 7: Violence experience and the seriousness of the violation (Chi-Square Test).

Attribute	Serious violation			χ^2	p-value	
	n	Yes	No			
Experience of any form of violation	Yes	125	38	87	44.811a	0.000***
	No	125	0	125		
Total		250	38	212		

Note: *** Perfectly significance at the 0.00 level.



** Correlation is significant at the 0.01 level (2-tailed).

Fig. 4: Relationship between frequency of residents visiting green space and distance from their houses.

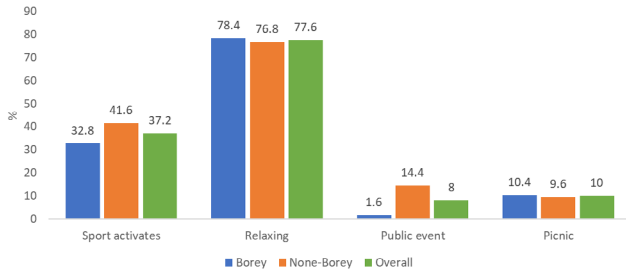


Fig. 5: Activities for leisure by two types of residencies to the green space.

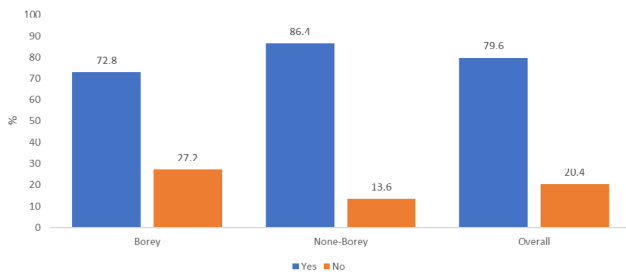


Fig. 6: Involving in community development by types of residencies.

environment. The respondents were satisfied with both private and public infrastructure. Comparatively, the proportion of the residents living in None-Borey (73.6%) shared a smaller proportion of those living in Borey (77.6%).

Table 8: Frequency of two types of residents visiting green space.

Attribute (time)	Borey	None-Borey	Overall	p-value
How often per month do you visit green spaces (public spaces) in your neighborhood?	4.43	4.77	4.60	0.590
How far are your green spaces (public space) in your neighborhood?	3.97	6.54	5.25	0.007**

** Very significance at the 0.01 level

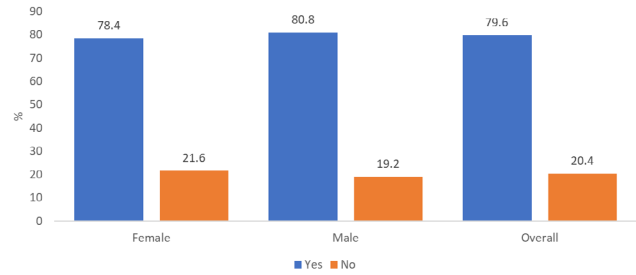


Fig. 7: Involvement in community development by gender.

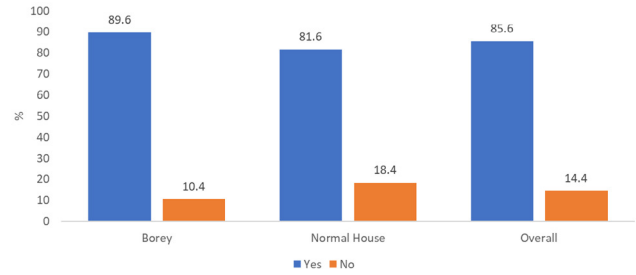


Fig. 8: Satisfaction of two types of residents on personal development.

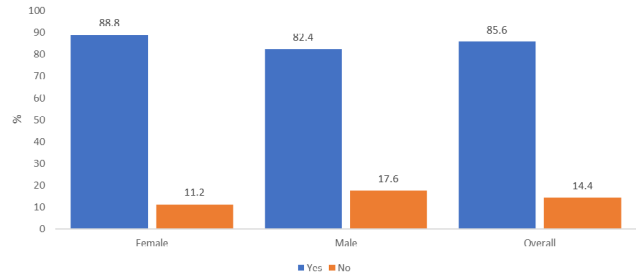


Fig. 9: Satisfaction of personal development by gender.

