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# Compliance with Planning Standards Related to the Setbacks around Domestic Buildings: Empirical Evidence from Kenya

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**ABSTRACT**

*This study investigates the extent to which planning standards that regulate the setbacks around domestic buildings are complied with by developers in Kenya, a case study of Kisii Town. Using proportional random sampling targeting seven neighbourhoods, a sample of 364 was drawn from the target population of 7430 developments. While checklists were used to collect data on the extent of compliance with the planning standards, data were analyzed using means, mode, standard deviation and a one-sample t-test. Results established that most developments disregarded the planning standards on setbacks. Hypothesis tests further reported significant differences between the respective recommended setbacks (front, side and rear) and extent of developers' compliance, t (289) = -14.746, p = .000; t (289) = -8.937, p = .000; and t (289) = -20.3826, p = .000. The study concludes that developers flout planning standards owing to insufficient development control by the County Government of Kisii. A recommendation is made for the adoption of locally nurtured standards that addresses the existing socioeconomic attributes as an alternative of relying on those generated at the national level. This study enriches the current body of literature in planning by validating how compliance with planning standards may be statistically assessed.*

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## 1. Introduction

The global urban population has been rapidly escalating since 1950. As a case in point, the population increased from 746 million in 1950 (29.6 per cent of the worldwide population) to 2.85 billion in 2000 (46.6 per cent of the worldwide population) and further projected to 5.06 billion by 2030 (60 per cent of the worldwide population) (UN-Habitat, 2015).

Ritchie and M. (2018) in actual fact confirm that over 50 per cent of the global population is already residing in urban areas. With this trend in mind, the UN-Habitat (2019) forecasted that by 2050, two-thirds of the global population will be living in urban areas. If this change is not well planned, it is bound to undesirably contribute to challenges such as urban decay (Adedeji & Arayela, 2017), urban sprawl (Fuladlu, 2019), and noncompliance with recommended land use planning standards with a particular reference to the developing countries.

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Accelerated increases in the population of urban dwellers are likewise being witnessed in Africa (Hope Sr., 2012). According to African According to African Development (2014), just a century ago, Africa had an urban population that was less than 8 per cent of its total population. An interesting fact is that by the end of 2020, Africa's urban population will have surpassed that of Europe's total urban population. A question that arises at this juncture is whether African countries have a well-structured development control regime for containing the rapidly expanding urban population. This confirms the arguments of UNDP (2013) that economic growth and concomitant demographic changes in Africa have given rise to urbanization without the much-needed land use planning. Evidently, although urbanization should make residents more successful, most African urban areas have remained unprepared for the transition (Institute of Economic Affairs, 2016). Rapid urbanization is not a new occurrence in Kenya where the growth has been accompanied by non-compliance with the applicable planning standards resulting in urban neighbourhoods which are characterized by challenges such as land-use conflicts, and the proliferation of informal settlements. Moreover, even though development control should be prescriptive on the account of being used as a panacea for land-use planning through enabling pieces of legislation, this to date remains as one of the central weaknesses within Kenya's planning system with much development proceeding in contravention of recommended planning standards (Babijes, 2016).

From the foregoing insight, through a case study of Kisii Town, the objective of this study was to investigate if developments in Kenya are complying with the recommended planning standards that are used in regulating the spaces around domestic buildings (commonly known as setbacks). To achieve this, the study was guided by the following three related hypotheses:

a) **$H_{o1}$**: There is no statistically significant difference between the recommended planning standards for the front setbacks and the observed extent of compliance by developers in Kisii Town.
b) **$H_{o2}$**: There is no statistically significant difference between the recommended planning standards for the side setbacks and the observed extent of compliance by developers in Kisii Town.
c) **$H_{o3}$**: There is no statistically significant difference between the recommended planning standards for the rear setbacks and the observed extent of compliance by developers in Kisii Town.

The findings of this study are expected to benefit the international audience by filling the existing gap in knowledge on how compliance with planning standards related to the setbacks around domestic buildings may be statistically analyzed after the undertaking of on-site measurements.

## 2. Literature Review

Urban planning is an important process in guiding spatial development towards the promoting of environmental, cultural and socio-economic tenets of the society (Beattie and Haarhoff (2018). Because of this, planning standards, therefore, outlines the minimum conditions that ought to be fulfilled by developers during the design and development phases of buildings (Karibasappa et al., 2016). Developers are consequently required not to go below the minimum planning standards that have been predetermined notwithstanding the fact that the desired target is usually the upper limits (Ajilowo Bayode Olujimi, 1993). This, without doubt, includes standards that regulate setbacks around domestic buildings in urban areas.

