

Using geospatial technologies to support compulsory land acquisition in Kenya – a case study of Kanunga – Nyaga road in Kiambu County

Mary N. Kamunyu, David N. Kuria and Kenneth Mubea

Abstract - Governments have power to compulsorily acquire land or other interest in land for a public purpose subject to prompt payment of the compensation to the affected persons. The process of land acquisition involves several government departments which have different mandates depending with the purpose of the acquisition. In several instances departments involved have been seen to be disjointed hence causing gaps and unfinished work in the whole process. In a number of occasions the government has acquired land yet delayed occupation of the same, the case study in this research being an example. This has resulted to encroachment of the already acquired land either knowingly or unknowingly by the same people who were compensated or new entrants who have purchased land after the compensation has been done, sometimes unaware of the state of the land. There has been failures in updating of documents and maps with the acquired data hence causing great losses where developments have been demolished especially where land has already been acquired for road construction. Ownership documents, the title deeds, have failed to have the acquired acreage deducted and the maps/plans with the National Mapping Agency fail to be updated. This paper looks at how best to use GIS in the process of land acquisition, bringing together all the information in all the departments involved for a one-stop-shop. In this research, the Registry Index Maps (RIMs) from the Ministry of Lands, Survey Department, and the road layout from the Roads Department were overlaid and parcels identified which are yet to surrender the acquired acreage. With GIS a list of all affected parcels together with the relevant attributes can be extracted and forwarded to the relevant departments as seen necessary. This will enhance transparency in operations where there are overlapping mandates and highlight gaps in the whole acquisition process.

Keywords - Compensation, GIS, Land acquisition, overlaid

Abbreviations and Acronyms

GIS – Geographic Information System
KeNHA – Kenya National Highway Authority
LIMS – Land Information Management System
NLC – National Land Commission
RIM – Registry Index Map

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I. INTRODUCTION

In compulsory land acquisition a property is taken over for public use without private negotiations or consent of the owner, but with a just and prompt compensation. Compulsory acquisition is the tool governments use to acquire private property in order to provide public facilities for enjoyment by citizens. Corporations, companies and persons can also acquire land under the Land Acquisition Act, now repealed by The Land Act, 2012 [1].

In Kenya, there are numerous cases where the power to acquire land compulsorily is conferred by an Act of Parliament to the Government or other public authority in order to carry out schemes for the benefit of the community as a whole. Such legislation include The Land Acquisition Act, The Land Act, The Water Act and The Electric Power Act [2].

The Constitutional of Kenya 2010, defines the term “land” in Article 260 to include: - the surface of the earth and the subsurface rock, any body of water on or under the surface, marine waters in the territorial sea and the exclusive economic zone, natural resources completely contained on or under the surface and the air above the surface.

Compulsory acquisition is also referred to as eminent domain and is the power possessed by the state over all the property in the country. Through this power the government is able to acquire land compulsorily for the public use. This acquisition must be done according to the law [3]. Two general conditions can be set up to assess what is a public interest. Firstly, the socio-economic benefits of the acquisition must outweigh its disadvantages, that is, it has to be profitable. Secondly, the purpose of the acquisition has to be important or *essential*. It is a debatable issue, which purposes are to be deemed “important”. But included is normally the basic infrastructure needed for individual properties to function in a good way, such as roads and utilities for water and sewage, electricity and telecommunications.

Conditions that the government must satisfy to exercise this power include: - Land must be private property, the government must have the capacity to take physical possession of the property, the property should always be for public purpose. If the acquisition is not for the public benefit then it will be an illegal acquisition therefore the property cannot be used for any other purposes. For instance land that

was left unused in the construction of a road cannot be sold or used for any other purpose and should be marked as road reserves. The private owner of the land must be paid compensation in full. The compensation should be adequate and should be paid without any unreasonable delay. There are many factors to be considered such as; the expenses incurred by a person who has to change his residence, damage caused by the publication in the Gazette, damages that may be incurred on the owner's other property.

Compulsory land acquisition by the Government should end at the point where the Government takes possession of the land it has acquired. This has not been the case in Kenya in quite a number of cases resulting to encroachment into the already acquired areas either knowingly or unknowingly.

Compulsory land acquisition is a very expensive venture for the Government. For example the Daily Nation on 17th June, 2014 wrote that the compulsory land acquisition for the first phase of the standard gauge railway line from Mombasa to Nairobi would cost Kenya shillings ten billion (ksh 10 B).

This justifies why the government should take possession of the land it has acquired soon after full payment.

The acquired acreage also in some cases is not deducted from the total acreage in the ownership documents or even noting at the Land Registries that the Government has some interest.

The Registry Index Maps (RIMs), Survey Plans and the Deed Plans are used for registration and the reason why they should depict the correct information for each and every parcel of land. Any proposed development on the parcel of land is done as per the RIM or survey plan proving the extent of the parcel. For example, a sub-division scheme or building plans will only be approved if they conform to the RIM or survey plan.

There have been many cases of demolition of buildings due to the developments being on the road reserve either knowingly or unknowingly. It is hence important to protect developers who may wish to purchase land yet with even due diligence do an official search and purchase maps then later learn that a road had been acquired and owners compensated yet not mapped!

