

Zoning Standards and Compliance in the Context of Customary Tenure System: A Case Study of West Ashiyie, Adentan Municipality in Ghana

Eunice MATEY, Ghana; Monica LENGOIBONI & Mila KOEVA, Netherlands

Key words: Zoning, Residential Standards, Customary Land Tenure System, Land Rights, Compliance

SUMMARY

Land use planning, through zoning regulations, is the regulatory component of land administration. For residential areas for example, zoning regulations detail the types of buildings and standards for setbacks, minimum parcel size, maximum plot coverage etc. This study assessed the implementation of zoning standards in areas under customary land tenure in Ghana. Customary authorities allocate land rights to individuals, while the Municipality's planning authority oversees the implementation of zoning standards. A case study approach is used to establish the factors that influence land right holders (under customary tenure system) to comply with residential standards; how enforcement (by the Municipality) ensures the implementation of zoning standards. Spatial conformity between the vector data extracted from local plans overlaid over the orthophoto from 2014 was analyzed. Results show a high compliance with the permitted land use i.e. residential area, although residents breached on the maximum plot coverage as compared to other standards. Residents are ignorant of the details of the zoning standards and have never seen a zoning regulations document. There is also a low level of monitoring and enforcement. Most respondents have never encountered the monitoring and enforcement team. Spatial analysis reveals four main types of non-conformity between orthophoto and local plans i) discrepancies in the orientation of the parcel boundaries, ii) discrepancies in the shapes of plot boundaries, iii) houses constructed on the plot boundary or straddle parcel boundaries, and iii) differences in plot sizes. Results suggest the need for planning authority to use efficient approaches to communicate, monitor and enforce the zoning standards. It is concluded that collaboration between customary land authorities and the Municipality during the allocation of plots may improve spatial conformity between orthophoto and the local plans.

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

Zoning Standards and Compliance in the Context of Customary Tenure System: A Case Study of West Ashiyie, Adentan Municipality in Ghana

Eunice MATEY, Ghana; Monica LENGOIBONI & Mila KOEVA, Netherlands

1. INTRODUCTION

Land use planning promotes efficient and effective management of land and ensure its sustainability for future generations. It seeks to follow a development approach that contributes to the prevention of conflicts between different land use types, adaptation of land uses to physical and ecological conditions, the lasting protection of land as a natural resource, the lasting productive use of land and a balanced use that fulfils all social, ecological and economic requirements (GIZ, 2012). Land use planning is therefore a regulatory component of the formal land administration (Williamson et al, 2010). Land use plans are commonly implemented and enforced through zoning and accompanying regulations.

Zoning ensures the highest and best use of land and natural resources. It regulates by specifying where permissible land uses such as residential, industrial, recreational or commercial may take place (Onsted & Chowdhury, 2014). For residential areas, zoning details, the types of buildings, setbacks, minimum parcel size, and maximum occupancy rate among others. Enforcement of the zoning standards may be seen as part of the broader implementation strategy. However, enforcement may affect the use of land and restrict the enjoyment of property rights, as the laws of the land may oblige land right holders to implement these regulations (Fischel, 2000). As such, the zoning regulations and standards directly or indirectly impact on property rights e.g. right to use or enjoy, right to exclude, and right to transfer. For example, zoning restrictions such as type of buildings may be influenced by increasing the costs of construction, thereby interfering with the enjoyment of land rights; while restrictions on maximum plot coverage and maximum number of rooms may interfere with the right to use and benefit from the land.

Enforcement mechanisms compel land right holders to implement and adhere to the zoning regulations. Specific tasks during enforcement may include: detecting buildings without permits, assessing building plans for compliance with the standards, inspecting buildings during construction for adherence to the residential buildings standards and prescribing appropriate corrections for noncompliance (Schilling & Hare, 1994; Boamah, 2013). Where there is noncompliance, sanctions such as ‘stop work’, fines and demolishing are sometimes used to bring compliance (Arimah & Adeagbo, 2000; Burby, May, & Paterson, 1998).

A number of factors influence the willingness of land right holders to comply with the residential standards. Such factors include income levels, educational level, household size and awareness of zoning and residential regulations (Alnsour and Meaton 2009). Household income can be linked directly to some aspects of the construction process such as area of the house, design and quality (Fekade, 2000). In countries where earnings are generally low, the extent of compliance can be

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

positively related to the level of income (Alnsour & Meaton, 2009); and larger households demand more space and are unlikely to comply (Fekade 2000). The extent to which people are aware of the existence of standards can also impact on compliance. Low adherence can be attributed to weak enforcement mechanism, complex bureaucratic procedures, limited resources and unqualified staff (Payne & Majale, 2004; Goodfellow, 2013). Administrative practices such as administration, culture and enforcement mechanisms are important for managing and controlling residential development.

Two types of compliance are identified –enforced and voluntary (Boamah, 2013; Burby et al., 1998). Enforced compliance calls for better trained personnel and more resources as it influences the task of administering compliance –poorly or not at all. Voluntary compliance calls for communicating standards to land right holders by persuading them to comply, offering incentives to those who comply and persecuting repeated violators (Burby et al., 1998). Meanwhile zoning regulations are administered on land under customary tenure. Customary rights to land are administered by traditional authorities and rules are generally unwritten. This begs the question: how is land use planning (a responsibility of a government institution) organized, implemented and enforced in a customary tenure setting? The problem here is that zoning regulations impose rules on how the land may be used, and the obligation to comply with the zoning regulations and standards may interfere with the freedom of land right holders to enjoy their land rights.

While a lot of research has been conducted on the effect of land use and zoning regulations on urban form, house prices and pattern of development (Arimah & Adeagbo, 2000; Ayyoob, Yoshihiro, Kohei, Satoshi, & Akito, 2014; Baffour Awuah & Hammond, 2014; Burby, May, & Paterson, 1998), and on the benefits and factors affecting compliance with residential regulations in the context of formal land administration, (Alnsour & Meaton, 2009; Baffour Awuah, Hammond, Lamond, & Booth, 2014), little is known about the effects of zoning regulations on land right holders in the context of customary land tenure. This study intends to explore the implementation of zoning regulations in areas under customary land tenure system in Ghana. The objective is to find out how the obligation to comply with residential standards (defined by government institutions e.g. Municipality, planning authorities) affect the enjoyment of land rights in the context of customary land tenure. Results of this study have implications on the relevance of zoning regulations and standards in customary areas. For the purpose of simplicity, zoning regulations and residential standards are used interchangeably.

2. STUDY AREA

The study area is Ashiyie, Adentan Municipality in Accra, Ghana. Ashiyie is a fast developing peri-urban community with a population of about 4,200 as at 2010. Demographics compose of low and medium income households. Ashiyie covers approximately 1,200 acres. It is located 11.5km from Accra city. The West Ashiyie neighborhood covers an area of about 500 acres and is the focus for this study.

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

2.1 Allocation of rights to land and land ownership

Land rights are administered under customary tenure. Land is managed by traditional chiefs and family heads (symbol of kingship and authority) under freehold perpetual title (allodial interest). The family heads are referred to as customary land authority or customary land owners. Individuals (land right holders) and estate developers acquire plots from the chief and family heads, who confer a 99 year leasehold or a freehold to the land. Land right holders build their own houses – by hiring private developers. It is the responsibility of the land right holder to obtain a building permit from the planning authority at the Adentan Municipality.

2.2 Land use planning, zoning regulations

The Adentan Municipality has the mandate under CAP 84 to create, implement and enforce local plans. The Municipality consults with the customary land owners when creating or modifying local plans. The Municipality and customary land owners together decide on the parcel sizes, which should be referred to when allocating the plots. The local plans show plots sizes and land uses applying on the land.

