

Realizing Rural Area Cadastre and Land Management in the Emerging Technology

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SUMMARY

New technologies are emerging and abound everywhere. They have made surveying practice quite interesting and easier. But our rural areas where majority population is residing are still quite under surveyed in this era of new emerging technology. Hence, our rural cadastre and land management remains in comatose.

Investigations have shown that practicing surveyors still use the analogue driven instruments for most if not all their survey works. They lacked the innovation and prerequisite knowledge of the new technologies. Hence, they exhibit a lot of lukewarm in training and re-training programmes in the new methodologies. Also, existing laws (legislations) are archaic as there are no provisions for implementation of the new technologies.

Further, our rural areas lacked the necessary reference framework (controls) to ensure that surveys are carried out to produce cadastral plans (to show size/extent, shape, ownership, etc) of land parcels. Consequently, surveyors create disparate surveys by using local origins.

It is here being advocated for extension and densification of our controls to our rural areas. Also, reviewing and updating the present legislations to legally incorporate the use of these new technologies. Again, the practicing surveyors should become disposed to the new technologies by engaging in retraining through seminars/conferences and workshops. Hence paving the way to achieve our rural cadastre and land management.

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1. INTRODUCTION

The riches of land need to be tendered, managed and preserved for the future generation of tomorrow. This auspicious task which some people refer to as husbandry of lands start with obtaining and having necessary information of the facts about the land and at the same time should be readily available for various timely decision on land matters. This information comes in information of cadastre.

Cadastre according to Asoegwu (2000) is a complete up-to date official records or inventory of land parcels within an area administered by a government unit. He further states that the records include a variety of information on each constituent parcel depending on the purpose the cadastre is meant to serve. Therefore to realize this parcel based information requires that the size or extent and shape of these parcels must be determined or ascertained. Further, various interests and other attributes on the land –parcels must be recorded and properly kept. But these are realizable based on geodetic infrastructures in our urban and rural areas.

Ilesanmi (1999) defined urban area is an area of population with lower limit of 20000 (twenty thousand) people. This definition is in line with United Nations definition. There are other indices one can think of. So an area with less than 20000 people is a rural area. In the context of this paper we also refer to rural areas as where so many social, economic and geodetic infrastructures are lacking. It is an area where so many developmental projects and modern facilities are lacking for adequate human habitation. This sometimes leads to government designating the area as rural or urban. A state like Adamawa in the north has about 2417 settlement localities (1991 census) but still remains largely rural in nature as only 11 settlements met the United Nations 1993 criterion. This is a general trend throughout the country.

Consequently without the basic geodetic control in our rural areas the survey to determine the shape and size/extent of these land parcels are almost impossible. Also, some practicing professionals engage in cutting corners by involving themselves in illegal, practices unbecoming of professionals. Again they are still hell-bent in using old methodologies and technologies in their practices.

Hence, this research is undertaken to highlight the deficiencies in various practices of surveying in our rural areas and for our rural areas. Also, with the emerging technologies, new legislation at our disposal, the realization of rural area cadastre and management is imperative.

2. THE NEED AND BENEFITS OF PROPER CADASTRE AND LAND MANAGEMENT

It was Moremo who remarked: "... many newly-independent countries inherited colonial land administration system, which long ago lost touch with modern methods of lands management and even with realities in the countries themselves. On the one hand, countries are advised to under take cadastral surveys and land administration as indispensable for their land administration, but on the other hand, the techniques and operations required are too costly and time consuming for any of them to do so ..." Hence the benefits from cadastre and appropriate land registrations as enunciated by Dale and McLaughlin (1988) are summarized in Table 1.

