

SURVEYING PRACTICE IN NIGERIA: STRATEGIES FOR SURVIVAL IN THE NEW MILLENNIUM

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ABSTRACT

Surveying is one of the oldest professions in Nigeria and has, since its inception, been governed by a number of legislations. The training of survey manpower is done at three levels. Professional training is carried out mainly in the universities, the technologists are trained mainly in the polytechnics and colleges of technologies while the technicians are trained in the polytechnics, state survey schools or on the job. Two main professional bodies exist within the profession to cater for the interest of the members. The practice of surveying in Nigeria is divided into two components: the public and private sector practices.

Recent development in computer, digital, information and satellite technologies have influenced tremendously the practice of surveying all over the world. Maps can now be produced on almost real time basis using digital satellite images with resolutions of up to 1m. These changes are taking place in very quick successions and this poses a great challenge to the professional practice and its survival in this millennium.

There is an urgent need to broaden the scope of training for surveyors in our institutions so as to incorporate courses in digital and geoinformation technology, satellite technology and environment, apart from the traditional courses. Due to the cost of equipment and the rate at which technology is changing, formation of surveying equipment-leasing companies should be encouraged. Merger of firms or, in the alternative, co-operative efforts by two or more firms should also be encouraged so as to be able to pull resources together to face future challenges. Furthermore, for surveyors to be consistently relevant, they must continuously update themselves through participation in seminars, workshops and conferences as well as participate in the Nigerian Institution of Surveyors Mandatory Compulsory Development Programme (MCPD).

1.0 INTRODUCTION:

A number of definitions for surveying have been given by Clarke (1973) and Fajemirokun (1988). Nwilo (1999), however, defined surveying as that branch of the geosciences that deals with the location of points on the earth's surface; the storage; retrieval and management of the geospatial data; the graphical representation and visual presentation of such points and the determination of the figure of the earth and its gravity field using the methods of applied mathematics and physics as basic tools. The production of maps from such spatial data can be in digital or hard copy format. To meet this definition of surveying, a surveyor has to be very knowledgeable in the fields of:

Geodesy;

- Photogrammetry and remote sensing;
- Hydrography;
- Land surveying;
- Cartography;
- Geographic information system (or Geospatial Information System);
- Mathematics and
- Physics.

A modern surveyor, therefore, in addition to determining the relative positions of natural and man made features on the earth's surface, and storing, managing and retrieving these data in a useable form, is also interested to some extent in the determination of the shape and size of the earth. The implication is that the surveyor's education should cover a rather wide area, while allowing for a desire to specialise in any of the fields highlighted above.

Surveying is often said to be the framework on which all developments on the earth's surface take place. Provision of infrastructure; exploration and exploitation of minerals; siting of industries; planning of towns and cities; management of hazard problems such as erosion, flooding, earthquakes and subsidence; coastal management issues, resource exploitation on the land and on sea are all dependent on surveying products. Currently, survey personnel are trained in the universities, polytechnics and through apprenticeship. These methods of training have been extensively dealt with in Fajemirokun & Nwilo (1996).

1.1 BRIEF HISTORY OF THE SURVEYING PROFESSION IN NIGERIA

The practice of surveying in Nigeria can be said to be as old as Nigeria, for surveying is one of the oldest professions practised in the country. In fact, there is evidence of the practice of the profession even before the amalgamation of the Northern and Southern protectorates in 1914. For example, a map of old Calabar town was produced on a scale of 1/930,000 by the Presbyterian Church as far back as 1868 (Ayeni, 1981). Also, survey departments existed in Lagos and Kaduna as early as 1899 and 1900 respectively. Much of the activities of these departments were mostly cadastral. The discovery of tin ore in Jos in 1912 and the boom in agricultural activities in Kano provided the necessary rationale for carrying out cadastral surveys (Okoronkwo, 1984). Furthermore, the first system of levels run in Nigeria was in 1891, while the first system of levelling for vertical controls in Nigeria started in 1920 and continued up to 1945 (Fajemirokun & Nwilo, 1990; Ebong, 1981).

Before regions were created in the early fifties, surveying in the country was under one umbrella of Nigeria Surveys with sub-headquarters in Ibadan, Enugu, Kaduna and the headquarters in Lagos. All surveys for cadastral, topographical, trigonometrical

and geodetic purposes were carried out under the direction of the Federal Surveys in Lagos. The early exposure of the country to the profession of surveying is no doubt due to the key role, which the profession plays in the physical development and economic planning of any nation. It is gladdening, therefore, to note the vital contributions of the forebears of the Nigerian Surveying Community to the development of this country in its early days and throughout her colonial days both through the use of products of the profession in the planning and provision of physical facilities and infrastructures, and also through political activities of some of the members of the profession (Fajemirokun and Nwilo, 1994).

