

USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) TOOLS FOR MITIGATING LAND CONFLICTS IN DELTA STATE, NIGERIA.

Ajaero, Joseph Onyewuchi

Dept. of Agricultural Extension, Federal University of Technology, Owerri, Imo State, Nigeria;

Email : futoedu23@gmail.com 08065928862

ABSTRACT

The study investigated the utilization of ICT tools for mitigating land conflicts in Delta State, Nigeria. Data were collected with structured questionnaire distributed to 120 respondents who were randomly selected. Percentage and mean were used to statistically analyze data. It was found that the following possible ICT devices/tools could be used in the area; computer (99.2%), internet (94.2%), maps/survey plans (89.2%) and internal data capture system (71.7%). Several factors causing land conflicts were double allocation of land (\bar{X} =3.60), inefficiency in delivering land service (\bar{X} =3.55), family boundary disputes (\bar{X} =3.53), corruption/ greed (\bar{X} =3.49), inappropriate use of technology to register lands, (\bar{X} =3.39), inappropriate land tenure systems (\bar{X} =3.27) and communal boundary disputes. It was observed that ICT has a significant role in mitigating land conflicts. The ICT role in land conflicts management is felt in the areas of facilitating easy planning and management, increased awareness on land issues and it ensures security on land tenure system. The use of geographical information system (GIS) should be introduced by government to support spatial analysis and visualization, including a map-based interface for web information services. Government should introduce Land Information System (LIS) to the land offices at local level to improve efficiency in delivering land services.

Keywords: Land conflicts, GIS, LIS, ICTs, Mitigate, land management

INTRODUCTION

Land Administration Systems (LAS) give the foundation to executing land approaches and land the board procedures on the side of feasible turn of events. This foundation incorporates the institutional game plans, a legitimate structure, measures, norms, land data, the executives and dispersal frameworks, and advancements needed to help assignment, land markets, valuation, control of employments, and improvement of interests in land. LAS are dynamic and develop to mirror individuals to-land connections, to receive new advancements and to deal with a more extensive and more extravagant arrangement of land data (Enemark, van der Molen, and McLaren (2010)

Land the board as we can also call it, supports the appropriation and the executives of a critical resource of any general public to be specific its territory. For western majority rules systems, with their profoundly equipped economies, land the board is a vital movement of both government and the private area.

Land the board, and particularly the focal land organization segment, intend to convey productive land markets and successful administration of the utilization of land on the side of monetary, social, and natural manageability (Enemark et al, 2005, McLaren, 2015). The land the board worldview, permits everybody to comprehend the job of the land organization capacities (land residency, land esteem, land use, and land advancement) and how land organization foundations identify with the chronicled conditions of a country and its strategy choices. The LAS is the principal foundation that supports and coordinates the land residency, land esteem, land use and land advancement elements of land organization to help an effective land market that completely exhibits manageable turn of events.

In Nigeria, since human settlement and the introduction of civilization, land has been the most significant resource for a country or society (Nyadimo, 2009). And in an attempt to control it and determine who uses it and has power over allocation, conflicts ensued. With expanding populace development and ensuing interest and abuse of high worth characteristic assets, including oil, gas, minerals and wood, clashes/conflicts over land have become contentious and fluidy, particularly in less-created nations where land is as yet integral to creation and financial development [Grzybowski, 2012].

Some African countries, like Nigeria, have encountered various contentions over land. A significant contributing component to these contentions is the expanding shortage of land brought about by populace development and metropolitan country relocation combined with indistinct limit divisions [Nlerum, 2011]. Appropriate land organization and the executives frameworks enhanced with most recent ICT innovations of planning land and other regular assets gets indispensable in standard and metropolitan land organization subsequently guaranteeing security of land residency for the populace.

