Teaching Statistics for Future Government Statistical Services in Africa

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1. The professional statistician in Africa

This paper was written with the hope that a "pending" ICOTS session on "Government Statistical Offices as a Resource for Statistics Teaching" would eventuate (as it did). In any case, it might be a good idea to have a regular session on "Teaching of Statistics for Government Statistical Services", starting with ICOTS IV. A number of developing countries have unique problems in this area. Sub-Saharan African countries, in particular, share a common set of problems, some of which are spelt out in this paper. A proposal is also made as to how to impact-programme the training of statistics in Africa. This neglect is surprising since almost all political leaders in Africa apparently recognise that while the *human resource* is by far the most important asset of any organisation/institution/country, *information* (in the wider sense) is by far the most important property of any organisation/country.

The reasons for this massive "discrepancy" between "thesis" and "reality" form one of the basic themes of this paper, written by the author, drawing mainly from his 20 years' experience (17 of these as Director) at a regional training institute for professional statisticians in Africa. The reasons have a bearing on training statisticians for statistical services in Africa. While most are related at a deeper level to African sociology, one main reason is that while statistics is on the ascendancy elsewhere, in Africa it is very much a young science, yet to gain public and especially political acceptance.

Future directions in training must take cognisance of this unique nature of statistics in Africa and weave suitable and viable programmes of work to establish and sustain a healthy balance between the supply of appropriate statisticians and the diverse information requirements of the day.

The problem of possible imbalances between the type of statistician, the work of the statistician, and the user of statistics, while deep and "octopusal" in Africa, has been

and to some extent still is, a problem in most countries, including industrialised countries. A random survey carried out by Chedzoy (1989) in the UK showed that the statistician is about the last person an ordinary citizen would want to be stuck in a lift with! So while the statistician seems to have "failed to market himself" to the decision-maker in Africa, historically the African statistician is not alone.

An African statistician, co-trained with a European counterpart in London or Paris, faces a different set of challenges from those of his counterpart. These challenges are basically environmental because of the state of the sociology, economics, politics, and development of the particular African country. These also wind up as professional challenges because the African statistician has to "deliver the goods" in this environment. Remarks on this environment will, of necessity, be generalistic and brief.

Sociology: African sociology is typified by relaxed attitudes towards life and other people (universal brotherhood of man) as well as towards allocation of resources, e.g. time, funds (in peacetime). In "war" or conflict or problem times, it is typified by acrimony, malice, and vengeance - often again in an uninformed, assumptive fashion. Deeper down beyond the pleasantries and what one commonly calls *African values*, some unscientific sociological traits can be identified.

Generally, African sociology has been *arrested*, partly by the incidence of colonialism, after centuries in an unscientific, ante-developmental straight-jacket. The scientific method does not run easy in African sociology. To say "I don't know" is the most shameful admission in most African societies. This implies the African "knows everything". Does he need a statistician? At the end of the day, African backwardness can be easily explained by a lack of *willingness* to manage information, a lack of *capacity* to manage information, a lack of *admission of ignorance* and lack of knowledge of where to go to repair that defect.

Compared with "European" sociology, African sociology is more humane, but less scientific. Will a humane, uninformed society survive unbridled population growth, especially in the next century? Or will the professional statistician, along with other information managers, win over political managers (first) and the population (in general) to scientific information?

Economics: Since economics is the scientific study of the behaviour of man in a demand/supply, limited-source environment, the sociology of the African does not stand him well in economic management. Lack of proper and realistic planning is abundant, and resource waste, especially human resource, is common. Consequently, almost all standard economic indicators (commonly and routinely collected by the African professional statistician) are depressingly low. Positive growth rates, where indicated, are *unbalanced* and *unsustainable*, mainly due to uncontrolled population growth rates, and are often accompanied by slow but sure denigration of the *physical environment*. African economics are still emphatically embedded in subsistence. And politics still very much dominates economics. Does the African statistician have *real economic value*? Despite the existence of statistical forecasting methods, African governments are often caught unawares by the incidence of devastating famine due to poor nutrition surveillance and food security systems. The starving, the deprived, still vote for the government in power.