1.2 SURVEY LAWS

Surveying in Nigeria had always been governed by laws and regulations since the introduction of the profession into the country in the later part of the nineteenth century. The laws and regulations are necessary for the following reasons:

- (i) because of the nature and scope of the work involved in surveying (for example surveying touches on national security);
- (ii) to protect the interest of the public to whom surveyors offer their services for a fee; and
- (iii) to ensure high standard of professional practice (Ajayi, 1984; Nwilo, 1999).

The legislations on surveying and mapping are embedded in Acts and Decrees. The main legislations, however, are:

- (i) Chapter 194 of the Laws of the Federation of Nigeria 1958 including the several amendments;
- (ii) the Survey Coordination Act of 1962 (including the amendments of 1968 and 1974); and
- (iii) Decree 44 of 1989 – Surveyors Registration Council of Nigeria Decree.

There are other laws that touch on surveying and mapping and these have been highlighted in Nwilo (1999). Among these, the land use decree in particular revolutionised land ownership in Nigeria (particularly in the southern parts of the country) with all lands in a state vested in the governor of the State.

1.3. TRAINING OF SURVEYORS IN NIGERIA

It is often claimed that the Nigerian Surveyor was the first professional man to be exposed to formal training locally. Indeed, a school for training of surveyors was first opened in 1908. That school was later moved to Ibadan in 1927 from where it finally moved to Oyo in 1935. When the Yaba College of Technology was established around 1932 as the highest institution in Nigeria, a provision was made for prospective surveyors to undergo basic educational studies in the institution for two years, followed by two years of surveying at the Survey School, Oyo. Successful candidates were subsequently to be awarded diploma of the College. The first exposure to University education came in 1947 when the first university in the country was established as the University College of Ibadan. There, provision was made for the training of professional surveyors for the country. The programme was later discontinued following a change in the policy of the

colonial administration. After the closure, the training of surveyors was again an overseas programme while technicians and instrument men were trained at Oyo from 1952. The Nigerian College of Arts, Science and Technology, Enugu was opened in 1955 and in 1956 a 4 year survey programme was started there. Surveying students in this institution were prepared for the first and intermediate professional examinations of the British Royal Institution of Chartered Surveyors (R.I.C.S). Some of the students later had to travel overseas to complete their professional courses.

1.3.1 University Education

In 1962, the Enugu College of Technology became part of the then two year old University of Nigeria, Nsukka and the Nigerian Surveyor was again exposed to University education. The first set of 5 students of surveying from the University graduated in 1966, 58 years after the first Survey school was opened in Lagos (Fajemirokun, 1976).

The University of Lagos admitted the first set of students in 1970 to do a 2 - year conversion M. Sc. programme in Surveying. In 1974 session, the first set of five students were admitted to pursue a three year B.Sc. programme after obtaining 3 A 'Level papers or having completed a one year preliminary programme in Engineering in the Faculty of Science. In addition, a postgraduate diploma programme for graduates with relevant degrees was introduced the same year. (Department of Surveying Unilag, 1980). The three-year undergraduate programme was later changed to a four-year programme to allow for enough practical experience before graduating. Today, admission is by a Joint Admissions and Matriculation Board (JAMB) conducted examination and the course is a five year programme after passing the Senior Secondary School Certificate Examinations. The Department of Surveying, University of Lagos now admits yearly an average of 50 students although some of these later change departments. Prior to all these, the Faculty of Engineering of the University of Lagos in 1967 arranged for a few students who were surveying undergraduates of the University of Nigeria, Enugu Campus and who were displaced by the Civil War, to complete their degree programmes in the Faculty, and earn a degree of the University.

The Department of Surveying, Ahmadu Bello University, Zaria was, set up at about the same time that the University of Lagos started offering Surveying at postgraduate level. At present apart from what may be regarded as the first generation university surveying departments, it is known that surveying is offered at degree level at the Universities of Science and Technology, Port Harcourt; and Enugu; the Universities of Technology, Minna and Yola, and the University of Uyo, Uyo. The establishment of more departments tends to deplete the number of qualified staff available to each university, as there are very few lecturers in surveying. This is however, not peculiar to surveying as most other courses are similarly affected.

