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ANALYSIS OF ICT APPLICATION IN MITIGATING LAND CONFLICTS: CASE STUDY OFTANZANIA

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***Abstract*—Land conflicts are common phenomena in Tanzania. They can be understood in the context of history, social relations and the process of commoditization of natural resources such as land and land resources.**

One of the factors causing land conflicts is the poor land use planning and management. Tanzania has about 44.0 million hectares of arable land in Tanzania, but only 23% (about 10.5 million hectares) is being utilized,

In this study literature review is done to understand the context of land information management, then take a look at how land use plan is being practiced at district level and how ICT is applied in land use plan towards land conflicts mitigation. The study aims to analyze ICT potential role by identifying factors causing land conflicts that can be solved by ICT and establishing ways of mitigating the conflicts. This can be accomplished by integrating ICT in land use planning and management for easier inventory and allocation of land resource.

The study conclude that, implications of ICT for the land use management at district level have impact towards land conflicts mitigation, because ICT can enhance land administration through modern ways of keeping land information and can help policy and decision makers in reaching good decision making.

Keywords—Land Conflicts, Land use, Arable land, ICT, LIS, GIS, DBMS

I. INTRODUCTION

In the past two decades emergence of land conflicts has been increasing between different land users. Land conflicts cause negative impact to the society such as loss of lives and destruction of properties (IPPMEDIA, 2014). One of the factors causing land conflicts in Tanzania is poor land use planning and management (Mugabi, 2013), which may be associated with the use of inappropriate tools or technology to facilitate land records keeping. However Information Communication Technology (ICT) has the potential to overcome this among other factors and hence aid in mitigating land conflicts by the use of ICT tools such as Land Information System (LIS), Geographical Information system (GIS)

Currently, there is no LIS at district level in Tanzania 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.

The recent land conflicts in Tanzania between different land users such as pastoralists and farmers have raised the need of applying ICT tools such as GIS and LIS for effective and efficient land administration and management. ICT is very useful especially where optimization in decision making is required. It is envisaged to be reliable tool for developing, planning and long run land programs. It will be a huge contribution to land offices at various levels i.e district, regional and national levels hence reducing land conflicts.

This study aims to analyse the potentials of ICT in mitigating land conflicts and state how ICT can play such role. Literatures indicate that this can be accomplished by integrating ICT in land administration and management and electronic inventory and allocation of land resource.

II. PROBLEM STATEMENT

There is no LIS for managing land information which results to poor land decisions such as double allocation of land leading to land conflicts and delaying of delivering land services to land stakeholders.

Main objective

The main objective of the study is to analyse the potential of ICT by identifying factors causing land conflicts and establishing ways of mitigating the conflicts.

Specific Objectives

Specific in this study;

- To identify factors causing land conflicts that can be solved by ICT.
- To analyse the role of ICT in mitigating land conflicts.

III. FACTORS CAUSING LAND CONFLICTS THAT CAN BE SOLVED BY ICT.

Land conflicts between different land users in Tanzania have been recurring for a long time claiming lives of many innocent people and creating major economic impacts to the nation. There are various factors that are causing land conflicts to persist that ICT can play part to solve them. These include the following.

i. Inefficiency in delivering land services. This resulting to delaying in delivering land services. According to (Mwaikambo & Hagai, 2013),

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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.

ii. Double allocation of land is another factor causing land conflicts. This problem greatly exists as two or more people find to be claiming on plot of land each with a valid certificate right of occupancy (Mwashambwa, 2012). Double allocation is caused by poor management of land records.

iii. Tanzania has total land area of 945,000 km2 out of which only 11% has been registered with the legal administration (Mithofer, 2006). This may be associated with the use of inappropriate tools or technology to facilitate land registration. Land registration 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. According to (Mclaren & Stanley, 2011) land registration in many societies became customary to document the transfer of land rights in the form of legal deeds and certificates. To provide additional security, official copies of these records were kept in deeds registries, or what in some countries are called land books.