When acquired land is not marked both on the ground and on maps and the land registry does not show government

interest on the land, then it shows that this public land is unprotected and ownership not yet transferred to the Government. These has caused embarrassing situations for Government departments like the case of Rironi demolition of a four storied building under construction in Kiambu County. The owner had purchased half an acre from the original owner and obtained a title deed. The parcel was even amended on the RIM! The RIM indicates the Nairobi – Nakuru highway as 40 meters wide while the Department of roads said that the acquisition increased the road width to 80 meters wide. The information with the Roads department was not recorded in the anywhere in the documents held by the Lands Ministry.

The main objective of the research was to identify how much land is yet to be surrendered to the Government by the compensated land owners in the study area and recommend measures to stem this failure to take possession. The Specific Objectives were to recommend a procedure in the compulsory land acquisition for a successful completion of the process, propose an effective procedure to be followed to map the already acquired yet not mapped roads, using GIS technologies, quantify the respective parcels of land that have not yet been taken over and prepare a report on the parcels that are in contravention of the acquisition process.

II. MATERIALS AND METHODS

A. *The Study Area*

Kiambu County is one of the fourty seven counties in the Republic of Kenya and is located in the central region. It covers a total area of 2543.5 sq km. It borders Nairobi and Kajjado counties to the south, Machakos to the East, Murang'a to the north, Nyandarua to the North West and Nakuru to the West.

The County lies between latitudes 0° 25' and 1° 20' South of the Equator and longitude 36° 31' and 37° 15' East.

The County has a good road network with a total of 2033.8Km of road under bitumen standards, 1480.2km under gravel surface and 430.1km under earth surface. There is great need to improve the condition of the roads since during the rainy season most of the roads become impassible [4].

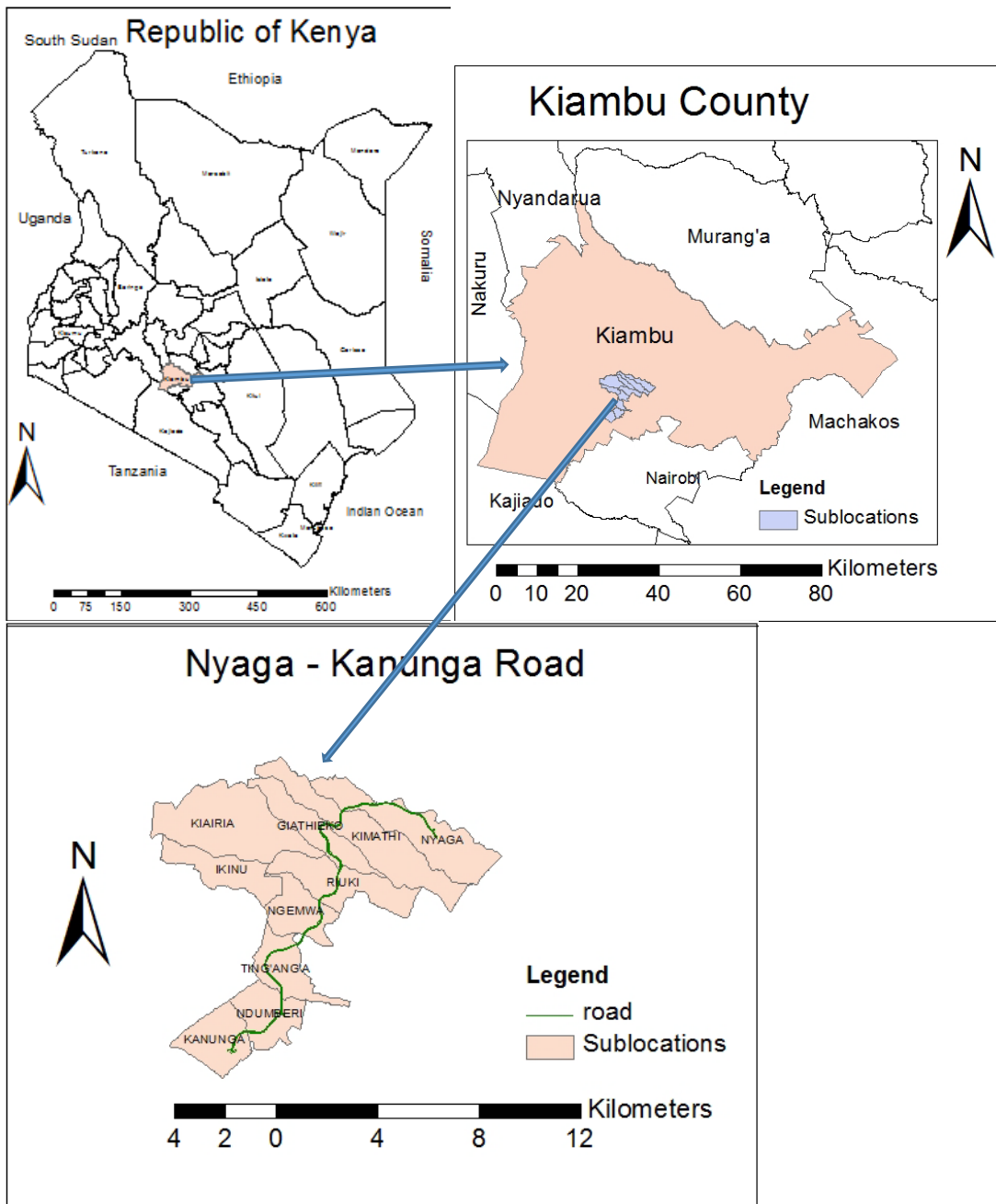


Fig. 1: Location of the study area

The County has twelve sub-counties and the road under study passes through three sub-counties which are Kiambaa, Kiambu and Githunguri. It starts at Kanunga sub-location in Kiambaa, proceeds to Ndumberi then Ting'ang'a in Kiambu sub-county and then to Githunguri sub-county through sub-locations Ngewa, Ikinu, Kiabria, Giathieko, Kimathi and finally Nyaga.