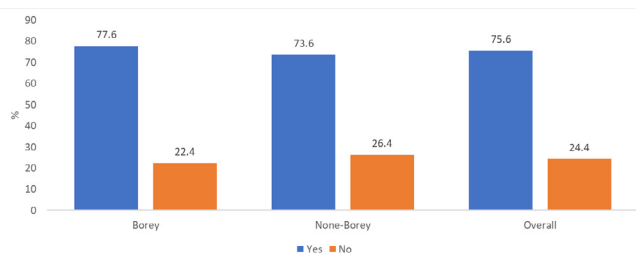


Fig. 10: Satisfaction with physical development.

Table 9: Degree of agreement on the physical environment.

Attribute	Borey (n = 125)		None-Borey (n = 125)		Overall (n = 250)		p-value
	WAI	OA	WAI	OA	WAI	OA	
	There are proper roadways that can allow residents to access your neighborhood	0.37	A	0.33	A	0.35	
There are sidewalks on the streets that can allow residents to access your neighborhood	0.37	A	0.34	A	0.36	A	0.132
There is a clean water supply fully supplied to the whole community	0.33	A	0.28	A	0.30	A	0.005**
Are all the size of streets allowing firefighters to access when there is fire?	0.32	A	0.31	A	0.32	A	0.600
Is there enough electricity supply connection to cover the whole community fully?	0.32	A	0.29	A	0.30	A	0.181
There is a public park as public space provides enough space for your community's residents	0.36	A	0.34	A	0.35	A	0.451
There is a proper drainage system to collect surface water in your community	0.34	A	0.31	A	0.32	A	0.179
Garbage collection is regularly collected in your living area	0.35	A	0.30	A	0.32	A	0.007**
There are sewerage and wastewater treatment in your district	0.35	A	0.35	A	0.35	A	0.935

Notes: WAI = weight average index measured on a five-point scale [strongly agree (SA) = 0.00-0.20, Agree (A) = 0.21- 0.40, moderate (M) = 0.41-0.60, disagree (D) = 0.61-0.80, strongly disagree (SD) = 0.81-1.00]. OA = Overall assessment.

*Significance at the 0.05 level.

** Very significant at the 0.01 level.

*** Perfectly significant at the 0.00 level.

Table 9 shows that the respondents in both residencies agreed that good roadway conditions allow residents to access their neighbors. Furthermore, they also decided that sidewalks on the streets could enable residents living in Borey and None-Borey to access their neighbors. Similarly, both types of residencies acknowledged that clean water supply is fully supplied to the whole community. All the side streets allow fire-fighters to access when there is fire; residents in Borey and None-Borey agreed upon this issue. Besides this, people living in Borey and None-Borey agreed that enough electricity supply connections fully cover the whole community. Public park as public space was decided upon by two types of respondents, who felt there was enough space for the residents in your community. Both respondents in Borey and None-Borey agreed that there is a proper drainage system to collect surface water in their community. In addition, garbage collection was also determined by people living in Borey and None-Borey as regularly collected in all living areas.

Moreover, sewage and wastewater treatment were agreed by all interviewees that these facilities are in their district. The respondents agreed that proper roadways could allow residents to access their neighbors; based on (p-value = 0.037), it was significant. More people in None-Borey decided more on this issue than residents living in

Borey regarding the clean water supply fully supplied to the two types of communities; according to (p-value = 0.005), it was very significant. Residents in None-Borey thought about clean water more than residents in Borey. Garbage collection is regularly collected in your living area; based on (p-value = 0.007), it was very significant; there was a larger amount of people in Borey who agreed more about garbage regularly collected than residents in None-Borey.

3. Conclusion

The research concludes that the six components of quality of life introduced by Muhammed & Abubakar (2019) is an appropriate concept to explore the perception of Phnom Penh residents to understand their access to public and private services, including health, security, personal development, community development, physical environment, natural resources, goods, and services. This paper aimed to measure and analyze urban quality of life in Dangkoa commune and Cheung Aek commune, in Dangkoa, Phnom Penh city, focusing on Borey and None-Borey residencies as comparative case studies.