iv. Land use planning refers to the process by which a society, through its institutions, decides where, within its territory, different socioeconomic activities such as agriculture, housing, industry, recreation, and commerce should take place. This includes protecting well-defined areas from development due to environmental, cultural, historical, or similar reasons, and establishing provisions that control the nature of development activities (World Bank, 2012). One of the factor that cause land conflicts in Tanzania is poor land use planning and management (Mugabi, 2013). This may also be related with the use of inappropriate tools in facilitating land use planning and records keeping.

v. Poor decision making has been mentioned as one of the source of the land conflicts. MOST land use conflicts in Tanzania are caused and escalated by decisions and acts of the state through its various agencies (Haki ardhi, 2009). Many of the decision makers perform poorly due to lack of enough information. For instance village council may give the area to the investors without knowing that, the area has been demarcated for other uses for the interest of the village. This may cause conflicts between villagers and investors.

IV. The Role of ICT in Mitigating Land Conflicts.

ICT has fundamental role in improving the operations of land administration and in making information services more available in support of urban and rural economic development and conflicts mitigation. ICT can have positive impacts 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 benefit of good land administration system is that it reduces land disputes, therefore ICT can be seen as integral tool in reducing land conflicts.

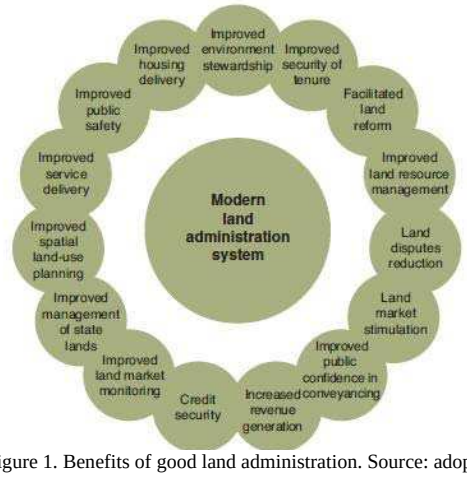

Figure 1. Benefits of good land administration. Source: adopted from (UNECE, 2005

In Tanzania land records are still kept and processed in paper based way and only available in land offices at the district council. ICT significantly supports good governance in land administration by facilitating open, transparent access to land records for all (Mclaren & Stanley, 2011). Therefore if 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 Locke, Giles Henley and Rugemeleza Nshala, 2013). ICT can enable land records to be accessed through mobile phones, either through web- or SMS-based information services. As the example from Indonesia indicates, 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 & Stanley, 2011).

Land tenure refers to the way in which land rights are held. Good land information systems can surpass customary land tenure systems by ensuring the security of land Tenure. According to (Matt McIntyre, 2010), tenure recording system has great role in reducing conflicts over land and its use for Pacific Island Countries & Territories (PICTs) provided that their specific needs are well addressed. For this to be achieved, information systems need to be enhanced to increase the knowledge base and provide a system of two-way communication between national governments and remote communities.

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Poor land use planning and management is another problem facing many developing countries such as Tanzania and hence leading land conflicts. However ICT tools such as Database management systems (DBMS) and other sophisticated applications GIS and E-planning can be useful in keeping records and in helping planners to easily plan the uses of the land and towns.

ICT significantly support land use planning and management. In countries fortunate to have mature ICT infrastructures, governments have established e-planning portals that allow citizens to access land-use control information, including,

- Access to zoning development plans, planning regulations, and general land-use information.
- Submission of development applications.
- Access to proposed developments, associated drawings and their current status.
- Access to the results of development control decisions.

avoid many land conflicts which would have happened if there was no E-planning system.

Mobile phones are also opening channels for citizen participation in the development control process and have significant potential to increase constituents' participation. For example, citizens can register for mobile phone alerts on specific types and/or locations of new development proposals and can text objections to development proposals to the planning authorities with associated authentication (McLaren 2010).

One of the major important component of any land administration system is a record of landownership. This is because of the uncertainties that can arise over who owns the land and under what conditions (Mclaren & Stanley, 2011). Land registration is a process of official recording of rights in land through deeds or title (on properties). It 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)*.