Table 1 Benefit of land registration

S/No	Benefits
1	Certainty of ownership
2	Security of Tenure
3	Reduction in land disputes
4	Improved conveyance
5	Stimulation of the land market
6	Security for credit
7	Monitoring of the land market
8	Facilitating land reforms
9	Management of state lands
10	Greater efficiency in land taxation
11	Improvement in physical planning
12	Support for land resource management

Source; Dale and McLaughlin (1988)

A certainty of ownership comes from a better land records which makes recognition of ownership certain and shows other rights that exist in the land. Also, security of tenure will be advantage to our rural areas dwellers where farmers have an incentive to take greater care of land and to invest their capital and resources. In all we stand to gain a lot from appropriate cadastral system, Infact, the cadastral system many be used to support physical planning in both the urban and rural areas. Better land administration should lead to greater efficiency in local government. Many development programmes like roads, utilities, have faired or been unnecessary expensive, because of a lack of knowledge of existing land rights, The cadastre also provides a basis for restricting certain uses of the land for instance those that might give rise to environmental problems.

In fact, building and establishing land information system is almost a reality with good cadastral records.

3. GEODETIC FRAMEWORK/CONTROLS

Geodetic frame work/controls are networks of monuments and benchmark emplaced on chosen position whose plane coordinates of northing and easting in a chosen projection system and possibly vertical positions have been observed. They are established to serve the several needs of coordination of cadastral surveys in our urban and rural areas, and they are presumed to satisfy the three general criteria of (i) precision (ii) reality and (iii) economy. These are designed to serve a wide range of users and ranging from reconnaissance-level Surveying, through small- and large- scale mapping engineering surveying to scientific research in geophysics. Also geodetic controls defines a unique reference framework through which mapping, field surveys and other data collection activities in any given area can be spatially integrated. Further, it is needed so that the relative positions of different features are established or compared.

In Nigeria, the control network is the scheme of Nigeria primary triangulation and traverse network which were observed some five decades ago. Some earlier studies; Adaminda and Field (1985), Ono and Igbokwe (2000) and Omoigui (1975) had identified various deficiencies in the network. Some of these deficiencies include poor/low order equipment and techniques used. Also, there is still yet no simultaneous adjustment of the network and some of the stations are placed on hill-tops which make the stations inaccessible.

Again, it is identified that the coverage of this network is mostly in urban areas which is also rather sparse. There is little or nothing in our rural area in terms of geodetic controls, and yet this is the area majority of population resides and most especially the farming population. The lack of these controls in the rural area has encouraged so many vices on the party of professionals surveyors like establishing indiscriminate “local origins” that are not linked or connected to Nigeria Primary triangulation schemes or the national network. Infact, cadastral surveys to determine the correct size and shape of land parcels which will further engender proper cadastral records and land management are impossible. Hence, a large section of the population believe that it is not important to carry out survey of land parcels.

The Nigerian nation is made of thirty-Six states long side with Abuja as the seat of the Federal capital. Also, there are presently seven hundred and seventy four (774) local government areas throughout the country. Some states have further created some smaller administrative unit called Development areas (units). The creation of states, local government areas and development areas has also necessitated new responsibilities of developing new areas. Consequently, some states have embarked on establishing, extending and densifying geodetic controls to cover these new areas, For example, two states of south eastern, Nigeria, i.e. Anambra state carried out the establishment of GPS controls and was within 10 (ten) kilometer radius, specifying the state capital. In Enugu state, the project is still ongoing and it’s being sponsored by state branch of Nigerian Institution of Surveyors. The design is better in that, the proposal is to observe at least three controls station in each of the local government areas of the state.

4. NEW TECHNOLOGIES /NEW METHODS AND PROBLEMS

There has been a tremendous emergent of new technologies and methods. Such new technologies include: GPS, (Global positioning system), Total stations, GIS, etc. The new technologies have brought new methods and attendant problems. The two projects of controls extension and establishment in two states of Enugu and Anambra are being extended with GPS technologies which is satellite based technique. This is quite good but this also is creating new problems of new controls different from Nigerian triangulation controls which actually are not subject matter of this paper. There are now available two sets of coordinates – one from satellite based techniques and the other from triangulations and traverse (terrestrial) techniques. From investigations, the professional practitioners are still using the coordinates derived from terrestrial techniques. In some instances, there is a mixture of the two because of inability to identify which is which.