1.3.2 Technological and Technical Education

Surveying is offered at Higher National Diploma level at the Federal Survey School, Oyo and the Kaduna Polytechnic. A number of Polytechnics and Colleges of Technology offer surveying at National Diploma level. The details of the exact number of these

institutions are not readily available but according to Yabani (1989), 13 Polytechnics were accredited to offer courses at National Diploma level, while only one was accredited at the HND Level in 1989

A few institutions such as the Federal Survey School, Oyo and some State Survey Departments offer trainings leading to Technical certificates in surveying, photogrammetry and related subjects.

1.4 PROFESSIONAL PRACTICE DEVELOPMENT

The need for formal courses of study in surveying for would-be surveyors in the country is now generally accepted. This has not been always so. The alternative to formal education - apprenticeship training was a popular and an acceptable way to rise to be a surveyor, since many of our past candidates were not otherwise qualified to undergo formal courses. Others preferred the financial benefits accruing from apprenticeship (Fajemirokun, 1976). In the past, one could advance from apprenticeship and through series of examinations to eventually qualify as a full professional. Under the Licensing Board, one had to undergo series of examinations to become a surveyor anyway, formal training or not!

The Licensing Board has now been replaced by the Surveyors' Council of Nigeria (SURCON). The Surveyors' Registration Council of Nigeria Decree 44 of December, 1989 otherwise known as the SURCON decree states that SURCON shall maintain a register which shall be in four Parts, of which the first shall be in respect of surveyors, the second in respect of pupil surveyors, the third in respect of technologists and the fourth in respect of survey technicians. Advancement within the profession had so far been by one form of examination or the other, or through the acquisition of new qualifications. In the opinion of the authors, a major difference between the present situation under SURCON and the situation under the Licensing Board is that in addition to the SURCON recognising the existence of Surveyors and Pupil Surveyors, it also recognises Technologists and Technicians. The SURCON Council membership is also more broad based although this has made for a rather unwieldy, expensive and perhaps a difficult - to - manage Council. A major achievement of SURCON is the clearing of a back log of people seemingly qualified to practice but denied licence one way or the other. All has, however, not been well with SURCON. Part of the problem include huge financial expenditure of the council due to the number in the Council, periods of inactivity due to the non - reconstitution of the Council as at when due, and the Council at one time was bogged down in a law suit which could have been avoided! For about two years now, the Council had remained dissolved, a regrettable situation that does augur well for the profession.

As could be seen above, SURCON is responsible for the registration of people to practice surveying within the country. In addition, the body has the responsibility of maintaining discipline within the profession. It is in the light of this that SURCON set up, as provided by the decree establishing it, a Disciplinary Committee to deal with the issue of surveyors collaborating with the quacks to bring the profession into disrepute. A number of surveyors were given different degrees of penalties emanating from the

decisions of the committee. It is believed that these actions had served as example which will deter other would be offending professionals. But it is very necessary to maintain this tempo.

Apart from SURCON, which is a statutory body, there is the professional association, the Nigerian Institution of Surveyors (NIS). This association brings together all surveyors, pupil surveyors, survey technologists and survey students within the country. The Institution fought tirelessly for the birth of SURCON and finally succeeded in 1989. It is about the oldest professional body in this country and has been in existence for over 60 years (Okoronkwo, 1984) having metamorphosed from the Association of Licensed Surveyors to Nigerian Institution of Surveyors. The Institution now has branches in many states of the Federation.

2.0 SURVEY PRACTICE IN NIGERIA

Traditionally, survey practice is concerned mainly with positioning, and production of maps, charts or plans. The services of the surveyor may include project design and specifications, cost analysis and determination, acquisition of survey data and data processing, analysis and reports, physical demarcation, meetings and arbitration. Thus, the surveyor played the roles of both a consultant and, at times a contractor. But his work was centred on acquisition and processing of data. This is still largely the case in Nigeria although there is now a gradual realisation of the importance of data management and information presentation in the practice of the surveyors. Indeed, modern Surveying, combined with GIS practice, are made up of the following three components:

- Data Acquisition
- Data Processing and Management
- Information Presentation

In Nigeria, the practise of surveying is done either in the Public or Private sector, with slightly different orientation and background.