Politics: A famous historical figure is quoted as saying that "Politics is the art of the possible". Most things, politically impossible elsewhere, are possible in Africa. Politics is immature. Can uninformed democracy work? On balance, the *universal vote*

was introduced "too soon" (although the educated also display amazing myopia in the way they cast their vote in any setting). "Democracy" has failed to produce managers. Military *coup d'etat* has not fared better. The management crisis has remained as one of Africa's most intractible problems. Bad economics continues to breed bad politics and bad politics to breed bad economics, with disproportionate expenditure on (consumptive) defence. The work of the statistician is one of the least recognised, especially when it comes to the percentage allocation of financial resources (cf. for example Uganda and Japan). It is also the politician who, by and large, practices the cartoonistic maxim: "My mind is made up; don't confuse me with facts". I quote:

"I find in India, and possibly in other parts of the world too, an attempt being made to answer questions before ... framing the question ... that is an extra-ordinary thing ... everybody is finding some remedy without knowing what the malady is ..." (Jawarharlal Nehru, first Prime Minister of India, addressing the Session of the ISI in Delhi, 1951)

Development: Tulya-Muhika (1976, 1979) defined development as a state in which households have access to an accepted list of goods, facilities, and services (both physiological and metaphysical). There is no single African country which can boast of the ability to avail even one of the facilities listed to all households. Few governments even earnestly plan to do so in future. Judged by economic and social indicators, Africa is not developing; it is under-developing. Some countries in the "third world" grouping seem to have left us behind and the gap is ever-widening. Those countries that attempt multi-round, multi-purpose household surveys come up with "tales of misery", but neither the professional African statistician nor the government (and especially the government) get any joy out of these surveys. We are under-developing, but do not want to say so. We certainly do not wish to be so told. So what can the professional statistician say?

In summary, the African statistician works in a professionally hard, harsh, and high-risk environment. One that does not imagine the worth of his potential beyond the immediate "political" needs of the day. Should this message be preached to would-be trainee statisticians? Or should we preach acceptance of facts as the basis for management of public affairs?

One indicator of the worth of the statistician in any African country is the state, size, location, organisational structure, and budget of the Central Statistical Office (CSO). Since this forms the natural habitat of the professional statistician, we pause to look at this and related issues.

2. Professional statistical services in Africa

Who is a professional statistician? In some African countries, any statistics graduate with a degree of sufficient quality or equivalent qualification (e.g. honours degree or upper second class, minimum) is employed in government service as a professional statistician. Others are graded as non-professionals. To my thinking, this is an inappropriate classification. Basically, there are three types of employment groups in Africa working in or with statistics: (a) professional statisticians; (b) academic

statisticians; and (c) social scientists, data analysts and other professionals who "brush with statistics" as a research method or, more often, in formulating policy decisions based on *no data* or on data they do not fully understand.

All three groups are engaged in "statistical services" (in some cases disservices) in Africa. All need not only training, but also integration into a "force" with a common purpose, understanding, and objective. The single group that needs to venture out more is the professional statistician group. This is because it has everything to lose, as a profession, if official statistics is not given its rightful place - which it does not have today in Africa.

Towards a "one-armed statistician": The first area of venture is within the CSO itself. There is a need for the establishment of a *Research and Methods Unit* to do the following:

- (i) develop and assess suitable *methodology* for data collection under African conditions (this may be done in collaboration with academics);
- (ii) identify, assess and/or develop methodology for *analysis* and *interpretation* of data (collected under African conditions);
- (iii) do statistical analysis and interpretation of data so collected;
- (iv) engage in design of special surveys and censuses, especially of a new or unique nature, e.g. environment, energy, resource use;
- (v) review and identify priorities for future work in statistics;
- (vi) act as a liaison office with planners, policy-makers, etc.

The second area of venture is *interaction with academics*. There is a need for the professional statistician to "invade" the university and other training institutions. Such statisticians should find time for teaching and training future statisticians in the training institutions within their reach. Such training should be practically-oriented, viz get the students to "rub their nose in the mud". In return, training institutions' staff should be invited to work in government statistical offices and get their "hands dirty". This exchange can be mutually beneficial. It has been used in some of the regional centres participating in the Statistical Training Programme for Africa (STPA) reasonably successfully. Bureaucratic problems exist in effecting this exchange, but these can be overcome with good planning and determination (see Rosenberg, 1981).