The study revealed that the majority of the respondents had good health conditions. However, they were not fully accessible to the closest pharmacy, which they considered the most packed healthcare place when

encountering normal health problems. However, both types of residents, Borey and None-Borey residencies, were moderately satisfied with public health. In terms of security, residents in Borey were safer than None-Borey. Most respondents experienced some types of violence's form but not serious violence. Both types of residencies are implementing safe commune and village; all types of incidents remained moderate. The respondents in Borey and None-Borey residencies enjoyed spending much time per month visiting green space. Whether near or far, the green space was important for them to enjoy certain activities like relaxing, sports playing, picnics, and public events. People in Both communities acknowledge that green space and wetlands were reservoirs, food production, space for recreation, and landscapes in the community. Greenspace, such as wetland, plays a very important role for both residents, Borey and None-Borey. Regarding community development, the research concludes that Borey was less engaged in community development than None-Borey; also, None-Borey residents need more infrastructure development. Concerning personal development, Borey residents were more satisfied than None-Borey. Moreover, most respondents of both types were confident with their personal development. Interestingly, Borey's residents had more satisfaction than People in None-Borey. The money and possessions were important for them. The residents in Borey were more satisfied with the physical environment than residents living in None-Borey. Furthermore, most residencies were confident with their communities' private and public infrastructure. Basic infrastructure such as water supply, electricity, drainage system, and sewage services existed for people in both residencies. Borey and None-Borey preferred good-quality house construction, green building design and potential location, and less traffic in the living environment. It can be seen that congestion, air pollution, and noise levels are important in the live environment. The respondent seemed to dislike the traffic jams oppositely, they enjoy low and smooth traffic in their neighborhood. Moreover, they preferred good construction quality.

The research finding suggests and provides some appropriate solutions to the current basic components of quality of life. To improve public health, the Royal Government of Cambodia (RGoC) is playing an important role, urging the public and private sectors to invest in several healthcare facilities at the edge of city more, urging healthcare facilities spreading close to the community. In addition, strengthening policy or law on healthcare service providers is needed to improve the current situation. Quality of life has appeared to be very important in developing countries, and it serves as an essential tool for identifying problems and the current status. Moreover, the study suggested some recommendations to the involved ministries regarding the development that must balance the social,

environmental, and economic triangles. Moreover, imposing and strengthening the implementation of law, policy, and regulation in addition to the existing once. Since it is very important to implement the law and some regulations effectively. NGOs also play an important role in coordinating and collaborating with all relevant stakeholders, contributing as advice on the solution through conducting research collaboration that work with local government to identify problems and provide recommendations to solve and improve the existing. Moreover, NGOs could help all stakeholders consider designing and planning the future development plan. NGOs should raise awareness about the enormous impact of the environment on quality of life through training the environment and conferences with local governments.

The study indicates that better-built environmental development is very important for urban residents. Therefore, it suggests policy intervention enhancement to policymakers, NGOs, government groups, academia, and related fields with their multi-dimensional factors within its framework. The research was conducted in a limited way since it focused only on the basic component of quality of life. It should run the survey at a more advanced level and consider more indicators in the conceptual framework. Since, Phnom Penh is currently a huge area, it has 14 districts. Each district has geographical and build typology differences as well as living environments. The study focuses only on the city's edge in the district of Dangkoa on the south of the city. Further research needs to expand to another area within the edge of Khan and the city center.

Moreover, the study seems to be facing the limitation of the indicator conceptual framework with the research. Therefore, it is necessary to conduct further research in other areas of Phnom Penh, such as the center and different directions within the city's edges. Furthermore, logical frameworks need to consider more indicators for greater complexity. Then, it would deliver more policies and frameworks for the government to improve the quality of life.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported. All

authors have read and approved the final, published version of the manuscript.

Credit authorship contribution statement

PHAL Piseth: Conceptualization, exploratory and descriptive approaches, data interpretation, drafting, visualization, reviewing, and editing. NGUONPHAN Pheakdey: Reviewing and editing. All authors have read and approved the final, published version of the manuscript.

All authors have read and agreed to the published version of the manuscript.