2.1 SURVEY PRACTICE IN THE PUBLIC SECTOR

The growth of the public survey establishments in the country spans a period of over a century. The importance of surveying in the exploration and exploitation of the nation's natural resources led to the establishment of the two survey departments at Lagos and Kaduna. Following the amalgamation of the Northern and Southern Protectorates in 1914, the two departments became one, under the leadership of Major F.G. Guggisberg, who later became the Governor of the then Gold Coast. The introduction of the Richards Constitution which created three regions in the country led to the regionalisation of the survey departments with each region having its own Survey Department as well as a Federal Survey Department. Under the 1960 constitution, Federal and Regional Survey Departments existed with clearly assigned responsibilities. Surveying was on the concurrent list. The 1979 and later constitutions largely maintained the status quo, in spite of attempts to increase the legal responsibilities and power of the Federal Survey Department. However it was agreed by the governments of the Federation, that the responsibilities of the Federal Surveys Department should include geodetic surveys, topographic surveys for the national map series, policy on

Aerial surveys, photolithographic printing of maps, etc.

Regional (later State) Survey Departments also had responsibilities for topo-mapping needed by the state governments, but which do not form part of the Nigerian National map series. They also engaged in cadastral and some township mapping.

While Federal Surveys still has the capability and some capacity to execute survey tasks assigned to that organisation, and has in fact, in the last few years, sought to modernise and go digital while also delving into applications of information technology in surveying. Many of our state survey departments are badly depleted in both human and material resources while others are mere shadows of what they ought to be. Lack of funding and lack of appreciation for the products of surveying by many state governments have rendered these survey departments almost totally ineffective. Certainly the state governments still need the products of surveyors in their planning and economic developments. Therefore, governments must rediscover the indispensability of the survey products in development and the systematic approach to the production of maps. Then and only then can their survey departments, now almost totally starved of funds, enjoy good funding necessary to rehabilitate and modernise these departments.

2.2 SURVEY PRACTICE IN THE PRIVATE SECTOR

The establishment of private indigenous survey firms in Nigeria followed the licensing of surveyors, which began around 1890. In the early period of the licensing Board, qualified professionals were granted the licence to upon retirement, provided they had served meritoriously in the survey department for more than fifteen years. This was in addition to those who obtained their licence through the process of examinations. It was clear, then, that people obtained the licence and immediately proceeded to establish their own survey firms.

As a result of the above, the first indigenous survey firms were sole ownership. They were not interested in huge survey works such as the mapping of extensive areas. Rather, they concentrated on cadastral surveys of the "four-corner job" types.

Later, by the second half of the last century, entrants into the government departments at professional level were those with undergraduate or postgraduate training in surveying, or those who had passed the final RICS examination. It became common practice for these people to seek and obtain the licence (through the process of examination), and then to remain in government employment until the time was "ripe" for them to leave the service and establish private firms.

The oil boom time in the 1970s brought with it a lot of economic activities and development. As a result, the demand for surveying and mapping increased tremendously. Many indigenous survey firms sprang up, and some surveyors came together to establish partnerships with bigger capital, potential and scope. Unfortunately, many of these partnerships and companies broke up prematurely due to several reasons including suspicions, and lack of trust.

Another hallmark of private survey from practice was the fact that, in securing surveying and mapping contracts usually given by Federal and State governments and parastatals, these indigenous firms lacked the capacity or capability to execute the contracts.

Therefore, some had to go into "joint ventures" with foreign partners to execute some projects, and this arrangement was at times a requirement specified by government before some types of survey contracts could be awarded to indigenous survey firms. Although this resulted in some form of technology transfer, in some cases, the Nigerian firm was a mere front for the foreign partner.

The situation today is not much better than the situation described above. In fact, the situation seems to have worsened, with modern requirements and methods imposed by advances in computer, digital and information technology. There are very many one-man practices, but only very few are strong enough to undertake sizeable surveying works and contracts. As in the case of practice in the public sector, lack of finance is a major setback, making it also impossible for indigenous firms to be properly equipped.

2.3 SURVEYING FOR ECONOMIC DEVELOPMENT

The indispensability of ground controls to mapping using either ground survey, aerial survey or satellite techniques have been well established. For a co-ordinated development of a country, it is necessary to provide, in a systematic manner, maps at various scales covering the region (Fajemirokun & Nwilo, 1990). This is even more important for a developing country such as Nigeria, where maps at relevant scales are in short supply while funds are not easy to come by. A co-ordinated mapping programme, therefore, not only ensures complete coverage of the country at appropriate scales for use when desired, but also minimises wastage of funds by eliminating unnecessary duplication of efforts. Without maps at various scales, developmental activities cannot effectively take place. It is also worth noting that the Space Imaging of the United States of America has launched her Ikonos 1 metre resolution satellite images. This implies that it is now possible to produce maps of 1/5000 with satellite images provided that the necessary survey controls, image processing softwares and hardwares are available. Orthophotos of cities can also easily be produced with these images. The 1m resolution satellite images can also find ready applications in the monitoring of troop movements by the military or in monitoring transborder movements of trucks and boats by the Immigration and Customs Departments. Furthermore, the images can be useful in determining seasonal changes in the movement of smugglers.