Zoning regulation was developed in 1990 while Ashiye West was bare land. The zoning regulation was not implemented until 2010. Zoning Guidelines and Building Regulation of Ghana, 2011 specifies types of buildings for various uses including residential standards. The zoning guidelines assign standards on the minimum plot size, maximum plot coverage, type of buildings permitted (detached, duplex, compound houses) and prohibited uses for various Zones – A,B,C etc. Section 3, Subsection 1, of the Town and Country Planning Act (1945): CAP 84 stipulates that land right holders cannot make any improvement be it construction, demolition, alteration, repair, extension without permit from planning authorities.

2.3 Monitoring and enforcement of building standards

Two types of enforcement mechanisms exist: first, land right holders need to obtain a building permit (Local Government Act, 1993). The permit process includes the verification of documents presented for a permit. A technical team which consist of the planner, works engineer, structural engineers and representatives from environmental protection agency and other departments will inspect the application. Second, the Task Force Division of the Works Engineering Department monitors building sites to oversee that building permits have been acquired prior to erecting a building. The task force pays a total of ten (10) visits to the building site to monitor implementation of regulation standards at various stages. Table 1.2 shows the stages of construction where penalties will be given if regulation standards are not adhered to. Penalties in the form of fines are defined by the Municipality.

Table 1: Residential standards for West Ashiye

Residential Standards	Zone B
-----------------------	--------

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

Permitted uses	Residential buildings, local shops, places of worship, basic education and childcare center, public open spaces
Maximum Plot coverage	60% –70%
Minimum Plot size	350m ²
Type of building	Detached building, row houses compound house, chamber and hall

(source: GTCPD, 2011)

Table 1.2: Fines at each level of construction (source: Adentan Municipal Assembly Fee Fixing Resolution, 2015)

Stage of Construction	Single Storey		Multiple Storey Building	
	Fine (GH¢)	% Of Permit Fee	Fine (GH¢)	% of Permit Fee
Stage 1: Up to substructure	300	50 %	500	75
Stage 2: Upto first floor slab	-	-	600	Actual Permit Fee
Stage 3: First floor and above	-	-	700	1.5 of Permit Fees
Stage 4: Up to roofing	400	75%	-	-
Stage 5; Roofing and Finishing	500	Actual Permit Fee	1,000	Twice Permit Fees

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

Study area and study samples (parcels digitized from local plan)

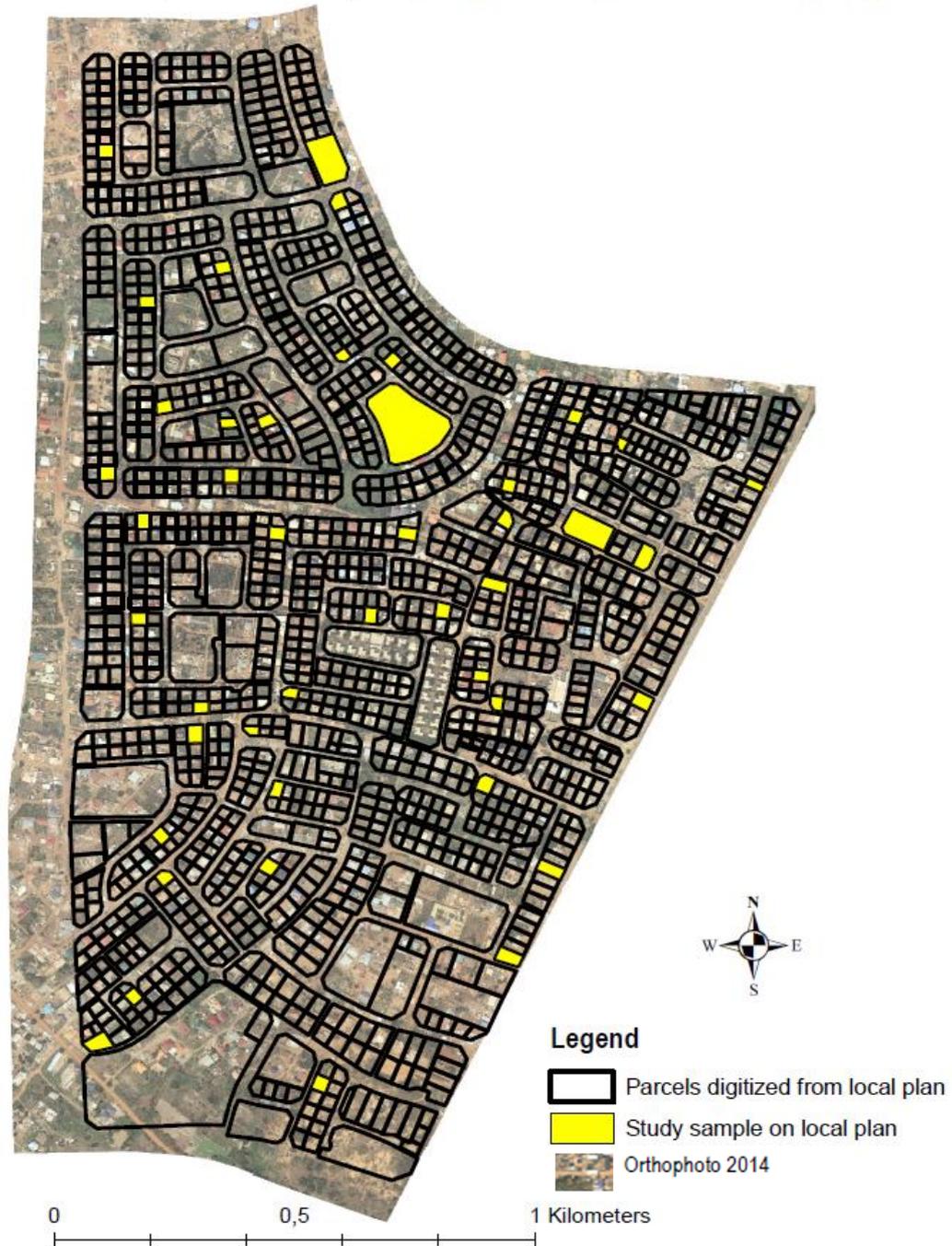


Figure 1: Study area and parcels selected for this study

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)
Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017
Surveying the world of tomorrow - From digitalisation to augmented reality
Helsinki, Finland, May 29–June 2, 2017

3. METHODS

The objective of this study is to find out how the obligation to comply with residential standards affect the enjoyment of land rights in the context of customary land tenure – in Accra, Ghana. Fieldwork took place in October 2015 in West Ashiyie. Face to face interviews were carried out with the occupiers of the plots (land right holders). Key informants i.e. a Municipal planner (responsible for physical planning); engineer (responsible for monitoring and enforcement of zoning regulations and building standards); Assembly representative (represents residents/land rights holders at the Municipality) and two customary authorities (landlords, they allocate land rights to individuals) were also interviewed. The planner and the engineer provided information on the planning and permitting process, monitoring and enforcement of the regulations, challenges and limitations. The Assembly representative was interviewed on awareness program and challenges faced. Customary authorities were interviewed on their role in the implementation of the zoning regulations. These key informants were purposively selected as they are in a better position to discuss the zoning standards and enforcement, and programs for creating awareness.

