

# The Indian Statistical System At Cross roads - An Appraisal of Past, Present and Future.

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Abstract. A rudimentary statistical system began in India during the Hindu - Buddhist period. It evolved into a more mature system when the Moghuls ruled India. A rapid growth took place during the British period. Further growth and modernization with focus on the country's socio-economic progress occurred after India became independent in 1947. Currently it has many problems but also many achievements and much promise. We trace the history of the system and end with an appraisal of its present status and future prospects.

1. Introduction. Collection of statistics in India for commercial or governmental needs goes back to ancient times. Jeganathan (1997 a, b) has argued that much of the undeciphered records of the prehistoric Harappan Civilization (1700 BC to 1000 BC) are records of transactions or stocks. Various people, Hacking (1965), Godambe (1976) and Chatterjee (2003) have pointed out a curious reference in the epic Mahavarata (compiled between 1000 BC and 500 AD) that seems to indicate a rare knowledge of probability based inference about population total. In later historical times, statistics became strongly associated with collection of land revenue and trade ----- an association that continued till the British period (1757 to 1947). The development of modern industries and many changes in India during the British period led to collection of many other kinds of data that the British Government considered useful for ruling India or understanding Indian people.

A further major change in the system occurred when India became independent. Welfare of the people, planning for socio-economic development and evaluation of its impact became new priorities of the young Indian democracy. P.C. Mahalanobis, who played a prominent role in India's planning in addition to being a very distinguished statistician, P.V. Sukhatme and others reshaped the Indian Statistical System within a very short period after independence.

Slowly, unobtrusively in the nineteen eighties, more dramatically since then, India has moved towards a market economy. Planning in the old sense has virtually ceased to exist. Welfare remains a priority. New demands are being made on the statistical new system.

The Indian statistical system has changed over to computerised data collection, cleaning and recording. It has also tried to change with time in respect of new data or quicker and more frequent publication. Nevertheless, there have been complaints about adequacy, relevance, timeliness and quality of the Indian data. A National Commission on Statistics was set up a couple of years ago. It has submitted its recommendations. The Cabinet has already cleared it.

These points are developed in more detail in the sections that follow.

2. Two highlights from the pre British period.

Our first example pertains to the Hindu - Buddhist period.

In the Arthashastra by Kautilya (321 - 296 B.C.), which literally means a treatise on economics, one gets an account of data collection.

" It is the duty of Gopa, village accountant, to attend the accounts of five or ten villages, as ordered by the collector general.....Also, having numbered the houses as tax paying or non-tax paying, he shall not only register the total number of inhabitants of all the four castes in each village, but also keep an account of the exact number of cultivators, cowherds, merchants, artisans, labourers, slaves and biped and quadruped animals, fixing at the same time the amount of gold, free labour, toll and fines that can be collected from it (each household)".

(Shamsastry, 1929, p 158)

There is also a reference to scrutiny and cross-check. To get a feeling for the time, note that Alexander invaded India in 326 B.C. and the great Buddhist king Ashoka ruled from 273 to 232 B.C. .

We now turn to a much later period, that of Akbar, the great Moghul emperor (1556 to 1605 A.D.). Akbar had brought together in his court some of the best Hindu and Muslim experts of India. Among them was the famous scholar and humanist Abul Fazal who wrote both Akbarnama, a biography of Akbar and Ain-I-Akbar, a treatise on land revenue (translated by Jarret, edited by Jadunath Sarkar).

"The basic unit for recording information pertaining to agriculturists and the produce was the village. Ascertainment of the extent of the soil in cultivation and weighing several portions of personal observation was made through the superintendent of the survey, the Bitikchi, the patwaris who were being appointed at the village level."

For most states of India, essentially this system is still followed. It does not work very well any more and is one of the main problems with the Indian (agricultural) data that we discuss later.

### 3. The British Period.

The British empire lasted from 1757 to 1947. India became independent in 1947. From around the 1860's all of India was directly under the British rule, but the land revenue and the system of collection introduced by the Moghuls was unaltered except in eastern India, where the elaborate system of village patwaris was abandoned.