Environmental issues have of recent become of global importance. Maps have become major tools in addressing environmental problems. For example maps are basic tools for monitoring erosion, desertification, oil spillage, flooding, subsidence, and other forms of environmental hazards. The United Nations conference on Environment and Development had advised all coastal nations to implement a coastal management programme by the year 2000. Nigeria could not implement this, because up-to-date topographic maps at appropriate scales, were not readily available. Developing countries such as Nigeria have been listed as being very susceptible to the impacts of sea level rise. Addressing these problems require vulnerability assessment, which again needs maps as a basic tool. In addition to maps, aerial photos and remotely sensed images, understanding the tidal dynamics,

wave characteristics and bathymetry are very essential in addressing the environmental problems associated with oil spillage whenever they occur. The surveys provide these data.

The uses of maps and surveying data in addressing environmental hazards can be enormous. This is an area that has been hitherto ignored by a majority of survey practitioners. Surveyors can take advantage of their basic training, supplemented with further training and refresher courses to become leaders in this area that usually requires integrated solutions from interdisciplinary approaches and studies.

3.0 PROBLEMS CONFRONTING THE PROFESSION IN NIGERIA

The profession of Surveying in Nigeria is currently faced with a number of problems that need to be addressed for effective professional growth and development. The first step towards addressing the problems is to identify the problems and then proffer solutions to them. Some of these problems are discussed in the subsections that follow.

3.1 COLLAPSE OF PROFESSIONAL BOUNDARIES

It is no longer possible to easily define clear-cut professional boundaries. In other words, it is not easy to say where surveying, for example ends, and civil engineering begins. It can be safely said that professional boundaries, that is boundary lines demarcating one profession from another are collapsing. As a result, each profession must work hard, remain alert, and be flexible enough to ensure that it is not destroyed due to lack of vision. For example, when it was observed that flooding and erosion have become issues requiring attention at the national level, a section to address the problem was created in the Federal Ministry of Works. This section turned out to have been created more or less exclusively from the staff of the civil engineering department. That should never have been so! Surveyors should have been part of the team because flooding and erosion are environmental problems that cut across several disciplines including surveying. Furthermore, one cannot effectively discuss problems of erosion and flooding without photographic maps. Unfortunately, however, our profession was probably too busy protecting its little empire to think of delving into new areas. Perhaps the problem lies with the training and level of confidence of surveyors. The annual report for the year 1993 of the Department of Surveying and Land Information, University of Melbourne stated that the department was changing its name to Department of Geomatics. The reason given for the change is that "professional degree programmes at the universities today are at pain to balance vocational demands of work within a specific professional discipline against the need to give graduates a sufficiently broad educational knowledge base on which to develop and adapt over time in a world of very rapid change". This is the new reality and we should embrace it.

3.2 ESTABLISHMENT OF ONE MAN BUSINESSES

Over 90% of the survey firms in Nigeria are one man companies. As stated earlier, most of these companies were set up during the oil boom of 1970s and part of 1980s. This was a

period when Nigeria witnessed tremendous economic growth as evidenced by the development of the river basins, construction of roads and new housing estates, and massive investments in exploration and exploitation of the petroleum mineral resources. All these projects needed survey and map information for their planning and execution.

In those days, the indigenous survey firms mainly collaborated with the foreign firms in the execution of most of the mapping projects. Although these arrangements resulted in some transfer of technology and technical know-how, it was not to the extent expected (Fajemirokun & Nwilo, 1994). As already stated above, in some cases, the Nigerian firms were mere fronts for the foreign firms and an avenue for siphoning foreign exchange. Some were simply just interested in the financial remunerations that helped to improve their social status. Essentially, the reasons for the state of affairs were attributed to lack of technical know how and equipment, greed, selfishness, and lack of patriotic zeal as well as the absence of clear government policy on professional practice in Nigeria. Generally, there was no deliberate policy to pull resources together to purchase some of the expensive equipment and to also train indigenous manpower (Fajemirokun & Nwilo, 1994).

