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Towards elimination of corruption in the land sector

Incorporation of Geospatial Technologies in land governance at the local level

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ABSTRACT

Context and background

In the wake of rapid urbanization and population growth, there is much contestation with the ownership and use of land globally, especially in Africa. It is widely acknowledged that the implementation of sustainable land governance is an antidote to tackling land-related conflicts (mostly as a result of multiple sales of land), engendered land access, among others. However, land governance in Ghana is challenged with inefficiencies and corruption being paramount amidst the implementation of other interventions. On this premise, this study sought to explore the viability of geospatial technologies in tackling corruption in land governance in Ghana, the present bottlenecks with the use of such technologies among land agencies, and the plausible solution going forward.

Goal and objectives

The paper advances a course for the incorporation of technology in land management as an indispensable endeavor to eliminating the bottlenecks and contributing to the fight against corruption in the land sector.

Methodology

Employing a mixed-method approach, chiefly qualitative, 250 individuals, including personnel selected nationwide from the five LAP implementing agencies and patrons of their services as well as individuals in academic and research institutions were interviewed.

Results

It was evident from the findings that there is generally, a low understanding of geographic information systems and their use in land governance at the local level. About, 96 percent of the personnel interviewed alluded to the importance and the need to incorporate GIS into land governance to enhance efficiency in their field of work. The paper advocates for the use of geographic information systems (GIS): database management systems (DBMS) and decision support systems (DSS) for land administration, documentation, and management.

Keywords:

Land Governance, Land administration, Geospatial technology, Corruption.

1. INTRODUCTION

The pace of growth and process of urbanization in Ghana has gained a lot of prominence in recent times. This rapacious growth challenges urban administrators and planners on daily basis to collect an avalanche of socio-economic and spatial data at various levels to inform decision making. As noted by Hassan et al (2016) this includes data on utility services in view of the unplanned urban physical environment (Hassan, Arsalan, & Fatima, 2016). Over the years, the process of Ghana's urban development has been coordinated and guided by various development plans done at various levels and urban governance practices (Burke, Huda, Azam, & Miandad, 2011). However, the intent and spirit of development proposals and plans are mostly not translated into the envisioned frameworks. The immediate outcomes are undesirable, disjointed, and differentiated urban growth. Consequently, these translate into effects such as uncoordinated land uses transformations, illegal occupation and usage of sites and services, encroachment, unauthorized development, and extensions, among others. As a panacea to the unguided urban growth, there is some consensus on the use of urban assessment tools and techniques. (Tiwary, 2016).

The ability of Geographic Information Systems and Science (GIS) and Remote Sensing (RS) to handle both location information and attribute data as well as locational characteristics within a single system have received much acknowledgment (Qiong, et al., 2006; Xia Li & Yeh , 2004; Tiwary, 2016). Kumar, Kumah, & Rathore (2016) for instance cite GIS techniques and Remote Sensing data as a vital means for monitoring land transformation and urban spatial growth. If urban growth cannot be halted but controlled and directed in a desirable manner, then GIS becomes crucial for data visualization and as a framework for modeling operations and spatial analysis for proper planning and management (Sant´e-Riveira, Crecente-Maseda, & Miranda-Barros, 2008; Slavin, 2016). The prospect of effectively streamlining and systemizing urban policies and subsequently development is hindered by a shortage of skilled personnel and lack of access to pertinent spatial data.

GIS usage has gained prominence in areas such as health (Kenu, et al., 2014), watershed management (Miryaghoobzadeh & Shahedi, 2012), and transport planning (Slavin, 2016), among other fields. Its application in land use planning, includes comprehensive planning, land use inventories, zoning, socio-demographic analyses, and site suitability assessments and it is generally used for the purpose of mapping (Yeh, 1999). It is however underutilized in the land management-the allocation of land to various use, land transactions, registration, and documentation. Patil (2015) indicated that GIS is just one of the computer-based information systems formalized with the competence of integrating data from several sources for the production of vital information needed for effective urban governance. GIS, serving as a database and toolbox for land management with other information systems such as database management systems (DBMS), decision support systems (DSS), and expert systems, makes it possible for efficient spatial query, data retrieval, and mapping. These benefits notwithstanding, the low uptake of geospatial technologies in Ghana's land management system reduces data processing efficiency, fostering corruption in some cases. The primary objective of this paper is thus to assess the prospect of incorporating geospatial systems in land administration under the umbrella of land governance to reduce corruption. In doing this, it specifically assessed public perception on corruption with the land management process; identify outstanding institutional

bottlenecks with land administration whiles exploring areas for potential incorporation of geospatial technologies.

2. THEORETICAL INSIGHTS INTO GEOSPATIAL TECHNOLOGY UTILIZATION AND THE LAND MANAGEMENT NEXUS

Planning and preparation of spatial plans in Ghana date back to the 1940s with the promulgation of the CAP 84- Town and Country Planning Ordinance (Acheampong & Ibrahim, 2016; Cobbinah & Darkwah, 2017; Acheampong, 2018), yet the incorporation of geospatial technologies are very recent. The Land Administration Project (LAP) was initiated in 2003 among the land sector agencies mostly for the registration of titles and disposition of land and as a means by which objectives of the national land policy (1999) could be attained (Bugri, 2018). The running of the street addressing programme using the Land Use Planning and Management Information System (LUPMIS) initiated GIS-based activities (GPS and Orthophotos) in land use planning to streamline land use in Ghana towards sustainable land use planning (Asare, 2015).

Evidently, the importance and application of Geographic Information Science and Remote Sensing in land use planning and land management, in general, is well documented and longstanding (see Fedra, 1995; Alshuwaikhat & Nassef, 1996; Brazier & Greenwood, 1998; Cromley & Hanink, 1999; Bojorquez- Tapia et al., 2001; Ball, 2002; Hoobler et al., 2003; Malczewski, 2004; Trung et al., 2006). Many authors have come up with diverse perspectives regarding what land administration should be since the term got greater usage around the mid-1990 (Dale & McLaughlin, 1999; Bennett, Tambuwala, Rajabifard, Williamson, & Wallace, 2013) making the clear delineation of its stages and processes as well as data requirement problematic

To Qu, land administration encompasses various processes that exist to organize, coordinate, supervise and manage land resources, land use, land property rights, and land profit with political instruments for the sake of the whole society (Qu, 2003). Also, Land Administration is the set of systems and processes for making land tenure rules operational (FAO, 2002 p12). As the working definition, references made to land administration by this paper are premised on the thoughts espoused by UNECE, which includes the processes of determining, recording, and disseminating information about the tenure, value, and use of land when implementing land management policies. It, therefore, encompasses issues relating to land registration, cadastral surveying, and mapping, fiscal, legal, and multi-purpose cadastres, and land information systems. In many jurisdictions, land administration is closely related to or facilitates land use planning and valuation/land taxation systems, although it does not include the actual land use planning or land valuation processes (UNECE, 2005). Recounting these perspectives, land administration can therefore be said to encompass institutional arrangements, working regulatory frameworks, processes, and systems for the determination, allocations, and dissemination of information concerning a parcel of land (Agyeman-Yeboah, 2015). Because of these, institutions and regulatory frameworks including land ownership systems and swift information generation and flow among land sector agencies are paramount in the quest to avert corruption and rent-seeking.

Essentially, GIS is capable of supporting all stages of processing spatial data which includes semi-automated and manual digitizing, editing and checking digital data, edge-matching of digital map

files, and output of information in hard copy or graphic devices. Yaakup, Ludan, Sulaiman, & Bajuri (2005) adds that GIS as information systems principally performs three functions, thus, descriptive, cognitive, and normative functions. The information gathered should help in the description of situations-descriptive; the information system should as well contribute to the improvement in understanding regional and urban problems by offering key variables and factors that can be analyzed by using regional and urban statistical and other modeling techniques.

More specifically, there can be the incorporation of tenets of GIS in all stages of a generalized urban planning process such as objectives determination, inventory of existing resources, existing situation analysis, projection and modelling development for planning options, planning option selection, plan implementation, and plan monitoring, feedback, and evaluation stages (Patil, 2015). Below are some of the specific things geospatial technologies can do in land administration and management.