A growing body of literature has so far attempted to appraise the extent to which developers are complying with the recommended planning standards. While examining the variables which influenced the level at which developers observed planning standards in the Old Salt City of Jordan, Alnsour and Meaton (2009) established that compliance was low. This was occasioned by variables such as inadequate enforcement by the planning authority, household monthly income, the dominant culture within the planning authority, the size of the household, and the vagueness of the applicable standards. A study in Wales and England by Baiche et al. (2006), however, found out that although compliance was not high, the main challenge was inadequate skills and lack of awareness of the applicable planning standards on the part of the operators, inadequate construction site management and the utilization of sub-standard labour. These findings could be likened to that of Sarkheyli et al. (2012) who gave an account that the level of developers' awareness and the average monthly income was among the top drivers of noncompliance with the floor area ratio planning standard in the City of Tehran. Noncompliance was equally impelled by variables such as the housing per capita, the price of buildings, building coverage ratio, and the status of transportation

infrastructure. Unlike Sarkheyli et al. (2012) whose study was descriptive, Karibasappa et al. (2016) quantified the disregarded standards in Bangalore's Neeladri Nagar, Electronic City Phase-1 and established that regarding road widths, while the average violation was 49 per cent, that of plinth height was 87.17 per cent. In the same vein, recommended building heights, setbacks, plot coverage, and the floor area ratio was exceeded by more than 39 per cent. A related study in terms of the methodology by Boob and Rao (2014) in India's local authorities of Yavatmal District of Maharashtra State established that roadside, side and rear margins were disregarded in all subdivided land. Further violations for the floor space index and the building coverage ratios were also recorded. At the same time, all main road junctions had been encroached on by developers.

Studies in Africa have also given an account of how planning standards are seldom complied with by developers. For example, in Ado-Ekiti, Nigeria, Ojo-Fajuru and Adebayo (2018) observed that unawareness of the benefits of development control and inadequate enforcement by the planning institutions were the main reasons why most developers encroached on the designated public open spaces. These arguments agree with that of Twum-Darko and Mazibuko (2015) who averred that developers in South Africa flouted the National Building Regulations because they were unaware of its existence. The findings, however, contradict that of Arimah and Adeagbo (2000) that confirmed the lack of a significant correlation between developers' awareness of the existence of planning standards (such as a building coverage ratio, and setbacks), on one hand, and the extent to which they complied with them on the other hand. In other words, awareness of the standards was not a predictor of conformity. Noncompliance was mainly instigated by inadequate inter-agency coordination. Developers without planning permission are likely to flout planning standards. This was corroborated by Obongha et al. (2016) in Calabar South where over 100 buildings were developed without the requisite planning permission, consequently disregarding the requirements of the Cross River State Building Regulations of 1984. These findings may further be compared to that of Jimoh et al. (2018) established that developers in the Auchi Edo State contravened planning control regulations such as setbacks, and exceeding of building coverage ratio, a problem blamed on the socioeconomic characteristics of respondents, and inadequate staff establishment within the Auchi Planning Authority. A different study in Calabar by Offiong (2017) provided a new insight that the age of the buildings, possession of approved building plans, housing development density and competency in supervision jointly affected compliance with planning standards. A similar line of argument was maintained in Wa Municipality, Ghana, by Dambeebo and Jallo (2018) who discerned that weak enforcement provided room for noncompliance leading to disorganized spatial development. This appears to agree with what Tasantab (2016) already found out in Sekondi-Takoradi that most developers flouted planning standards on account of inadequate enforcement. In Eldoret, Kenya, Ngetich et al. (2016) established that although a planning standard of 3 meters had been recommended for building lines, 100 per cent, 95 per cent, 84 per cent and 74 per cent of developers in that order from Elgon View, Maili Nne, Kimumu and Langas disregarded it. Further, 11per cent of developers who had approved building plans amended them without seeking for a new approval from the local authority.

There is no doubt that the reviewed body of empirical evidence suggests that developers seldom comply with planning standards. However, there is still a dearth of knowledge on how compliance with planning standards that are used in regulating the setbacks around domestic buildings may be statistically determined after undertaking pragmatic on-site measurements. Most studies have moreover delved on what causes non-conformity with recommended planning standards instead of quantifying their extent of conformity. The current study fills this new gap in knowledge since planning standards provide the basis for undertaking development control, in addition to acting as a precursor for implementing urban land use development plans.