Average holding size of land in the county is approximately 0.36 ha on small scale and 69.5 ha on large scale. The fragmentation of land has made it uneconomical and hence majority of the farms are converting their farms into residential plots to supplement the meagre income from the

farms.

B. Methodology

Both primary and secondary data sources were used. Thirty six (36) Registry Index Maps from the Director of Surveys and five of the proposed Kanunga-Nyaga Road Maps from the Kenya National Highways Authority (KeNHA) were used. The gazette notices were obtained from the National Archives and used to identify the parcels that were compensated for.

The questionnaires were administered to land owners, local Chiefs and relevant professionals. The questionnaires assisted to assess the effectiveness of the Land Acquisition process

TABLE I
REGISTRY INDEX MAPS (RIMS) USED

S/No.	Registration Section	Sheet Nos.	No. of sheets
1	Kiambaa/Kanunga	4, 6, 7, Township	4
2	Ndumberi/Ndumberi	3, 5, 6, 8, Township	5
3	Ndumberi/Ting'ang'a	3, 4, 5, 8, 9, Township	6
4	Githunguri/Ikinu	14, 19	2
5	Githunguri/Kiairia	12, 19	2
6	Githunguri/Riuki	2, 3, 5, 6	4
7	Githunguri/Giathieko	7, 8, 9, 10, Township	5
8	Githunguri/Kimathi	6, 8	2
9	Githunguri/Nyaga	4, 5, 6, 10, 12, Township	6
Total			36

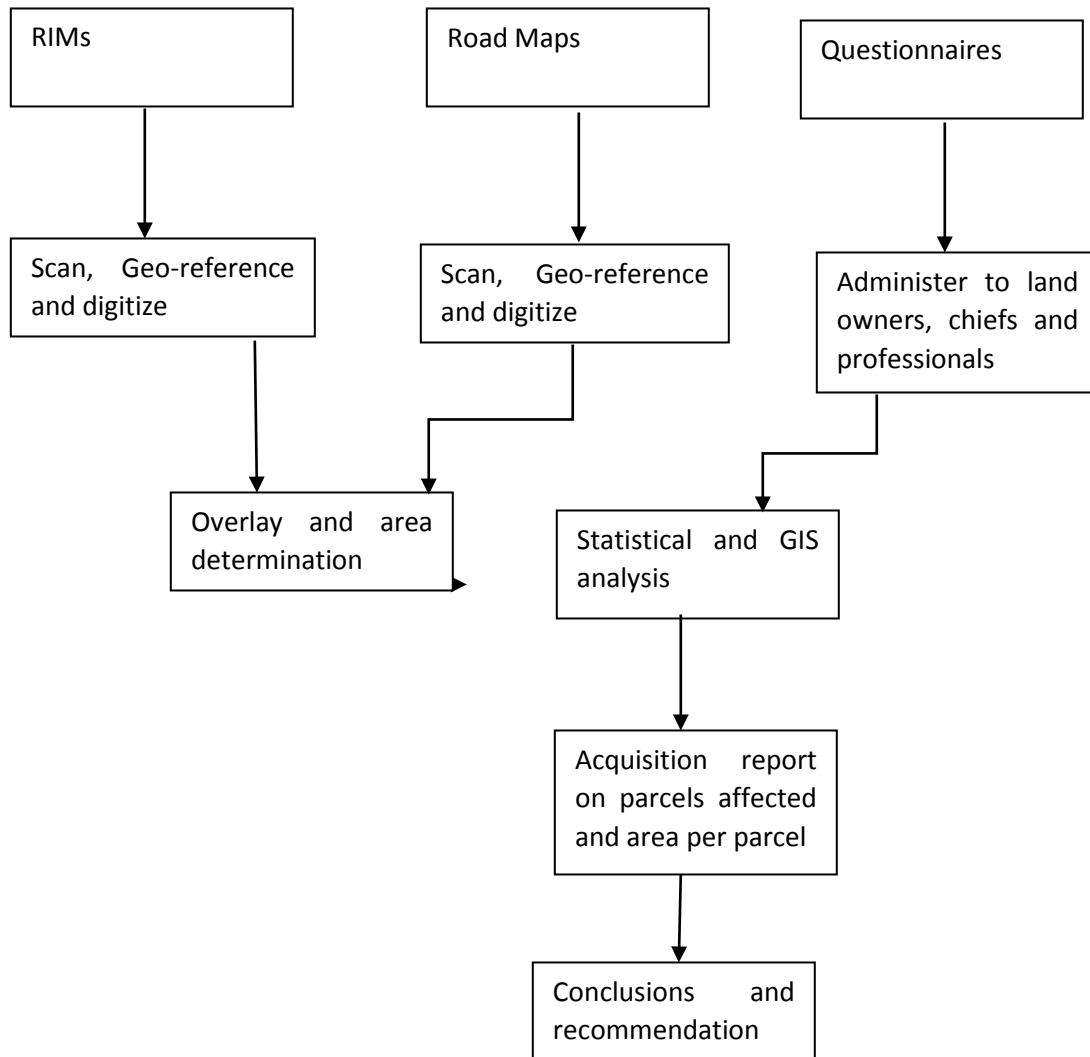


Fig. 2: Methodology flowchart

Two questionnaires were developed one to the land owners and the other to the relevant professionals and the local chiefs. Purposive sampling was used where the chiefs assisted in identifying the respondents whose parcels were affected by the acquisition. 160 and 22 questionnaires were distributed with an 83 and 86 percent response for questionnaire 1 and 2 respectively.