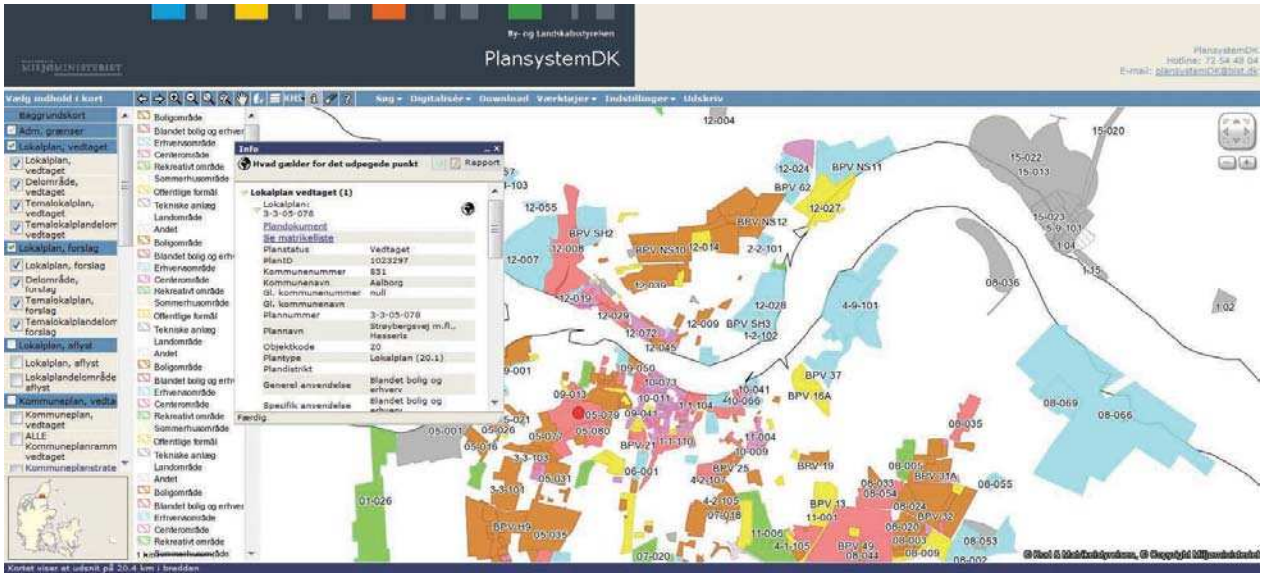

Figure 2. Example of E-Planning Portal. Source: adopted from (Mclaren & Stanley, 2011).

E-planning portal is one of the most advanced portals in Denmark. The solution provides public access to all statutory land-use plans such as municipal plans and development plans (called a lokalplan), both adopted or proposed, across Denmark. 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, orthophotos and other kind of land use constraints, such as conservation areas and coastal protection zones (Mclaren & Stanley, 2011). Citizens preparing to build or extend their house can use the system to determine what planning restrictions apply in their areas and hence reduce or

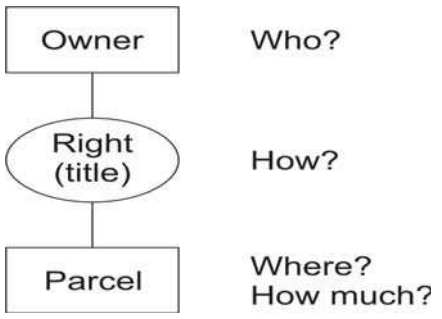

Figure 3. Core entities of land administration system. Source: adopted from (Zevenbergen, 2004) 2004).

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As populations gradually increase in most societies, land become scarce resource and there are various types of rights to use the land developed. Hence registration is important to clarify ownership and minimize disputes, but also important for governments to collect property taxes. Without knowing the owner of the land and how that land is being used for, disputes may increase and governments cannot charge property taxes.