## 3. Materials and Methods

### 3.1 The Study Area

Kisii Town is located 120 kilometres northwest of Nairobi City County, the capital city of the Republic of Kenya (Figure 1). The town is currently designated as the administrative and commercial headquarters of Kisii County. It is spatially segregated into five selections, namely: Mwamosioma, Bobaracho, Bomwanda, Nyanchwa, Township, and Nyaura. About the Constitution of Kenya (The Republic of Kenya, 2010), the County Government of Kisii (CGOK) retains the exclusive legal jurisdiction of undertaking land use planning and enforcement of development regulations control in Kisii Town.


**Figure 1**: Kisii Town location in Kenya, Source – Writterstake (2019)

According to the Constitution of Kenya (The Republic of Kenya, 2010), the CGOK operates under legislative and executive arms. While the legislative arm makes county legislation, the County executive, in contrast, implements the national and county legislation, including managing and coordinating the functions of all devolved county departments. This indicates that once the County legislature has pronounced itself in a way of passing applicable legislation on planning and development control, it is the responsibility of the County executive which is headed by the Governor to undertake monitoring and enforcement.

The town's population was estimated at 90,700 by the Kenya Population and Housing Census Survey in 2019 (The Republic of Kenya, 2019a). This is projected to 135,000 by 2032. Kisii Town has also the third-highest population density (2,862 per km$^2$) in Kenya (after Nairobi and Mombasa cities). A combination of a high population growth rate and density in the absence of adequate development control by the CGOK has compounded the challenges which are related to compliance with planning standards.

### 3.2 Theoretical Context

This study was anchored in the Theory of Regulatory Compliance (TRC) which is primarily concerned with the necessity to comply with regulations or rules. The theory, according to Fiene (2016), first came to light in the 1970s, the era when the association between compliance with regulations was correlated with best-practice standards and outcome data. From this comparison, it became manifest that total compliance with stipulated rules and regulations contributed to positive results. When related to the current study, TRC makes a justification on why developers in Kisii Town should comply with the planning standards that regulate setbacks. The aim is to attain the objective of sustainable spatial urban development. To achieve this, the CGOK uses development control to ensure total compliance by developers in regard to planning standards that relate to the spaces around domestic buildings. To additionally link the theory with the existing policy and legislative framework, the Ministry of Lands (The Republic of Kenya, 2007) prepared the Physical Planning Handbook in 2007 with an intention of providing clear guidelines on the minimum standards that developers should comply with as a way of promoting the best practice in land use planning.

Further, in an attempt to enforce regulatory compliance, section 57 (2) of the Physical and Land Use Planning Act of 2009 (The Republic of Kenya, 2019b) states that any person who commences any development without obtaining a development permit is liable to be convicted to a fine of not less than five hundred thousand shillings (50,000 USD) or incarceration for a term not less than two months or to both. Compliance with planning standards that regulate setbacks is, therefore, realized through statutory regulatory compliance.

### 3.3 Population, Sample and Sampling Design

The CGOK does not maintain a spatial database of residential developments in Kisii Town. As such, there was no readily available sampling frame for residential developments. To overcome this limitation, high-resolution satellite imagery that covered the seven neighbourhoods and QGIS software was used to digitise all building developments from the seven neighbourhoods.

A comprehensive ground-truthing exercise was afterwards undertaken to ensure that the digitised developments were residential in addition to determining the boundary for each neighbourhood to ensure no overlaps in data collection. A total of 7,430 residential building developments was successfully mapped (Table 1). This provided the required sampling frame and the target population which was used to determine the extent to which developments were complying with the recommended planning standards as regards the spaces around domestic buildings.

Determination of sample size was carried out using Krejcie and Morgan (1970) sample size determination table which recommends that if the population range from 7,000 to 7,999, a sample size of 364 should be selected.