A total of 1941 parcels that are close to the acquired road were digitized. 649 parcels were affected by the road after the intersection of the parcels layer and the road layer as compared to 338 parcels listed in the Kenya gazette. The increase is associated to subsequent sub-divisions of the parcels after acquisition.

III. RESULTS AND DISCUSSIONS

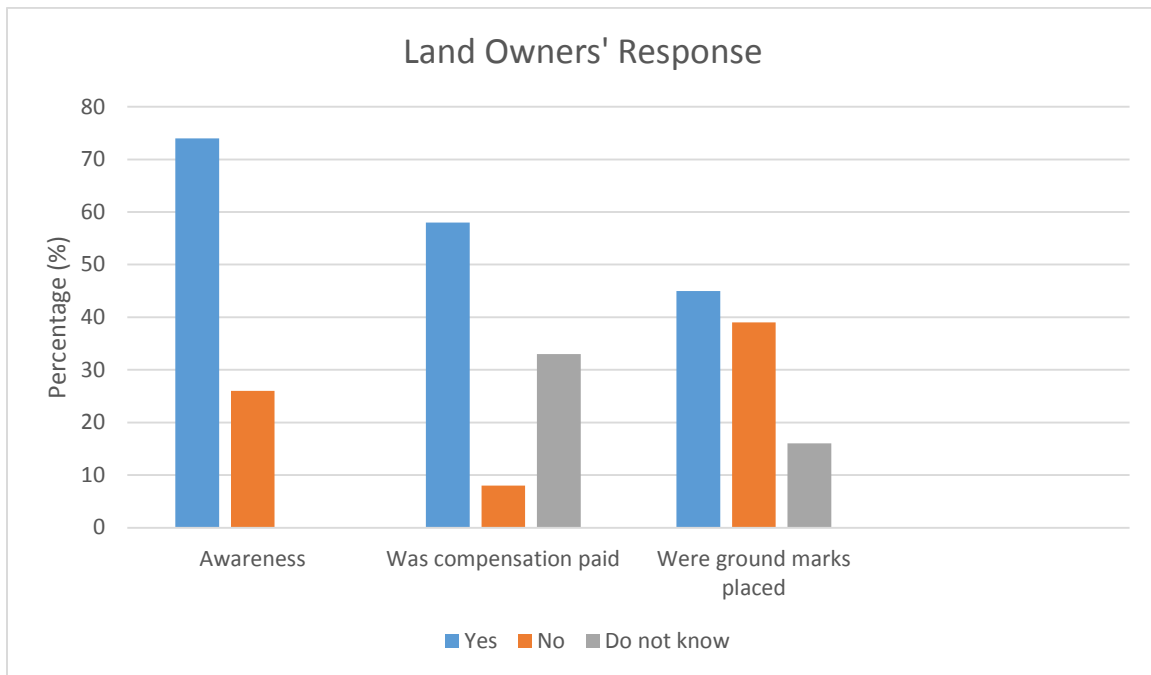


Figure 3: Land Owners' Response

From Figure 3 it can hence be concluded that land owners were aware of the acquisition and were compensated