Land clashes between various land clients in Nigeria have been repeating for quite a while guaranteeing lives of numerous honest individuals and making major monetary effects on the country. Helpless dynamic has been referenced as one of the wellspring of the land clashes. Most land use clashes in Nigeria are caused and raised by choices and demonstrations of the state through its different offices (Hakiardhi, 2009).

In the previous years, land clashes have been expanding between various land clients. Land clashes

cause adverse consequences to the general public like loss of lives and annihilation of properties (IPP MEDIA, 2014). One of the variables causing land clashes in Nigeria is helpless land use arranging and the board (Mugabi, 2013), which might be related with the utilization of unseemly apparatuses or innovation to work with land records keeping. Anyway Information Communication Technology (ICT) can possibly defeat this among different variables and henceforth help in relieving land clashes by the utilization of ICT apparatuses, for example, Land Information System (LIS), Geographical Information framework (GIS).

ICT has a significant task to carry out in improving the activity of land organization and in making data benefits all the more promptly accessible on the side of land residency [McLaren, 2016]. The progression of planning innovation and Participatory topographical data framework (PGIS) has made land organization more exact and successful in the administration of standard land [Barry 2013].

The current and routinely happening land clashes in Nigeria between various land clients, for example, pastoralists and ranchers have raised the need of applying ICT apparatuses like GIS and LIS for viable and effective land organization and the executives. ICT is helpful particularly where improvement in dynamic is required. It is imagined to be dependable device for creating, arranging and since a long time ago run land programs. It will be a colossal commitment to land workplaces at different levels i.e area, provincial and public levels henceforth diminishing area clashes. There is no Land Information System (LIS) for overseeing country land data which results to helpless land choices like twofold allotment of land prompting land clashes and deferring of conveying land administrations to land partners. Numerous chiefs perform inadequately because of absence of enough data, for example a town chamber may give a specific part or space of land to a financial backers without realizing that, the region has been delineated for different utilizations for the interest of the town. This may cause clashes among locals and financial backers. (Hakiardh, 2009).

Currently, there is no LIS at district level in Nigeria to facilitate land management processes and activities. This cause difficulties in land management processes because of the complexity involved in the land management issues which eventually leads to land conflicts.

OBJECTIVE OF THE STUDY

The main objective of the study was to analyze the potential roles of ICT tools in land management/ administration for mitigating land conflicts in Delta State, Nigeria.

The Specific Objectives were to:

- i. identify possible ICT devices/ tools used in land management and administration;

- ii. examine perceived factors causing land conflicts in Delta State; and
- iii. identify the perceived roles of ICT in mitigating land conflicts.

METHODOLOGY

The study was carried out in Delta state Nigeria. The state covers a landmass of about 18,050 km², of which more than 60% is land. The state lies approximately between Longitude 5°00' and 6°45' East and Latitude 5°00 and 6°30' North. Delta State is an oil and agricultural producing state of Nigeria, situated in the region known as the South-South geo-political zone with a population of 4,112,445 (NPC, 2021). The capital city is Asaba , located at the northern end of the state, with an estimated area of 762 square kilometres (294 sq mi), while Warri is the economic nerve center of the state and also the most populated. It is located in the southern end of the state. The state has a total land area of 16,842 square kilometres (6,503 sq mi). It is bounded in the north and west by Edo State, the east by Anambra , Imo , and Rivers States, southeast by Bayelsa State , and on the southern flank is the Bight of Benin which covers about 160 kilometres of the state's coastline. Delta State is generally low-lying without remarkable hills. The state has a wide coastal belt inter-lace with rivulets and streams, which form part of the Niger Delta. The average rainfall ranges from 1905mm to 2660mm monthly, while the temperature ranges from 29°C to 34°C with an average of about 30°C (Delta State Ministry of Agriculture, 2010). Stratified sampling technique was used to select 60 respondents each from the State Ministries of Agriculture and Lands. This gave a total number of 120 respondents.