The first half of the British period is noticeable for collection and records of new information other than just agricultural statistics. The first "Statistical Abstract of British India" was published in 1868 -- it contained information on trade, finance, education, population, agriculture, live stock, mining and industry as well as other items. It continued to be published from London till 1923 and has been published in India since then.

The operation of a decennial census for the whole country started in 1881 and has continued since then. Kingsley Davis (1951) remarks that "the Indian censuses are remarkable not only for the information they reveal but for the special obstacles they had to overcome.....".

A position of Director General of Statistics was first created in 1869 to prepare a "comprehensive and co-ordinated scheme of statistical survey" for the twelve main provinces of British India. We do not know if Mahalanobis was inspired by this event when the National sample survey was set up under a Director General of Statistics.

The later British period seemed more concerned with co-ordination and verification. The Directorate General of Commercial Intelligence and Statistics (DGCI&S) was set up in 1905. In addition to trade and business, for a long time it was responsible for publication of statistics relating to demography, crop production , and prices, rainfall, industrial production etc.

Further unification and integration was suggested by two important Committees, namely, the Economic Enquiry Committee, set up in 1925 under the chairmanship of a famous engineer Visweswaraya and the Bowley - Robertson Committee set up in 1934.

Both recommended a central statistical bureau for co-ordination. There were also recommendations for a statistical cadre, State Statistical Bureaus and maintenance of statistics for the entire country.

During the British period, the statistical system in India grew up to its present form. It is partly decentralised and partly centralised, with responsibilities divided between the central and the state government. Moreover, different ministries in the central government are involved. Co-ordination either vertically or horizontally and improvement of quality are not easy.

#### 4. The Statistical System After Independence.

##### Statistical frame work at the Centre:

As seen in the foregoing paragraphs, throughout the British period the statistical development was geared towards administration, trade, commerce and such other activities. It is only after the independence in 1947 that the country saw an urgent need for a statistical frame work suitable for economic and social development. Mahalanobis was appointed as a honorary statistical adviser to the Indian Cabinet in 1949 and a Central Statistical Unit was set up in the Cabinet Secretariat in 1949 under his technical guidance. In the same year, a National Income Committee was set up to work out a system of reliable estimates of national income in the Ministry of Finance, Government of India. A couple of years later, this Central Statistical Unit was converted into the Central Statistical Organisation (CSO) in 1951 to coordinate the statistical activities of independent India. The National Sample Survey (NSS) was created in 1950 as a multifaceted fact-finding body. The Department of Statistics (DOS) was set up in the Cabinet Secretariat in the April 1961 and during the same period, CSO and NSS were put under the full fledged Department of Statistics (DOS). The DOS, in 1967 built up a computer centre within itself and later became a part of the Ministry of Planning in 1973. In the month of February, 1999, Departments of Statistics and Programme Implementation were merged and named as "Department of Statistics and Programme Implementation" in the Ministry of Planning and Implementation. Finally, by October 1999, Department of Statistics and Programme Implementation was declared as "Ministry of Statistics and Programme Implementation."

India opted for a planned economic and social development along a path of quick industrial development, especially in basic industries like steel and energy. The goals were a mixed economy, nearly full employment and complete eradication of poverty. None of the latter goals have been achieved but some progress have been made.

In 1949, a National Income Committee was set up to work out a system of reliable estimates of national income. In the early fifties, Mahalanobis was also given the responsibility of drafting the Second Five Year Plan. The Mahalanobis Model for planning remained the starting point for most, if not all, subsequent five year plans by a galaxy of very distinguished Indian economists, including Sukhamay Chakraborty. All of this required new data, the collection of which led to several structural changes in the statistical system. An indication of the importance attached to statistics was that the newly created departments statistics and planning were directly under Prime Minister Nehru.

Responsibility for collection or co-ordination of collection of data fell on CSO and NSSO.