Well the two techniques can be integrated so that we have one improved coordinates for use by all practitioners. Alternatively with transformation parameters, one can move from one system to the other, hence achieving consistency and uniformity. Still, this new technology has not been fully applied in our rural areas in order to promote our rural cadastre and land management.

5. PRACTITIONERS AND NEW TECHNOLOGIES

The Nigeria Institution of surveyors (NIS) has in 1998 introduced Mandatory Continuing Professionals Development (MCPD) for its members. One of the main objectives is to keep its membership with latest information on new development in the profession and make every body to be abreast of time. A complementary and supplementary effort through workshops and seminars are also being provided by many state branches of NIS.

But, there is no tangible success noticed yet in the applications of the new technologies and techniques in the cadastral survey and land management. There are nearly two thousands registered professional surveyors in Nigeria (NIS, 2004). A sample from some states in Nigeria showed that most private surveyors' offices are empty. They are empty in the sense that these new technologies are not found and therefore not being used. Even the commonest cloned computer set is not there. What you find in the offices are still old analogue instruments. Ironically, they are so much contented as they are still using the old analogue instrument and techniques to make their money and keep afloat. What is in the least of mind is to apply the new technologies (acquired) from the MCPD seminars/conferences and workshops.

You cannot find any latest software packages for survey works in the survey offices. A highly appreciable new technologies and techniques are found within the survey firms working in the oil industries. Also, training institution, like Universities and Polytechnics are doing fairly well in trying to use and apply the new technologies.

Now, the irony of the situation is that it is the professional practitioners that engage in most surveys of these rural areas. They still produce plans of blue copies and red blanket copies which are submitted to survey units in the ministries. Hence, they are perpetuating hard copy syndrome and analogue storage. The most usual thing is manual filing as the various survey units are not computerized automated. In some instances, the surveys are not even submitted for charting and registration. This may be a fall out from illegal practices such as connection to non-existent controls or local origin. This is quite in conflict of Kukoyi (1980) when he recommended that

“the private surveyor should endeavour through up-dated professional knowledge, improved skill, a good comportment in society, establishment of impressive survey offices, sincerity and mutual respect in dealing with colleagues, clients, indeed members of the public to reflect dignity on the profession”

6. SURVEY OFFICES DISTRIBUTION

From, NIS (2004), survey offices were compiled state by state based on the addresses supplied. This is shown in Table 2. Lagos state has 72 survey offices or 25.09%. In fact that there are offices in the southern part of the country shows greater practices of cadastral and may be more cadastral records and land management. Actually, a survey office implies practicing professional surveyor exists.

Table 2: Survey offices Locations

S/No	States	No. of Survey Offices	Percentage
1	Abia	12	4.18
2	Adamawa	0	0.00
3	Akwa Ibom	6	2.09
4	Anambra	12	4.18
5	Bauchi	1	0.35
6	Benue	2	0.70
7	Bayelsa	1	0.35
8	Borno	0	0.00
9	Cross River	4	1.39
10	Delta	20	6.97
11	Ebonyi	0	0.00
12	Edo	14	4.88
13	Ekiti	1	0.35
14	Enugu	11	3.83
15	Gombe	0	0.00
16	Imo	17	5.92
17	Jigawa	0	0.00
18	Kaduna	5	1.74
19	Kano	1	0.35

20	Katsina	0	0.00
21	Kebbi	0	0.00
22	Kogi	1	0.35
23	Kwara	8	2.79
24	Lagos	72	25.09
25	Nasarawa	0	0.00
26	Niger	1	0.35
27	Ogun	12	4.18
28	Ondo	7	2.44
29	Osun	10	3.48
30	Oyo	27	9.41
31	Plateau	2	0.70
32	Rivers	37	12.89
33	Sokoto	0	0.00
34	Taraba	0	0.00
35	Yobe	0	0.00
36	Zamfara	0	0.00
37	Abuja	3	1.05
Total		285	100.01

Source: NIS (2004)