References

- Armstrong, D., & Caldwell, D. (2004). Origins of the concept of quality of life in health care: A rhetorical solution to a political problem. *Social Theory & Health*, 2(4), 361-371.
- Beckwith, L. (2020). *When the lakes are gone: The political ecology of urban resilience in Phnom Penh* (Doctoral dissertation, Université d'Ottawa/University of Ottawa).
- Contreras, L. V. (2012). Organisation for Economic Co-operation and Development/Organización para la Cooperación y el Desarrollo Económico (2011), How's Life?: Measuring Well-being. *región y sociedad*, 24(55).
- Conceição, P. (2020). Human Development Report 2020-The Next Frontier: Human Development and the Anthropocene. *United Nations Development Programme: Human Development Report*.
- Delux, T., & Socheata, (2022). P. Cambodia's Covid-19 Impacts and Economic Recovery Pathways: Aspects and Perspectives.
- Doyle, S. E. (2012). City of water: architecture, urbanism and the floods of Phnom Penh. *Nakhara: Journal of Environmental Design and Planning*, 8, 135-154.
- De Walden-Gałuszeko, K. (1997). Ocena jakości życia uwarunkowana stanem zdrowia. *Jakość życia w chorobie nowotworowej. Wybrane zagadnienia Centrum Onkologii Instytutu im. Marii Skłodowskiej-Curie. Warszawa*.
- Durdyev, S., Omarov, M., & Ismail, S. (2020). SWOT Analysis of the Cambodian construction industry within the ASEAN economic community. In *Proceedings of the 28th IBIMA conference on Vision*.
- Thiel, F. (2011). Real Estate Market, Property Valuation, Land Taxation and Capacity Building in Cambodia. *ZfV-Zeitschrift für Geodäsie, Geoinformation und Landmanagement*, (zfv 1/2011).
- GGGI, Global Green Growth Institute (2019). *Phnom Penh Sustainable City Plan 2018-2030*. Phnom Penh.
- Harun, R. (2003). *The Political Economy of Cambodia's Transition, 1991-2001*.
- Hughes, C. (2003). *The Political Economy of Cambodia's Transition, 1991-2001*. London and New York: Routledge Curzon.
- JICA-PPUTMP (2014), Project for comprehensive urban transport plan in Phnom Penh capital city (PPUTMP), Japan International Cooperation Agency.
- Jensen, C. B. (2021). Phnom Penh Kaleidoscope: Construction Boom, Material Itineraries and Changing Scales in Urban Cambodia. *East Asian Science, Technology and Society: An International Journal*, 15(2), 211-232.
- Ministry of Economy and Finance (2019) Geographical distribution and property values in Phnom Penh.
- Khmer Times, 2020: Crowded, small homes drive people to bedroom.
- MoEF, Ministry of Economy and Finance (2019). Geographical distribution and property values in Phnom Penh
- MoP, National Institute of Statistics Ministry of Planning, (2019), General Population Census of the Kingdom of Cambodia.
- Muhammed, Z., & Abubakar, I. R. (2019). Improving the quality of life of urban communities in developing countries. *Responsible Consumption and Production. Encyclopedia of the UN Sustainable Development Goals*. Springer, Cham. https://doi.org/10.1007/978-3-319-71062-4_25-1.
- Mund, J. P., Waibel, M., Sanara, H., & Jayaweera, R. (2020). Phnom Penh: Urban Development Towards a Green City. Ministry of Land Management, Urban Planning and Construction, MLMUPC 2016: Cambodia National Report for Habitat III Preparation.
- National Institute of Statistics Ministry of Planning, (2019), General Population Census of the Kingdom of Cambodia.
- Preedy, V. R., & Watson, R. R. R. (2010). Handbook of disease burdens and quality of life measures. In *Handbook of disease burdens and quality of life measures* (pp. 6-v).
- Pierdet, C. (2012). Spatial and social resilience in Phnom Penh, Cambodia since 1979. *South East Asia Research*, 20(2), 263-281.
- Phnom Penh Capital Municipality, official website: <https://phnompenh.gov.kh/en/phnom-penh-city/>
- Palimaru, A. I., McBain, R., McDonald, K., Batra, P., & Hunter, S. B. (2023). The relationship between quality of housing and quality of life: evidence from permanent supportive housing. *Housing and Society*, 50(1), 13-34.
- Pengly, K., & Tirapas, C. (2022, November). A Survey of Phnom Penh Apartment Shophouses' Conditions for Future Housing Adaptability Revitalization in Phnom Penh. In IOP Conference Series: Earth and Environmental Science (Vol. 1101, No. 4, p. 042024). IOP Publishing.
- Quality of life in Phnom Penh. <https://mobilityexchange.mercer.com/Search-Results?Search=Phnom%20penh>
- STT, Sahnakum Teang Tnaut (2015). Phnom Penh's Lakes: Where are they now? Phnom Penh. <https://teangtnaut.org/wp-content/uploads/2016/03/20160325-Report-Lake-Final-V10.compressed-1.pdf>
- Streimikiene, D. (2015). Quality of life and housing. *International Journal of Information and Education Technology*, 5(2), 140.
- Tnaut, S. T. (2018). The Phnom Penh Survey: a study on urban poor settlement in Phnom Penh. *STT, Phnom Penh, Cambodia*.
- Sub-Degree No.42 on Urbanization of the Capital City, Towns, Urban areas of Royal Government of Cambodia in 2015. From:https://docs.google.com/a/servingweb.com/viewer?url=http://mlmupc.gov.kh/items/17%20_optimize.pdf
- Springer, S. (2011). Articulated neoliberalism: the specificity of patronage, kleptocracy, and violence in Cambodia's neoliberalization. *Environment and planning A*, 43(11), 2554-2570.
- Sodeth Ly 2016: Cambodia is now a lower-middle income economy: What does this mean?<https://blogs.worldbank.org/eastasiapacific/cambodia-is-now-a-lower-middle-income-economy-what-does-this-mean>