- *Resource inventory*

Integration of remote sensing with geographic information techniques saves time in the collection of environmental and land use information. Using remotely sensed images can aid in the detection of land uses and land-use changes for an entire urban area. It gives a broader view of the urban area mostly with current temporal features that make planning for a broader urban space possible. Deriving 3-dimensional CAD models of buildings for direct import into a GIS database or dynamic visualization of a city becomes handy using stereoscopic pairs of digital aerial photographs.

- *Analyzing existing situation*

GIS enables the storage, manipulation, and analysis of the social, economic, and physical data of an urban environment. The mapping and spatial query function of GIS can be used by urban planners to analyze the existing situation in an urban area. GIS can as well help in the identification of areas of land development and environmental conflicts by overlaying existing land development on land suitability maps. The use of remotely sensed data and other environmental information can aid the identification of environmental sensitivity areas.

- *Projection and Modelling*

Projection of future population and economic growth are the primary functions of planning and required for satisfactory sustainable futuristic planning. Modelling of spatial distributions brings possibilities to the estimations of impacts associated with existing trends of the population required as inputs for economic and environmental interventions. For example, through the projection of future land resource demand from the current population and economic activities, a range of environmental scenarios can be explored. Modeling of the spatial distribution of such demand as identified areas of conflicts and inadequacies can be known using GIS map overlay analysis. Developed models for socioeconomic and environmental planning aids the identification of areas of development conflict and environmental concern (Schuller, 1992).

- *Planning options development*

Land suitability maps can be used in the identification of the solution space for future development, making it very beneficial in the development planning options. There can be formulation and

development of planning options using spatial optimization models with GIS. Planning options can be attained with the simulation of different scenarios of development with GIS (Landis, 1995).

- *Selection of planning options*

However political the process of final planning option selection may be, urban planners can offer technical contributions to the selection process to aid communities in collectively making choices. The combination of non-spatial and spatial models within GIS aids in evaluating different planning scenarios (Despotakis, Giaoudzi, & Nijkamp, 1993). Using GIS with multi-criteria decision analyses can help in the provision of the technical inputs in selecting planning options. (Eastman, Kyem, Toledano, & Jin, 1993)

- *Implementation of selected Plan.*

By carrying out an environmental impact assessment, GIS can be used in the implementation process of urban plans. This is to assess and minimize the adverse environmental impacts of the prepared plan. Subsequently, plans can be modified to alleviate the impacts based on recommended remedial measures.

- *Plan monitoring, evaluation, and feedback*

GIS can help in the monitoring of the environment, thus, land-use changes, when combined with tenets of remote sensing. Using the overlay function of GIS, remotely sensed images can be overlaid on an area land use plan for development control purposes and to determine if development is in accordance with approved land use plans. Differences in development can be known and plans adjusted as needed and required. Figure 2 adequately outlines for example the uses of Geospatial technologies in the land use planning process.

In the Ghanaian context, Land Use Planning and Management Information System, with GIS base software for development control and revenue generation was adopted as part of the Land Administration Project. The limited usage of these technologies means that land management, in general, is still carried out using traditional and rudimentary approaches, the reason for development still preceding adequate planning (Cobbinah & Darkwah, 2017; Acheampong, 2018). Authors such as Yeh, (1999) and Yeh (2008) indicated that the use of GIS in land use planning and by extension land administration is hindered not by technical issues but generally by organizational change, staffing, and data availability.

2.1. Existing institutional framework and information flow systems for land delivery in Ghana

The land sector of Ghana is highly fragmented and this has allowed for the dispersal and shirking of responsibility for the formulation and implementation of land policies among various ministries and institutions belonging to different sectors (Agyeman-Yeboah, 2015). Primary institutions for land administration and processes are the Office of Administrator of Stool Lands, Land Title Registry, Land Evaluation Division, Physical Planning Department, Lands Commission, Survey Department, and at large, Traditional Authority. These institutions are related, share information (Refer to figure 1), and function under Ministries such as the Ministry of Land and Natural Resources, Local Government Ministry, and the Ministry of Environment, Science, Technology, and Innovation (Refer to figure 2).

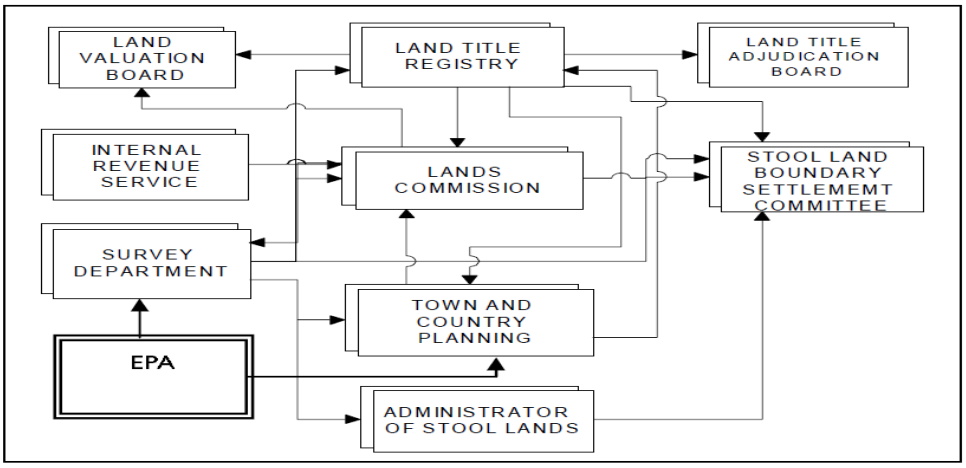


Figure 1. Information flow among land administration institutions.

Source: Adapted from Arko-Adjei (2006)

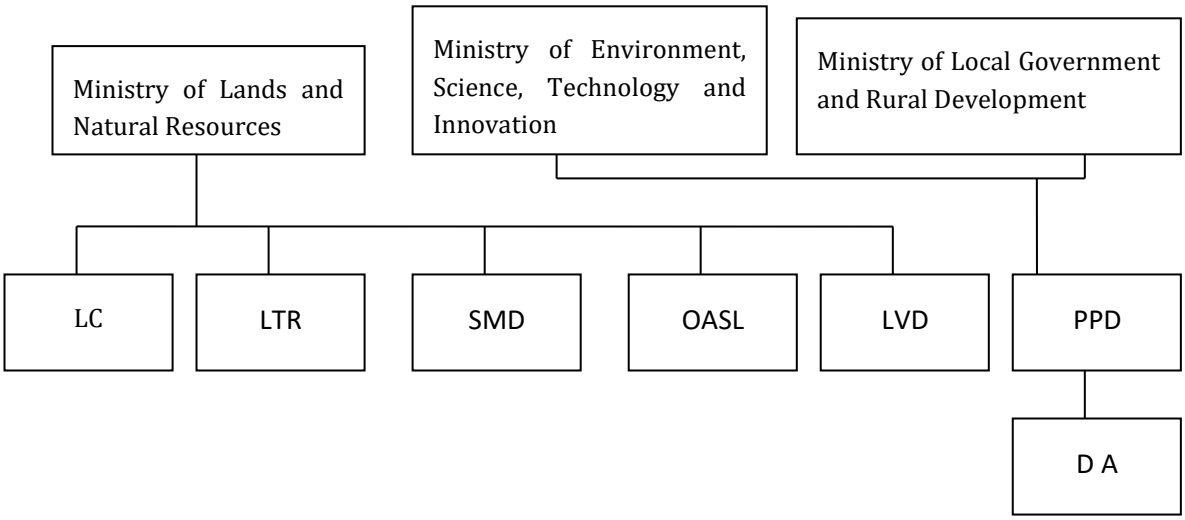


Figure 2. Institutional framework for land administration institutions in Ghana.