**Table 1:** Neighbourhoods sampling promotions.

| Neighbourhood/ Strata | Mapped Houses | Sample Size |
|---|---|---|
| Jogoo | 1,551 | 220 |
| Mwembe | 1,105 | 54 |
| Nyamage | 1,171 | 57 |
| Nyanchwa | 673 | 33 |
| Nyamataro | 808 | 40 |
| Egesa | 821 | 40 |
| Daraja Mbili | 1.301 | 64 |
| **Total** | **7,430** | **364** |

Having determined the sample size, seven residential neighbourhoods were taken as strata and proportional random samples afterwards drawn to arrive at a sample size of 364 residential developments. Based on the sample of 364, proportional random sampling through the random numbers was applied to select the desired sample size for each neighbourhood. Random numbers were used because they permit the selection of samples without any bias. As such the sample can be said to be representative of the whole population.

### 3.4 Data Collection and Analysis

A structured observation checklist was used to collect data from each sampled residential development. The checklist was divided into four columns. The first indicated the description of the applicable planning standards. Conversely, while the second and the third columns respectively, showed the value for each recommended planning standard and their observed extent of compliance, the fourth column recorded the ensuing deviation from each of the recommended planning standards. In this case, a negative variance denoted noncompliance while a positive deviation confirmed compliance.

Collected data were analyzed using a one-sample t-test to statistically determine the extent at which each planning standard had been complied with by sampled developments. The observed extent of compliance was determined through factual on-site measurements. This is a key attribute of positivist research philosophy which advocates for a deductive method of inquiry where analysis involves working on quantifiable and measurable observations including hypothesis testing using statistical analyses. The research hypotheses were also tested using a one-sample t-test.

The Republic of Kenya (2007) through the Physical Planning Handbook recommends that domestic buildings be sited (setback) by leaving an open space in front, which shall extend throughout the whole width of the front of the building to a distance of not be less than 6 m, measured at right angles, provided that, if the building fronts a street of lesser width, the width of such open space may not be less than the width of the street, together with one half of the difference between that width and 6 metres.

The Handbook further prohibits the construction of any part of a building (normal housing) within 4.5 metres and 3 metres of the rear and side boundary of a site respectively. Figure 2 gives an illustration of the recommended setback planning standards as per the Handbook.

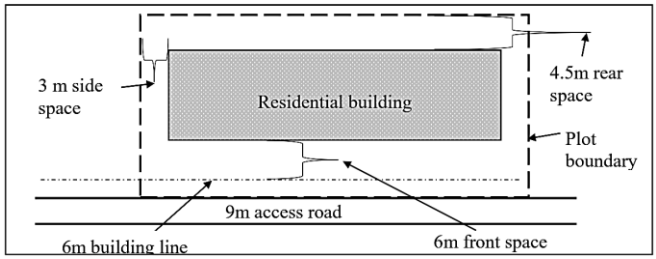


**Figure 2**: An illustrated guide on recommended planning standards for setbacks.

As illustrated (Figure 2), the recommended setbacks promote adequate outdoor spaces and well lightened and ventilated building interiors. They also promote fire safety planning by spacing buildings away from each other, therefore allowing easy passage of vehicles. These are the planning standards for setbacks that are used by the CGOK in regulating the development of domestic buildings. The current study is, therefore, concerned with the extent to which developers comply with them. This is because the provision of such setbacks further permits sufficient space for accommodating amenities such as septic tanks, water and sewer reticulation. They also create space for parking.

The current study finally tested for the assumption of normality in the collected data through the application of the Kolmogorov-Shapiro. This is because assessing the normality assumption is necessary if the collected data is parametric in nature, in consequence, a key determinant of its validity. The rule of thumb is always that if the Sig. value of the Shapiro-Wilk Test is greater than 0.05, the data is considered as normally distributed. However, if it is below 0.05, the data significantly deviate from a normal distribution.

## 4 Results and Discussions

The objective of this study was to determine the extent to which developers in Kenya, a case study of Kisii Town, comply with the recommended planning standards that regulate

the spaces around domestic buildings. This section therefore concurrently presents and discusses the research findings per residential neighbourhood. It commences by presenting the results of the normality test in addition to the outcome of the response rate. The section caps by testing the research hypotheses.

### 4.1 Tests for Statistical Assumption of Normality and Response Rate

The results Kolmogorov-Smirnov Test for normality reported a high p-value of 0.316. Since this was greater than 0.05, it was concluded that the data were normally distributed. The response rate for the checklists that were used to record the extent of conformity with the recommended planning standards was also determined. This is because response rate generally provides an indicator that can be used to better understand the validity of survey data. The response rate for the checklists used in the current study was 80% (290 out of 364). This was way above the minimum threshold of 50% as suggested by Mugenda and Mugenda (2003) thereby giving credibility for data analysis and reporting.

