

STATISTICS, STATISTICIANS AND PUBLIC POLICY MAKING*

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1. STATISTICS

"There cannot be a good plan for economic progress without adequate data and there cannot be adequate data without a good plan for collecting them."—P. C. Mahalanobis.

Any discussion on official statistics begins with an account of their defects in terms of gaps, economy, timeliness, accuracy, presentation, priority phasing, personnel, interdepartmental coordination, etc., and ends with suggestions and hopes for improvements. Commissions have been appointed and committees are constituted, from time to time, to go into the problems of official statistics and make recommendations for improvement. There are, however, some inherent limitations in the development of efficient statistical systems. Some of the requirements like timeliness and economy conflict with demand for accuracy and more detailed information. The resources, expertise and personnel needed at any time to maintain a comprehensive statistical system to plan for the growing demand for information are often underestimated by the governments. Naturally, various types of defects continue to exist in some form or other despite continuous efforts being made to remedy them. However, the present day official statistics in any country are in a much better shape than what they used to be. This is mainly due to the growing demand for statistics in formulating national plans for socio-economic development, which every developing country is trying to do to achieve quick improvements in the quality of life of the people.

Planning involves assessing the present against the background and experience of the past and setting goals for the future. Past trends in economy have to be examined and current inputs necessary to achieve future specified targets have to be determined. All these processes require the use of statistics in its dual aspects, viz., data and methodology. In fact, development of statistics is a prerequisite for the formulation of meaningful socio-economic plans. The demand for statistics may increase in the future when planning

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done at the national level now is extended to regional and subregional levels. All these require the formulation of a broad plan for a coordinated national statistical system, and the creation of a special cell in the national statistical office with a group of experts charged with the following responsibilities :

- to periodically review and suggest improvements in the existing methods of collection and compilation of data in the traditional areas like agriculture and industry. As Claus Moser (1976) says, "There is a built-in tendency in economic series to deteriorate unless enough care—and—maintenance work is done";
- to assess the data requirements for solving new problems which continually arise in making policy decisions;
- to plan for collection of data through special censuses and sample surveys in areas where it is not possible to acquire information through normal administrative channels;
- to lay down priorities in the compilation and publication of data;
- to organize¹ periodically seminars and meetings with the participation of government statisticians and outside specialists to discuss data improvements and to assess the future data needs;
- to avoid duplication and coordinate the statistical activities of the different government agencies.

The last aspect, viz., coordination is extremely important specially if a country has a decentralized statistical system. But coordination is also a difficult task and there may be administrative and technical bottlenecks which may not be easily resolved (Rosenberg, 1981).

2. STATISTICIANS

"... the statistical science was the peculiar aspect of human progress which gave to the twentieth century its special character ... it is to the statistician that the present age turns for what is most essential in all its more important activities."—R. A. Fisher.

What are the functions of a statistical office and the responsibilities of government statisticians and the head of a statistical office? Is their job mainly to collect and compile statistics for possible use (i.e., statistical analysis and interpretation) by others? Should they also be involved in statistical analysis of data and help the policy makers in taking decisions? Opinions

¹In India, the Econometric Society holds periodical seminars on Data Base of Indian Economy and issues proceedings of the papers presented on data improvements and needs together with recommendations for consideration by the government.

differ on these issues. I refer to a paper by Subramaniam (1969) who quotes from the records of the British period in India to highlight two different opinions.

Commenting on the role of the Director of Statistics, the Indian Industrial Commission of 1918 recorded :

"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.

The preparation of forecasts was a highly technical business. The existing practice whereby the Director of Statistics was responsible for amending the forecasts of provincial officers was disapproved. Such a duty would more appropriately be performed by a responsible officer having general experience of Indian agriculture."

On the other hand, the Imperial Statistical Conference held in London in 1920 noted :

"The arithmetical work of a statistical officer constituted only the preparatory and less important stage of the work of such an office. If this principle be ignored, the more important services which through statistical work is capable of rendering the community will be sacrificed."

The above contrary views held more than sixty years ago still persist in spite of the emergence of statistics as a separate discipline and the recognition of statistics as an indispensable tool in a scientific investigations, specially in the social sciences, and in decision making.

The distinction between suppliers and users of statistics is an unfortunate one. If it is the responsibility of the statistician to produce "useful data" which are "timely, accurate and without gaps", he must have a good idea of the contemplated uses of data and also be personally involved in data analysis and problem solving. Usefulness of data cannot be thought of in absolute terms. There is nothing like fully accurate data²,³ or data without gaps. These issues are relevant only in terms of their use in solving particular problems.

²Weirus, a German physician of the sixteenth century, a time when most Europe was gripped by the fear of demons and witches, calculated that exactly 7,405,928 demons inhabited the earth. Most people believed that the figure 7,405,928 sounded "about right" for to them demons were a reality and Weirus was a learned man.

³The story is told about a man who, when asked about the age of a certain river replied that it was 3,000,004 years old. When asked how he could give such an accurate figure, his answer was that four years ago it was reported that the particular river was three million years old.