Source: Adapted from Agyeman-Yeboah (2015)

2.2. Land ownership and acquisition processes in Ghana.

Land ownership in Ghana can be broadly categorized into four: state lands; private lands: belonging to skins, tools, and families; vested lands; and private lands: lands given as freehold by skins, stools, and families. However, the exact process mostly depends on the ownership and localized mechanisms agreed upon for appropriation and management of such land. Although there are other land ownership agreements, most land delivery and registration occur on the lines of the customary ownership, thus, stools, families, skins, and vested lands (Narh, Lambini, Sabbi, Pham, & Nguyen, 2016; Borne, 2014). In a broader array, the process passes the hands of Lands Commission, Vested Lands Management Division, Office of the Administrator of Stools Lands, Customary Land Secretariat, and the Survey and Mapping Division. There are fifteen steps with deed registration whiles land title registration involves 23 steps (Agyeman-Yeboah, 2015).

- *Land administration under customary land ownership*

First of all, there should be interest shown in the acquisition of a parcel of land by individual developers or a group of people. Agents or middlemen who work closely with traditional authority and family heads on issues of advertising their parcel and getting them prospective buyers will lead the buyer to the traditional authority or family heads. A person or committee in charge of land allocation will lead buyers and middlemen to the said land in which the interest lies. After inspections and agreements, the buyer indicates his willingness in appropriating the land. Afterward, a site plan is prepared from either a cadaster or layout. This activity is carried out either by legalized authorities or mostly by unqualified individuals hired by the traditional authorities or family head. An allocation letter is then issued on the land. Subsequently, depending on which paramountcy the land falls under, the buyer of the parcel submits an allocation letter and prepared plan to the Otumfuor land secretariat for validation and documentation. If the land has not been given out already, drink money is paid and the lease document is prepared on the land. The buyer then goes to the Lands Commission for "checks" and registration. The amount due for processing and ground rent is paid and registration is carried out.

- *Land administration under public/vested land ownership*

There is an expression of interest by a buyer which is mostly preceded by a work of an agent or a middleman. Plan, mostly cadaster, is prepared on the land to record spatial characteristics and other interests in land. An application with site plan and intended land use is made to the lands commission, which is followed by an inspection, and records check by the departments and offices responsible for such endeavors. The developer makes due payments and the application is sent to a board for consideration. Upon acceptance, an offer letter is given to the applicant.

2.3. Corruption issues in land administration.

Corruption occurs at all levels especially traditional and customary arrangements (Kasanga & Kotey, 2001). Several writers (see Karikari B. I., 2003; Karikari & Stillwell, 2004; Ubink, 2008; Williamson, Enemark, & Rajabifard, 2009; Okpala, 2009; Barry & Danso, 2014; Biitir, Nara, & Ameyaw, 2017; Kleemann, et al., 2017; Akaateba, Huang, & Adumpo, 2018; and Chimhowu, 2019) have identified areas that are breeding corruption in the land sector and various institutional and technical problems justifying the need for the incorporation of Geospatial technologies in Land Sector Agencies. These factors include the following:

i. Internal corruption, especially extortions;
ii. Very slow manual data input processes in the administration of land;
iii. Conflicting land records kept by different sectors of land administration;
iv. Information retrieval that is mostly tedious, manual, fraught with errors and dubious manipulations;
v. Low capacity of people and institutions in charge of land administration; and
vi. A general lack of consistent management support for programmes initiated in the land sector agencies.

Explanatorily, corruption levels mostly correspond to land values where such an increase in the value of land serves as an incentive for resale of land in peri-urban and urban areas. This is because, resulting from the unguarded allocations with traditional tenure, original land users, without strong bargaining power mostly have their lands stripped off and they lose their employment and income base (Ubink & Quan, 2008). Kasanga & Kotey (2001), recounting such trend of displacement of poor and marginalized families from their land termed it as a "national disease". Similar to OASL, the Lands Commission is hampered by lack of support services and basic logistics, shortage of motivated and trained staff, poor incentive packages and remuneration, low morale, and endemic corruption (Grant, 2004; Ubink & Quan, 2008).

A study conducted by Ubink & Quan (2008) identified the process of registration and formalization of land with Lands Commission as "long, cumbersome and expensive", corroborating the findings made by Grant (2004) that it may take one about two years to have registered title. Biitir & Nara (2016), explaining the cause of numerous land disputes attributed the phenomenon to land allocations which are mostly not recorded by landowners, and even in instances where they are recorded, they are done on pieces of paper that may be lost and not traceable when a new traditional head assumes authority. In other instances, where transactions are documented, they are done with improper maps with less scientific accuracy (Kumbun-Naa Yiri II, 2006; Biitir & Nara, 2016). Additionally, low transparency in the traditional systems mostly breeds speculation and corruption (Cotula et al., 2004).

Institution and legal remit	**Contributions to land administration**	**Areas of corruption**
Lands Commission **Lands Commission Act, Act 483 of 1994** **Administration of Lands Act, Act 123** **1992 Constitution, article 267**	Responsible for the management of all public lands and vested lands Assist in land title registration	Undue long processes in title registration which breeds corruption on the basis of rent-seeking (Agyeman-Yeboah, 2015)
Office of the administrator of stool lands (OASL) **OASL Act, 1992, Act 481** **1992 Constitution, article 267**	Responsible for the establishment, management, and revenue collection into the stool land accounts	Extortion in the form of drink money Less accountability for the 25% stool maintenance share and 20% share for the traditional council Less declaration of stool land revenue since its generally accepted to be drink money (Borne, 2014)
District assembly **Local Governance Act, Act 936**	Making of by-laws by their legislative powers for sanitation, building, and environment. Prepare and approves planning schemes Process and grants building permits and enforces regulations and met out sanctions for non-compliance	Undue delays in permit applications and processes due to lengthy and bureaucratic procedures. This brings about corruption (Kasanga & Kotey, 2001)
Land title registry **Land Registration Law of 1986**	Established to provide cost-effective, open, and timely service in the registration of title and interest in land	Rent-seeking behavior and undue delays in the registration process (Kasanga & Kotey, 2001)

	that is state guaranteed to meet the needs and expectations of the country	
Physical Planning Department **Land Use and Spatial Planning Act, Act 925** **National Development Planning Systems Act, 1994**	Mandated to plan and produce layout or planning schemes to guide development in their jurisdiction. Development control functions	Unapproved means of plan preparation, rent-seeking, and undue delays (Ubink & Quan, 2008)
Traditional Authority **Traditional and Local Systems**	Disposition of land at the local level	Double sales of land and weak documentation of documentation land-related transaction (Biitir, Nara, & Ameyaw, 2017)
Survey and Mapping Department **Survey Act 1962**	Determination and demarcation of boundaries needed for the registration of land titles.	Old systems for surveying and cumbersome processes in the retrieval of land information (UNECE, 2005)

Table 1. Areas of corruption in the land sector.

Source: Authors Construct, 2019

2.4. Adoption of Geospatial technologies in Land Administration in Ghana

Ghana still runs land administration procedures that are time-consuming, inefficient, and outdated. This is because various land sector agencies are yet to fully embrace technologies available for capturing, storing, manipulating, displaying, and sharing land and property information (Karikari & Stillwell, 2005). Although reforms in the land sector of Ghana commenced with the promulgation of the National Land Policy in June 1999, the focus was on tackling the fundamental issues with domestic land administration and management but it lacked the incorporation of computer-based information systems for land records. However, efforts to operationalize issues in the national Land Policy saw the rolling out of Land Administration Project (LAP I&II) from 2001 (LAP., 2002a; 2002b). The LAP was in line with World Bank's County Assistance Strategy in 2000 and was to aid the reduction in processes for storing information on land, replacement of damaged land registers, make preparations for the expected increase in title and mortgages registration, aid the improvement of and collection of ground rent and to facilitate the compilation of information and reports impossible or very cumbersome to produce using the current manual systems.

Whiles there have been extensive systematic studies into the infusion of GIS in the land sector of the developed world (Chan & Williamson, 1999), Karikari B. I. (2003) documents that relatively, there is no such abundance of work in the developing countries and even where there has been, critical institutional hitches still exist in the application of GIS (Sahay & Walsham, 1997). Since the research is on the incorporation of GIS in land registration in the context of land administration, in essence, it extends to the activities of the Land Valuation Division (LVD), the Survey and Mapping Department (SD), Land Title Registration (LTR), Office of the Administrator of Stool Land (OASL), Physical Planning Department (PPD), Traditional Authority (TA) and the Lands Commission (LC).