Primary and secondary data were used to collect the sample from the field. Structured and validated questionnaire forms were used to collect primary data from the field. While secondary data source include; text books, journals, bulletins and magazines as this assisted to give background information necessary to achieve the objectives of the study. Descriptive statistical tools such as frequency distribution and percentage were used to analyze objective 1. A four-point likert type scale of Strongly agreed (4), Agreed (3), Disagree (2) and Strongly disagreed (1) was used to analyze objectives 2 and 3. Mathematically,

$$X = \frac{4+3+2+1}{4} = 2.5$$

Therefore a mean value of 2.5 was accepted as a perceived cause of conflicts and ICT roles, while any mean value below 2.5 was not accepted.

RESULTS AND DISCUSSIONS

Information and Communication Technology (ICT) devices/ tools used in land management and administration

Table 1 revealed the possible ICT devices to be used in the study area. The following ICT devices/tools are preferred; computers (99.2%), internet (94.2%), maps/survey plans (89.2%) and internal data capture system (71.7%), mobile phones (51.7%) and web-mobile phone based information service with percentage of 50%, geographic positioning system (99.2%) and land information system (94.2%). The map-based interface provides a range of navigation tools, including address, cadastral parcel number, municipality, and area polygons. The areas of the

development plans can be displayed in combination with cadastral maps, topographic maps, and other kind of land use constraints, such as conservation areas and coastal protection zones (Mclaren and Stanley, 2011). Information and Communication Technology tools such as GIS and LIS, provide the infrastructure for implementation of land policies and land management strategies and facilitate operations of the land registration, valuation and cadastre. It provide robust and secure repositories to manage the significant volumes of land information (textual and geospatial) in a distributed environment and to support efficient searching and querying of the information

Table 1: Distribution of ICT devices/tools used in Land Management.

Available ICT devices	*Frequency	Percentage (%)
Geographic positioning system(GIS)	119	99.2
Internet	113	94.2
Web-mobile phone based information service	60	50.0
Internal data capture system	86	71.7
Mobile phones	62	51.7
Land Information System (LIS)	113	94.2
Maps/survey plans	107	89.2
Computers	119	99.2

** Multiple responses

Perceived Factors Causing Land Conflicts

Table 2 revealed the distribution of the respondents based on the factors causing land conflicts. A decision rule was made to indicate that, any mean value from 2.50 and above ($\bar{X} \geq 2.50$) was adjudged agreed while any mean value less than 2.50 ($\bar{X} < 2.50$) was adjudged disagreed. From the result, the respondents agreed that the following were the factors causing land conflicts; double allocation of land ($\bar{X}=3.60$), inefficiency in delivering land service ($\bar{X}=3.55$), family boundary disputes ($\bar{X}=3.53$), corruption/ greed ($\bar{X}=3.49$) inappropriate use of technology to register lands, ($\bar{X}=3.39$), inappropriate land tenure systems ($\bar{X}=3.27$), communal boundary disputes ($\bar{X}=2.99$), and poor land use planning and management ($\bar{X}=2.70$) while the respondents

disagreed that, resource control ($\bar{X}=2.42$) is not a factor causing land conflicts. This result agreed with (Mwashambwa, 2012) who observed that double allocation of land is a cause of land conflicts due to poor management of land records. Inefficiency in delivering land services result to delay in delivering land services. According to (Mwaikambo and Hagai, 2013), general inefficiency of delivering core land functions is caused by the increased value for both land and land related properties as well as a fast growing population which increased high demand for land. The family boundary disputes are rampant because of a non-coordinated and systematic land demarcation system supported with proper land ownership evidence.