It is noted that twelve (12) states representing one third or 33¹/₃ percent do not have any survey office that would show a practicing professional surveyor exists in the state. The distribution shows that these states are in the North East and North West of Nigeria. They are Adamawa, Gombe, Bauchi, Taraba, Sokoto, Yobe, Zamfara, Katsina, Kano, Jigawa and Borno. There is one state in south east without a survey office. The Table 2 shows more concentration of offices in Lagos, Rivers, Oyo, Delta, Imo, Edo, Enugu etc. Actually, the number of offices shows the level of professional practices going on there. Also, it shows great awareness of the needs of surveying among the people. More activities based on this, is recorded in the south-south, south west and south east geopolitical zones of Nigeria. This is attributable to oil exploration and exploitations in the south and further by the land tenure law which allows for individual ownership of land. Again, higher institutions that offer surveying and geoinformatics courses are mostly located there.

A quite number of surveyors engage in freelancing and prefer not to rent an office but rather to use their residential homes as offices. Thus, any time they have cadastral survey to do, they go to hire the analogue instrument to carry out the job.

7. BEACONS/PILLARS ESTABLISHMENT AND RE-ESTABLISHMENT

One of our discoveries concerning carrying proper surveys is the attitude of people in the urban and rural areas on survey beacons/pillars. It was and still is a common occurrence and sight for survey beacons and pillars emplaced by surveyors are either destroyed or removed and emplaced at the wrong places. These are situations where they are even fenced off. The consequences of this, makes future surveys or re-establishment most difficult for the cadastral

surveyor. Hence, the hope of fully realizing rural cadastre becomes a mirage. Also, instead of having peaceful rural community for proper land management, what we have is a restive community engaged in land disputes.

Government is being called to fully implement the regulations and even constitutional provisions on importance of survey beacons/pillars. The Cap. 194, part. 4, section 28 states: any unauthorized person who shall willfully obliterate, remove or injure any trigonometrical station, set up or placed for the purpose of any public survey mark affixed, survey order by a court, shall be liable to a fine of twenty pounds or to imprisonment for three months or to both, and in addition may be ordered to pay the cost of repairing or replacing the thing obliterated, removed or damaged and of making any survey rendered necessary by the act for which the conviction is made.

It is obvious that the penalty for this offence is grossly inadequate in the present circumstances. The regulations have so much become archaic and incapable of policing or checking the offence. One can decide to pay twenty pounds (or approximately N5000) and commit an offence that can even lead to loss of life or properties worth millions of naira. More stringent legislations in tune with modern times and requirements are advocated to deter persons involved in this practice.

One other thing is the quality of the pillar. It was noticed that the quality of the beacons has dropped considerably and with a little pressure, they break. The right specification should be followed to avoid these unintentional damages.

8. FINDINGS AND DISCUSSIONS

From field investigations in the southern part of country, the professional practitioner's unbecoming practices have resulted in the following:

- In most cases, no surveys are conducted to cover transactions, on land, especially when family lands are being allocated to family members to build their homes or as farm lands. In their lands subdivisions, they apply primitive techniques such as stepping, pacing, visual estimate or by use of bamboo sticks etc.
- Boundaries are demarcated by fence walls, life trees, e.g. 'ogirisi' or 'odu' or by use of 'mbe' ridge mounds and so, no records of such deals are kept.
- In the above cases are boundary information, size, location, title, deeds register, control system and other base information, necessary for the establishment of land information system are not available.
- About ninety-five percent of practicing surveyors are still deeply using analogue instruments and are mostly are not computer.

Because of these bad practices, no land records are kept at rural areas levels. It is a common place to notice cases of lands disputes and most especially land speculation is so rampant. The case of existing legislations which in most cases have become obsolete and clog in the wheel of development is still a big hindrance. A case in point is the land use Act of 1978, By

this Act, all lands in the country are vested in the control of the government empowering only the state governors on application to grant applicants for urban lands statutory right of occupancy, while the chairman of local government areas, the authority to grant applicants for rural lands customary right of occupancy. Upon all these, people still exercise individual ownership over land while selling and buying land is very common in the southern part of the country. Even government accept back dated document of recent lands transaction and issue certificate of occupancy.