### 4.2 Compliance Assessment to Planning Standards

#### *4.2.1 Nyanchwa*

Analysis commenced in Nyanchwa by examining the extent to which residential building developments in the study area were complying with the recommended planning standards that are used by the CGOK in regulating spaces around and in front (setbacks) of domestic buildings.

Initial results showed that observed mean compliance (M = 1.88, SD = 0.52) for side spaces was lower than recommended mean of 3 metres by 1.12. Regarding rear spaces, the mean (M = 2.40, SD = 1.17) was lower than the recommended standard of 4.5 meters by 1.6. Concerning front spaces, the mean (M = 2.17, SD = 1.83) was also lower than the recommended 6 metres by 0.83. From this background, using a one-sample t-test, the study further sought to determine if the observed non-compliance by developers were by any chance statistically significant (Table 2).

**Table 2:** One-test for observed compliance in Nyanchwa.

| Planning Standard | t | df | Sig. (2-tailed) | Mean Difference | Test Value |
|---|---|---|---|---|---|
| Side space | -10.570 | 23 | .000 | -1.124 | 3m |
| Rear space | -8.757 | 23 | .000 | -2.096 | 4.5m |
| Front space | -2.226 | 23 | .036 | -.8333 | 6m |

In the first incident, observed measurements for side spaces were found to be statistically significantly lower by 1.124 than the recommended planning standard of 3 metres, t (23) = -10.570, p = .000. Similarly, in the second case, observed measurements for rear spaces were also statistically and significantly lower by 2.096 than the recommended planning standard of 4.5, t (23) = -8.757, p = .000.

As regards front space, observed measurements were correspondingly lower by .833 than the recommended standard of 6, t (23) = -2.226, p = .036, attesting that both enforcement and monitoring of residential building developments by the current and previous planning authorities in Nyanchwa have not been effective.

#### *4.2.2 Jogoo, Egesa, Nyamataro, and Daraja Mbili*

These four neighbourhoods were jointly analysed because they are located in the same sublocation of Mwamosioma, the largest sublocation in Kisii Town. It was found out that in Jogoo, the means for front space (M = 5.56, SD = 1.82), side space (M = 1.97, SD = 1.31) and rear space (M = 2.89, SD = 1.93) were lower than respective test values of 6.0, 3.0 and 4.5. In Nyamataro, observed means for front space (M = 3.91, SD = 1.84), side space (M = 1.51, SD = 0.78) and rear space (M = 2.36, SD = 1.44) were in the same way less than the corresponding planning standard test values.

A similar pattern repeated in Egesa where the means for front space (M = 4.97, SD = 1.82), side space (M = 1.73, SD = 1.30) and rear space (M = 2.25, SD = 1.44) further fell below the test values. Daraja Mbili was no exception where means for front space (M = 3.59, SD = 1.56), side space (M = 1.92, SD = .931) as well as rear space (M = 2.34, SD = 1.80), were below their respective test values (See Table 2).

**Table 2:** One-sample statistics on compliance in Egesa, Nyamataro and Daraja Mbili

| Description of Planning Standard/Neighbourhood | N | Mean | SD | SEM | Test Value |
|---|---|---|---|---|---|
| **Jogoo** | | | | | |
| Front space | 70 | 5.56 | 1.82 | 0.22 | 6.0m |
| Side space | 70 | 1.97 | 1.31 | 0.16 | 3.0m |
| Rear space | 70 | 2.89 | 1.93 | 0.23 | 4.5m |
| **Nyamataro** | | | | | |
| Front space | 35 | 3.91 | 1.84 | 0.31 | 6.0m |
| Side space | 35 | 1.51 | 0.78 | 0.13 | 3.0m |
| Rear space | 35 | 2.36 | 0.88 | 0.15 | 4.5m |
| **Egesa** | | | | | |
| Front space | 31 | 4.97 | 1.82 | 0.33 | 6.0m |
| Side space | 31 | 1.73 | 1.30 | 0.23 | 3.0m |
| Rear space | 31 | 2.25 | 1.44 | 0.26 | 4.5m |
| **Daraja Mbili** | | | | | |
| Front space | 60 | 3.59 | 1.56 | 0.20 | 6.0m |
| Side space | 60 | 1.92 | .931 | .120 | 3.0m |
| Rear space | 60 | 2.34 | 1.80 | 0.23 | 4.5m |

A determination of the significance of noted differences (observed compliance against test values) was further tested using a one-sample t-test (Table 3).