The local plan was used to select the parcels – and therefore the households to be interviewed. Forty four (44) parcels were identified using Bouchard's sampling formula. The households were selected regardless of the social economic status of the occupants. Specifications for residential building standards and orthophoto from aerial images (from 2014) were used as a proxy to assess the effect of zoning regulations on land rights. Structured, face to face interviews were administered to the participants i.e. land right holders and key informants. Land right holders responded to closed and open ended questions while the key informants responded to open ended questions.

Three sub-objectives are pursued. Sub-objective 1 aimed to find out the factors influencing compliance by addressing two issues: firstly, factors that motivate land right holders to implement residential standards (permitted land uses, maximum plot coverage, minimum plot size and types of buildings); and secondly, how enforcement influences land owners to implement the residential standards. Interviewees responded to questions on awareness of the standards, household sizes, income and how monitoring and enforcement influence compliance. Variables such as awareness of residential standards, socio-economic data (size of households, household income and education levels) can be used to answer factors that motivate landowners to comply with residential standards (Alnsour & Meaton, 2009). Enforcement was measured based on the frequency of visits by responsible team and sanctions or penalties given.

Sub-objective 2 focused on how zoning regulations affects the enjoyment of land rights by addressing two issues –i) perception of how the zoning standards interfere with the enjoyment of rights to land; and ii), how land right holders defend themselves against the prescribed zoning standards. Respondents were asked of how zoning regulations (permitted land uses, maximum plot coverages, minimum plot size; and types of buildings and standards) affect their freedom to enjoy their land rights. For sub-objectives 1 and 2 descriptive statistics were used to analyze the qualitative and quantitative data. Results are presented using frequency distribution tables and bar charts.

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

Lastly, sub-objective 3 focused on spatial analysis for assessing conformity and compliance of the selected plots using:

- i) Local plan produced in 1990 and provided by Adenta Municipality in paper form
- ii) Orthophoto produced from aerial images with a resolution of 0.2m. produced in 2014 provided in *.tiff format from Survey and Mapping Division of Lands Commission.

Local plan was scanned and georeferenced using ground control points (GCPs) which were obtained with handheld eTrex Garmani GPS during the fieldwork. For accurate superimposition all raster data was projected to the same coordinate system –WGD 84, UTM Zone 30 N. The boundaries of the plots were manually digitized over the raster local plan in ArcGIS. Plots that had been sampled for this study were digitized over the orthophoto. Fence walls and hedges were used as a guidelines in digitizing parcels as they serve as parcel boundaries. Evaluating land use changes and level of conformity was done by overlaying vector data (extracted from the local plan) over the orthophoto. Visual interpretation was used to identify the conformity with the local plan. According to Pfeiffer (1996) spatial patterns can be explored using visualization in Geographical Information Systems (GIS).

4. RESULTS

4.1 Factors influencing influence compliance with residential standards

4.1.1 Influence of awareness on implementation of residential standards

There is low public awareness of the residential standards. Of the 44 respondents, 14 are aware of the permitted land uses; 6 are aware of the maximum plot coverages; 10 are aware of the minimum plot size; and 11 are aware of the types of buildings and standards. Those aware of the residential standards obtained the information through the radio, neighbors, friends/spouses, information sessions by the Municipality and experiences from other communities. None of the respondents has ever seen a zoning regulation document. All residents practiced residential uses, an indication of deliberate or accidental compliance to the permitted uses– even though most were unaware of the zoning standards.

Key informants mention three methods to convey residential standards to the citizens. First, the type of land use and plot sizes are indicated in the indenture (a written instrument that conveys interest in land by the customary authority). Customary authority provide the zoning standards when transacting land, but to those who request for it. Secondly, detailed information on the zoning standards are posted on the notice boards at the Assembly. Thirdly, the Municipality creates awareness through its Residents Association Meetings. Meetings are organized monthly by the Assembly representative and Unit Committee members (political representatives of the residents at the Assembly) to educate residents on the Assembly’s developmental projects and other matters. According to the Assembly representative, participation is not compulsory hence rarely attended. Key informants indicate it is the responsibility of individuals to check the zoning status and standards before acquiring land. However, none of the land right holders was aware of this process.

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

Respondents however were aware that verification of the title document (search at Land Title Registry) prior to acquiring the land was important.

Dissemination of the zoning information has an impact on the levels of awareness, and consequently motivation to implement the zoning regulations. While the zoning standards exist, result suggest they are distant from the people. Leaving the responsibility to seek the zoning standards to the land right holders may give the impression that the zoning regulations are optional for implementation. It is no wonder that just a few residents are aware of the zoning standards. As such, the land right holders will pursue what is most important for themselves, i.e. the security of their land rights. This leads to the residents feeling more responsible to the customary land owners – in paying ground rent, rather than the Municipality – to implement the zoning standards.

4.1.2 Influence of household size on compliance with the maximum plot coverage

More than half of the respondents breached on the plot coverage, according to Figure 2. Ignorance of plot coverage (never heard of it), building to rent (benefit from land) were given as reasons for given for non-compliance with plot coverage. Respondents indicated using their own discretion to build on as much of the land as they wished while giving allowance for air circulation. Moreover, Figure 2 shows household size has direct negative impact on compliance with required maximum plot coverage. Respondents from a 3-5 household size fall within the accepted plot coverage of 60%-70%. Similarly, all small households of less than 3 build within the accepted coverage. However, plot coverage for large family sizes (households above 5) exceed the maximum plot coverage. This category of respondents indicated the need to shelter relatives compel them to maximize available space on their compound. Household size can thus negatively motivate residents to comply as they increase shelter space to accommodate their large families.

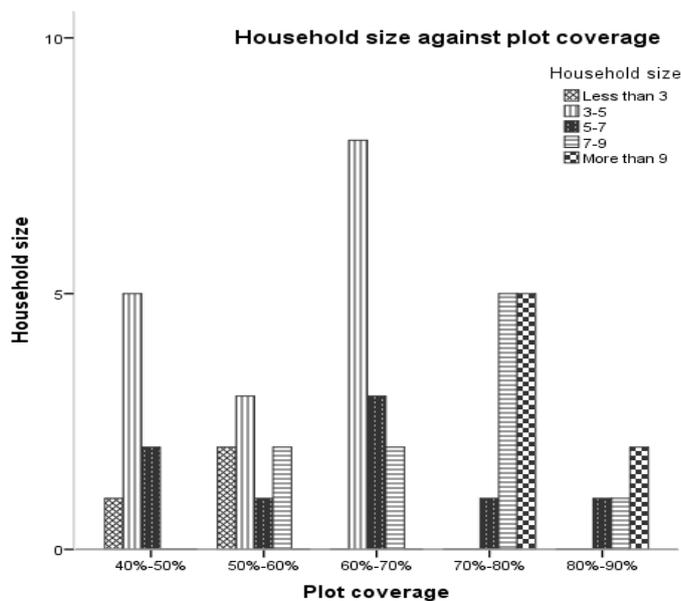


Figure 2: House hold size and compliance with plot coverage

4.1.3 Influence of household income on compliance with the minimum plot size

There is compliance with the minimum plot size as all the plots conform to the stipulated minimum plot size of 350m² (Figure 3). Customary authorities thus allocate land in compliance with the minimum parcel sizes. Majority of respondents who own more than 930 m² plots are in the GH¢ 500- GH¢ 1,000 income bracket. This income group is dominated by pensioners aged above 60 years old. Most purchased the plots with lump sum retirement benefits – in the 2000's, although they are currently earning between 500- GH¢ 1000. Figure 3 thus suggests that income levels and parcel sizes have little correlation.