The CSO acts as the main co-ordinating body for all statistical activities in different central ministries and states. It also prepares the National Accounts, including the GNP. The Statistical Abstract and many other statistical publications are brought out by the CSO. It has also been conducting economic censuses and follow up surveys.

Partly at the request of the National Income Committee, the NSS was set up in 1950 to fill up the gaps in the estimation of national income. Data about household income were collected indirectly by asking questions on consumption, savings and indebtedness. It was believed that the indirect method would be more reliable than direct questions on income. The Design Section of the NSSO was housed in the I.S.I. (Indian Statistical Institute) till 1971; after that it has remained in Calcutta as a separate department of NSSO.

The NSS is the largest multi-purpose socio-economic survey in the world. According to Lahiri, who was one of the chief architects of the NSS (and a distinguished number theorist), "The NSS chose a multipurpose and multi-subject frame work, and the survey design was gradually so evolved as to permit study of the inter-connections between the various components of the socio-economic picture of the country and its constituent regions and states". Deming (1973) remarked, "No country developed, under developed or over developed, has such a wealth of information about its people as India". The NSS enquiries

on consumer expenditure are still the main sources of data on level of living of the Indian population. The Annual Survey of Industries (ASI) is another major responsibility of NSS. It has always had a problem of properly sampling the informal sector, but after liberalization the coverage of major industries has also been questioned. One reason is that the questionnaire is too long and another reason is that after liberalisation the industries are not bound to apply for licence for expansion. Information has become entirely voluntary since no act on information gathering is in place.

The NSSO also periodically conducts surveys on employment and unemployment. It is responsible for the annual survey of industries. From time to time it has helped in collection of agricultural statistics in the eastern states where the patwari system was abolished during the British period. Among other things, the NSS collects data about price changes which provide the basis of the labour ministry's consumer price index numbers for rural and urban areas.

The following is a summary picture of the current statistical system of India:

- (a) CSO, Ministry is the main Co-ordinating body;
- (b) NSSO, Ministry of Statistics and Programme Implementation, collects socio-economic information through surveys;
- (c) Office of the Registrar General and Census Commissioner, Home Ministry, is responsible for conducting the decennial population data, birth and death statistics, calculation of birth, death and other demographic rates.
- (d) Department of Commercial Intelligence and Statistics, Ministry of Finance, looks after statistics on foreign trade and business.
- (e) Reserve Bank of India, Ministry of Finance, looks after foreign trade, monetary flow, interest rates etc.
- (f) Labour Bureau, Ministry of Labour, prepares consumer price index numbers. The current WPI (wholesale price index) series with base 1993-94 is compiled by the Office of Economic Adviser (OEA), Ministry of Industry, on a weekly basis, based on price quotations collected by official as well as some non official agencies in respect of 435 selected items and commodities identified in the basket of the Index.

- (g) Directorate of Economics and Statistics, Ministry of Food and Agriculture, is responsible for compiling and publishing agricultural statistics such as crop production, Crop forecasts, fisheries, live stock on an all India basis.
- (h) Central Bureau of Health Intelligence (CBHI), State Welfare Bureau, ICMR, Ministry of Health and Family Welfare record different aspects of public health and family welfare. The system producing health statistics is totally decentralised and still relatively weak even by Indian standard on incidence or prevalence of major diseases at the national level. It needs major overhaul and improvement.
- (i) Both the newly created Ministry of Environment and CSO have been bringing out handbook on environmental statistics. Satellite images are used to estimate forest cover. Latest estimates show forest cover has increased a little after a steady decline over many years.

For special problems technical help is given by the I.S.I. and the IASRI (Indian Agricultural Statistics Research Institute). The Reserve Bank of India also has a large group of research statisticians and economists.

##### 5. Achievements and Criticisms.

The Indian Statistical System collects and publishes an enormous amount of data. The decennial census and the many surveys of the NSSO are a store house of information about one of the most diverse societies in the world. For example, one of the foremost economists at the ISI once pointed out to us that NSS provides evidence that more than 50% Indians eat meat, may be a ritual, at least once a year, contrary to the common impression that Indians are vegetarian. A continuous series on GNP, price indices, agricultural and Industrial production, and other aspects of Indian Society and economy have made India one of the most well-studied countries. These are generalities. A number of special features are mentioned below.