**Table 3:** One-sample test on compliance in Jogoo, Egesa, Nyamataro and Daraja Mbili

| Description of Planning Standard/Neighbourhood | t | df | Sig. (2-tailed) | Mean Difference | Test Value |
|---|---|---|---|---|---|
| **Jogoo** | | | | | |
| Front space | -2.03 | 69 | .05 | -0.44 | 6m |
| Side space | -6.58 | 69 | .00 | -1.03 | 3m |
| Rear space | -6.95 | 69 | .00 | -1.61 | 4.5m |
| **Nyamataro** | | | | | |
| Front space | -6.717 | 34 | .00 | -2.08 | 6m |
| Side space | -11.37 | 34 | .00 | -1.49 | 3m |
| Rear space | -14.45 | 34 | .00 | -2.14 | 4.5m |
| **Egesa** | | | | | |
| Front space | -3.16 | 30 | .00 | -1.03 | 6m |
| Side space | -5.45 | 30 | .00 | -1.27 | 3m |
| Rear space | -8.73 | 30 | .00 | -2.25 | 4.5m |
| **Daraja Mbili** | | | | | |
| Front space | -11.93 | 59 | .00 | -2.41 | 6m |
| Side space | -8.98 | 59 | .00 | -1.08 | 3m |
| Rear space | -9.27 | 59 | .00 | -2.16 | 4.5m |

Results disclosed that in Jogoo, compliance with front spaces was statistically lower as corroborated by a mean difference of -0.44, t (69) = -2.03, p =.05. The mean compliance with side space was correspondingly lower with a mean difference of -1.03, t (69) = - 6.58, p =.00. The same applied to rear space, whose mean difference (-1.61), was highly significant, t (69) = -6.95, p =.00. In Nyamataro neighbourhood, front space compliance as well, fell short of meeting the test value as shown by a significant mean difference of -2.08, t (34) = -6.717, p = .00. Additionally, compliance with side space recorded a significant mean difference of -1.49, t (34) = -11.37, p = .00, so was the mean difference in the observed rear space of -2.14, t (34) = -14.45, p = .00. As regards Egesa, front spaces reasonably recorded declined mean differences (-1.03), t (30) = -3.16, p = .00. Moreover, observed mean difference (-1.27) for side spaces was significant, t (30) = -5.45, p = .00. Akin to other standards, the mean difference (-2.25) for rear spaces was highly significant, t (30) = -8.73, p = .00. In Daraja Mbili, the situation was not different where the mean difference for front

space showed noncompliance (-2.41) that was significant, t (59) = -11.93, p = .00. The same applied to side spaces where mean difference was -1.08, t (59) = -8.98, p = .00, in addition to rear spaces which also had a significant mean difference (-2.16), t (59) = -9.27, p = .000, thus inadequate development control by the CGOK.

### *4.2.3 Mwembe and Nyamage*

Data analysis for these two neighbourhoods were analyzed together since they have been zoned by the CGOK as low density. Regarding front spaces, the observed mean compliance for Mwembe (M = 3.10, SD = 1.60) was less than six (6) metres with a resultant modal frequency of three (3) metres. Likewise, in Nyamage, observed mean compliance on front space (M = 4.6, SD = 2.16) fell short of complying with the recommended standard (6 metres). The modal frequency for Nyamage (Mo = 4) was higher than that of Mwembe. It was observed that while the mean compliance with side spaces in Mwembe (M = 1.06, SD = 0.81) was less than recommended six (6) metres, the same applied to Nyamage (M = 1.12, SD = 0.92) with a modal frequency of zero (0). A further descriptive analysis on rear space confirmed that observed mean compliance (1.47) for Mwembe was lower than 4.5 metres, so was a comparable trend in Nyamage (M = 1.76, SD = 1.31). Both Mwembe and Nyamage reported equivalent low modal frequencies (Mo = 0) for rear spaces (Table 4).