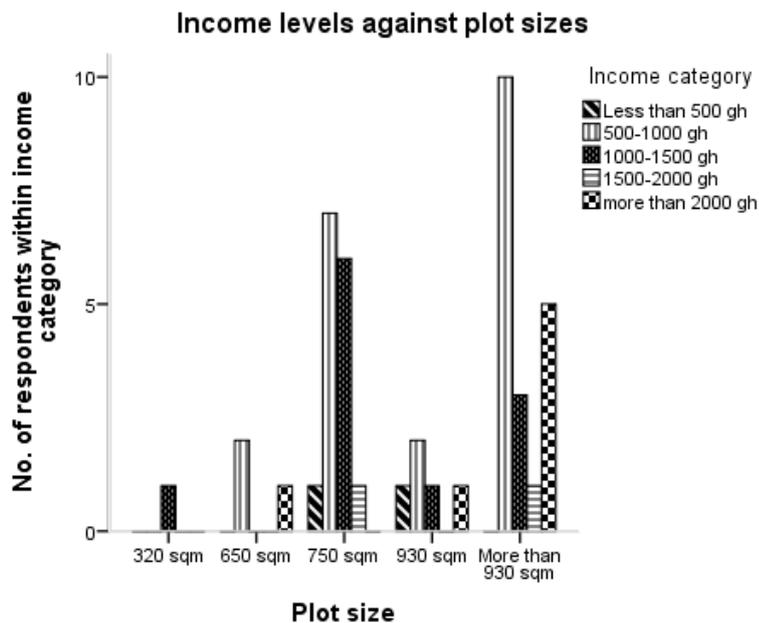


Figure 3: Income in relation to plot size

4.1.4 Influence of monitoring and enforcement on implementation of residential standards

More than half of the respondents did not possess a building permit (Table 2). Reasons for this include high cost, long process, lack of required documents, change of Municipality and the absence of task force. However, respondents possessed the indenture, which stipulates what the land is to be used for. This was confirmed by the customary land authority, that while the indenture shows how the land should be used, they leave it to planning authorities to enforce the building standards. This suggests that enforcement of zoning regulation is strictly a government function.

Table 2: Number of respondents with building permits

Description	No of respondents	% of respondents
Yes	17	39
No	26	59
No answer	1	2
Total	44	100

Further, there is a low level of monitoring and enforcement of residential standards. Of the 44 respondents, more than half of them (25) were never visited by the enforcement taskforce. According to the key informants (Planner and Works Engineer) limited staff and logistics hinder the task force's ability to monitor and enforce the implementation. Hence, after issuance of building permit, the task force is unable to undertake the inspection visits as required due to logistical challenges and organization's limitations.

Nineteen respondents were visited by the monitoring and enforcement taskforce. All but one received one form of penalty. Three were visited more than once. Penalties were issued because land right holders begun constructions without building permits. The penalties are in the forms of fines, written warnings and verbal warnings – Figure 4.

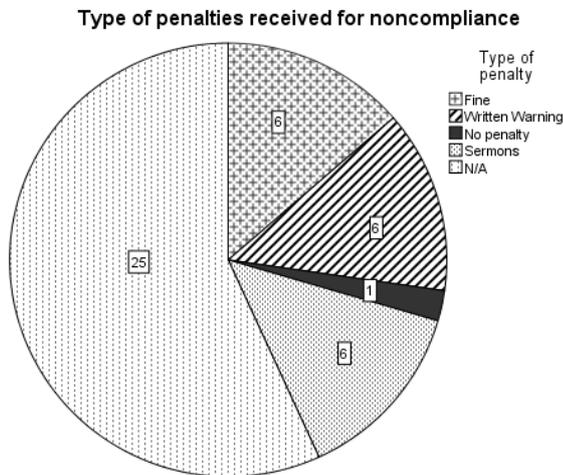


Figure 4: Types of penalties received for noncompliance

The penalties are light, according to the respondents. The planner indicate that harsher measures such as demolitions are limited to buildings blocking the right of way (road, utility) or waterway and not due to non-compliance. This suggests that land right holders may not be compelled to adhere to the residential standards even after receiving penalties. Moreover, respondents indicated that it is possible to regularize buildings at later stages. This has led to a practice of land right holders opting to regularize their buildings after receiving a penalty. This practice perhaps also encourages land right holders to flout on regulations.

4.2 Effects of zoning regulations on the enjoyment of land rights in the context of customary tenure.

Majority of respondents are confident of not losing their land rights due to noncompliance. Having obtained their land rights from the customary authorities, respondents believe the planning authority can only fine for non-compliance. Further, by registering their land rights (getting land title certificate from Lands Commission) respondents strengthen their land rights and security of tenure. According to the respondents, tenure insecurity can result from a lack of the title certificate and not from non-compliance. Thus, non-compliance to residential standards has minimal interference on enjoyment of land rights.

4.2.1 How land right holders defend themselves against the prescribed residential standards

Land right holders do not resist the residential standards perhaps due to lack of awareness and low enforcement by the planning authority. One respondent indicated taking legal action against the Municipality. Written false warnings on buildings have also been used as a mechanism by

developers to prevent task force from visiting property. These false warnings e.g. ‘stop work’ notice gives the task force the perception that they have already visited the said property thereby evading penalties. Respondents have also bribed the task force to avoid penalties.

4.3 Spatial analysis to assess conformity and compliance with the local plan

This section assesses conformity between reality of land uses and parcel sizes (derived from orthophoto from 2014) and the local plan. By overlaying the vector data extracted from the local plan over the orthophoto visual interpretation was performed to derive any changes. Figure 4 shows the general differences upon overlaying the vector data from the local plan and the orthophoto. On Figure 5, spatial compliance is visible concerning. i) permitted uses i.e. residential area and ii) minimum plot size. However, four main types of spatial non-conformity between the local plan and orthophoto are identified:

- i) Orientation of the parcel boundaries
- ii) Shapes of plot boundaries
- iii) Plot sizes
- iv) Houses constructed on the boarder, or straddle parcel boundaries.

4.3.1 Differences in the orientation of parcel boundaries

A size reduced version of the images are used to present the results. Thus, a few of the 44 plots sampled for this study are used to elaborate on the changes observed between the orthophoto and the vector data extracted from the local plan. Figure 6 shows changes in the parcel boundaries as observed from the orthophoto and the local plan. Parcel 44 in Figure 6 shows a spatial misalignment between the local plan and as appears on the orthophoto by a whole right angle.