The third area of venture is traditionally more difficult. Debate has been on-going for some time now as to where the professional statistician should stop. One view, was instanced by Subramaniam (1969), quoting the Indian Industrial Commission of 1918, namely, "The Director of Statistics should be a compiling officer only. His relation with statistics should be merely arithmetical, that is, he should not comment on them" Perhaps we have moved some way from this towards the rather more accommodating (contrary) view expressed by the Imperial Statistical Conference held in London in 1920. "The arithmetical work of a statistical officer constitutes only the preparatory and less important stage of the work of such an office. If this principle be ignored the more important services which thorough statistical work is capable of rendering the community will be sacrificed" Rao (1983), partly building on this view, recommends that "... statisticians work alongside policy-makers in decisionmaking if the country is to get full benefits of the available statistical knowledge and skills ...". I agree, but go further. Working *alongside* would confirm the statistician as

the caricatured "two-armed statistician" ... on the one hand ... on the other hand. The statistician should *work with* policy-makers to arrive at policy formulation which the statistician would be able to understand and defend in the light of the statistical information available and within its limitations and scientifically conceived implications. This interaction would also enable the statistician, through first-hand feedback, to refine the information required for either refinement of existing policy or evolution of alternative policy. Statisticians thus not only promote better understanding of socio-economic problems quantitatively, but would improve their own capacity to understand and put forward feasible solutions to some of them. In short, the one-armed statistician would arrive. There are good reasons to hail this arrival, but for me one is dominant: management of the political economy.

Since the days of Adam Smith, economists have held undeserved importance in the management of the political economy. They have not only unduly influenced the thinking of governments, but often one of their number hovers close to the throne of power as the Presidential Economic Adviser. Yet it is obvious that economics, as a science, has failed to identify and explain economic phenomena in Africa. Economic observations have often led to wrong conclusions and consequent action by one government after another. Recently, African economists met in Addis Ababa to discuss the evolution of the African alternative to *Structural Adjustment Programme* (standard economic aspirin dolled out by the IMF/World Bank to ailing economies). Is this a recognition that IMF/World Bank economics has nothing to do with the African economy? How does one know that the economics of African economists will have anything to do with African economies unless their thinking is soaked in accurate, timely, and reliable statistical observations? In general, I believe that *statistical observations* have a better chance globally than *economic observations* in bringing about the *right economic policies*.

The future statistician and his workplace: To achieve these goals the statistician of the future will have to be a multi-faceted, knowledgeable, public relations officer. He (or she) will need the capacity to do *statistical work*; be knowledgeable in *data processing* and conversant with *development* issues; be able to *work with* policymakers, data processors, and other specified groups, e.g. demographers, health workers, agriculturalists, industrialists; form an effective bridge-head between statistical information and users of statistics, including the general public.

To perform these tasks effectively, statistical training will have to change. So will statistical work. Most CSO's in Africa started off as Records Offices to keep data for (colonial) administrative purposes. Most of the data kept was on population size and vital statistics. Later on, some economic information on agricultural production and trade was included among the records. With the introduction of the Harrod-Domar Model (in the 1940s), which depends on national accounts, and the influence of the IMF/World Bank (also created in the 1940s), compilation of national accounts became and has remained in vogue. The direction now is to introduce household surveys on a multiround, multi-purpose basis. In fact, the typology of data collected ought to be a subject for constant review by the Research and Methods Unit (mentioned earlier). While it is obviously important to maintain some time series as a matter of routine, the use to which these are put, vis-a-vis the cost of collection, ought to be constantly reviewed.

At present, professional statisticians are employed in a variety of institutions. These include national statistical offices (including provincial and district offices);

government ministries; government parastatals (including banks and research institutions); special development agencies (within the country); private sector organisations; regional and international organisations. Training for service in these is basically the same. However, training varies if the national statistical service is decentralised (but coordinated) because in decentralised services, statistical officers have to work on their own without close supervision.

A common direction beginning to emerge in Africa is to create an Integrated National Statistical Service (INSS) - with decentralised services. The essence of an INSS is a strong Directorate with a strong Permanent Field Organisation (PFO). The Directorate should have appropriate "Sectional" Offices at headquarters to assess demand, receive, assess, and process sectoral data from the "field", and to "market" it both internally and externally. Thus, in an INSS, all government ministries, provincial and district headquarters as well as major parastatals should, as a working minimum, have statistics offices reporting to the Directorate. Organisation at headquarters may vary according to country, size, and taste. This would facilitate training and comparability of data - not to mention efficient coordination of all statistical activities. It would also assist in identifying job types and hence manpower gaps for initial training, as well as subsequent needs for specialised retraining of serving officers. Without an INSS as a receptacle for trainees, training remains largely an exercise in mere increase of the number of trained statistics personnel in Africa. The quality of data, especially socioeconomic micro-data (and its subsequent utility) will continue to suffer (see, for example, Kiregyera and Tulya-Muhika, 1981).

3. Training statisticians for statistical services in Africa

Although there is a need for teaching in statistics from preschool right through secondary, tertiary, and specialised training institutions, we shall focus on training in the universities and specialised institutions which normally produce statisticians for statistical services in Africa.