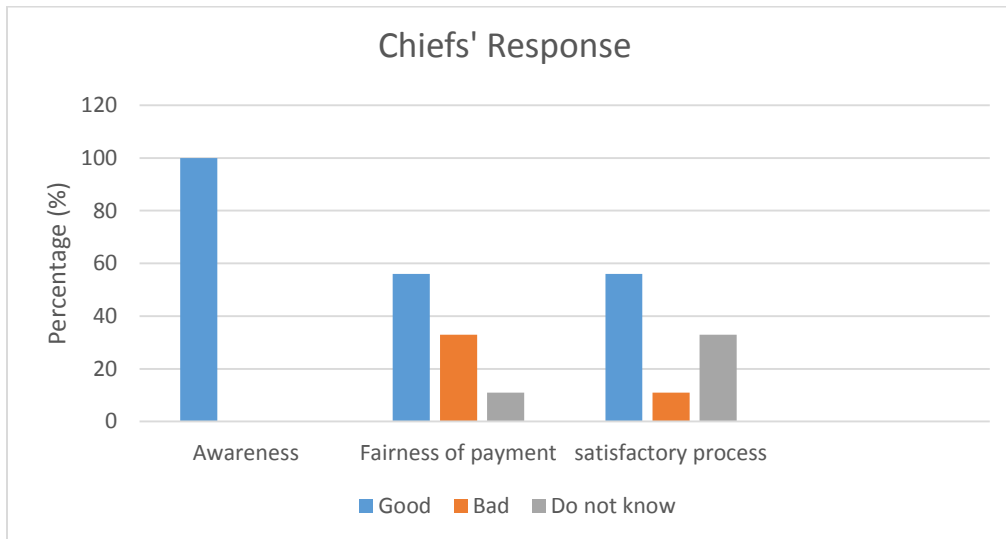


Fig. 4: Response from the Chiefs

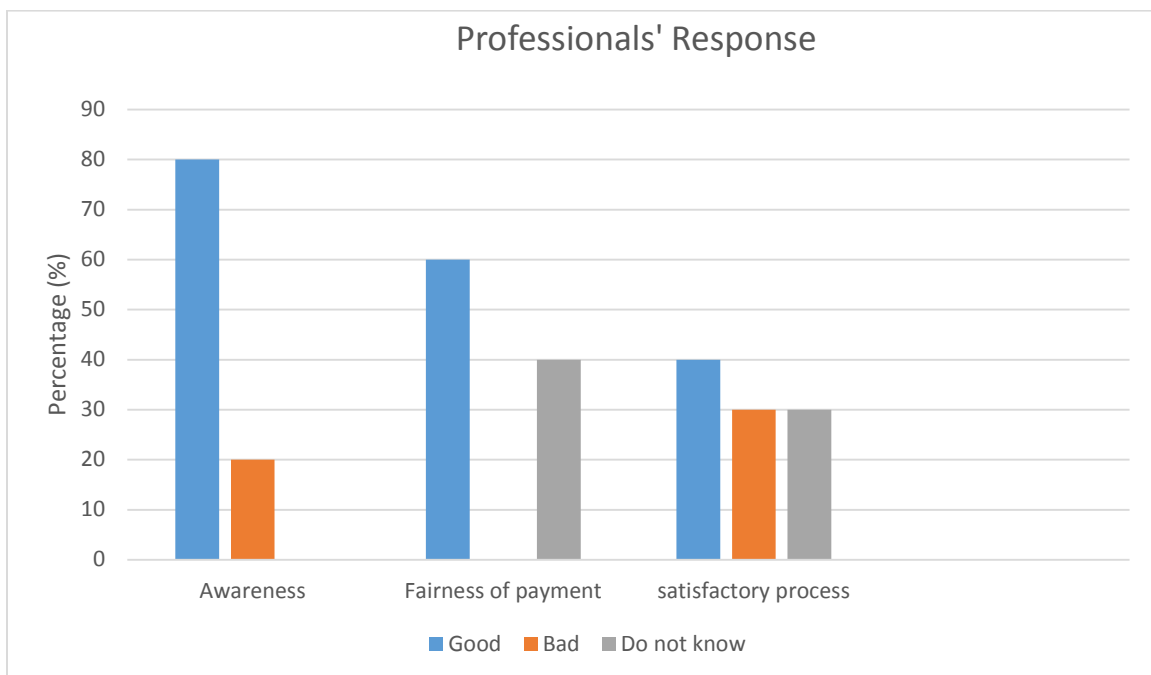


Fig. 5: Response from Professionals

All professionals based in Kiambu and the chiefs were aware of the acquisition and were of the opinion that the amount paid was adequate, fair and equitable as per the time of acquisition. Though most respondents said they were

satisfied with how the acquisition was done then, others felt that the failure of the government to take possession shows that the acquisition was not justified.