**Table 4:** One-sample statistics on compliance in Mwembe and Nyamage

| Description of Planning Standard/Neighbourhood | N | M | SD | SEM | Mo | Test Value |
|---|---|---|---|---|---|---|
| **Front space** | | | | | | |
| Mwembe | 40.00 | 3.10 | 1.60 | 0.25 | 3 | 6m |
| Nyamage | 30.00 | 4.60 | 2.16 | 0.39 | 4 | 6m |
| **Side space** | | | | | | |
| Mwembe | 40.00 | 1.06 | 0.81 | 0.13 | 1 | 3m |
| Nyamage | 30.00 | 1.12 | 0.92 | 0.17 | 0 | 3m |
| **Rear space** | | | | | | |
| Mwembe | 40.00 | 1.47 | 1.43 | 0.23 | 0 | 4.5m |
| Nyamage | 30.00 | 1.76 | 1.31 | 0.24 | 0 | 4.5m |

Based on observed deviations, additional analysis was further conducted to determine whether all the resultant nonconformities in the neighbourhood were statistically significant in relation to the respective test values (Table 5).

**Table 5:** One-sample test on compliance in Mwembe and Nyamage

| Description of Planning Standard/Neighbourhood | t | df | Sig. (2-tailed) | Mean Difference |
|---|---|---|---|---|
| **Front space** (Test Value = 6m) | | | | |
| Mwembe | -11.48 | 39.00 | 0.00 | -2.90 |
| Nyamage | -3.55 | 29.00 | 0.00 | -1.40 |
| **Side space** (Test Value = 3m) | | | | |
| Mwembe | -15.11 | 39.00 | 0.00 | -1.94 |
| Nyamage | -11.17 | 29.00 | 0.00 | -1.88 |
| **Rear space** (Test Value = 4.5m) | | | | |
| Mwembe | -13.44 | 39.00 | 0.00 | -3.03 |
| Nyamage | -11.47 | 29.00 | 0.00 | -2.74 |

As concerns front space setbacks, test results confirmed that mean compliance differences for Mwembe (-2.90) and Nyamage (-1.40) were individually statistically significant, t (39) = -11.48, p = 0.00 and t (29) = -3.55, p = 0.00 respectively. In all cases, mean compliance denoted deviations from the standard test values. Similar observations were made in the side spaces where corresponding mean differences for Mwembe and Nyamage (-1.94 and -1.88) were statistically significant, t (39) = -15.11, p = 0.00 and t (29) = -11.17, p = 0.00.

A final analysis on rear space confirmed significant negative mean differences (-3.03 and -2.74), t (39) = -13.44, p = 0.00, and t (29) = -13.44, p = 0.00 respectively. An illustration of noncompliance with the recommended 4.5 metres rear setback planning standard in Daraja Mbili is demonstrated in Figure 3.

**Figure 3**: Noncompliance with rear setback planning standard in Daraja Mbili

In the above occurrence, the entire 4.5 metres rear setback has been used to develop servant quarters and stores, oblivious of the important role that it provides. A challenge is bound to arise in case of emergencies such as those associated with fire disasters. This undermines development control principles of safety, access, convenience, and aesthetics, consequently signifying inadequate development control.

### 4.3 Results of Hypothesis Testing

The research findings have so far demonstrated that most residential developments from each of the neighbourhoods of Kisii Town do not comply with the stipulated planning standards for the setbacks around domestic buildings. This further provides an insight that development control by the CGOK is inadequate.

From the foregoing background, this section now presents the results of the significance tests for the three research hypotheses which were tested using a one-sample t-test:

#### *4.3.1 First Hypothesis*

"**$H_{01}$**: There is no statistically significant difference between the recommended planning standards for the front setbacks and the observed extent of compliance by developers in Kisii Town" (Table 6).

**Table 6:** Significance test for the first hypothesis.

| | Test Value/planning standard = 6 m | | | |
|---|---|---|---|---|
| **Front space setbacks** | **t** | **df** | **Sig. (2-tailed)** | **Mean Difference** |
| Recommended planning standard *vs* observed extent of compliance | -14.746 | 289 | .000 | -1.68931 |

As indicated in Table 6, the test found a statistically significant difference between the two variables, t (289) = -14.746, p = .000. The null hypothesis was, for that reason, rejected at the 95% confidence level owing to the fact that on average, compliance with the recommended planning standard for the front setbacks declined by a calculated mean of 1.68931m.

#### *4.3.2 Second Hypothesis*

"**$H_{02}$**: There is no statistically significant difference between the recommended planning standards for the side setbacks and the observed extent of compliance by developers in Kisii Town" (Table 7).