There have been several methodological inventions. The method of having two replicated samples -- the so called interpenetrating samples of Mahalanobis provide a simple estimate of variability of an estimate. It has been regarded as a forerunner of bootstrap -- a recent reference is Hall (Statistical Science, 2003). Wald mentioned Mahalanobis's pilot surveys as an early example of sequential analysis.

There is a huge methodological literature on measurement and eradication of poverty. There are also many estimates of poverty based on innovative data analysis, Sen (2000), Deaton et al (2002), Tendulkar (1996). Along with this, there has been an extensive discussion of national income, inequality and patterns of consumption. [ Mookherjee (1969), Dandekar (1981), Dandekar and Rath (1971),]

We have seen penetrating discussions of the quality of data, e.g., Minhas (1988), Sen (2000) and there have also been innovative special purpose surveys. The usual registration of births and deaths is still quite incomplete, but it has been supplemented by SRS(Sample Registration System) in which a fixed very large sample, spread all over India, is followed carefully over time for ten years. Most of current estimates of various demographic rates are based on this data. An unfortunate fall out is that SRS seems to have diluted efforts towards full registration of births and deaths.

There is some duplication of information in the government. Usually information on the same item collected by different departments do not agree. This is partly because of slightly different definitions of basic items. Of course such lacunae should be removed, but to recommend abolition of duplication is unwise; it is almost like forceful removal of dissent. For example, it is known that estimates produced by states may have biases in different directions --- a lower estimate to attract central aid or a higher estimate for publicity --- that would be absent in NSS estimates.

The Indian Statistical System has been relatively free from political interference. However, its internal problems of extreme decentralisation, lack of co-ordination, aggravated by insufficient attention to human resource development had affected timeliness and quality of the data. Some of the surveys are weak because there are not good frames (as for the so called informal sector). All the surveys (including the Annual Surveys of Industries) tend to have very long questionnaires. Also no good information act is in place. As in agriculture, the system depends on administrative workers at different levels of hierarchy to collect and record statistics, which is a low priority for their main job.

Finally, the relocation of the subject of statistics away from the Prime Minister's office has led to reduced importance and lack of interest in timeliness and quality.

These obstacles have been offset to some extent by advances in information technology, there has been substantial improvement in timely publication. On the other hand, changes in Indian economic policy have raised new questions of adequacy, relevance and quality, which are discussed in the next section.

## 6. Impacts of Liberalisation and the National Commission

Throughout the eighties, the Indian economy was being liberalized by removing various controls and licences. In 1991 the government of India adopted a policy of liberalization and market economy. Since then there have been new criticisms and controversies relating to industrial and agricultural data, the consumption data of NSS and the new quarterly estimates of GNP that are being brought out fairly recently. The quarterly estimates have been subject to such large revisions later that they have attracted special sarcastic comments from newspapers. The industrial time series is very irregular and the consumption data of the NSS seem to be at variance with the widely believed high rate of economic growth, supported by the growth in GNP or per capita income. In agriculture, it is known that agricultural revenue has diminished over time. Hence the administrative interest in land record and crop production has languished. Also, recently, there have been complaints of interference in various organisations including the NSSO.

In response to these criticisms, the Government of India set up a National Statistical Commission in January 2000. The Commission submitted its report in two volumes in August 2001. The Cabinet in the Government of India has already accepted the recommendations. The Commission "has adopted a five fold remedial approach".

"First, reform in the administrative structure of the Indian Statistical System and upgrading its infrastructure so as to ensure its economy,

Second, improvement of the present system of collection of data, in relation to data that are currently being generated,

Third, exploration of alternative techniques, in relation to the existing statistics, if the present system for collecting data is under strain for whatever reasons,

Fourth, identification of new data series that may be generated in keeping pace with the expanding economy, and

Fifth, evolution of appropriate methodologies for collection of data, in relation to new data requirements".