It is not suggested that government statistical offices should be turned into research departments for producing academic papers. But a statistical office should have the necessary expertise to do the following :

- (i) to undertake research on methods of collecting data (types of schedules to be used, agency to be employed to collect data, built in checks, ancillary information useful in detecting errors and editing the results);
- (ii) to do minimal statistical analysis which will help in judging the adequacy of given data for taking certain policy decisions, and assessing the errors involved in making forecasts and predictions. This type of research should be oriented to data improvement, compilation of meaningful summary figures such as index numbers, input-output statistics, analysis of time series, short term forecasts useful to the government for day-to-day administrative decisions.

The functions of a statistical office should extend beyond collection of data to its analysis which is necessary "to hold a statistical system in place, to make possible most communication with decision makers about their data needs, and to inform them of current statistical capability".

3. PUBLIC POLICY MAKING

"There is no denying that many policy decisions made by the government, which effect each one of us, depend crucially on their statistical base. Stretching the point further, one could argue that no other profession today carries so far ranging a responsibility in public affairs as do we (statisticians)."—Claus Moser

How best can the government statisticians contribute to the national efforts for the benefit of mankind? How can they help the government, specially in developing countries, in meeting new challenging tasks of removing poverty and ensuring a desirable rate of economic growth?

The efficiency of a government depends on the nature of the decisions it takes. The quality of decisions in turn depends heavily on the availability of timely and accurate data and also, which is equally important, on proper statistical analysis of data. Compilation of data and statistical analysis require considerable skills for the exercise of which the statistician is specially trained. Thus a statistician has the responsibility and an important role to play in national affairs. To argue that a statistician has no place at the policy making table and that he is merely a purveyor of "pure facts" is to ignore the whole body of the specialized branch of knowledge known as

statistical methodology by which optimal decisions are arrived at from given data and constraints to achieve desired goals.

Many countries have adequate facilities for training statisticians at various levels, and also well developed national statistical systems in relation to statistical data routinely collected in administration, as well as in relation to special data collected through censuses and sample surveys. However, in spite of so much statistical expertise and competence, and so much statistical data becoming available, I must confess to a feeling of dissatisfaction that the statistical science and the profession are not giving their due in achieving and promoting a better quantitative understanding of the socio-economic problems and in suggesting and putting forward feasible solutions of the same. The reason for this serious failure must be traced to lack of interaction between different groups of experts who seem to be working independently of each other. We have the professional statisticians who collect data without being aware of their uses, the academic statisticians who develop statistical theory for data analysis without relevance to current real problems and the social scientists who formulate policy decisions based on data with which they may not be familiar, using statistical analysis which may not be efficient.

How can we bring these experts together, coordinate their activities and use their specialized knowledge for achieving the best possible results? I am aware that this can be only a gradual process. I suggest that efforts should be made in several directions :

- * The statistical departments in the universities have remained either allied to departments of mathematics or, where they are independent, they have tended to remain aloof from applied areas in general and social sciences in particular. In the social science departments the faculty and student body both not only lack adequate mathematical training but are in fact generally weak in mathematical and quantitative reasoning. Hence a wide gap exists between statistics and social sciences in the universities. To close this gap, serious efforts should be made to reorganize the courses in statistics and the social sciences to produce professional statisticians with bias towards applications and social scientists with a quantitative bias and competence in quantitative analysis.
- * Provision should be made to recruit both statisticians and social scientists in statistical offices and policy making divisions of the government to provide a proper mix of personnel with different skills to interact and produce best possible results.

*The possibility of inviting experts from universities and research institutes to work in government statistical offices and to send government statisticians to teach in the universities on practical aspects of statistics should be explored. Such an exchange of experts would have beneficial effects in improving the efficiency and usefulness of government statistical offices and also in the production of statisticians better suited to work in statistical offices after completion of their university education.

Public policy making is no longer a gamble with an unpredictable chance of success or a hit and miss affair. It is now within the realm of scientific techniques, whereby optimal decisions can be taken on the basis of available evidence and the results continuously monitored for feedback and control.

4. SOME NEW PROBLEMS

"...the stakes involved in economic and social policies are enormous, and we (statisticians) have a good share of the responsibility"—Harold Wilson.

There are wide areas of social statistics which are neglected as their importance in the context of planning has not been fully understood. In a recent study⁴, a comparison was made of the socio-economic profiles of six countries during the period 1950-1965. It was found that presence or absence of rigidities in social structure including divisions based on ethnic differences influence the economic growth. The consideration of social factors has introduced a new dimension to economic planning and places heavier responsibilities on statisticians for evolving an integrated system of economic and social statistics, and conducting studies on the influence of social factors on economic development.

While we have adequate economic statistics to compute magnitudes like the GNP, we do not have even basic data on social aspects such as income and expenditure of households, family size, health and educational status of individuals, which are necessary for constructing social indicators. I understand that about two out of five of professional statisticians in the U.K. are now working on social statistics. This ratio was very small five years ago, which indicates the high priority given to social statistics in the U.K. in recent years. The use of social indicators as objective functions besides the GNP is far more important for planning in developing countries.