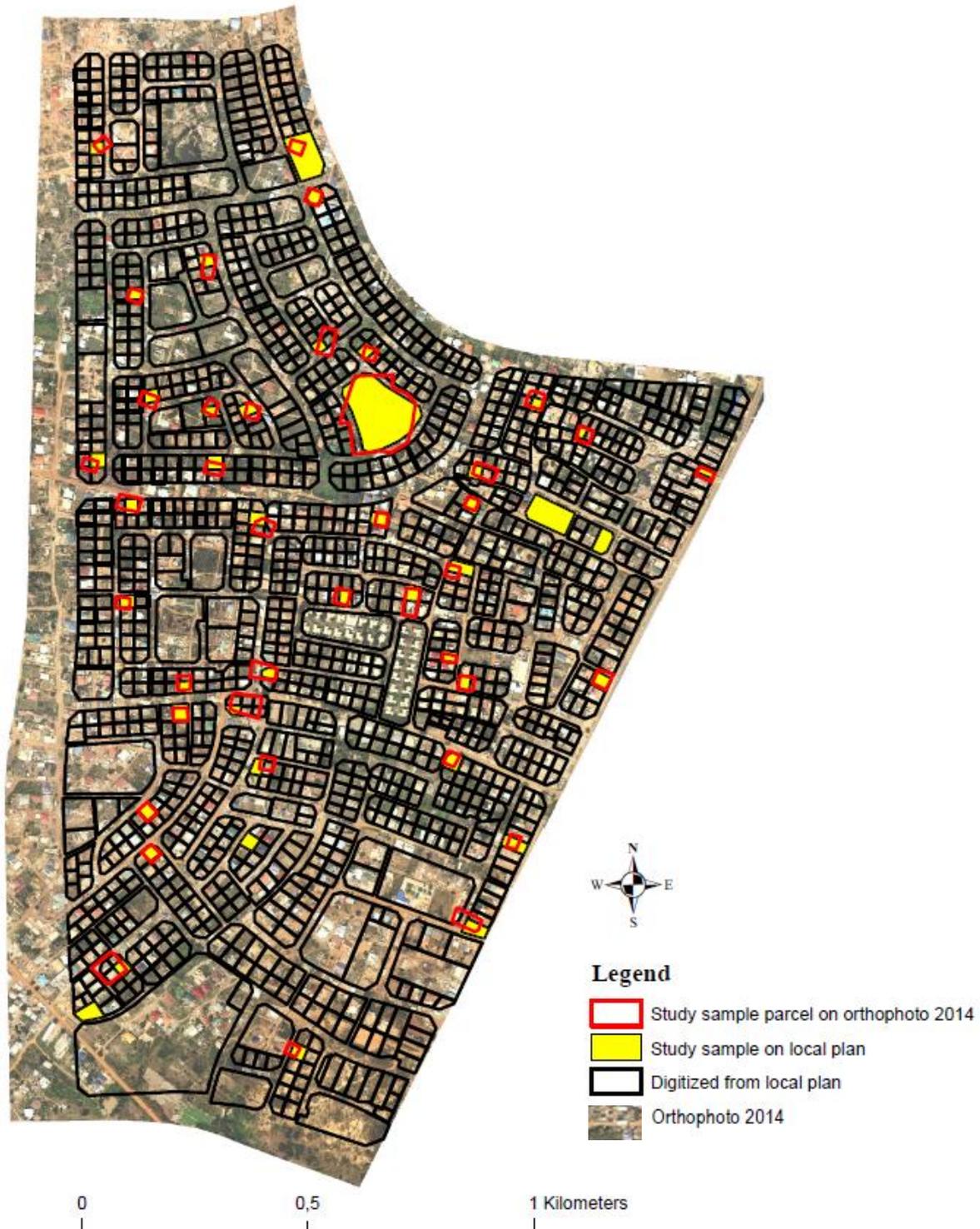
4.3.2 Changes in shape of parcels

Figure 6 also reveals the differences between parcel shapes on the local plan and on the orthophoto. All parcels sampled for this study do not spatially conform to the local plan. Figure 6 shows a few examples. Parcel 43, for example, suggests that according to the local plan, one plot exists on that space. However, the orthophoto shows that the plot has perhaps been subdivided into smaller plots. Boundaries of parcels adjustment to plot 43 also show discrepancies on the intended shapes of the plots compared to the orthophoto.

According to the customary key informant, the proportion of family heads with maps/layout of the extent of their ownership is unknown. The key informant added that customary authorities receive the layouts from the Municipality. However, they often allocate parcels based on their own discretion of where they think the boundary with the local plan layout lies. This may lead to a deviation on the parcels boundaries in reality and parcels depicted on the local plan. The Municipality may find it difficult to monitor spatial non-conformity especially when residents fail to obtain permits building permits for their plots. Further, the differences remain undetected as the

zoning enforcement team rarely monitors this.

Differences between vector data extracted from the local plan (2010) and orthophoto (2014)



Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)
Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

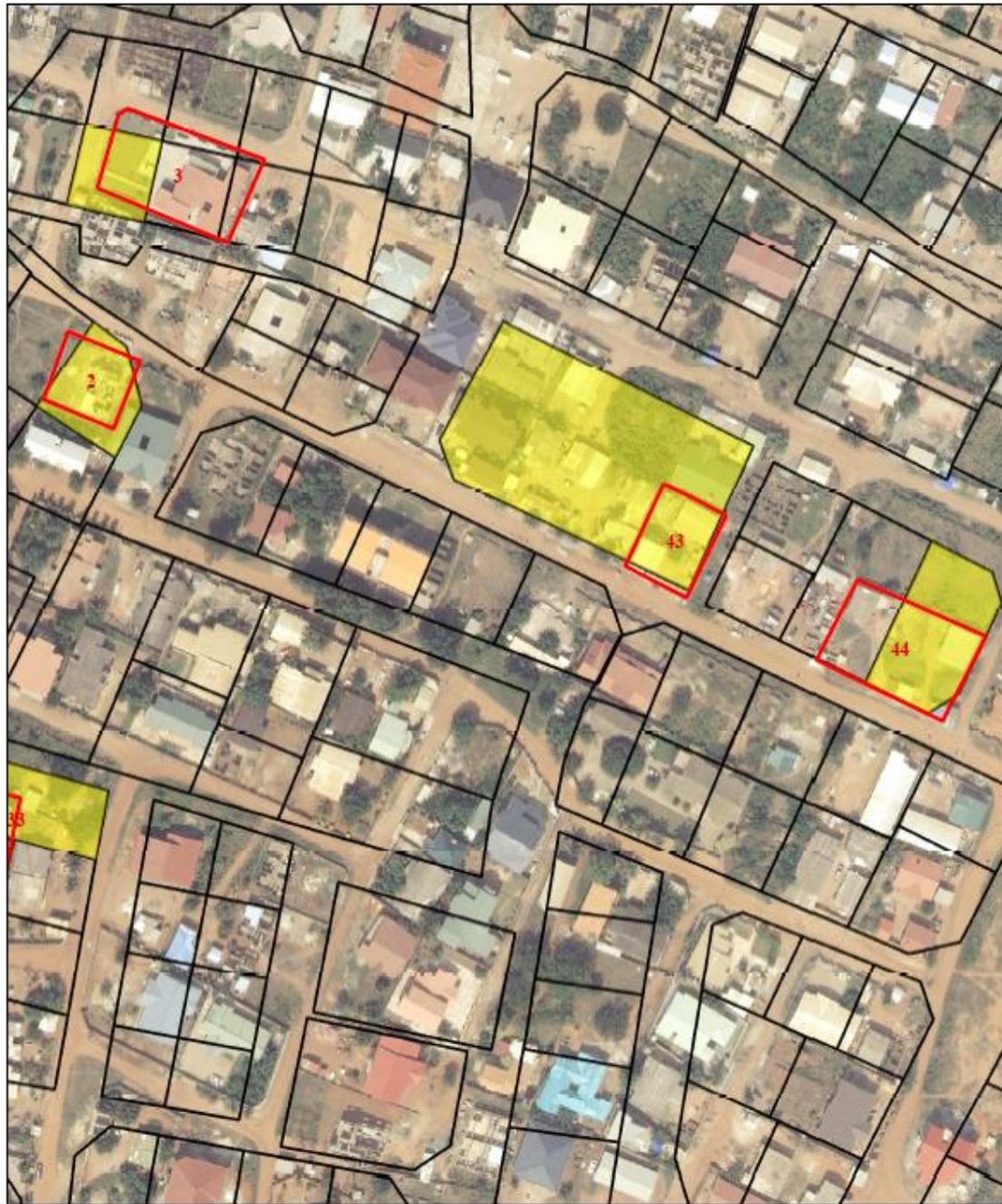
FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

Changes in plot boundaries

Figure 6:



0 0,1 0,2 Kilometers



Legend



Study sample on orthophoto 2014



Orthophoto 2014

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)
Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

Changes in orientation, shapes, and sizes of plots

4.3.3 Change in Plot sizes

All plots conform to or are above the minimum parcel size. Areas (in size) are above the minimum standard (350m²). Differences between the orthophoto and local plan suggest that changes in the plot sizes have taken place. All parcels sampled for this study in Figure 6 confirm this. Changes in plot sizes result from subdivisions e.g. in parcel 3 or merging of plots e.g. on 43. According to the Municipal Planner, most of the subdivisions and merges are undertaken without approval from the Municipality. The Municipality finds this problematic as it defeats the purpose of the plan. Also, there is no restriction on how many parcels one can own as customary landowners are interested in receiving rent from the land. This situation further suggests that land right holders not affected by zoning standards as they can opt to subdivide or merge parcels by consulting customary authority instead of the Municipality.