The research aligns itself to the challenges as pointed out by Deininger, Selod, & Burns (2012). They identified that the challenges slowing the pace of effective land governance encompass i) the political sensitivity resulting from fragmentation of institution on the land sector; b) the country-specific and sometimes local nature of land tenure arrangements that make simple institutional transplants

impossible; and c) the technical complexity of land management and administration and the need to make policy trade-offs. However, more specifically, this study delves into the technical complexities of the land sector and its contributions to tackling the other challenges with regard to land administration. We acknowledge the technical complexities surrounding land administration as the concept cuts across several fields and disciplines such as economics; law; surveying and geomatics; urban planning; environmental, social and cultural, and political connotations. Some of these fields rapidly keep advancing which makes it expedient not to remain with outdated solutions but rather to design systems in a way that anticipates and makes preparations to suit future development.

This notwithstanding, a primary challenge is also to make trade-offs that help improve overall system performance rather than focusing on over-engineered approaches that may be appropriate from a disciplinary perspective but weigh down the system and eventually make it unsustainable. In a broader array, two key components exist with incorporating technology in land administration. Initially, there should be wide acceptance and documentation of reforms in land administration by actors. Secondly, the complexity of the nature of the land administration should be acknowledged and systems devised should contribute to the overall vision for the land administration system in a country (Figure 3). Effective land administration systems and the extent to which technology can be incorporated must stem from the needs and aspirations of actors of the sector. Gradually, there should be a change in the human-land relationship, generation of land administration policies, land administration systems, spatial business systems which in the end will lead to cogent spatial data infrastructure, useful to actors of land administration in the country. It is empirical to reckon that cadastral and land administration systems "……are not ends in themselves. They support effective land markets, increased agricultural productivity, sustainable economic development, environmental management, political stability, and social justice." (UN-FIG, 1996).

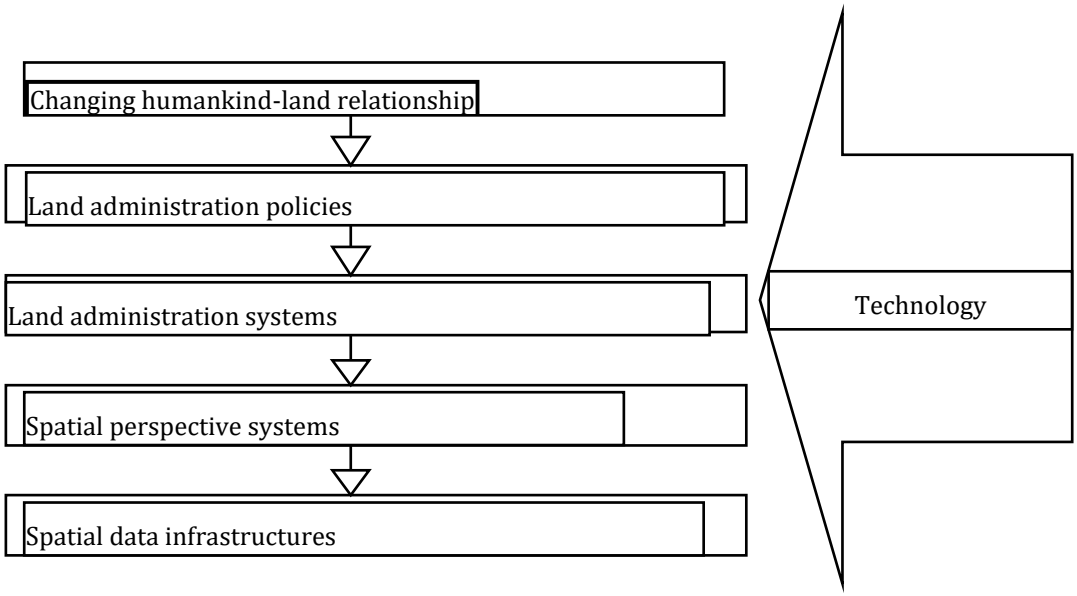


Figure 3. Devising spatial information management strategies.

Source: Adopted from Williamson (2000).

In Ghana, there is no laid down step-by-step structure for land administration. Issues are different with respect to the prevailing land tenure system, land ownership, the interest shown, use of land,

and available institutions. Although there are no such structures, land administration of either customary land ownership and public/vested land ownership revolves around 1) showing of interest; 2) plan preparation; and 3) registration and certification.

Recent work on *Scaling Up Responsible Land Governance: Guiding Principles for Building Fit-For-Purpose Land Administration Systems in Developing Countries,* carried out by Enemark, Mclaren, Lemmen, Antonio, & Gitau (2016), proposed a form of land administration system fashioned on what they termed as "fit-for-purpose". To them, land administration and spatial frameworks should be first of all done with boundaries that are visible rather than fixed boundaries. Secondly, satellite/aerial imagery should be resorted to rather than currently done field surveys. Also, accuracy should be related to the purpose rather than technical standards. Lastly, the system should be incrementally developed. Additionally, McLaren, Enemark, & Lemmen (2016) and Lemmen, et al. (2016) give credence to the use of information technologies (e.g., E-services) as vital to the delivery of better services and enhancement of trust and confidence in governance and land administration.

The use of Unmanned Aeriel Vehicles (UAVs) in supporting land administration is gaining prominence in developing countries. Stocker, Koeva, & Zevenbergen (2018), presenting the role of digital data technologies in tackling shifting and demarcating boundaries, indicated that, high resolution UAV-based orthomosaic cadastral mapping can replace the manual cadastral mapping currently practiced in most developing countries. This will aid visual interpretation of land information, automatic and semi-automatic mapping of feature detection and digitization. This will reduce the cost and workload in mapping.

The primary objective of this study was to assess the incorporation of geospatial in land administration under the umbrella of land governance to reduce corruption. Specifically, the study is

- To assess public perception of corruption with the land administration process
- To identify outstanding institutional bottlenecks with land administration
- To identify areas of incorporation of geospatial technologies.

3. METHODOLOGY ADOPTED FOR THE STUDY

Having embedded the study in a theoretical framework, the study employed a mixed-method approach, chiefly qualitative. Researchers took data at three levels. For triangulation purposes, data were collected firstly from the general public, secondly from the people who have gone through the land administration process or are going through the land administration process and the various land sector agencies. Respondents had visited one or more agencies involved in the land administration processes (Figure 4).

Using google forms, online instruments were sent out to individuals, including personnel selected nationwide from the five LAP implementing agencies at the local level and patrons of their services as well as individuals in academic and research institutions. A little over 250 forms were returned. After evaluating their completeness consistency and accuracy, 250 of them were analyzed. Interviews were also conducted with officials of the land sector agencies as a follow-up to get clarity

on the responses they had earlier sent. The focus of the interviews among those in the former category was to assess their capacities and competencies in the use of GIS in land governance at the local level. It also ascertained the challenges to fully embracing the desired technological change.