Table 2: Perceived Factors Causing Land Conflicts

Factors	Mean (\bar{X})	Standard Deviation (SD)
Inefficiency in delivering land services	3.55	0.56
Double allocation of land	3.60	0.49
Inappropriate use of technology to register lands	3.39	0.84
Family boundary disputes	3.53	0.79
Resource control	2.42	0.94
Poor land use planning and management	2.70	1.04
Communal boundary disputes	2.99	0.86
Inappropriate land tenure systems	3.27	0.79
Corruption/greed	3.49	0.69

Decision rule Mean effect (\bar{X}) ≥ 2.50 = Agree

Perceived Roles of ICT in Mitigating Land Conflicts

The result showed that ICT have a significant roles in mitigating land conflicts; facilitates easy planning and management ($\bar{X}=3.30$), increase awareness on land issues ($\bar{X}=3.14$), easy accessibility of land through mobile phones and computers ($\bar{X}=3.14$), ensures security of land tenure system ($\bar{X}=3.14$), facilitates transparent land allocation and records ($\bar{X}=3.10$), provides adequate information on land ownership ($\bar{X}=3.03$), improves the outreach of land administration services ($\bar{X}=3.00$), implementation of land policies and management strategies ($\bar{X}=2.96$), support good governance in land administration ($\bar{X}=2.77$), and facilitates participation in development through the use of mobile phones ($\bar{X}=2.77$). This result showed that Information and Communication Technology (ICT) plays a crucial role in sharing and analyzing land information among agencies and in communicating and testing change scenarios with the citizens involved. The Information and Communication Technology (ICT) has the potential to make land information available to the key customers or stakeholders, through internet or mobile phones which support internet access.

Information and Communication Technology (ICT) also improve the operations of land administration and in making information services more available in support of urban and rural economic development and conflicts mitigation. Information and Communication Technology (ICTs) impact positively in land administration by ensuring that its benefits reach many people by determining, recording, and disseminating information about various attributes of land. According to (UNECE, 2005), one of the benefits of good land administration system is that it reduces land disputes.

Therefore, Information and Communication Technology ICT can be seen as an integral tool in reducing land conflicts.

In Nigeria land records are still kept and processed in paper based way and only available in land offices at the Local government council. Information and Communication Technology (ICT) significantly supports good governance in land administration by facilitating open, transparent access to land records for all (McLaren and Stanley, 2011). Therefore if Information and Communication Technology (ICT) is well applied to the land information management it can provide transparency to the land records. Lack of transparency to the land records is one of the causes of land conflicts (Anna, Giles, and Rugemeleza, 2013). Information and Communication Technology (ICT) enable land records to be accessed through mobile phones, either through web- or SMS-based information services. As the example from Indonesia indicates, Information and Communication Technology (ICT) greatly improve the outreach of land administration services, especially for groups that were long excluded from such information hence increase transparency of the land information to the customer or key stakeholders (McLaren and Stanley, 2011).

Land registration means that there is an official record (the land register) of rights on land or of deeds concerning changes in the legal situation of defined units of land. It gives an answer to the questions "who" and "how" (Zevenbergen, 2004). This is important in reducing or avoiding land conflicts because it clears doubts that can arise over the real owner of a certain parcel of land and the conditions under that land.

Table 3: Role of ICT in Mitigating Land Conflicts

Roles	Mean (\bar{X})	SD
Facilitates transparent land allocation and records	3.10	0.64
Easy accessibility of land through mobile phones and computers	3.14	0.85
Facilitates easy planning and management	3.30	0.75
Ensures security on land tenure systems	3.14	0.71
Provides adequate information on land ownership	3.03	0.94
Disseminating information about the attributes of land	3.33	0.81
Facilitates participation in development through the use of mobile phones	2.77	0.78
Implementation of land policies and management strategies	2.96	1.02
Supports good governance in land administration	2.77	1.04
Improves the outreach of land administration services	3.00	0.87
Increased awareness on land issues	3.14	1.07

Decision rule Mean effect (\bar{X}) \geq 2.50 = Agree

CONCLUSION

Absence or poor ICT in delivering land services is among the factors accelerating land

conflicts, However, many land conflicts can be solved when the use and importance of ICT technology tools such as Land Information System

(LIS) and Geographical Information System (GIS) in land use planning and management will be recognized especially at district level. Most of the operations that require land information, are continuous due to the fact that information need to be revised, updated and monitored continuously, it is very useful in tracking various issues of land use such as if there is land conflicts or possibility of conflicts to occur at certain places, this cannot be sustainable without proper land information system. LIS will also increase awareness concerning land issues to the planning officers, policy and decision makers as well as customers. In order to ensure successful land conflicts mitigation by the use of ICT it is recommended that LIS to be introduced to the land offices at district level to improve efficiency delivering land services. This is a step ahead to efficient deliverance of land services resulting to reduction of conflicts.