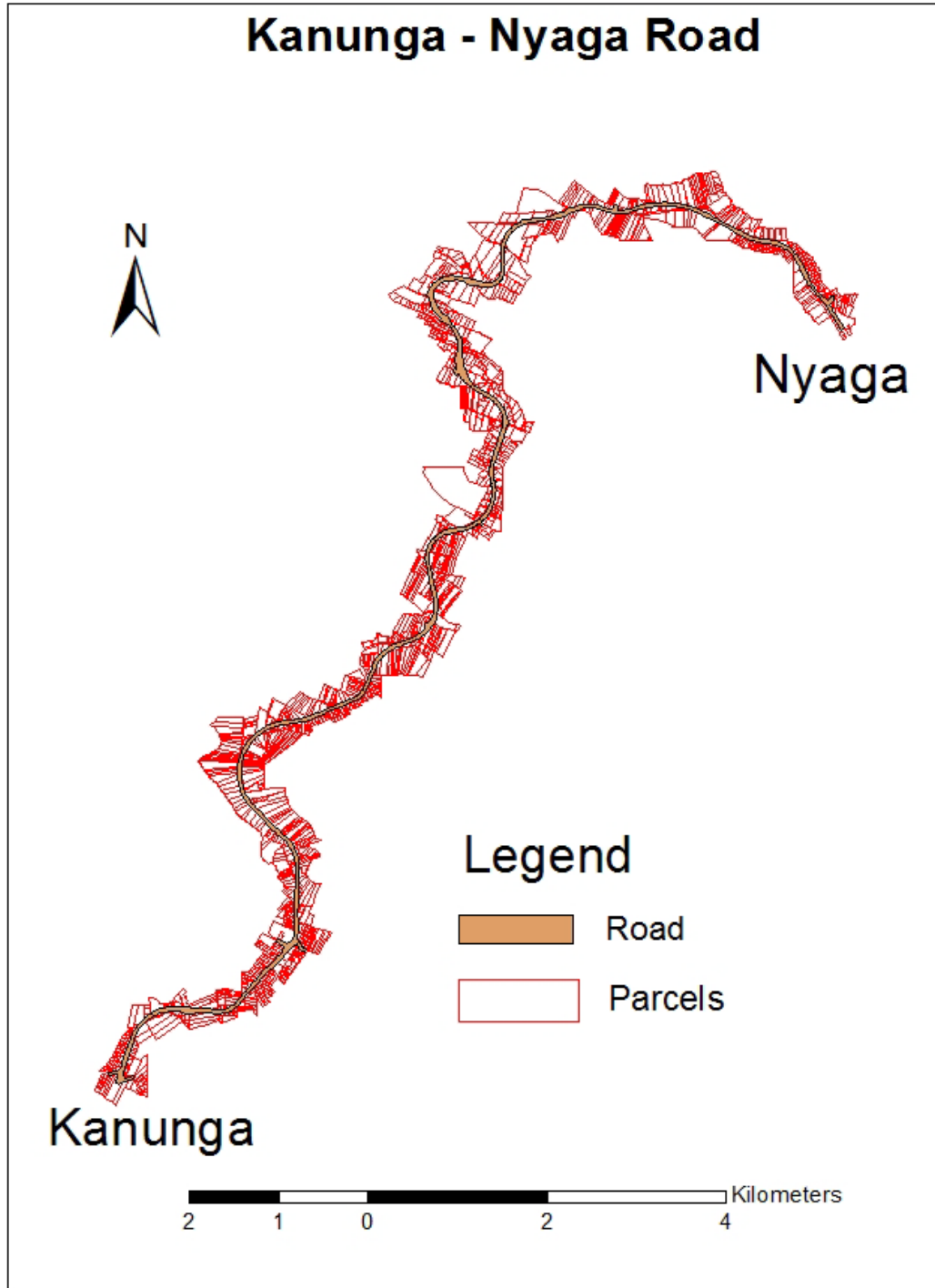


Fig. 6: The digitized layers

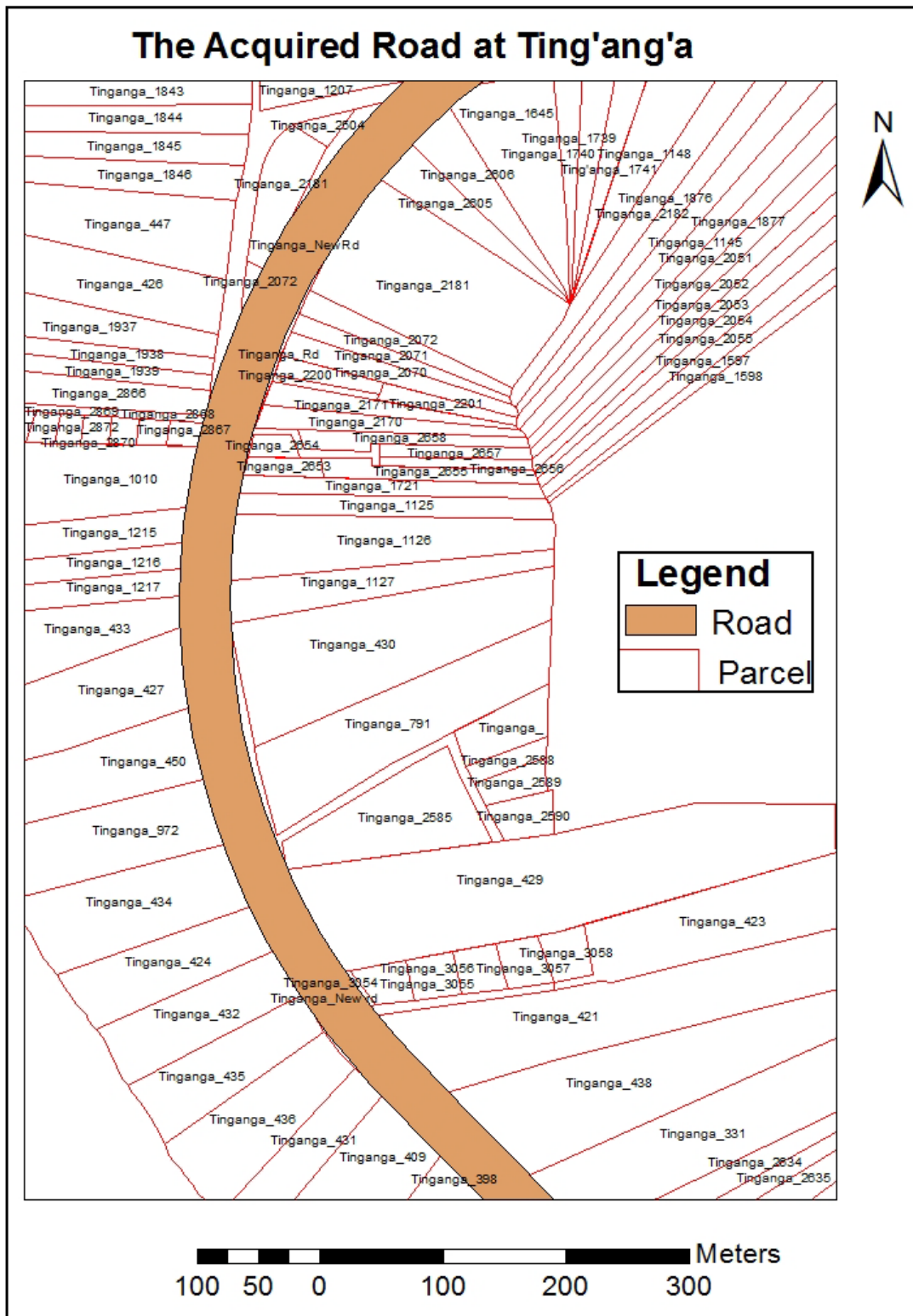


Fig. 7: Acquired road at Ting'ang'a

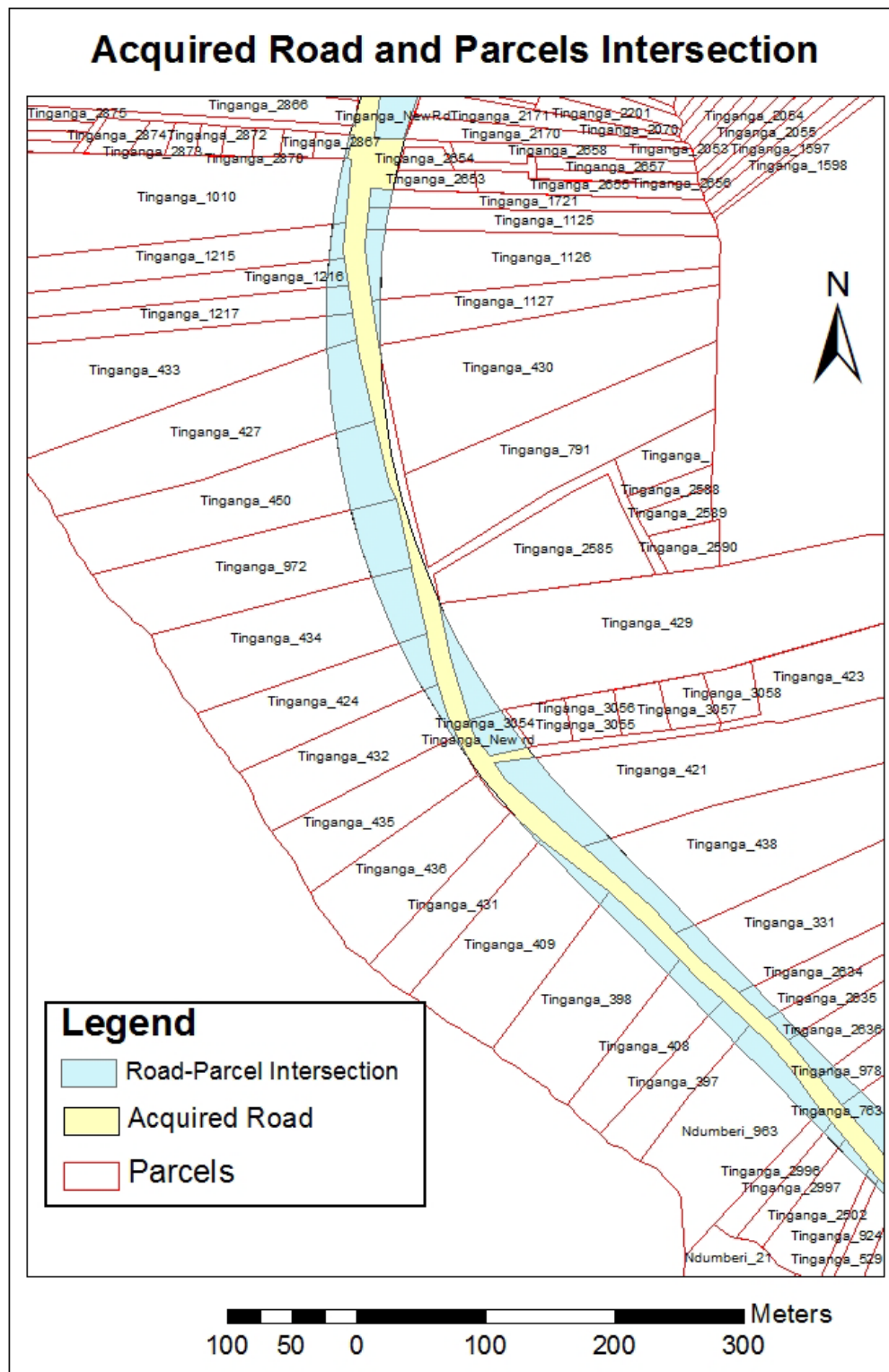


Fig. 8: Extract of the intersection of the parcels and road layers

TABLE II
EXTRACT OF THE LIST OF ALL AFFECTED PARCELS

Parcel_ID	area_ha	AcqArea_Ha	AqArea_Percentage
Ndumberi_NewRd	0.11941731890	0.11236699847	94.10
Giatheko_107	0.43865715031	0.14799971777	33.74
Giatheko_109	0.37780910546	0.14614002857	38.68
Giatheko_132	0.33138566839	0.29350653569	88.57
Giatheko_134	0.31664345031	0.26732716765	84.43
Giatheko_135	0.29293519508	0.16769369829	57.25
Giatheko_143	0.40817650503	0.00351805421	0.86
Giatheko_158	0.86072956182	0.13028838533	15.14
Giatheko_171	1.75806727925	0.11464563681	6.52