**Table 7:** Significance test for the second hypothesis**.**

| | Test Value = 3m | | | |
|---|---|---|---|---|
| **Side Space setbacks** | **t** | **df** | **Sig. (2-tailed)** | **Mean Difference** |
| Recommended planning standard *vs* observed extent of compliance | -8.937 | 289 | .000 | -.86917 |

As the case of the first hypothesis, the results presented in Table 7 reports a statistically significant difference between the two variables (recommended planning standards for side setbacks and the observed extent of conformity by developers in Kisii Town), t (289) = -8.937, p = .000. The null hypothesis was consequently rejected at the 95% confidence level on the account that compliance with the recommended setback planning standard significantly declined by a mean of. 0.86917m.

### *4.3.3 Third Hypothesis*

"**$H_{03}$**: There is no statistically significant difference between the recommended planning standards for the rear setbacks and the observed extent of compliance by developers in Kisii Town" (see Table 8).

**Table 8:** Significance test for the third hypothesis

| | Test Value = 4.5 m | | | |
|---|---|---|---|---|
| **Rear space Setback** | t | **df** | **Sig. (2-tailed)** | **Mean Difference** |
| Recommended planning standard *vs* observed extent of compliance | -20.382 | 289 | .000 | -2.01079 |

It is clear from Table 8 that there is a statistically significant difference between the recommended standards for the rear setbacks and the observed extent of compliance by developers for the reason that, t (289) = -20.382, p = .000. This made a justification for the rejection of the null hypothesis at the 95% confidence level given that on average, the observed compliance declined by a mean of 2.01079 m.

The results of the three hypotheses that have been tested outwardly demonstrate that owing to inadequate development control by the CGOK, most developers continue to flout the recommended planning standards for setbacks. If the status quo remains, it is anticipated that the challenges related to unregulated housing development in Kisii Town are bound to further escalate in the near future at the detriment of sustainable urban development.

To this end, the findings of the current study concur with that of Babatunde and Emmanuel (2014) which appraised development control in Ogbomoso South Local Government, Oyo State, Nigeria, and consequently found a relationship between the extent of compliance with development control regulations and attainment of development planning objectives. The current study, however, determined the difference between the recommended planning standards for the setbacks and their observed extent of compliance by developers, thus further filling the research gap that hitherto existed on compliance assessment of recommended planning standards.

## 5. Conclusion

Planning standards that regulate spaces around domestic buildings in Kisii Town are widely disregarded owing to inadequate development control as well as a weak monitoring regime by the CGOK. The problem continues notwithstanding the legal framework that has given the CGOK the statutory powers of enforcing compliance. Disregard of planning standards may suggest why Kisii Town continues to experience problems such as inadequate parking within residential areas, encroachment on road reserves, pressure on infrastructural services and environmental degradation. The current setting dents the development control principles of aesthetics, access, convenience and safety. It further overlooks the United Nation's much-publicized goal on sustainable cities and communities which targets that all countries should by 2030 have promoted inclusive and sustainable urbanization as well as enhanced their capacity for integrated and sustainable human settlement planning.

Having ascertained the prevailing status of affairs, there is a dire need for the CGOK to rethink of a workable strategy that would address the problem at hand because it is obvious that very little can be done to reverse the deeply rooted nonconformities as this might call for unpopular initiatives such as demolition of the affected buildings. The move is likely not to succeed as it would derail the national government's current ambitious plan of developing at least 500,000 affordable residential housing units by 2022.

Henceforward, a recommendation is made that the CGOK should in accordance with section 46 of the Land Use and Physical Planning Act, 2019, urgently endeavour to prepare a comprehensive Local Physical and Land Use Development Plan for Kisii Town to provide, among other statutory requirements, clear zoning guidelines including those related to planning standards on setbacks. The zonal guidelines should be unique to the specific niche of Kisii Town hence addressing the limitations of the guidelines hitherto issued under the Physical Planning Handbook, 2007. The central argument is the CGOK should purpose to develop standards that are customized to fit and address the current and the unique needs of its environment instead of relying on general standards whose development was conceptualized at the national level, therefore,

not compatible within the prevailing local socio-economic dynamics and spatial structure. While developing the new standards, care should be taken to ensure that the entire process is stakeholders driven. The planning standards should, thereafter, form the basis for approving subsequent applications for development permits once they have been approved.

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**Conflict of interest**
The author declares no conflict of interest in this research publication.

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