The situation has not changed much today. With the advances in computers, digital technology, satellite positioning and imaging, and the importance that geographic information systems had now come to assume, the situation seems to be worse. Although the nation is endowed with abundant human resources in mapping and surveying, their knowledge have become largely dormant or out dated. They are not conversant with the new developments, due to lack of continuous professional development, which is now being canvassed as being by both the Nigerian Institution of Surveyors and some of our higher institutions. The main reasons for this state of affairs are the political and economic situations in Nigeria between 1984 and 1999, which had led to a high degree of isolation from international contacts and interactions. With the new democratic dispensation, the efforts of the NIS and some of our higher institutions, through the Mandatory continuing Professional Development programme, it is hoped that the situation is bound to improve.

3.3 LACK OF ESPRIT DE CORPS

Lack of co-operation and personal greed among surveyors in private and public sectors have not helped the profession. Surveyors in the public sector often feel that their colleagues in the private sector are too comfortable and deliberately become hard on them in the award of contracts. In some cases, there are allegations that surveyors in government work out some arrangement whereby public sector works are executed by them or their nominates while paying a private sector registered surveyor to sign the plans. In addition, it seems that for some reason, surveyors in both public and private sector find it difficult to collaborate with their colleagues in universities, polytechnics and research institutes in addressing some of their problems. Typical examples include the issues of the adjustment of the Nigerian geodetic networks, analysis of the GPS network by Federal Surveys,

oil spillage and other environmental hazards to mention but a few. **It must**, however, be acknowledged that some of our surveyors **have** encouraged research and co-operative efforts between institutions of higher learning and their personnel.

3.4 LACK OF INTEREST BY STUDENTS AND NEW ENTRANTS

In our institutions today, it is difficult to attract bright students to pursue courses in surveying. This is because of the way these young men and ladies perceive the profession. The general impression is that there is too much suffering for very little money. Another reason that may have led to lack of interest by the youth is that surveyors have concentrated too much on land surveying with little or no interest in the areas of hydrography, computer-aided cartography, geospatial information systems and other emerging areas at the periphery of the profession. These areas also include coastal management, environment management, oceanography, hydrology and hydraulics and geophysics. These areas obviously hold a lot of promises for our young graduates. However, most of these areas may need postgraduate courses and programmes for effective participation. Higher degrees also give some level of confidence because these areas by their nature may require interdisciplinary approaches. The point being made here is that surveyors need to acquire higher degrees. These degrees need not be in the core areas of surveying. Combining the core professional surveying courses with postgraduate training in cognate areas could be exciting to the practitioners and that could encourage the younger ones, who are very anxious to improve themselves.

3.5 SURVEY FIRMS AND EQUIPMENT OWNERSHIP

Fajemirokun and Nwilo (1994) have identified sole ownership as one of the problems confronting the profession. It is their belief that surveyors in partnership can pull their material and human resources together and in a recession period like we now have, they should be in a better position to come up with new ideas. Although, it is admitted that partnership has its own problems, Yet the advantages are much more than the disadvantages and partnership is certainly the way forward for the future.

Basic equipment for surveying and mapping such as the theodolites, levels, electronic distance measuring (EDM) equipment and GPS receivers are becoming increasingly difficult to acquire especially for new entrants into the profession. The main reason is the economic and political situation in Nigeria today, as well as the poor strength of the naira against foreign currencies. Partnership, together with setting up of companies specifically for the leasing of survey equipment could be useful in the solution of the problems posed by the dearth of survey equipment in various survey firms.

3.6 FUNDING

Funding is a most critical problem confronting the profession of Surveying in Nigeria, no matter the perspective from which one views the performance of the profession. The public sector survey departments are grossly under funded such that many are rendered virtually ineffective. The various governments do not seem to accord the surveying profession, the important place it should

occupy and the priority it deserves in view of the indispensability of its products to sustainable development. Although the United Nations recommends that Surveying and Mapping services output should be at a level of about 2% of any nations Gross National Product, that of Nigeria is a far cry from that figure. Government Survey Departments cannot boast of adequate modern equipment, which can make them lay claims to having full capacity for Surveying and GIS practice.