In section 36 (3) and (4) which stipulates the use of “a sketch” or a diagram, or any other sufficient description of the land not in an urban areas, thereby undermining the importance of accurate survey plans for representation of property boundaries, location, size. Yet, the bulk of the country’s lands are located in the rural areas.

Again, the existing legislations allows surveys plans to be made in blue and red blanket copies coupled with this, the surveyors still use analogue equipment that give low accuracy in their practice. Infact as at present, there is no law authorizing the use of digital /electronic equipment in our cadastral system. This is a great set back. The need is now for the existing survey laws and regulations to be completely reviewed in order to introduce legally the use of the new electronic /digital equipment for control establishments for surveying and mapping.

9. CONCLUSIONS AND THE WAY FORWARD

It is of note that our cadastral surveys are tied to so many different origins as they (cadastral surveys) are controlled by individual states. The scales also vary from state to state and in many cases some states do not even have any particular scale. Onyeka (2000) reported that in Enugu state in the eastern part of Nigeria, plans are charted at a scale of 1:2500 for urban areas. In Lagos state, western part, it is 1:1200 and 1:2400 in Nasarawa state of northern part of Nigeria. Even, in Anambra state, most cadastral survey plans are drawn with such scales as 1:500; 1:1000; 1:1200 etc.

It is being advocated that variations in scale should not be encouraged and for orderly data compatibility, the origin and accuracy of the plans be harmonized and uniform. Further, the many existing local origins should be transformed to a uniform national origin. The existing survey laws and regulation are retarding the modernization of cadastre. Therefore, the law should be revised to accommodate the lawful use of the emerging technologies and especially in the extension, densification of controls which hopefully will eliminate the establishment of local origins.

As part of revising the existing laws, it should be compulsory for new surveys and new plans to be presented in computer compatible form such as CD-ROMs, Floppy disc etc. this will also ensure that surveyors become computer literate. The MCPD (Mandatory Continuing Professional Development) programme of the NIS should be revitalized and reinvigorated to ensure that new ideas and technologies imparted and acquired are implemented. Again, as a way of encouraging the buying of the new and modern equipment, noting the prohibitive

costs, survey practitioners can come together and pool resources in order to acquire these new technologies. Above all, they must possess the spirit of change and acquiring new knowledge.

In conclusion, to facilitate the realization of rural areas cadastre and land managements, we need massive integration of modern technologies in our system, reviewing the existing laws that have proven to be cog in the wheel of progress, the re-orientation of professionals to be more innovative and dynamic to follow the trend of things evolving in the modern times.

REFERENCES

- Adaminda, I.I.K. and Field, N. (1985). Strength analysis of the south eastern loop of the Nigeria triangulation. In Agajelu, S.I (ed.) Proceedings of symposium on definition of the Nigeria geodetic datum
- Agajelu, S.I. (2000). The reference framework for a modern multi-purpose cadastre in Nigeria. An invited paper for the seminar/workshop on functional multipurpose cadastre for national development. NIS, Enugu Branch.
- Asoegwu, R.N. (2000) on the concept of multipurpose cadastre. An invited paper for the seminar/workshop on functional multipurpose cadastre for national development. NIS, Enugu Branch
- Dale, P.F. and McLaughlin, J.D. (1988) Land Information Management: An introduction with special to cadastral problems in third world countries. Oxford University Press.
- Ilesanmi, F.A. (1999). Urban settlements. In Adebayor A.A. and Tukur, A.L. (eds.) Adamawa state in maps. Dept of Geography, FUTY and Paraclete Publishers, Yola. pp 104-106.
- Kukoyi A. (1980) The Role of the private surveyor Seminar on surveying and mapping in Nigeria University of Lagos
- Nigerian institution of surveyors (2004) Directory of members
- Omoigui, D.A. (1973. the Nigeria triangulation and the scale check programme. International seminar on electronic distance measurement, University of Lagos, Lagos Nigeria.
- Ono, M.N. and Igbokwe, J.I. (2000). Towards realization of a uniform geodetic reference network for surveying and digital mapping in Nigeria. Environmental Review Journal, Vol. 3, No. 2.

BIOGRAFICAL NOTES

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