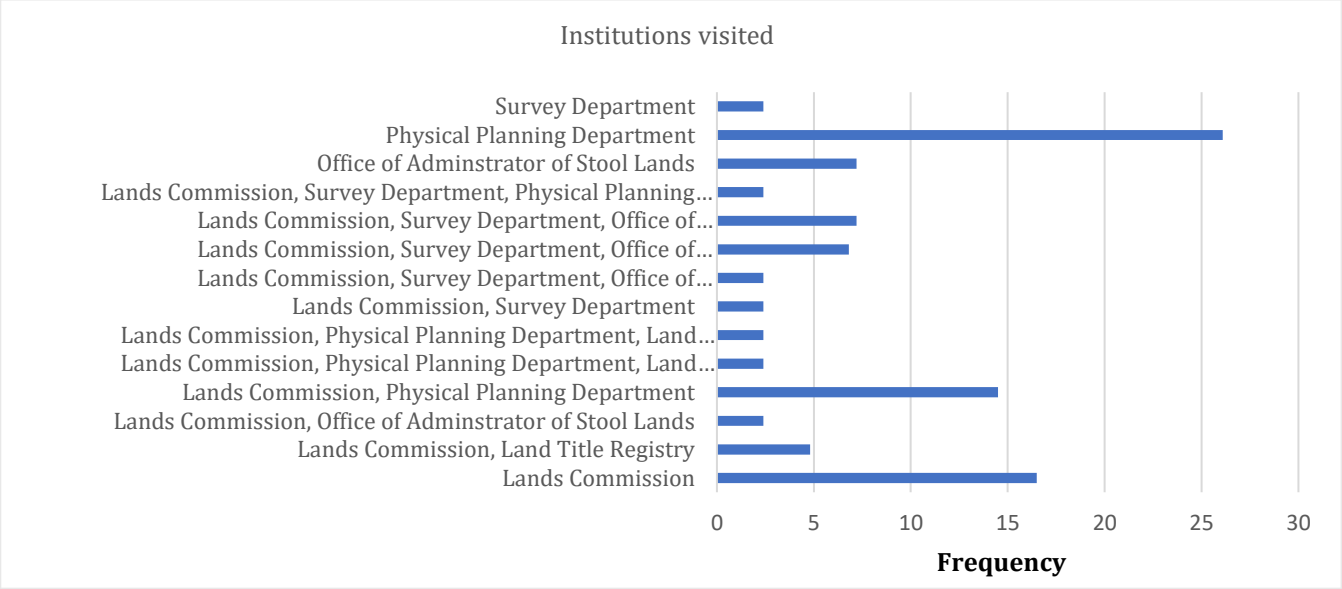


Figure 4. Institutions visited by respondents.

Source: Field Data, 2019

The viewpoint of the latter was also sought on issues of corruption and the possibility of adopting geospatial technologies in land management. The officials engaged from the land sector agencies included Traditional Authority, Survey and Mapping Division, Lands Commission, Planning Departments, among others. In order to assess the reliability of the study, the Cronbach Alpha statistic test was done. The variability and consistency of the responses were also assessed using the means and standard deviation of some of the responses.

4. FINDINGS AND DISCUSSION OF THE STUDY

The findings have been grouped under the general perception of the public on the activities of the land administration and the perception of the public on the extent of corruption in land administration, which constitute the first objective. The main institutional bottlenecks to effective land administration follow and finally, an assessment is made of the capacity gaps relating to the adoption and use of geospatial technologies among the staff of the land sector agencies and the general consensus on how the use of geospatial technologies can help address the corruption in the land administration system of Ghana.

The respondents comprised 202 males (80.8%) and 48 females (19.2%). Those aged between 26-30 years were 54.4% (Table 2). The mean age was 30.112(SD 8.54). The sex disparities indicate engendered issues of the land sector where males dominate and likely to lead the process of land documentation. Educational level was such that 59% had first-degree certificate and the lowest recorded was A level and Basic/SHS with 2.6%. This notwithstanding, 9.6 % of respondents had not received any formal education (Figure 5). This implies a plausible less understanding of the formal

land administration processes which creates chances for delays, extortions, etc. by agents and officials of land sector agencies.

Age ranges	Frequency	Percent
26-30 years	136	54.4
31-40 years	24	9.6
41 years and above	29	11.6
18- 25 years	61	24.4
Total	250	100.0

Table 2. Ages of respondents

Source: Field Survey, 2019

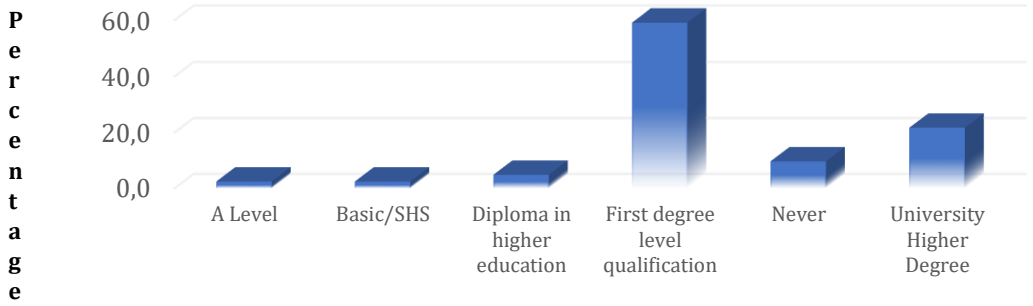


Figure 5. Level of education of respondents.

Source: Field Data 2019

i. The general perception of the public on the activities of the land administration in Ghana

The study objected to measure the perception of the public and land sector agencies on corruption in the land administration processes and among the land sector agencies. Among the respondents interviewed, 244 (97.6%) perceived that corruption occurs in land administration processes. More specifically, Lands Commission was perceived as most corrupt with the Land Valuation Division being the least corrupt (Refer to Figure 6).

Additionally, Table 3 indicates that land administration in Ghana is cumbersome and burdensome process, inconsistent, breeds unfair treatment, and comes with high cost. The knowledge of the public on land administration processes is low. The public believes that currently, land administration services are fairer and are rendered with speed. This was mainly attributed to the implementation of the LAP and bringing the various agencies closer to each other. However, there is much corruption in the land administration. Corroborating the assertion of corruption, personnel at the OASL revealed that "issues of corruption in land administration have taken an institutional dimension and it runs through all institutions and not the land sector agencies alone".

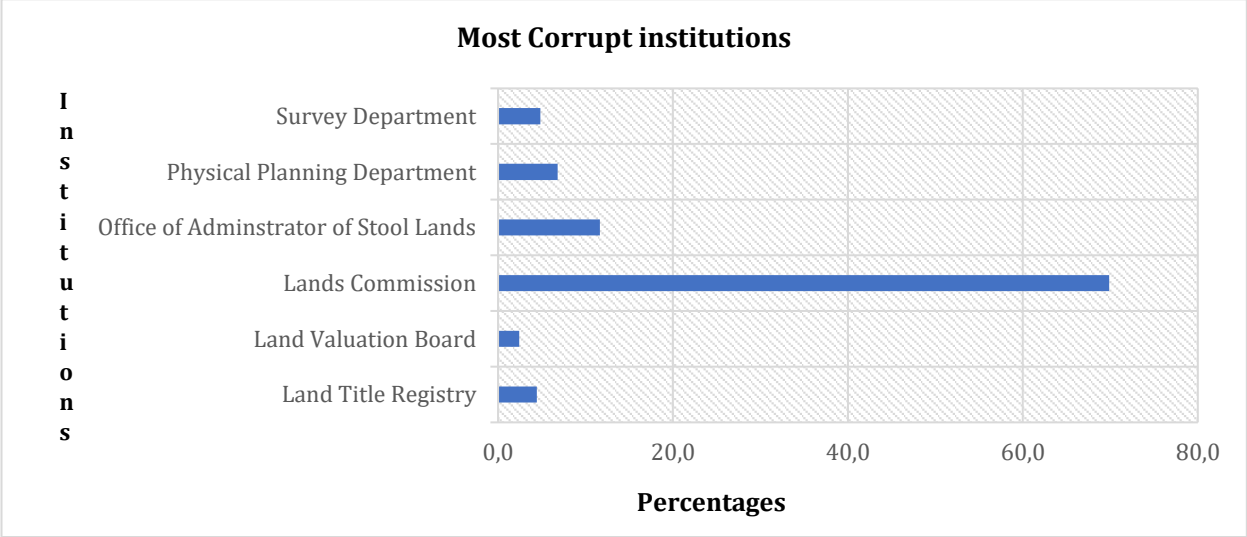


Figure 6. Most corrupt institutions.