In the memorandum to the vision 2010 committee, the writers reviewed extensively, the current status of Surveying and Mapping in the country. The document stated *inter alia*:

"Nigeria is very poorly mapped. Where maps exist, they are out of date or out of fashion. A twenty-year-old topographical map, which depicts the surface features, is as good as no map, particularly in a developing country as Nigeria, with fast changing infrastructural developments. Nigeria lacks a culture of funding mapping. Furthermore, the existing products are paper maps, which are increasingly becoming out of date and not amenable to easy revision. Also, the traditional processes of making these maps are now obsolete".

Even when Nigeria compares itself with other African countries, it is still true that Nigeria is lagging far behind most African countries in digital mapping and GIS. According to the memorandum to the vision 2010 again:

"During the 9th UNRCCA Conference in Ethiopia, it was discovered that many less endowed African countries were far ahead of Nigeria in terms of modern technology and instrumentation, as well as human development in current surveying and mapping processes".

The funding situation is worse for the private organisations. Because a survey firm, being a channelled professional organisation, has limited clientele, this makes financing from external sources very difficult to obtain. A resort is therefore usually made to individuals financing of projects, which immediately limits the scope of operation of the company.

According to Fajemirokun (1998), the Surveying and Mapping Industry has suffered so much neglect in the past years because classical survey products aroused very little political interest. But opportunities presented by modern techniques can make surveying and mapping products attractive to decision makers as for them to be prepared to adequately fund the industry if they are better informed and educated on the accruing benefits. Luckily, survey data and information products, in their new formats are not only visibly functional but also useful for revenue generation.

4.0 FUTURE DIRECTIONS

4.1 NEW AREAS OF OPERATION

Areas that are currently of much significance are Geospatial Information System and Land Information System and Management. Surveyors are supposed to be experts in spatial and time dependent systems. Unfortunately, many of us lack the interest to venture into these emerging areas. Also, many are generally conservative and so do not respond fast to changing situations. For these

reasons, surveyors seem to be late entrants to the new areas. In this country today, geographers, architects, estate valuers and others tend to dominate the new field of applied information technology. Surveyors must be prepared to change in accordance with the trend in the profession the world over.

Data and information management is another area that surveyors do not seem to have appreciated their strength. Access to large data and information bestows on surveyors so much power that has not been fully appreciated and exploited. Surveyors must be prepared to demand adequate remuneration for the collection and management of data and they should be able to make several secondary uses and meanings out of a particular set of data. For example, provision of controls for the mapping of a coastal state could reveal information on rates of coastal erosion in that stretch of the coastline. Although monitoring coastal erosion was not the primary objective, yet that could be inferred from the information gathered. The surveyor should take advantage of information available to him to market himself and the profession at the slightest opportunity. We again have as an example the problem of flooding and erosion in Victoria Island and along most of the Nigerian coastline. As experts in the collection and management of spatial data, surveyors should be in a position to offer useful input to the solution of the problem. There are several other grey areas where the Surveyor can make his impact felt and benefit materially too.

4.2 CURRICULA FOR THE TRAINING OF FUTURE SURVEYORS

Having dwelt extensively on where the profession was in the past and where it is today, the obvious question is where does the profession go from here? To start with, for the present departments of surveying to become attractive to prospective students, their curricula must undergo some structural adjustments in terms of course contents and direction. The departments must become stronger in computing and information technology. They must include, apart from the geoinformation courses, those courses that have hitherto been referred to as peripheral courses. The focus should not only be to train professional surveyors but also graduates who may decide to practise in other spheres of human endeavour such as information technology, environmental management, coastal management and geophysics. Experiences from our past students have shown that surveyors can easily get into other areas and make success out of them these areas.

In line with the developments in our field in recent times, and in view of the above, the Department of Surveying at the University of Lagos recently reviewed its various degree programmes and came out with new structures, whose curricula tend to address the shortcomings of the past. As a matter of fact after the review, the Department had to take a second look at its name and organised a public workshop to consider a name which would appropriately describe the new curricula and direction of training (Department of Surveying & Geoinformatics, Unilag, 1999). As a result, a new name has now been approved for the department, which is now the Department of Surveying and Geoinformatics. There is no doubt that this pioneering effort will ultimately catch up in other institutions. Indeed, even the Nigerian Institution of Surveyors

should take another look at its present name which is somehow limiting in scope, and adopt a more encompassing name before such names are appropriated by other professions in the country. Such a change in name can also be a stimulant to members, who would, as a result be urged on to new areas of applications as noted above. In addition, there is a need too to take a serious look at the name of the Institution's journal – "The Map Maker" with a view to arriving at a more appropriate name for the journal.