4.3.4 Building outside plot boundaries

Figure 5 also reveals that buildings have been constructed outside the designated parcel/plot boundaries on the local plan. Buildings touch, across the boundary by the local plan, or are constructed on road reserves. Visual interpretation suggests live or other types of fences represent legitimate boundaries in use, indicating that the local plan has been thrown overboard. The planning authorities are aware of this problem. The key informant from the Municipality believes that there is about 50% compliance with residential standards; and about 30% conformity with parcel boundaries and planning with the local plan. The key informant believes that the spatial non-conformity is due to lack of cooperation between customary landowners and planners, lack of technical staff to monitor compliance and conformity, land litigations and the many number of family heads selling/leasing land. Planners have little influence where land is held under customary tenure as the allocation of land in reality differs from the local plan.

5 DISCUSSION

5.1 Factors influencing compliance

The study found out that lack of awareness of the zoning standards contribute to the non-compliance by land right holders. Lack of interaction between the multiple institutions and dealing with land i.e. the customary land owners (on allocation of land rights), the land commission (on issuing title certificates) and Municipality (on issuing building permits) also contribute to the lack of awareness. Lack of awareness of the standards, household size, and need to generate income through rent contribute to non-compliance with the maximum plot coverage. Respondents of this study did not have clear procedure on where to get the information on the building standards. Lack of communication between the different authorities means citizens are uninformed of what processes to follow and from which institution. Where opportunities were available e.g. through the Assembly representative, participation to the monthly meetings is optional. A synchronized

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

procedure with the multiple institutions is perhaps needed to communicate the zoning standards, and emphasize its relevance. This confirms that the government and customary institutions do not work well together because their systems are not synchronized Fekade (2000). This study also shows that when citizens encounter with different institutions for different purposes, they learn to assert which institution is most relevant or poses most consequences to them. In this study, citizens revere customary authority (to access land rights) and the lands commission (to secure their tenure through a title certificate), and pay little attention to planning authority (on building standards).

Meanwhile, larger households call for more space. Demand for rental houses tempt land right holders too intentionally or unintentionally breach the maximum plot coverage. This result confirms Tipple's (2000) assertion that household size can negatively motivate use right holders to comply with standards such as maximum plot coverage. Low income also play a role in compliance with the plot coverage. The role of low income in compliance is twofold. Firstly, low income can serve as motivation for respondents to expand their houses or utilize their compound to earn income through rents thus exceeding maximum requirements and secondly, the costs of obtaining a building permit are often unaffordable by the low income earners, and the building standards may be burdensome, and this can negatively influence compliance (Dowall & Clarke, 1996; Fekade, 2000).

In this study the land right holders barely obtain a permit voluntarily because the process is circuitous, time-consuming and expensive. Logistical challenges affect monitoring and enforcement activities by the Municipality. This situation contributes to non-compliance as it creates conditions under which residents can violate zoning regulations (Burby et al. 1998). Burby adds that planners need to either improve their staff base and resources to detect or correct violations or create conditions under which violations are unlikely to occur. This study shows that the problem of non-compliance is exacerbated in the context of customary land tenure, where the customary land owners are concerned about earning rent rather than implementation of the zoning standards. Rukwaro (2009) observes that where enforcement by the planning authority is ineffective land owners can contravene the regulations with impunity. This also shows in this study.

5.2 Effects on land rights

Land right holders in a customary tenure setting do not risk losing their land rights due to non-compliance. In this study, respondents view that their financial commitment to pay the rent to the customary land owner and obtaining a title certificate from the lands commission is much more important. While building permits and zoning standards – (by the Municipality/planning authority) may be costly and cumbersome to obtain/implement, residents do not protest against this. Rather, residents have learnt a tricks to evade the prescribed zoning standards. Residents take advantage of the weak enforcement and light penalties by the planning authority and opt to regularize their buildings through a different permit – only after receiving a penalty from the planning authority. Regularization of buildings after completion implies that the planning authorities tolerate deviation from the zoning standards. Tanasesc et al (2010) observes the same in the context of formal land administration, where buildings deviant to the zoning regulations are considered illegal become accommodated in the mainstream policies. Toleration of deviation from the zoning standards

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

happens when the government takes initiative to shift their policies and device approaches to regulate, rather than to demolish illegal structures or buildings not compliant to the zoning standards Tanasesc et al (2010). As such, where property deviant to zoning regulations become accommodate in the mainstream policies, then the zoning standards have no effect on land right holders enjoying their land rights. However, there are cases where zoning regulation affects the land rights through evictions therefore loss of tenure security and consequently the loss of livelihoods as well (UN Habitat, 2008),

5.3 Spatial conformity

This study notes the lack of cooperation between Municipality – planners and customary land owners does not only lead to unawareness of the required building standards by the residents, but ripples out to the spatial incompatibility between reality and the local plan. A total disregard of the plans by the customary authority and residents has left the planning authority being the only one concerned with the implementation of the building standards. Coupled with the inefficiencies in monitoring and enforcement by the planning authority, results are dramatic deviations between the real world and local plans – as revealed in this study. Deviations range from contrasts in the orientation of the parcel boundaries; in the shapes of plot boundaries; houses constructed on the boarder, or straddle parcel boundaries and differences in the plot sizes. However, compliance with residential standards is high, perhaps due to the area’s proximity to the city of Accra and demand for residential houses. Studies show that zoning standards are challenging to implement in customary areas due to multiple interests held in the same land by different people – especially in the rural areas; and that the existing land tenure system in an area can affect how the zoning standards are received as planning institutions can find themselves being at the mercy of customary land owners to get a local plan effectively implemented (Yeboah & Obeng-Odoom, 2010).

This study suggests the need for the planning authority to find ways to improve efficiency and effectiveness on monitoring and enforcement of building regulations. The spatial analysis this study has proven the relevance of (GIS) for monitoring deviations with the local plan. GIS has become a significant tool to effectively monitor the zoning standards in the recent years (Talen, 1996). Unmanned Aerial Vehicles (UAVs) can help inspect/monitor properties and support the enforcement process quicker and cheaply. Application of such Geo-information tools and technologies in monitoring and enforcement can counteracting logistical challenges associated with field patrols.