TABLE III
EXTRACT OF LIST OF PARCELS YET TO SURRENDER

<u>Parcel_ID</u>	<u>area_ha</u>	<u>AcqArea_Ha</u>	<u>AqArea_Per</u>
Giatheko_808	0.45490013806	0.20193603970	44.39
Giatheko_T140	0.09616450685	0.00091880411	0.96
Giatheko_T20	0.07545551432	0.02750728869	36.45
Giatheko_T21	0.07633778678	0.07015469359	91.90
Giatheko_T22	0.09164713598	0.09164713598	100.00
Giatheko_T223	0.04642524982	0.03673433642	79.13
Giatheko_T23	0.08385241521	0.00550296808	6.56

It is evident that irrespective of the acquired acreage from Table II and III that parcels remained intact on the RIMs

TABLE IV
ACQUIRED ACREAGE ON GAZETTE NOTICE COMPARED WITH THE ACHIEVED FOR TING'ANG'A PARCELS

Parcel_ID	area_ha	AcqArea_Ha	Gazt_AcqArea_Acres	Gazt_AcqArea_Ha	Difference	percentage Diff
Tinganga_1007	0.33145659744	0.09034768261	0.35	0.141643059	-0.05129537688	-36.21
Tinganga_1010	3.21819675312	0.03942211655	0.054	0.021853501	0.01756861594	80.39
Tinganga_111	2.78140274129	0.47758807472	1.7	0.687980575	-0.21039249995	-30.58
Tinganga_331	1.82855790971	0.09577384459	0.15	0.060704168	0.03506967624	57.77
Tinganga_341	0.95575156293	0.23952205131	0.66	0.267098341	-0.02757628944	-10.32
Tinganga_430	1.87436314715	0.00089771865	0.007	0.002832861	-0.00193514254	-68.31
Tinganga_431	0.55565033322	0.00391939195	0.005	0.002023472	0.00189591967	93.70
Tinganga_432	0.77147102582	0.03034530388	0.03	0.012140834	0.01820447021	149.94
Tinganga_433	1.89213599525	0.05061447274	0.1	0.040469446	0.01014502717	25.07
Tinganga_434	1.21528948962	0.14709262097	0.31	0.125455281	0.02163733971	17.25
Tinganga_435	0.71322764362	0.00304512301	0.003	0.001214083	0.00183103964	150.82
Tinganga_437	1.55674464379	0.09986357463	0.12	0.048563335	0.05130023995	105.64
Tinganga_438	2.16067038926	0.14963236695	0.4	0.161877782	-0.01224541532	-7.56
Tinganga_450	1.34057760261	0.20413293085	0.4	0.161877782	0.04225514858	26.10
Tinganga_529	0.27911276767	0.02009489575	0.1	0.040469446	-0.02037454982	-50.35
Tinganga_638	0.28516523096	0.02275806412	0.2	0.080938891	-0.05818082701	-71.88
Tinganga_763	2.33785567928	0.21569986569	0.43	0.174018616	0.04168124974	23.95
Tinganga_767	0.26827616368	0.02686985433	0.2	0.080938891	-0.05406903680	-66.80
Tinganga_924	0.18397952323	0.00900568627	0.07	0.028328612	-0.01932292563	-68.21
Tinganga_960	0.18452888398	0.00152397978	0.08	0.032375556	-0.03085157668	-95.29
Tinganga_967	1.14067964178	0.03345068339	0.08	0.032375556	0.00107512694	3.32
		1.96160030275		2.205180089	-0.24357978629	-11.05

The differences were noted mainly as acreage computation discrepancies. This highly supports why GIS should be used in the acquisition process since the acreage obtained is accurate hence compensation based on acquired acreage is assured.

The use of Google Earth and Satellite imagery further enable the analysis of the developments that are on the acquired land.



Fig. 9: An extract of the Intersected layer on Google Earth at Ndumberi Township



Fig. 10: Land Acquisition Process [5]

With land evoking a lot of emotion in Kenya, the national land policy has principles that provide for equitable access to

land, secure land ownership, effective regulation of land development, sustainable land use, access to land information,

efficient land management, vibrant land markets and transparent and democratic administration of land [6]. With the policy's guiding values especially of transparency and cost effectiveness, the process of land acquisition should aim at meeting them. The creation of Land Information Management Systems (LIMS) will ensure availability of land information for decision making in land administration and management [7].

The National land Commission is the main player in the Acquisition process (see Figure 10) as mandated by the Land Act, 2012 and hence should ensure that all institutions involved fulfil their functions. Other players include, the national and county governments, State Agencies, the land registrars, government printers, national/county survey office and the judiciary.

IV. CONCLUSION AND RECOMMENDATION

The process of compulsory acquisition should only start after the government has ensured reasonable justification for causing any hardship on the interested persons as required in Article 40 (3) of the Constitution. The acquiring body should sensitize land owners and have adequate public participation before and during the process, Expedite survey and valuation process and ensure clear ground marks are placed. Compensation for disturbance should be considered and Streamlining of documentation between departments and sharing of data. NLC should link up the departments. Sufficient funds should be acquired to complete the whole process and take possession immediately else ensure acquired land is protected from encroachment.

With geo-referencing of all parcels and the opening of National Spatial Data Infrastructure, greater protection of

acquired land is expected in future.

The results of this research may be used by the land registrar to register government interest on the parcels and the relevant Roads Authority to mark and protect the acquired land. The County Government may also use it to follow up on the construction of the road by KeNHA.

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