Our profession must ensure that its members are conversant with new instrumentation such as the global positioning system (GPS) and competent in new areas such as Geo-information system, digital photogrammetry and remote sensing. This can be achieved through formal and informal training. The Nigerian Institution of Surveyors can arrange the informal training and the short term courses in conjunction with higher institutions offering surveying who can also in addition offer both formal and informal training of their own. This is already happening because institutions such as the Department of Surveying & Geoinformatics, University of Lagos has introduced a professional masters programme on Geoinformatics. The institution's Master of Science programme in Surveying and Geoinformatics has also been reviewed to take into considerations current developments in the field. We are aware that the School of Surveying, Oyo has put in place diploma programmes on Surveying and Geoinformatics, and in Geoinformatics, while other institutions are also working in the same direction of modernisation.

5.0 SUMMARY AND CONCLUSIONS

5.1 SUMMARY

We have attempted, in this paper, a review of the survey Practice in Nigeria. The history of the profession is traced from the early colonial days. The training which survey personnel at all levels undergo were also highlighted as well as the laws under surveyors operate in this country.

The paper has also highlighted the development of Professional practice, both from the control of the profession perspective and the state of practice both in the public and private sectors of the economy.

The problems confronting the profession of Surveying in Nigeria are many and solutions to these must be found if the profession must make progress in this country in the next millennium. These problems include, *inter alia*:

- The collapse of professional boundaries
- The problems posed by the establishment of one-man survey firms, which form about 90% of indigenous firms in the country.
- Lack of co-operation between Surveyors in all sectors – public, private and institutions of higher learning.
- Lack of interests by students and prospective entrants into the profession.
- Cost of acquisition of Equipment
- Inadequate funding of the surveying and mapping sector of the economy.
- The fast changing instrumentation and methods of data

acquisition, processing, display and management.

5.2 CONCLUSIONS AND RECOMMENDATIONS

The following recommendations and conclusions will go a long way to solving some of the problems confronting the surveying and mapping industry, and ensure its growth and its survival in the next millennium.

1. Survey institution of higher learning must review their curricula, and re-align same to fall in line with modern developments in the field of surveying. In view of the phenomenal changes in methodology and instrumentation, emphasis must now be shifted in training from data acquisition only, to data processing presentation and management in addition to acquisition. The scope of training must also be expanded to include electives in areas such as Coastal Mapping and Management, Operational Method, Economics, Laws and Management, Valuation, Geology, Hydrology and Environmental Management.
2. There should be a review of the names of the departments of surveying to reflect the changes which their curricular had undergone. Names such as Geoinformatics, Geomatics, Geomatic Engineering, are now appropriate, so as to accommodate the new roles of the Surveyor in the management, analysis and presentation of spatially related data.
3. The Nigerian Institution of Surveyors should also seriously consider a change in its name and the name of its journal to reflect the new roles her members are now expected to play in the acquisition, processing, presentation and management geospatial data
4. There should be a programme for the training and re-training of existing survey manpower so as to acquaint them with new developments in Surveying and GIS. To this end, the continuous and Mandatory Professional Development Programme of the NIS must be encouraged to take a strong foothold. Moreover, institutions of higher learning should also be encouraged to mount programmes for the retraining of survey personnel in the country through short term courses workshops and seminars. The orientation of survey seminars of personnel needs to be changed through a nationally planned, co-ordinated, and systematic retraining process.
5. The staff of the various institutions needs to be exposed to industry. As it happens in other practical oriented professions, instructors in institutions need to acquire hands on experience in industry concurrently with teaching in the classroom.
6. The level of funding by Federal, State and Local governments, for Surveying and Mapping activities must significantly improve. Sporadic and "fire-brigade" approach to geospatial data acquisition by each government organisation when they perceive a need for it, is wasteful and must be replaced by a systematic, and "wholistic" approach to mapping and geospatial data acquisition processing and management. There is a need to get decision makers better informed and

educated on the benefits of proper funding of this sector of the economy.

7. The Nigerian Institution of Surveyors should encourage the pooling of resources together by two or more survey firms in order to form strong and virile survey companies that can handle large survey and mapping contracts. Consortiums may also be formed as a alternative when bidding for big jobs. The aim is to make available pooled resources, both human and material. Also funding of project execution through equity capital and or debt capital may prove to be easier.
8. In view of the heavy cost of equipment, the establishment of equipment leasing companies should be encouraged.
9. Private survey firms should be properly managed along business lines so as to ensure economy and effectiveness.

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