6 CONCLUSION

This study assessed the effects of zoning standards on the enjoyment of land rights in the context of customary land tenure in Ghana. Three sub-objectives were addressed i.e. i) determining the factors influence land right holders to comply with residential standards; ii) determine how zoning standards affect the enjoyment of land rights; and iii) use orthophoto to analyze spatial conformity with the local plan. The context of the study is interesting because of the multiple institutions dealing with land i.e. the customary land owners (on allocation of land rights), the land commission (on issuing title certificates) and the planning authority of the Municipality (on issuing building

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

permits), Results indicate unclear procedures on where and when to obtain zoning standards lead to ignorance of the building standards. The three authorities dealing with land have left the responsibility to inquire and implement the zoning regulations to the residents. The planning authority assesses and enforces implementation of the regulations through field patrols and penalties. Field patrols are affected by logistical challenges, therefore monitoring and enforcement is minimum. Residents take advantage of this shortcoming by not implementing the residential standards. Residents choose to regularize their buildings after receiving a penalty, which often happens after the building has been completed. The residents are therefore also a step ahead of the enforcement teams who are often late with enforcement. The planning authority does tolerate the deviations from the building standards by permitting the completed buildings under a different permit.

The customary authorities are involved in developing zoning plans. They however put little regard to them when allocating plots for lease. This study superimposed the local plans of 2010 over the orthophotos of 2014. Differences in four main ways were revealed i.e. changes in the orientation of the parcel boundaries; changes in the shapes of plot boundaries; houses constructed on the boarder or straddle parcel boundaries; and differences plot sizes. Customary authorities may not have the techniques to ensure proper alignment of the plots with the plans. Customary authorities interest may lie entirely on generating rent from their land rather than emphasis proper alignment of plot boundaries with the local plan, as this study has shown. Ensuring conformity with plot boundaries calls for coordination between the planning authority and the customary authorities. The study reveals as long as holders pay rents to the customary land owners, zoning standards do not hinder their enjoyment of land rights.

The results have significance to the land use planners. Much time and resources are put in to developing the local plans and defining regulations standards and enforcement mechanisms. These efforts are in vain when field visits are the main methods for monitoring and enforcing the zoning standards. This is worsened where logistical challenges hinder monitoring and enforcement activities. In this study, synchronization of procedures and cooperation between responsible authorities i.e. the Municipality, customary authority and lands commission may help increase awareness and enhance implementation of the zoning standards. Further, tools like GIS, and lately using affordable acquisition techniques such as UAVs can enhance efficiency in monitoring and implementation of the zoning standards and address logistical challenges associated with field visits.

Acknowledgments

This study was funded by the Netherlands Fellowship Programed (Nuffic) for providing sponsorship for this study. We sincerely thank the family heads and residents of West Ashiyie for their kindness, hospitality and immense help during data collection. Authors also thank the key informant form the Adenta Municipality for his time and support with needed resources. Also thanks to Hon. Patricia Tetteh (Assemblywoman) for allowing the author's to join in one of the Resident's Association meetings and for permitting the interviews with residents in her electoral

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

area. Also to Mr. Eugene Kodzo Anipa of the Ghana survey school for providing 2014 orthophotos.

REFERENCES

- Alnsour, J., & Meaton, J. (2009). Factors affecting compliance with residential standards in the city of Old Salt, Jordan. *Habitat International*, 33(4), 301–309. <http://doi.org/10.1016/j.habitatint.2008.08.003>
- Arimah, B. C., & Adeagbo, D. (2000). Compliance with urban development and planning regulations in Ibadan, Nigeria. *Habitat International*, 24(3), 279–294. [http://doi.org/10.1016/S0197-3975\(99\)00043-0](http://doi.org/10.1016/S0197-3975(99)00043-0)
- Arko-Adjei, A. (2011). *Adapting land administration to the institutional framework of customary tenure: The case of peri-urban Ghana*. Amsterdam: IOS Press (Delft University Press).
- Ayyoob, S., Yoshihiro, C., Kohei, O., Satoshi, Y., & Akito, M. (2014). Can master planning control and regulate urban growth in Vientiane, Laos? *Landscape and Urban Planning*, 131, 1–13. <http://doi.org/10.1016/j.landurbplan.2014.07.014>
- Baffour Awuah, K. G., & Hammond, F. N. (2014). Determinants of low land use planning regulation compliance rate in Ghana. *Habitat International*, 41, 17–23. <http://doi.org/10.1016/j.habitatint.2013.06.002>
- Baffour Awuah, K. G., Hammond, F. N., Lamond, J. E., & Booth, C. (2014). Benefits of urban land use planning in Ghana. *Geoforum*, 51, 36–46. <http://doi.org/10.1016/j.geoforum.2013.09.019>
- Boamah, N. A. (2013). Land use controls and residential land values in the Offinso South municipality, Ghana. *Land Use Policy*, 33, 111–117. <http://doi.org/10.1016/j.landusepol.2012.12.016>
- Brody, S. D., & Highfield, W. E. (2005). Does planning work?: Testing the implementation of local environmental planning in Florida. *Journal of the American Planning Association*, 71(2), 159–175.
- Burby, R. J., May, P. J., & Paterson, R. C. (1998). Improving Compliance with Regulations: Choices and Outcomes for Local Government. *Journal of the American Planning Association*, 64(3), 324–334. <http://doi.org/10.1080/01944369808975989>
- Cotula, L. (2006). Key concepts and trends in policy and legislation. in L. Cotula (Ed.), *Land and water rights in the Sahel: Tenure challenges of improving access to water for agriculture*. (Paper No., pp. 9 – 20.). London: International Institute for Environment and Development.
- Cotula, L., & Chauveau, J. P. (2007). *Changes in customary land tenure systems in Africa*. Iied.
- Da Rocha, B. J., & Lodoh, C. H. K. (1999). *Ghana land law and conveyancing*. DR & L Print. and Pub. Services. Retrieved from <https://books.google.nl/books?id=9X4lAQAAIAAJ>
- De Schutter, O. (2010). *The right to food: Sixty-fifth session of the general assembly* (Vol. 48230). Retrieved from http://www.srfood.org/images/stories/pdf/officialreports/20101021_access-to-land-report_en.pdf
- Deininger, K., Selod, H., & Burns, A. (2012). *The Land Governance Assessment Framework*. Burns. <http://doi.org/10.1596/978-0-8213-8758-0>
- Dowall, D. E., & Clarke, G. (1996). *Urban management and land: A framework for reforming urban land policies in developing countries* (No. 7). Washington, D.C.