In case of horticultural crops, the Commission recommends to try an alternative method for "Crop Estimation Survey on Fruits and Vegetables" and also suggests to develop a suitable methodology for estimating the production of crops such as mushroom, herbs and floriculture.

Two major administrative recommendations are as follows. There should be a "permanent and statutory apex body through an act of Parliament, independent of the Government in respect of policy making, co-ordination and maintaining quality standards of core statistics". Among other things, this will ensure autonomy and prevent political interference. To improve statistical co-ordination among different ministries as well as "poor and unproductive statistical advice to the concerned administrative ministries and departments", there should be statistical advisers in important ministries.

Another interesting administrative suggestion is to have separate posts of a Census Commissioner and Registrar General, rather than one person for both. Moreover, the post of the Registrar General, whose job requires statistical expertise should be filled from the Indian Statistical Service. This may resolve an old dispute between the Home Ministry and CSO as to how and by whom the census should be conducted. On the one hand, census is a difficult administrative operation and on the other hand, collecting complex information or handling non-response is a technical matter that can not be left to administrators. The new suggestion recognized the need for a senior administrator as well as a statistician under him.

The recommendation to have a comprehensive Health Management Information System may strengthen the data base for health.

There has been considerable scepticism in the country about the Government's price indices. To some extent this is recognized by Commission. "On account of existing deficiencies, such as involment of multiple data collection agencies, use of varying concepts and definitions, non-existence of an exclusive field agency, non-standard specifications, repetition of prices due to non-response, and the meagre honorarium to data collections, the Commission has recommended.....An expert committee should be

constituted to go into the quality aspect of Whole Sale Price Index (WPI) data. To make the system transparent, the Office of Economic Adviser should make available detailed data to other government agencies for official use”.

Instead of examining this voluminous report in detail, we explore a few general questions which do not seem to have received attention.

In addition to being extremely decentralised, which is necessary in a big country like India, the system of collection of statistics depends on unmotivated administrative workers for whom collection, recording or scrutiny is often a secondary responsibility . It is unclear how only a few administrative changes at the top would help. Another serious problem is a lack of focus. The system collects all kinds of statistics, most of which are rarely, if ever, used. Moreover, new series, like environmental data and quarterly figures for GNP are being added continuously at a time when all over the world governments are shedding jobs. The Commission wants all the old statistics to be retained and new series added, but has not examined what kind of manpower and what kind of money would be needed to implement its recommendations. Given this background, the whole exercise seems somewhat unrealistic. Hopefully, the proposed apex body will examine some of these questions.

As the distinguished economist T.N. Srinivasan comments, the report makes no cost benefit analysis either for different kinds of data or for the recommendations. A fundamental deficiency is that the Commission accepts the criticism that the current data base is weak without any careful scrutiny. There is no in-depth critical appraisal of the data base, nor is there any evidence that the Commission was aware of the papers of Minhas (1988), Sen (2000), Deaton et al (2001) which seem to absolve at least the NSS. It is not clear if the Commission had taken a hard look either at conventional wisdom or the feasibility of its own recommendation or their likely impact. Given this back ground, the whole exercise seems somewhat unrealistic. Hopefully, the proposed apex body will examine some of these questions.

The Commission has pointed out that in the future the new self-managed local bodies in cities and rural areas created by the 72<sup>nd</sup> amendment of the constitution can supply lots of data. Since the persons living there are the actual stakeholders, unlike petty government

servants, it is possible that they may be willing and able to generate reliable data at a modest cost. On the other hand politics of election can have unexpected consequences.

It is expected that information technology will be available at these levels (panchayats and municipalities). With a bit of external checks and balances to enforce accountability, the new source of data has a lot of promise. Some of the issues are discussed in the report of the project entitled *ISI – PWI joint project on strengthening local government in Madhya Pradesh, India* [Roy et al (1999)].

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