When CSO's were started in African countries (in the 1940s or soon after), they were manned by colonial officers. The statisticians to whom these officers were handed over at independence or some time after (late 1950s, 1960s, 1970s), were almost invariably trained in the UK or France. Their training was thus not geared towards African problems. With the assistance of the UN in the main, a number of regional institutions were started in the 1960s and 1970s to train nationals of African states in Africa for statistical services in Africa. The accent and orientation of such training was clear, but the results did not match expectations. Towards the end of the 1970s, the UNECA carried out an evaluation of the African Statistical Training Programme only to discover that not only had the needs spectra increased and diversified since the 1960s, but that the training programmes in place had not even met the original quota (neither for professional-level nor for middle-level training).

This is how the Statistical Training Programme for Africa (STPA) was born in 1978. The STPA was originally conceived as a concerted regional effort spanning ten years, and coordinating the work of twelve centres (professional and middle-level) aimed at making Africa self-sufficient in the supply of statisticians by the 1990s. This expectation has not been met either, and the STPA has been extended to 1991 under the umbrella of the UNDP-financed Statistical Development Programme for Africa. Current needs are unlikely to be met in this period. Indeed, these indicative requirements are conservative because of the fashion in which the needs assessments were carried out. More telling is the fact that most African countries are yet to put INSS's in place.

Parallel activities have attempted to supplement the STPA effort. These include training in university departments of statistics in various African countries, in the (former) colonial master countries (UK and France), or in other countries outside Africa, mainly the USA and India. However, excepting the CESD in Paris, the orientation of this training is not towards African problems and hardly produces suitable material for African conditions. Some associated "centres" in OECD countries developed programmes, mainly of a short-term nature, specifically for either African countries or third world countries in general. Africa has continued to benefit from these. But the problem is overwhelming, as needs are great and likely to get greater, while donor agency funds for statistical training have been on the decline since the mid-1970s.

Training needs and input requirements: Training statisticians for Africa has so far been at four distinct levels, especially for English-speaking African countries. These can be briefly identified as:

- (i) middle-level (requiring O-level/A-level or equivalent, and training assistant statisticians to act as support personnel and field assistants).
- (ii) undergraduate (requiring good A-level or equivalent, and training professional statisticians normally appointed as "statistical officers").
- (iii) postgraduate (requiring good 1st degree or equivalent as prerequisite, and used for retraining and producing specialised statistical officers, e.g. national accountants).
- (iv) various short-term courses, seminars, and workshops.

A joint EEC/ACP/ECA study of Needs for Statistical Training in Africa was carried out in the early 1980s. Results of this study showed the needs of African countries as below for the period 1983-92.

Level	Language Group		
	English	French	Total
Postgraduate	1070	240	1310
Undergraduate	3065	860	3925
Middle-level	4540	2980	7520
Total	8675	4080	12755

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Such figures are generally under-estimates of actual requirements because a number of government officials surveyed often do not know what a statistician is, let alone what he does (see ECA, 1987a), while private sector requirements, and other possible "pipeline leaks", are often left out. As aforementioned, the ECA did a similar study in 1977/78. Over the period 1977-84, Africa as a whole had the capacity to meet

most of the requirements indicated in the first of the surveys, but did not do so, any more than it will meet the above requirements by 1992.

To obviate these problems, a more uniform ballpark approach would be to: (a) establish the requirements of each CSO (especially if it is an INSS); and (b) estimate some *planning ratio* for demand of statisticians, e.g. for each professional statistician, plan for five support statisticians (middle-level) and for each statistician trained for government service, allow for a "loss buffer" of four (viz train five in order to capture one for government service). This way more realistic indications of overall needs for future statistical service might be available for planning purposes.

Last but not least, the central force to bring about the changes referred to earlier in this paper will be the *quality* of the African statisticians themselves. Future training of statistical personnel should thus be re-oriented towards the end of providing *quality graduates*, even though this is against a background where problems abound.

Training infrastructure: The institutional framework outlined earlier is likely to continue. National institutions, specialised regional institutions (within or outside universities), and universities, will continue to train statisticians in future. What is needed is *identification* of certain training institutions for specific capacity enhancement in order to make sure that various aspects of levels of training identified (and others that may come on the scene in future) receive *quality treatment*.

Generally, middle-level training ought to be the responsibility of national training institutions. But one anglo-phone centre and one franco-phone centre need to be enhanced to sufficient capacity to define acceptable quality for the others. Professionallevel training to the extent indicated earlier is expensive. While national institutions may continue to churn out statistics graduates, the "impact-programmed" statistician identified there will be more easily available through regional capacity building. Here again, there is a need to identify two or more *regional* institutions to define quality in undergraduate training, in postgraduate and retraining programmes, and possibly in short-term courses as well. Regional cooperation and eventual "tearing" down of the Berlin Conference boundaries in Africa remains the only hope for Africa.