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

- Fekade, W. (2000). Deficits of formal urban land management and informal responses under rapid urban growth, an international perspective. *Habitat International*, 24(2), 127–150.
- Fischel, W. (2000). Zoning and Land Use Regulation. *Encyclopedia of Law and Economics*, 403–442. Retrieved from <http://www.dartmouth.edu/~wfischel/Papers/WAF-zoning ELEpdf.pdf>
- Ghana Statistical Service. (2012). 2010 Population and Housing Census. *Seoul, Korea, Various Issues*, 1–117. <http://doi.org/10.1371/journal.pone.0104053>
- GIZ. (2012). *Land Use Planning Concepts, Tools and Applications*. (B. Wehrmann, Ed.). Berlin, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
- GOG. (2015). Land Administration Project. Retrieved December 30, 2015, from <http://www.ghanalap.gov.gh/>
- Goodfellow, T. (2013). Planning and development regulation amid rapid urban growth: Explaining divergent trajectories in Africa. *Geoforum*, 48, 83–93. <http://doi.org/10.1016/j.geoforum.2013.04.007>
- Kasanga, K., & Kotey, N. A. (2001). Land Management in Ghana: Building on Tradition and Modernity. *Russell The Journal Of The Bertrand Russell Archives*, (February), 1–42. <http://doi.org/ISBN: 1-899825-69-X>
- Larbi, W. O. (1996). Spatial planning and urban fragmentation in Accra. *Third World Planning Review*, 18(2), 193. <http://doi.org/10.3828/twpr.18.2.512j2355x17032m1>
- Loh, C. G. (2011). Assessing and Interpreting Non- Implementation Assessing and Interpreting Non-conformance in Land-use Planning Implementation, (May 2015), 37–41. <http://doi.org/10.1080/02697459.2011.580111>
- Mayer, C. J., & Somerville, C. T. (2000). Land use regulation and new construction. *Regional Science and Urban Economics*, 30(6), 639–662. [http://doi.org/10.1016/S0166-0462\(00\)00055-7](http://doi.org/10.1016/S0166-0462(00)00055-7)
- Nkwae, B. (2006). *Conceptual Framework for Modelling and Analysing Periurban Land Problems in Southern Africa*. Ph.D Dissertation. University of New Brunswick, Fredericton, New Brunswick, Canada.
- Onsted, J. a., & Chowdhury, R. R. (2014). Does zoning matter? A comparative analysis of landscape change in Redland, Florida using cellular automata. *Landscape and Urban Planning*, 121, 1–18. <http://doi.org/10.1016/j.landurbplan.2013.09.007>
- Payne, G. K., & Majale, M. (2004). *The urban housing manual: Making regulatory frameworks work for the poor*. Earthscan.
- Pressman, J. L., & Wildavsky, A. B. (1973). How great expectations in Washington are dashed in Oakland. University of California Press, Berkeley, California.
- Quigley, J. M., & Rosenthal, L. A. (2005). The Effects of Land Use Regulation on the Price of Housing: What Do We Know What Can We Learn? *A Journal of Public Development and Research*, 8(1).
- Rukwaro, R. W. (2009). The owner occupier democracy and violation of building by-laws. *Habitat International*, 33(4), 485–498.
- Schilling, J. M., & Hare, J. B. (1994). *Code Enforcement: A Comprehensive Approach*. Solano Press.
- Šliužas, R. V. (2004). *Managing Informal Settlements A Study Using Geo-Information in Dar es Salaam, Tanzania*. Utrecht University and ITC.

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

- Talen, E. (1996). Do plans get implemented? A review of evaluation in planning. *Journal of Planning Literature*, 10(3), 248–259.
- Tanasescu, A., Wing-tak, E. C., & Smart, A. (2010). Tops and bottoms: State tolerance of illegal housing in Hong Kong and Calgary. *Habitat International*, 34(4), 478-484.
- TGUP Perera. (n.d.). Implementing Land Registration Systems in Sri Lanka : Being Pragmatic. *Journal, Sri Lankan Estate, Real*, 74–96.
- Town and Country Planning Department. (2011). *Manual For the Preparation of Spatial Plans*. Accra.
- Town and country plnning department. (1991). *Strategic Plan for the Greater Accra Metropolitan Area*. Accra.
- Turkstra, J. (1998). *Urban Development and Geographical Information: Spatial and Temporal Patterns of Urban Development and Land Values Using Integrated Geo-data, Villavicencio, Colombia*. International Institute for Aerospace Survey and Earth Sciences.
- UN Habitat. (2008). *Secure Land Rights for All*. Nairobi: UN Habitat.
- UN-Habitat. (2007). *Situation Analysis of Informal Settlements in Kampala. Development Southern Africa* (Vol. 22). Nairobi. <http://doi.org/10.1080/03768350500043794>
- Williamson, Ian;Enemark, Stig; Wallace, Jude;Rajafibard, A. (2010). *Land Administration for Sustainable Development*. California.
- Yeboah, E., & Obeng-Odoom, F. (2010). “ We are not the only ones to blame ”: District Assemblies ’ perspectives on the state of planning in Ghana. *Commonwealth Journal of Local Governance*, 1996(7), 78–98.
- Yeboah, I. E. A. (2003). Demographic and Housing Aspects of Structural Adjustment and Emerging Urban Form in Accra, Ghana. *Africa Today*, 50(1), 107–119. <http://doi.org/10.2307/4187553>

BIOGRAPHICAL NOTES

Eunice Matey is an employee of the Land Valuation Division of Lands Commission, Ghana, as an Assistant Valuer. In 2009, she obtained a B.Sc. (Land Economy) from the Kwame Nkrumah University of Science and Technology. She also obtained an MSc. (Land Administration) from ITC-Faculty of Geo information Science and Earth Observation, University of Twente in 2016. Eunice is a Professional member of the Ghana Institution of Surveyors (GhIS).

Monica Lengoiboni is Assistant professor of Land Management at the Faculty of Geoinformation Science and Earth Observation (ITC), at the University of Twente in the Netherlands – since 2014. She holds a BSc in Geoinformation Science (Wageningen University) and a PhD in the field of Land Administration (focus on the land rights of nomadic pastoralists in the context of formal land administration systems) - from Wageningen University in collaboration with ITC. Before pursuing her PhD research Monica worked at the Kadaster International in Apeldoorn, the Netherlands (2005-2006). After her PhD she worked as a lecturer at INES-Ruhengeri in Rwanda, where she instituted a BSc program in Land Administration and Management (2012-2014). Currently she teaches about land policy and land management, land tenure systems, innovative approaches for recordation of tenure rights and participatory GIS Mapping (PGIS) at ITC. She has been involved in several Tailor Made Trainings on innovative approaches for tenure recordation in Africa. Monica has contributed to the evaluation of the Social Tenure Domain Model - STDM (an initiative of UN-Habitat – GLTN) since 2009. She works closely with the Eastern Africa Land Administration Network (EALAN) – a network of 12 universities engaged in land administration related studies and activities in Eastern and Central Africa.

Mila Koeva gained her doctorate from the University of Architecture, Civil Engineering and Geodesy of Sofia, Bulgaria, on the topic of in 3D modelling in architectural photogrammetry. She is assistant professor working in 3D land information at University of Twente, ITC Faculty, The Netherlands. Her main areas of expertise include 3D modelling and visualization, 3D Cadastre, 3D Land Information, UAV, digital photogrammetry, image processing, producing large scale topographic and cadastral maps, GIS, application of satellite imagery for updating cadastral information among others. Currently she is also Co-chair of ISPRS WG IV/10 "Advanced Geospatial Applications for Smart Cities and Regions".

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)

Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality

Helsinki, Finland, May 29–June 2, 2017

CONTACTS

Ms Eunice Matey
Land Valuation Division
Lands Commission
P. O. Box CT 794
Head office, Accra
Ghana
Tel: +233 503 361 449
E: offeieunice872@gmail.com

Dr Monica Lengoiboni
Assistant Professor Land Management
ITC – Faculty of Geoinformation Science and Earth Observation, University of Twente
Department of Urban and Regional Planning and Geo-Information Management (PGM)
School of Land Administration Studies,
PO Box 217
7500 AE Enschede
The Netherlands
T +31.(0)53.4874.226
E: m.n.lengoiboni@utwente.nl
www.itc.nl

Dr Mila Koeva
Assistant Professor Land Management
ITC – Faculty of Geoinformation Science and Earth Observation, University of Twente
Department of Urban and Regional Planning and Geo-Information Management (PGM)
School of Land Administration Studies,
PO Box 217
7500 AE Enschede
The Netherlands
T: +31 (0)53 4874 410
E: m.n.koeva@utwente.nl
www.itc.nl

Zoning Standards and Compliance in the Context of Customary Tenure System: a Case Study of West Ashiyie, Adentan Municipality in Ghana (8695)
Eunice Ms Matey (Ghana), Monica Lengoiboni and Mila Koeva (Netherlands)

FIG Working Week 2017
Surveying the world of tomorrow - From digitalisation to augmented reality
Helsinki, Finland, May 29–June 2, 2017