EDITORIAL

All of us have problems connected with our teaching activities - not enough staff, equipment, or enthusiastic and able students perhaps - but no-one could doubt that the problems are greatest in the less developed countries. The main item in this issue is the first part of a (slightly edited) article describing the situation as it is seen in one country, but the picture must be broadly the same in many others.

REPORTS FROM ROUND THE WORLD

ITALIAN INITIATIVE

A committee specifically concerned with pre-university studies has been set up in Italy, as the following note by Professor G. Leti, President of the Società Italiana di Statistica, records.

Italian statisticians have been actively involved in the introduction of statistics in primary and secondary schools.

A round table was held in June 1970 at the European Education Centre, Frascati, on "Teaching Statistics". In September 1979, the Statistics Faculty, Padua University, organised a congress at Bressanone on "Pre-university teaching in statistics in the seondary school". In this occasion the Scientific Committee of the Italian Statistical Society (SIS) presented a contribution on "The role of statistics in the cultural formation in primary and secondary schooling". Other research contributions of the same Committee were given at the SIS conference held at Salice Terme, April 1981.

The three conferences show the logical itinerary followed in the introduction of statistics in pre-university education.

At first statistics was regarded as an operative instrument useful only in certain fields. It was only taught in the secondary school in commercial and accountancy courses. Later elementary statistics and

probability were introduced in middle school programs. The interdisciplinary function of the use of statistics was stressed. Now it has been recognised that statistics is a language of strong logical potentiality and it is considered necessary that it be introduced as early as possible so as to become part of the child's potential knowledge. The statistical and probability techniques in the education programmes for the middle school have been anticipated to the primary school supported by elements of informatics and logic.

On the 31st January 1984, the Directory Council of the Italian Statistical Society has established a Committee on "The problem of educational training and teaching of statistics in the pre-university school system". Members of this committee are R. Leoni (chairman, Florence), G. Leti (Rome), F. Pesarin (Padua), A. Mineo (Palermo), N. Lauro (Naples), S. Rigatti Luchini (Padua), E. Aureli (Rome), A. Pinnelli (Rome), M.G. Ottaviani (Rome), E. Vinci (Rome), V. Santoro (Salerno), E. Lombardo (Rome), O. Vitali (Rome).

The committee has begun its activity by sending work-groups in various types of schools so as to formulate a reference scheme with the essential characteristics needed in pre-university statistical education.

A training course in statistics for middle school teachers has been programmed. This programme will soon be carried out in the various universities.

ISI ROUND TABLE CONFERENCE ON THE IMPACT OF

CALCULATORS AND COMPUTERS ON TEACHING STATISTICS

The latest ISI round table conference was held in Camberra, Australia, on 20-23 August 1984, immediately before the Fifth International Conference on Mathematics Education in Adelaide. The proceedings, edited by the organisers, T.P. Speed and L. Råde, are due to be published, under the title The Teaching of Statistics in the Computer Age, by Chartwell-Bratt Ltd., Old Orchard, Brickley Road, Bromley, Kent, BR1 2NG, U.K.

The contents will include the recommendations made by the conference, and written versions of talks presented at the conference: Gani: The impact of calculators and computers on teaching statistics; Aoki:

Mastering elementary probability and calculator programming in a class; Bastow: The place of computers in the teaching of statistics; Dupuis: How calculators and computers change the field of problems in teaching statistics; Engel: Statistics and computer science: An integrated high school course; Holmes: Using microcomputers to extend and supplement existing material for teaching statistics; Lanwehr: Using microcomputers for data anlysis and simulation experiments in junior and senior high school; Lunn: Computer animation: a powerful way of teaching concepts of probability and statistics; McNeil: Using microcomputers for teaching introductory statistics - experimental results and implications; Moortgat: New and improved skills in computer era; Nuesch: Are statistical tables obsolete?; Oosthuizen: The microcomputer as an aid to instruction - problems and

pitfalls; Rade: The pocket computer in the classroom; Sharpe: Use of the computer in statistics courses at the University of Melbourne; Speed: Teaching statistics at university level: How computers can help us find realistic models; Swift: The Nightingale data library and protocol: A proposal for a library of interesting data; Werry: The teaching of statistics in New Zealand Secondary Schools.

STATISTICAL EDUCATION IN TANZANIA I

1. <u>Introduction</u> In the developing countries there is an urgent and increasing need for services of trained statisticians. However, in many smaller and/or poorer countries, institutions of statistical education are either inadequate or nonexistent. Due to the shortage of qualified teachers and financial resources, it is clearly not feasible for every developing country to establish its own statistical training centre and a university department of statistics. In our view it would be better for several countries to co-operate through joint efforts and the pooling of resources to develop regional centres of statistical education with assistance from organizations such as the International Statistical Institute (ISI) and the Institute of Statisticians (IOS).