Source: Field Data 2019

s/n	Statement	1	2	3	4	5	Mean
1	Land administration service are rendered with speed	38.4	37.6	16.8	7.2	0	**1.932**
2	The land administration process is fair	23.6	32.8	31.6	12.0	0	**2.308**
3	There is ease of contacting officers	17.2	42.0	26.4	14.4	0	**2.380**
4	The needs of customers are timely responded to	26.0	24.0	45.2	4.8	0	**2.284**
5	The level of knowledge of public on land administration processes is low	4.8	9.6	18.8	37.6	29.2	**3.752**
6	Administrative processes are burdensome and time-consuming	9.6	2.4	12.0	36.0	40.0	**3.944**
7	There is corruption in land administration	0	14.4	7.2	26.4	52.0	**4.160**
8	High cost of administrative processes	2.4	2.4	24.4	35.2	35.6	**3.984**
9	Land administration procedures are inconsistent and breeds unfair treatment	**9.6**	**4.8**	**12.4**	**35.6**	**37.6**	**3.864**

Table 3. Public perception on land administration activities.

1-Strongly Disagree, 2-Disagree, 3-Neither agree/disagree, 4- Agree, 5- Strongly Agree.

Source: Field Survey, 2019

ii. Perception of the public on the extent of corruption in land administration in Ghana and specific activities and areas where corruption festers in the land administration

As posited in literature and reported, there is corruption in almost all processes of land administration. This assertion was corroborated by 98% of the respondents who alluded to various corrupt practices experienced in the land administration processes especially, the registration processes. Supporting this claim, interviews conducted and data gathered from the land sector agencies revealed a 100% agreement to the issues of corruption among the various institutions. This is such that, with a land disposition at the local level, "higher bidder will be given the land denying the lower bidder with the little amount who even bid first" (Respondent from PPD)

Although the introduction and implementation of the Land Administration Project sought to remove the bottlenecks that being experienced in the Land Administration Process, information gathered from one of the LAP implementing District, Ejisu Municipality revealed that, although there have been successes concerning the LAP, there are still outstanding issues to be resolved which include problematic customary arrangements. Again, data gathered from other institutions identified the activities of middlemen and agents, the inability of using geospatial technologies for land registration and documentation, lack of avenues for information sharing, etc. as challenges still hampering effective land administration. This section, therefore, looks at the issues identified that festers corruption in the activities of land sector agencies.

- *The Customary Land Issues*

The customary system is still battling with issues that make land administration under customary systems problematic since grants emanate from diverse grantors as opposed to countries where only the state grants. This makes monitoring and proper supervision difficult. It bothers on double sale of land and land contestation at the local level. On why these challenges, the official at the Lands Commission attributed it to the ownership of land. He indicated that "the chief who apex customary leaders, in essence, do not own land but they are overlords for pieces of family lands, hence they should not dispose of lands". However, in contravention, an interview conducted with a subchief and secretary of a customary land secretariat, revealed that chiefs are rather the owners of land and that tenant farmers cannot claim ownership of land. Again, lands bought are not registered because people hold on to allocation notes as the final documents so long as land registration is concerned due to their low level of knowledge in land administration processes. Others also fail to pay ground rent thus creating room for forceful re-entry and multiple sales of land.

- *Increasing activities of agents in land administration*

There is a proliferation of agents in the land administration processes and their activities are known by all the Land sector agencies. "Their activities are heightened and they are mostly hired by "big men" who do not want to be seen in the facilities of land agencies or have an encounter with land administrators. Others also want to dodge the seemingly long procedures" (interviewee at Lands Commission). Corroborating this was an interviewee at the Land Valuation Department who revealed that the agents pay their way through the process and get things to be done faster for their clients. This has therefore increased their patronization since it will take one a long time should the person decide to follow the normal process. On the issue of their awareness, the interviewee indicated that "these agents are known to us but we pay less attention to what happens between them and their clients who engage their services. We know that these agents malevolently inflate the charges we have here and extort monies from applicants. Additionally, workers at various offices of the land sector agencies can lead the process for applicants and can take "thank you" if applicants see their lease documents done within time for them and they are happy" (interviewee at OASL).

- *Less transparency in land transactions*

There are monies paid without receipts and most of the time, a receipt issued is less than the amount paid. Again, institutions like the LVD take about 100 cedis for inspection which never gets done.

There is no transparency in the land administration system right from the chiefs, the customary land secretariats, and the various government agencies in the land administration process. The LAP sought to deal with that but "the problem is institutional and systemic since and the people working here (from the bosses to the least person) will sabotage the system and for their gains, will never allow the transparent systems in place to thrive and work" (interviewee at OASL).

- *Information sharing among agencies*

One of the key issues considered under the Land Administration Project, the various land sector agencies would have operated an automated system that aids information sharing among them. However, effective information sharing has not been achieved due to the non-existence of such facilities and the unwillingness of the people to operationalize the system. The office does not have a system that is used for their work. From the interviewee, "the office had a system to capture records and do an assessment of bills before it can be served and collected. However, the system is not working currently and we cannot get the IT person to work on it. Due to these bottlenecks and the fact that we have to be working with head office for such endeavors, the office, therefore, relies on manual assessment of bills and preparation of demand notice which creates room for subjectivity, assumptions, and mistakes. Targets, in terms of monies from rents paid, are mostly not reached: "big companies mostly reject handwritten demand notices and the likelihood of mistakenly serving a house with a wrong bill. They will come for negotiations for a reduction in their bills" (interviewee at OASL).

- *Outmoded Land information documentation*

Effective recording, capturing, and documentation of land transactions are paramount in effective land administration. There is a sort of documentation of property transactions and titles at the various institutions. However, these institutions still use outmoded methods of documentation. For instance, the OASL still uses book ledgers in the documentation of ground rent payments. Again, folders and sheets pertaining to land title registration and documentation are still the norms at the Lands Commission (Figure 7). Additionally, land transactions at the local level on land dispositions are not recorded electronically and in most times oral documentation of history sometimes gets distorted by opportunistic elders. In all these, multiple sales, missing files of land, due to inefficient documentation of land transactions and titles, becomes inevitable.

Figure 7. Outmoded documentation practices.

Source: Land Title Registry, Lands Commission

The land administration begins with landowners who give land to people who have shown interest in the property. This starts with customary practices at the local level, including paying of drink money and other monies for site plans and allocation notes. The process for public and vested land is showing interest by writing to appropriate quarters. Subsequently, an application is made to the Lands Commission for lease registration. The first contact is the client services access unit to facilitate the process. Chronological processes in registering land are as follow:

The application goes to the Survey and Mapping Division where a cadastre of the property is done based on the submitted site plan. Identification of the area where the land is located is carried out by examining the site plan presented. Afterward, the survey department does a field visit to prepare a cadaster map of the land stated in the application. The geographic position of the land is determined based on which a search is done. Comparing the grid on the map to a paper map prepared (Fig 8), the two are overlaid on each other to ascertain if the land has already been registered or not. The submitted boundary is manually sketched and demarcated on the plan to indicate a registered land. Application is made to the regional lands officer requesting registration of land, which is accepted. At this stage, there is vetting, checking of dates and ownership, and legal issues pertaining to the property. The lease application, after signatories of parties, is sent to the Land Valuation Division for tax assessment and stamp duty. After payment of the stamp duty, the application is referred to the Office of the Administrator of Stool Lands for assessment and determination of grounds rent. The office prepares demand notice based on the information concerning the location and size of the property. After payment, approval of lease is done and recorded, and documented by the Land Title Registry.

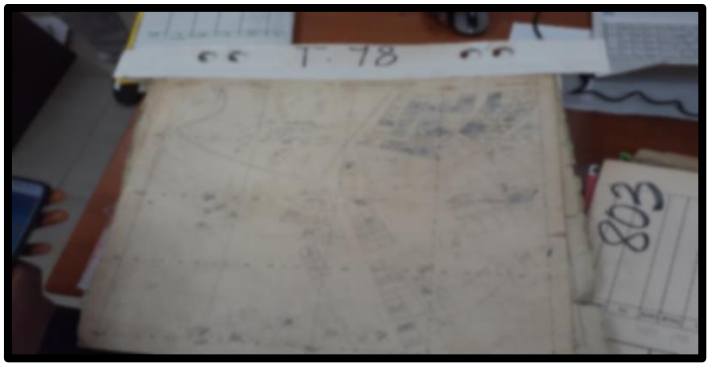


Figure 8. Map indicating registered properties.