⁴Report by the U.N. Research Institute for Social Development, Geneva, entitled "Levels of Living and Economic Growth".

For a long time there has been the dominant belief that any type of education confers productive skills on the educated—the only issue to be debated used to be whether the stream of additional returns accruing to the educated because of the acquired skills as compared to the uneducated was commensurate with the costs of education. In short, in the orthodox view, acquiring education is like any other investment, only it is on the human being. Thus we have the human capital theory.

Recently, because of the observed realities, an entirely new view contradictory to the human capital has emerged. This is the so called "Screening Theory" of education as expounded among others by the Nobel Laureate in Economics, Kenneth J. Arrow. An extreme version of this theory holds that education confers no skills—the productive contribution of the individual to the society being dependent only on his inherent ability and not on education. On the other hand, those with greater ability have a greater chance of success in obtaining a college degree. This being the case, the college degree serves merely as a "filter" or "screen" to separate those with potentially greater inherent abilities from the rest. Thus, even though from the society's point of view the college degree confers no productive advantage and any use of resources in providing college education is a complete waste, there is obviously positive gain to individuals to acquire a college degree and thereby providing the information to the employers that they have greater inherent ability and thus obtain a higher wage. The advantage to employers is also obvious—they are able to acquire employees with greater inherent abilities by hiring those with college degrees. It is not surprising, therefore, that there is a substantial and increasing demand for education that governments are forced to meet. The rapid expansion of education, particularly higher education is a pointer in this direction. Of course, this is an extreme view—some types of education namely technical and vocational education obviously confers skills. But, bulk of the expansion in our higher education took the form of providing a liberal arts or a general science degree and it is quite likely that the "Screening Theory" is relevant here.

It is of great importance to know whether education confers skills or not and what types of education does confer useful skills. Though attempts have been made in the past to estimate statistically the contribution of education to the observed differential in the earnings of the educated as compared with the uneducated, most of these calculations are unsatisfactory because it is by no means simple to avoid confounding of the effects of inherent-

ability and that of education. Any one who can develop statistical tools and techniques to isolate the effect of education will provide a basis for rational educational policy for a number of developing and poor nations.

Another problem of current interest is the estimation of undernourished persons in the developing countries. The only available data for each country are indirect estimates of per capita food consumption (with an unknown magnitude of error) and empirical income (expenditure) distributions "with all its unreliabilities". Even if one had reliable estimates of these quantities, it is not possible to obtain proper estimates of the undernourished persons in each country without making some assumptions on calorie intake, income elasticity, distribution models and unknown variability of individual calorie requirements. Recent estimates of the number of undernourished persons made by the FAO and World Bank differed considerably since they are based on different sets of assumptions. It is difficult to justify one or the other of the estimates in view of the extreme inadequacy of the data base and the "judgemental assumptions" made by these two organizations. I believe FAO is contemplating a world wide survey to collect data for assessing the extent of undernourishment in the developing countries. Here is an interesting and extremely important problem where the statisticians and the social scientists can collaborate in making a useful contribution.

5. CONCLUSIONS

In conclusion let me say the following :

The responsibilities of statisticians do not end with just purveying timely and accurate data. They must have a deep involvement in the analysis and interpretation of data. Analysis of data also enables feedback for data improvement and future data needs.

There should be greater interface between statisticians and social scientists, which can be brought out by suitable changes in the courses given at the universities and in the recruitment policy of government departments to provide the necessary interaction between statisticians and social scientists.

With emphasis on social indicators as indices of development new dimensions of official statistics have opened up placing heavier responsibilities on government statisticians.

Statistical knowledge is a national resource and as such should be fully and efficiently exploited.

Good statistics is not a substitute for a good statistician and similarly a good statistician is not a substitute for good statistics. We must have both. But this is not sufficient. It is also necessary that statisticians work alongside policy makers in decision making if the country is to get full benefits of the available statistical knowledge and skills.

Statistical offices should maintain contact with the University statistics departments, research institutes and individual research workers for assessing their data needs, evaluating the quality of existing data and for keeping abreast with research in statistical methodology.

In an address to the delegates of the International Statistical Conference held in 1961, Jawaharlal Nehru, the then Prime Minister of India, stressed the importance of statistics in understanding the problems of the country and seeking for solutions. He said :

"I find in India, and possibly in other parts of the world too, an attempt being made to answer questions before framing the questions. That is an extra-ordinary thing, of course, that everybody is answering questions without knowing what the questions are. In other words, everybody is finding some remedy without knowing what the malady is."

Statistics is a gateway to knowledge and the progress a country makes is vitally dependent on the efficiency of its statistical system.

REFERENCES

- MORSE, CLAUDE (1976) : The role of the Central Statistical Office in assisting public policy makers. *The American Statistician*, 30, 59-66.
- SUBRAMANIAM, S. (1969) : Statistical wisdom—old or new. *J. Roy. Statist. Soc., A*, 132, 229-234.
- ROSENBERG, HARRY M. (1981) : A report and comments on improving the federal statistical system, *The American Statistician*, 35, 183-208.

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