REFERENCES

- Anna, L., Giles, H. and Rugemeleza, N (2013).** Tanzania-G8 Land Transparency Partnership. Tanzania's Land Transparency Partnership: Inception Report.
- Barry, D. M (2013)** "Land tenure administration and GIS: trends and challenges," SASGI Proceedings, University of Calgary, 2013.
- Delta Ministry of Agriculture(2010)** Agricultural Calender of the State ADP. Ministry of Agriculture, Asaba.
- Enemark, S., van der Molen, P. and McLaren, R. (2010):** "Land Governance in Support of the Millennium Development Goals: Responding to New Challenges," Report on FIG / World Bank Conference Washington DC, USA 9-10 March 2009, FIG Publication.
- Grzybowski, A. (2012)** "Land and Conflict: Toolkit and guidance for preventing and managing land and natural resources conflict," UN department of political affairs.
- Hakiridh, A. (2009).** Land Rights Research and Resources Institute: The Changing Terrain of Land Use Conflicts in Tanzania and the Future of a Small Producer. Commonwealth Association of Surveying and Land Economy CASLE on 29th June 2009 at White Sands Hotel in Dar es Salaam Tanzania.
- IPP MEDIA (2014).** Farmers, pastoralist's conflicts: Where have we failed? [Online] AVAILABLE: <http://www.ippmedia.com/frontend/?l=63745> (June, 2015).
- McLaren, R (2015),** "ICT FOR LAND ADMINISTRATION AND MANAGEMENT," Online at Available:http://www.ictinagriculture.org/sites/ictinagriculture.org/files/final_Module14.pdf. [Accessed 19 March 2016].
- McLaren, R.and Stanley, V (2011).** Module 14: ICT FOR LAND ADMINISTRATION AND MANAGEMENT.[Online]Available: http://www.ictinagriculture.org/sites/ictinagriculture.org/files/final_Module14.pdf (June, 2015
- Mugabi, C. (2013).** Challenges Facing Land Ownership in Rural Tanzania: What needs to be done? Economic and Social Research Foundation (ESRF) policy brief No. 4/2013.
- Mwaikambo, E and Martin Hagai (2013).** The Role of Land Information System in Instigating Development of a National Spatial Data Infrastructure in Tanzania. FIG Working Week 2013 Environment for Sustainability Abuja, Nigeria, 6 – 10 May 2013
- Mwashambwa, B. (2012).** Land disputes in Tanzania simanjiro case study. [Online] Available: https://www.academia.edu/5996577/LAND_DISPUTES_IN_TANZANIA-SIMANJIRO_CASE_STUDY (June 2015)
- Nlerum, F.(2011)** Using Information Communication Technology (ICT) Tools in Manageing Customary Land, Demarcation, Conflict and Tenure Data in Developing Countries: "Security Implications of land and Chieftaincy Disputes,". University of Zambia.
- NPC (2017) National Census Figur, National Population Commission. Abuja**
- Nyadimo, E (2009).** "The role of private sector in land adjudiction in Kenya," XXIII FIG Congress, Munich.
- UNECE (United Nations Economic Commission for Europe). 2005.** Land Administration in the UNECE Region: Development Trends and Main Principles. Geneva.
- Zevenbergen, J (2004).** A Systems Approach to Land Registration and Cadastre. Nordic Journal of Surveying and Real Estate Research VOL 1, 2004.