Source: IT Section, Lands Commission

iii. The main institutional bottlenecks to effective land administration in Ghana

- *Lands Commission*

The Lands Commission has the mandate of the registration of concurrence (Land Commission Act, 2008, Act 767). To them, land administration begins at the local level with the land inclination to go according to the procedures followed in the customary, vested, and public lands. It as well encompasses documentation of land transactions and how such information is managed. Just about 20% percent of lands in Ghana have been registered and it is mostly for collateral and loan purposes by businessmen. Even with vested lands, the Lands Commission has less control over the lands. He

added that, even with state lands, "in most cases, the chiefs sell it before Lands Commission gets to know that the land has been bought, so before the person comes in, he comes with allocation note from the chief an indication of purchase" (interviewee at Lands Commission) There should be a system that helps indicate that land has been bought at the local level but should be backed by law making it compulsory for every land bought to be registered. At the local level, land conflicts are a result of multiple sales that stem from power play: although queen mothers and sub-chiefs have no business in sales of land, they have been selling lands and issuing allocation notes which are not valid.

- *Office of Administrator of Stool Land*

The OASL under Article 367 of the Ghanas 1992 Constitution is mandated to collect stool land revenue and disburse the same. In the administration process, an applicant pays ground rent to the OASL before the person can proceed to the other stages of the land administration process. The office manually prepares demand notice from rent ledgers based on information captured on properties. The OASL does not use any geospatial technologies in their work. The interviewee disclosed that "we mostly serve wrong notices, we are not able to track served notices, people get angry and we are not able to efficiently track payments from the numerous cash books, hence were are not able to determine who have paid their rents. There are no geospatial technologies used in this office, though the presence of it will enhance the activities of the office and reduce leakage".

- *Traditional Authority*

Traditional authorities are the custodians of the land and hold in trust of the people. In many areas, lands are for the chiefs and they have all the powers to alienate them to buyers. However, the authority also recognizes the tenant farmers (families) who use the land for farming and related activities till the settlement grows towards those areas. Hence, the authority meets with these families and agreed on a system for the demarcation and sharing of land between the two parties. Land transactions are recorded in a register kept at the secretariat.

There are instances of multiple sales that come as a result of the disposition of the same land by the chief and the tenant farmers who may feel agitated by the portion of land taken from them by the chief. On plan preparation, most secretariats hire private surveyors who do combine both surveying and planning works without any approval from the Physical Planning Department. Although efforts are made to conform to the existing plans prepared this way are mostly substandard and have less regard for non-residential land uses for communal and public use such as education, open spaces, among others. Site plans are made from these ill-prepared layouts which are then submitted to the chief for endorsement and the issuance of the allocation note. An undisclosed amount of money is paid on the land as drink money with additional money charged for the signing of the allocation note for which receipt is issued.

Plans prepared are mostly kept at the secretariat and not submitted to the appropriate authorities. This makes it difficult for synchronization of plans done and harmonizing of information captured by other agencies at the local level. This situation has led to the disposition and development of land on the blind side of development control authorities. In other areas such as Asokore Mampong, plans have been digitized and documentation processes are automated but information sharing among

other land sectors remains a challenge at the local levels. The customary system still poses challenges at the local level: willfully selling of lands by tenant farmers, theft on the side of surveyors and greediness on the part of some chiefs" (interviewee at CLS).

- *Physical Planning Department*

The Physical Planning Department is responsible for the approval of layout and development plans at their area of jurisdiction in that, the office has to authenticate the site plans prior to the issuance of allocation notes from customary landowners but this is mostly not done since the owners hire their people to do the layout for them from which site plans are prepared. Although the Land Administration Project pilot areas have implemented key strategies for land administration, some districts are still making efforts to start the implementation.

An interview conducted at the PPD, Ejisu Municipal Assembly revealed that the office has made conscious efforts of automating and digitalizing their activities. However, such files are principally for records keeping and kept only with the designer of the system. There is no central system and mechanisms in place for sharing such information with other land sector agencies. Geospatial technologies used at the office are basically for map-making and digitizing of hard copy maps into soft copies. On issues of corruption, the clients request quick services and I see nothing wrong if a client asks you to work on their application and you do it when you go home and in your free time. There is also, less coordination between the office and the traditional authorities (the fact that "they do not present their plans for approval and statutory documentation"), there have been instances where even road reservations have been sold. There can be the incorporation of geospatial technologies but it should be backed by a law lest the process will be sabotaged by the officers of land sector agencies who take advantage of the loopholes in the current corrupt systems.

- *Land Valuation Division*

The land valuation forms part of the Lands Commission and plays a key role in the land administration processes. The division values all properties that come to the commission for registration or lease applications. The Division assesses the applications submitted and determines government taxes in the form of stamp duty under measures as provided by the Stamp Duty Act 689, 2005. The division manually prepares and determines fees due for payment. This creates room for manipulation where a client could arrange with the official to pay less for the service by offering a bribe. Such monies collected "are in the known and forms part the normal administrative decision" (interviewee at LVD).

- *Land Title Registry*

The land title registry is in charge of attributing titles, registering, and documentation of titles. The activities of the office mostly happen at the tail end of the process and they document titles to land. The registry keeps records of titles and archives them for subsequent searches and retrievals.

- *Survey and Mapping Division*

The Survey Department, mostly working under the Lands Commission is mandated to prepare cadaster plans needed for the determination of property boundaries as inputs for the land

administration process. Their activities form part of the numerous activities of the land registration process. Until recently, the Survey Department relied on known old methodologies and practices for the determination of boundaries. An interviewee revealed that "the survey department now use modern software and gadget that gives real-time coordinates and add efficiency to our work. The bottlenecks of the department have to do with inadequate logistics and personnel". Although the department uses technologies, the works that are done are individualistic and do not form part of any database systems for subsequent review, retrieval, and use.

iv. Level of knowledge of the staff of the land sector agencies on the use of geospatial technologies and the capacity gaps identification

The level of knowledge of the staff of various land sector agencies on the use of geospatial technologies in their activities was assessed. The highest educational attainments were University Higher Degree and First Degree (Figure 9). However, there were workers with Diploma in higher education certificates and were above forty years of age. Although 77% of the respondents had generally received training on GIS and Geospatial Technologies, 54% of them had not gotten any training on required GIS systems to make their work effective. This, from personnel interviewed, was due to logistics and low level of knowledge in GIS, lack of finance to support their work, and little appreciation from officers. Explanatorily, personnel interviewed at the OASL indicated that "everyone knows the importance of technology in our work including those here, but some people will have less interest and will prevent the system from working".