ICT significantly can facilitate land registration. Through the ICT land registration process can be easily implemented efficiently and effectively.

V. DISCUSSIONS

In Tanzania Land information are obtained from individual Institutions such as (N.G.Os, Survey companies, Researchers, district council), which collect them for their own purposes. Therefore it is difficult for the district particularly land office to use these information if critical decisions are to be made concerning land use plan and management, due to the fact that these information are not integrated with other aspects of social economic development. ICT has a crucial role to play in sharing and analyzing land information among agencies and in communicating and testing change scenarios with the citizens involved. The ICT has the potential to make land information available to the key customers or stakeholders, through internet or mobile phones which support internet access. This new channel bridging land administration services to a wider range of society many of whom are currently excluded (McLaren, 2010).

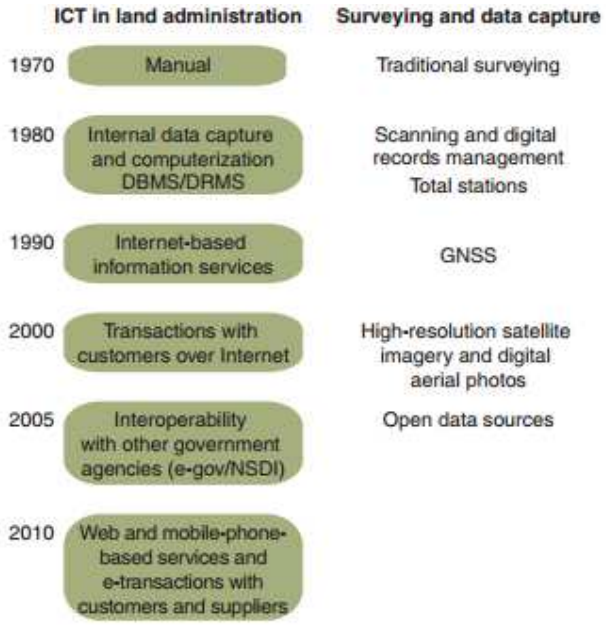

Figure 4. Evolution of ICT in Land Administration. Source: adopted from (Mclaren & Stanley, 2011)

paper based method of handling land information at the land office in is still practiced at district level whereby when a customer come to ask for the information about specific land, land officer has to look for a flat file to search for the information and if the file is not found the customer is told to go and come back later after sometimes. The paper based method of handling land information brings a lot problems such as land conflicts but also the process is expensive and time consuming.

ICT 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.

GIS efficiently store and retrieve raster scanned documents such as paper deeds. GIS supports the capture and editing of geospatial information such as parcel boundaries and interfaces to the land information repositories and wider national spatial data infrastructures (NSDI) to support spatial analysis and visualization, including a map-based interface for web information services.

The increased value for both land and land related properties as well as a fast growing population increased high demand for open access to land administration information and contributed to complexity in land management issues. This causes difficulties in handling different land allocations due to poor and conventional ways of keeping land information leading to inefficiency in delivering land services, example double allocation of the land resulting to land conflicts. LIS is an integral tool for effective and efficient land delivery services and hence reducing land conflicts. LIS can significantly support greater access to and sharing of information, improve data quality and completeness, increase security and transparency of operations and information increase revenue generation around new services, and provide a basis for monitoring and evaluation.

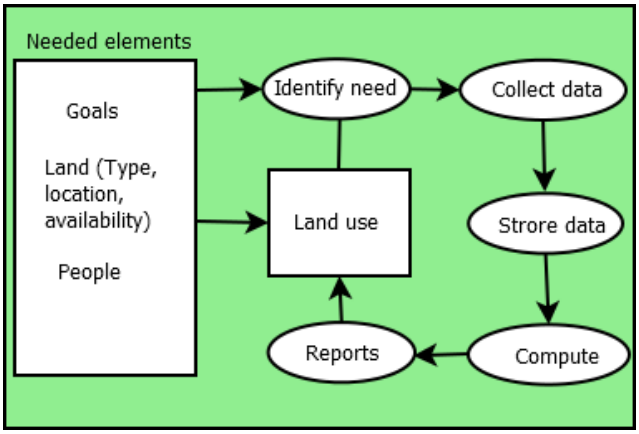

Figure 5. Land Information Management Link

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LIS has tremendous value in land use planning and management in terms of ensuring the availability of land information for planning, analysis of growth and development trends, monitoring land resource and its uses. LIS can also lead policy and decision makers to reach the appropriate decisions for the benefits of the public which is vital in mitigating land conflicts.