- Urban Development in Phnom Penh, World Bank Group, Report, 2017: <https://documents1.worldbank.org/curated/en/286991511862455372/pdf/121692-REVISED-Phnom-Penh-Urban-report-V8-V-low.pdf>
- Turkoglu, H. (2015). Sustainable development and quality of urban life. *Procedia-Social and Behavioral Sciences*, 202, 10-14.
- ESCAP, U. (2019). *The future of Asian and Pacific cities: transformative pathways towards sustainable urban development*. United Nations.
- Cambodia, U. N. F. P. A. (2014). Urbanization and its linkage to Socio-Economic and Environmental Issues. See <http://tinyurl.com/zsb527g>.
- World Health Organization. (2017). Urban green spaces: a brief for action.
- UNDP, (2020). The Next Frontier Human Development and the Anthropocene. <https://hdr.undp.org/sites/default/files/Country-Profiles/KHM.pdf>
- Waibel, M., Blöbaum, A., Matthies, E., Schwede, D., Messerschmidt, R., Mund, J. P., ... & Kupski, S. (2020). Enhancing Quality of Life through Sustainable Urban Transformation in Cambodia: Introduction to the Build4People Project. *Insight: Cambodia Journal of Basic and Applied Research*, 2(2), 199-233.
- WHO (2012) Program on mental health, World Health Organization quality of life, WHOQOL, World Health Organization <https://www.who.int/tools/whoqol>
- Eurostat 2015 Statistical books quality of life fact and views. Luxembourg: Publications Office of the European Union <https://ec.europa.eu/eurostat/documents/3217494/6856423/KS-05-14-073-EN-N/742aee45-4085-4dac-9e2e-9ed7e9501f23>
- World Bank, (2017). Urban Development in Phnom Penh. <https://documents1.worldbank.org/curated/en/286991511862455372/pdf/121692-REVISED-Phnom-Penh-Urban-report-V8-V-low.pdf>
- World bank (2019) Life expectancy at birth, total (years) - Cambodia, Thailand, Lao PDR, Vietnam, <https://data.worldbank.org/indicator/SP.DYN.LE00.IN?end=2019&locations=KH-TH-LA-VN-MM&start=2019>.
- World bank (2023), Cambodian Economy Advances Amid External, Domestic Headwinds. <https://www.worldbank.org/en/news/press-release/2023/11/22/cambodian-economy-advances-amid-external-domestic-headwinds>
- World bank, (2019). Life expectancy at birth, total (years) - Cambodia, Thailand, Lao PDR, Vietnam. <https://data.worldbank.org/indicator/SP.DYN.LE00.IN?end=2019&locations=KH-TH-LA-VN-MM&start=2019>. (Access online, 28 March 2022).
- Zainal, N. R., Kaur, G., Ahmad, N. A., & Khalili, J. M. (2012). Housing conditions and quality of life of the urban poor in Malaysia. *Procedia-Social and Behavioral Sciences*, 50, 827-838.