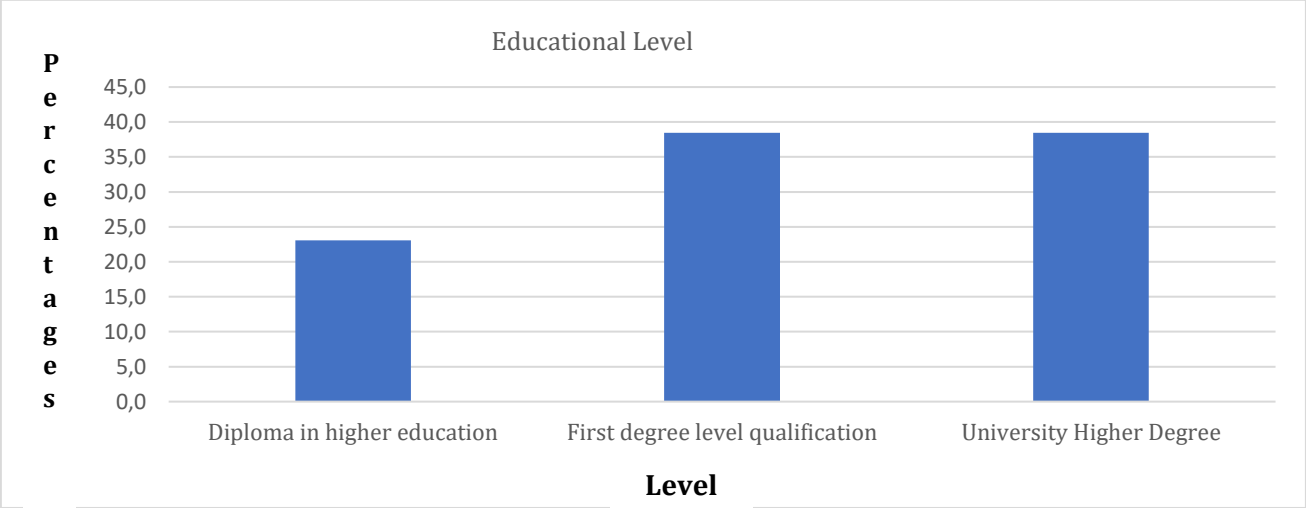


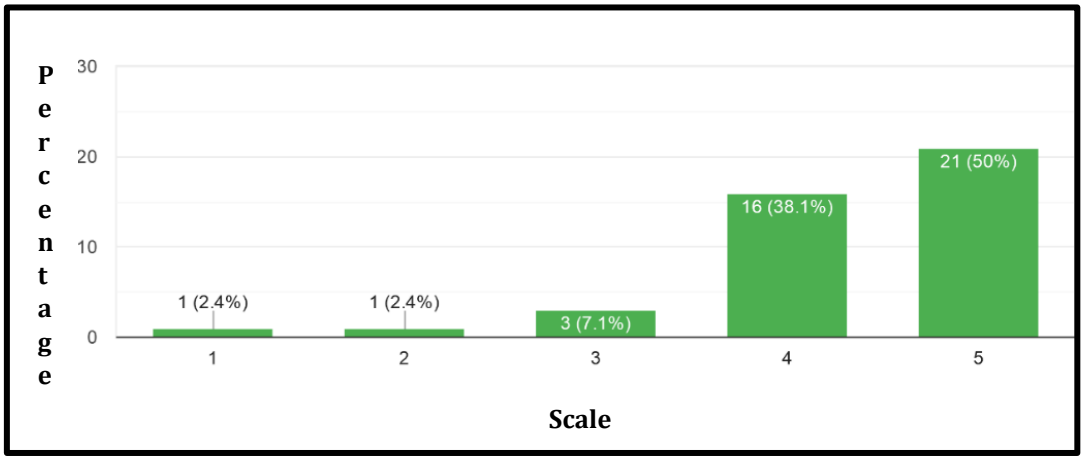
Figure 9. Educational attainment of interviewed staff.

Source: Field Data, 2019

v. The consensus on how the use of geospatial technologies can help address the corruption in the land administration system in Ghana

The issue of GIS and incorporating geospatial technologies in land administration have gained prominence in the developed world. However, efforts are being made by third-world countries to incorporate GIS in land registration and documentation. As gathered, various land sector agencies are yet to make use of geospatial technologies. For instance, the OASL does not use any technology in tracking their demand notice. Personnel from the office indicated that the use of such technologies

"will reduce the leakages in our activities and enhance our effectiveness in collecting grounds rent". This is supported by public perception such that, geospatial technologies can help reduce processes in land administration (Figure 10). Additionally, such an endeavor will reduce corruption and help reduce the ineffectiveness of the agencies. However, there is a need for institutional capacity building on the use of geospatial technologies in their work. The need for capacity is as well heightened as 84% of land sector workers feel that they will need capacity building tailored along their activities to enable them effectively harness the benefits of using geospatial technologies (Figure 11).



1-Strongly Disagree, 2-Disagree, 3-Neither agree/disagree, 4- Agree, 5- Strongly Agree

Figure 10. Educational attainment of interviewed staff

Source: Field Data, 2019

Figure 11. The need for capacity building on geospatial technologies for actors in and administration.

Source: Field Survey, 2019

5. CONCLUSION

The study has revealed various contemporary bottlenecks in Land Governance, administration, and management of land in Ghana especially the traditional system. However, the research focused much on land administration with much emphasis on registration and documentation. Although the LAP has been implemented, there are still issues hindering the full running of the LAP, hence hampering effective land administration in Ghana. Again, the study pointed out the institutional practices that aids and contribute to corruption and rent-seeking as experienced with organizational processes. Public perception is as well higher regarding corruption issues which were attested to by land sector agencies. Findings corroborate other findings made by many authors (e.g. Kasanga & Kotey, 2001; Karikari, Stillwell, & Carver, 2005; Ubink, In the Land of the Chiefs, Customary Law, Land Conflicts, and the Role of the State in Peri-Urban Ghana, 2008; Okpala, 2009; Biitir, Nara, & Ameyaw, 2017; Akaateba, Huang, & Adumpo, 2018). In all, GIS and geospatial technologies are principal and have gained the overwhelming support of public and implementing agencies as a means by which corruption can be eliminated in the land administration process. However, there is the need for institutional capacity building on agency-specific systems for technologies and database management. Based on the aforementioned, the authors proffer these recommendations towards the effective incorporation of geospatial technologies to eliminate corruption in land governance in Ghana.

6. RECOMMENDATIONS

- Retraining (value clarification) on the Land Administration System

Land administration should be seen as a lifeline. This is where actors of the land sector agencies are made to appreciate that, the concept of land administration is linked to several activities. For instance, a registered property could be used as collateral for loans to expand businesses and enhance economic growth. Eventually, poverty will be reduced, and improved living conditions. Similarly, a registered property with secured land tenure enhances peace since it reduces or prevents land disputes and conflicts. With this mindset, actors will reduce or stop rent-seeking behavior and extortion, contributing to the elimination of such corrupt practices.

- GIS as a database system

The Database Management System (DBMS) of most geospatial technologies can be used for the capturing, documentation, and storing of land-related transactions and registration. This makes it possible for the attributes information about a property to be attached to the same. Such systems make it possible for swift searches, data management, and data retrieval. Database systems being used to record land transactions at the local level, even with customary practices, will avert multiple sales that come as a result of loss of documented files.

- GIS as Decision Support System (DSS)

Geospatial technologies have a component to be used as decision support systems. Decisions such as land dispositions, declaration of vacant properties, preparation of ground rents, and other fees can be supported by GIS. Additionally, geospatial technologies especially Unmanned Aerial Vehicle (UAVs) technology allows for High accurate aerial images; Up-to-date land information; Multi-purpose data acquisition; High spatial resolution; Low-cost solutions; Involvement of local stakeholders in data acquisition; High temporal resolution; and Fast and flexible data acquisition. In essence, subjectivity and guess works will be eliminated. Endeavors such as -demand notices can therefore be prepared and submitted to the right people and returns collected even via electronic means. If effectively implemented, the DSS will foster the activities of ground rent collectors who go to the field for such endeavors. There will be no avenues for negotiations.

- Establishment of the data management office

An office that will be in charge of data management, information dissemination, and monitoring of information usage is indispensable for effective land governance at the local levels. The office, among other importance, will serve as a pool of information technology (IT) persons who will prepare plans and take charge of all registries and documentation. The presence of the office will aid prevent double and duplication of efforts and activities among land sector agencies. Currently, almost all related agencies conduct separate inspections which are all costs to the applicant who wants to register the land. All searches, map-making, and documentation can be carried out and information is made available and easily accessible for all other land sector agencies.

- Capacity building on Geospatial Technologies for land sector staff

The human capital is as good as the system in place to eliminate corruption. Pieces of training that are tailored and are agency-specific should be carried out to bring workers to speed on the various modern technologies that can be made use of.

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9. THE AUTHORS' CONTRIBUTIONS

Anthony Kwabena Sarfo: Conceptualization, development of study design, and organization of the report

Prince Aboagye Anokye: Design of data collection instrument and methodologies

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11. KEY TERMS AND DEFINITIONS

Land Administration - land administration by this paper is premised on the thoughts espoused by UNECE, which includes the processes of determining, recording, and disseminating information about the tenure, value, and use of land when implementing land management policies.

Land Governance - Land governance bothers with the rules, structures, and processes by which access to land and its use decisions are made, how those decisions are enforced and implemented, and the way in which competing interests in land are managed.