Indeed, the ISI committee on Statistical Education was established in 1949 in response to a UN resolution to take appropriate steps to further the improvement of education in statistics on an international scale (see Gani (1979)). In 1969 the ISI Review published a report, "Round-Table Discussion on the University Teaching of Statistics in Developing Countries", which also recommended "the use of sub-regional or regional institutions where both staff and facilities are currently available".

The purpose of this paper is to report on the present situation of statistical education in Tanzania in East Africa. It is hoped that by this means attention will be drawn to the need for assistance for the further development of statistical education in that region of the world.
Tanzania is among the poorer developing countries; yet she is also among the more advanced in statistical education. On the university level, the University of Dar es Salaam has a Department of Statistics which has produced graduates with B.A., B.Sc., M.A., and Ph.D. degrees in statistics. On the sub-university level, Tanzania houses the Eastern Africa Statistical Training Centre which trains junior statistical officers for several countries in East Africa

2. <u>The Teaching of Statistics in the University of Dar es Salaam</u>
2.1 <u>The Department of Statistics</u>. The Department of Statistics was created in 1967 within the Faculty of Arts and Social Sciences in the former University of management and administration who needed some statistics background for quantitative analysis of business and socio-economic phemomena. The courses offered were only introductory courses in statistics and mathematics.

With the reorganization of the Faculty of Arts and Social Sciences in 1971, following the dissolution of the University of East Africa and the founding of the University of Dar es Salaam in 1970, the role of the Department of Statistics was expanded. Thanks to the substantial number of expatriate staff in the early years, the Department was able to offer enough courses in statistics so that students could study for a bachelor's degree with statistics as a major. Later, an M.A. program in statistics (in which students are required to both follow course work and present a thesis) was also developed. As a result, a number of Tanzanians have graduated from the University of Dar es Salaam with B.A. and M.A. degrees in statistics. A few have also been able to complete further studies abroad and obtain Ph.D. degrees in statistics from Britain and the United States of America. In the early 1980's there were 15-25 B.A. or B.Sc. graduates each year, and one or two M.A. graduates. In 1983 a statistics student received the first Ph.D. awarded by the University in any subject (for a thesis on an econometric model for the Tanzanian telecommunication system). External examiners are involved in student assessment at all three levels.

The department has (1983/4) 11 academic staff (from senior lecturer to tutorial assistant), all Tanzanian, most being M.A. graduates from the University; two are studying for a Ph.D. in the U.S.A. The strength of the department is in applications in micro-economic fields: for example, the four staff with doctorates consist of two demographers, an econometrician and a time series analyst; and M.A. theses have been in areas such as forecasting the numbers of tourists, and constructing trade indices. (However the courses are intended to give a broad training, so that in the final year there is a range from Probability Theory through OR to Sampling Theory, Quality Control and Econometrics). Graduates have gone into various governmental and para-statal organisations – e.g. the Bank of Tanzania, the Bureau of Statistics, the State Motor Corporation – as well as into teaching in the University and elsewhere.

The vigorous growth of the Department of Statistics during the 1970's has, unfortunately, not been consolidated and continued throughout the 1980's because of the decline in Tanzanian economic conditions, particularly since, as expatriates have found it less attractive, it has become difficult to recruit teaching staff from overseas. The graduate programs have been temporarily suspended in consequence, though it is hoped to resume the master's program as soon as additional staff can be recruited: the Department is particularly desirous of obtaining a professor of mathematical statistics for this reason.

2.2 <u>Department of Mathematics, Faculty of Science</u>
The majority of students majoring in mathematics take up teaching in elementary and secondary schools after graduation. The development of statistical education in schools depends in a large measure on the training in statistics received by mathematics majors in the University.

At present, the mathematics majors are required to take only a one-term (10 weeks) course in elementary statistical methods in the second year. Third-year students can take an additional but optional one-term course in mathematical statistics, which can cover at most half of a standard one-year first course in statistical theory in Canadian universities. The Department has recently decided to offer a second one-term course in mathematical statistics so as to give prospective teachers of mathematics better preparation in statistics. However, this also awaits the availability of a suitable lecturer. The present staff members are trained either in pure mathematics or in traditional applied mathematics.

The Department of Mathematics has been aggressively pushing its staff training programs over the years. It has now 14 permanent Tanzanian lecturers and professors, almost all of whom have been trained abroad with at least a Master's degree. Four have obtained doctorates from Britain and West Germany. Two are currently studying for Ph.D. degrees at Carleton University in Canada, with one studying probability and statitics and the other modern applied mathematics. Two other Tanzanian staff members are pursuing Ph.D. studies in West Germany and the Netherlands. All others who have not done so have been urged to seek opportunities to undertake Ph.D. studies.

The Department of mathematics has considered offering a graduate program in probability and mathematical statistics as an alternative to the applied-statistics oriented graduate program offered by the Department of Statistics. This, however, is still in the planning process.

2.3 <u>Statistics Courses in Other Departments</u>
Statistical Methods are also taught, mostly by their own specialists, in some ten other departments including, for example, Rural Economy, Veterinary Science and Economics

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