Currently, the STPA "umbrellas" twelve African (regional) statistical training institutions. This umbrella should gradually give way to a situation where a handful of these centres, on the basis of excellence, attract "consultancy" work and survive partly on the basis of excellent activities outside normal teaching, e.g. research, seminars, workshops, data processing contracts. African regional institutions must survive and survive *through excellence*.

At present, the days of survival on a "consultancy" basis are still far off. Traditional donor agencies have been the major sources of enhanced capacity in training statisticians in Africa for some time now. This cannot last forever. Programmed choice alternatives need to be put in place before the end of the century. While the total quantum of donor funds for statistical training Africa-wide has dwindled, bounties have come up periodically in specific *areas of concentration*. Some time back, it was easy to get funds for *population activities* (still so to some extent). Recently, *health and nutrition* programmes assumed the upper hand within population studies. Currently, *women in development* seems to be catching up fast. Such donor biases, of necessity, distort availability of resources for pre-conceived plans in this area. Moreover, (see Tulya-Muhika, 1981), such donors ought to be assisted to realise that statistics on health and nutrition, for instance, depend on the existence of an appropriate professional

framework spanning a larger cause - household survey capability in this case - which needs to be supported up front or as a parallel activity. Ideally each government ought to (a) do a needs assessment, and (b) identify priorities in statistics. Then invite donors to assist with specific programmes to execute an agreed plan of action. But while donors control their funds, this remains a difficult area of "statistical diplomacy".

Centres of excellence in Africa will need to forge some links (in some cases form "twins") with other centres, especially in OECD states and other countries. This will help them "glean" some current trends in statistical theory and hopefully enable them to isolate and adapt the new knowledge to African conditions. An even more important linkage is to do with statistical associations. It is desirable for staff of such centres to be members of and actively participate in the activities of national statistical societies in their countries, the African Statistical Association, and international statistical organisations such as the ISI (and especially its Sections), and a large number of national statistical societies that have now become "international", e.g. Royal Statistical Society, American Statistical Association. African training centres as well as government statistical offices might do well to forge links with well-established and well-run government statistical offices elsewhere, e.g. Statistics Canada, Statistics Sweden, INSEE, for mutual benefit.

Programmes and syllabuses: There is a need for horizontal and vertical integration of programmes and syllabuses in Africa. Middle-level training programmes ought to dove-tail into professional programmes, undergraduate programmes into post-graduate programmes and into specialised short-term courses. This would then produce integrated schemes for training of statisticians in Africa. Periodic review will be necessary.

Curricula reform should now move towards introduction of some additional teaching in (a) data processing; (b) development studies; (c) economics; (d) politics; (e) sociology; and (f) industrial and other scientific applications, all in the African context, for all would be professional statisticians in Africa. Population dynamics and cartography also ought to be an essential part. The ECA produced guide syllabuses for training at middle and professional levels a few years back (ECA, 1987a,b). These need to be looked at and revised periodically to meet current and relevant expectations. Training may, of necessity, take longer, by virtue of inclusion of more subject-matter, but this will pay dividends in the end if carefully and sensitively handled. Finally, I believe that French ought to form part of the syllabus of any Anglo-phone training centre and English part of any Franco-phone centre to enhance communication, exchange of data and research findings on a sub-Saharan scale.

Methods of training are normally by teaching and/or lecturing and tuition. For training a would-be practising statistician, I consider the following aspects to be *additionally* important:

- (i) the trainee should be exposed to practical work regularly in a statistical laboratory and/or a computer laboratory, through exercises based on real data;
- (ii) the trainee should be exposed to *field work*, especially collection of data through a survey, on a *group effort* basis;
- (iii) the trainee should be exposed to *field work* on an individual research project basis and should be required to write an acceptable report arising therefrom before gaining acceptance as a statistician.

In conclusion, I would like to state that training in statistics, being the most basic, common, and important method in manpower development, ought to be seen as destined to determine the course of future development in Africa. It should be given higher priority in any future African economic order. Establishing such a priority has to come about through an unprecedented improvement of African statisticians, their places of work, their attitudes to statistics and its vital importance in their environment, and, most important, the process of their formation.

The views expressed in this paper are meant to provoke a serious discourse on future directions in statistical training and statistical services in Africa, leading to major changes in the function and use of statistics as an indispensible tool in the management of decision-making, planning, and development in Africa.

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