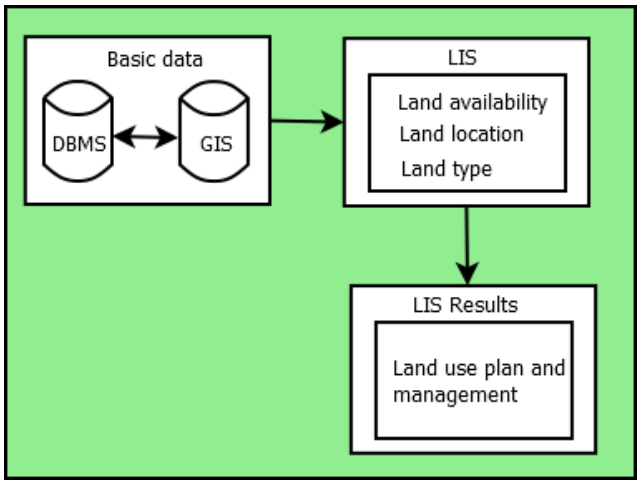

Figure 6. Decision support system pattern for land information management.

VI. 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 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. This is a step ahead to efficient deliverance of land services resulting to reduction of conflicts.

VII. Recommendations.

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.

References.

IPPMEDIA (2014). Farmers, pastoralists conflicts: Where have we failed? [Online] AVAILABLE: http://www.ippmedia.com/frontend/?l=63745 (June, 2015).

Charity Mugabi (2013). Challenges Facing Land Ownership in Rural Tanzania: What needs to be done? Economic and Social Research Foundation (ESRF) policy brief No. 4/2013.

Anna Locke, Giles Henley and Rugemeleza Nshala (2013). Tanzania-G8 Land Transparency Partnership. Tanzania's Land Transparency Partnership: Inception Report.

Eric Mwaikambo & 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

Barnabas Mwashambwa (2012). Land disputes in Tanzania-simanjiro case study. [Online] Available: https://www.academia.edu/5996577/LAND_DISPUTES_IN_TANZANIA-SIMANJIRO_CASE_STUDY (June 2015).

World Bank (2012). Getting to Green - A Sourcebook of Pollution Management Policy Tools for Growth and Competitiveness. Pollution Management (PoMa) Sourcebook. [Online] Available: http://siteresources.worldbank.org/INTRANETENVIRONMENT/Resources/244351-1279901011064/GovLandUsePlanning.pdf

Robin Mclaren & Victoria Stanley (2011). Module 14: ICT FOR LAND ADMINISTRATION AND MANAGEMENT. [Online] Available: http://www.ictinagriculture.org/sites/ictinagriculture.org/files/final_Module14.pdf (June, 2015).

Matt McIntyre (2010). Planning for Sustainable Community Lifestyles – Experience with Customary Societies. PIA Qld Conference November 2010.

Robin McLaren (2010). Can the Innovative Use of Mobile Phones Support More Effective Land Administration Services? FIG Congress 2010 Facing the Challenges – Building the Capacity Sydney, Australia, 11-16 April 2010.

Land Rights Research and Resources Institute – HAKIARDHI (2009). 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.

UNECE (United Nations Economic Commission for Europe). 2005. Land Administration in the UNECE Region: Development Trends and Main Principles. Geneva.

Jaap Zevenbergen (2004). A Systems Approach to Land Registration and Cadastre. Nordic Journal of Surveying and Real Estate Research VOL 1, 2004.

https://sites.google.com/site/ijcsis/
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