Appendix 1: Social mapping of Dangkoa commune and Cheung Aek commune

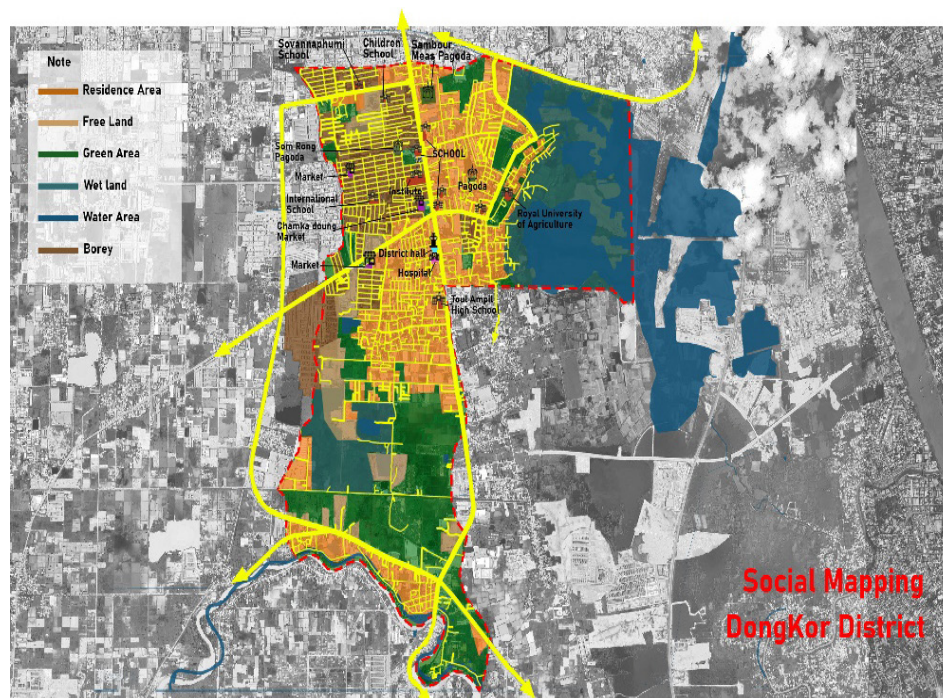


Figure A1: Social mapping of Dangkoa commune, showing infrastructure.

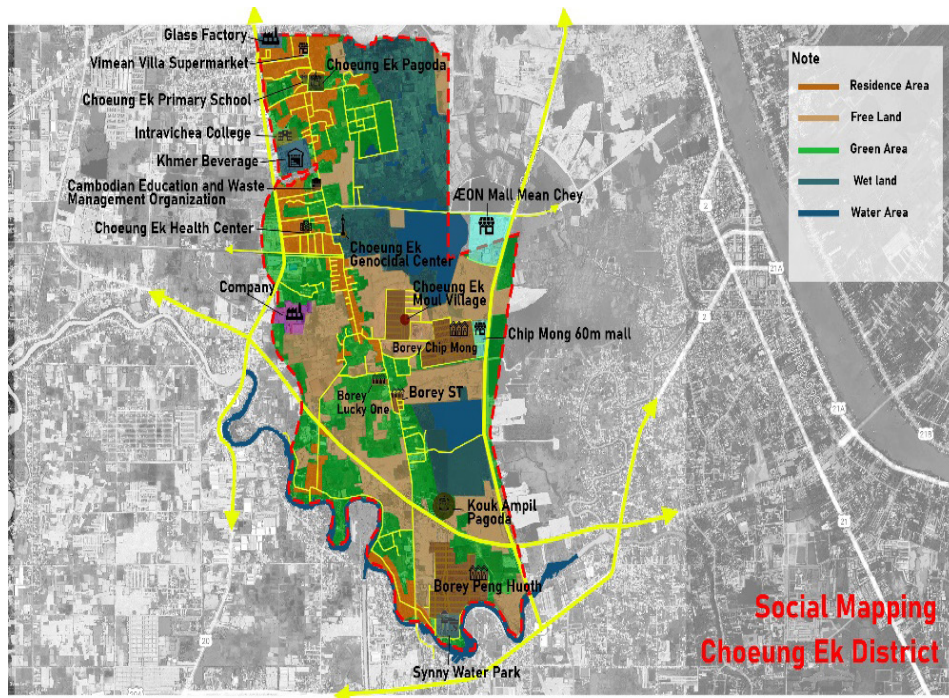


Figure A2: Social mapping of Cheung Aek commune, showing infrastructure.