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**Wide Variations in Statistical Data Sets on the Same Subjects:
Reconsidering the Report of the Indian National Statistical
Commission**

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Abstract

This paper reconsiders the final report submitted by the National Statistical Commission of India in August 2001. The focus is on the approach adopted by the Commission for examining the deficiencies of the statistical system. The Commission examined the wide variations in the statistical data sets on the same subjects for the purpose of providing quantitative descriptions of the reliability of statistics in India. This approach is fairly effective not only in the examination of the deficiencies of the Indian Statistical System but also in prompting necessary corrective steps for improving the system. This approach will be highly regarded from the viewpoint of the Japanese social-scientific statistics, though the Commission neither revealed the theoretical framework for this approach nor discussed the matter at the micro level.

CONTENTS

Abstract

Introduction

Chapter 1. Reconsidering the Report of the Indian National Statistical Commission

1-1. Background

1-2. Report of the National Statistical Commission

Chapter 2. Divergences in the Alternative Data Sets on the Same Subjects

2-1. Reliability of Statistics

2-2. On the Wide Variations in Statistical Data Sets on the Same Subjects

2-3. Case Studies

2-3-1. Case (α)—Crop Area Statistics

2-3-2. Case (η)—Number of Manufacturing Enterprises

2-3-3. Case (κ)—Statistics of Births and Deaths

2-4. Results

Chapter 3. Discussion from Viewpoint of the Japanese Social-Scientific Statistics

3-1. Viewpoint of the Japanese Social-Scientific Statistics

3-2. Basic Issues of the Approach adopted by the NSC

Chapter 4. A Further Direction of This Study

NOTES

TABLES

REFERENCES

Introduction

It is generally recognized today that it is necessary to pay attention to the system of data production in order to assess the reliability of statistics. New approaches to data quality in statistics continue to emerge among national and international statistical agencies. However, a general consensus on the practical and theoretical framework for improving the reliability of statistics has not yet been formed. It is currently open to discussion in the Eurostat and IMF (Elvers and Rosén [18] and Laliberté et al. [19]).

In India, the loss of credibility of official statistics especially during the 1990s, prompted the appointment of the National Statistical Commission (NSC). The final report was submitted in August 2001. Since the time of P. C. Mahalanobis, India has built a fairly sophisticated system of sample surveys, known to be the best among the developing countries (Ghosh et al. [3] and Ministry of Statistics [4]). Nevertheless, over the decades, the co-ordinating mechanism in the Indian Statistical System has been weakening, and in particular, the administrative statistical system has been deteriorating. Therefore, the NSC has critically examined the system of data production to assess the reliability of statistics in India.

Traditionally, the Japan Society of Economic Statistics (JSES) has discussed the reliability of statistics on the basis of its unique paradigm, i.e. the paradigm of the social-scientific statistics¹. A theoretical review of India's recent statistical experiences will be an incentive to develop this paradigm. Therefore, this paper reconsiders the final report of the NSC and explores the basic issues that may serve as a basis for theoretical interaction between Indian and Japanese statistical communities.

An outstanding feature of this final report was to provide quantitative descriptions for the reliability of statistics in India. The NSC examined the wide variations in the statistical data sets on the same subjects. This approach is fairly effective not only in examining the deficiencies of the Indian Statistical System but also in prompting necessary corrective steps for improving the system. This approach will be highly regarded from the viewpoint of the Japanese social-scientific statistics. However, the NSC did not reveal the theoretical framework for this approach. Moreover, a micro-level analysis of these wide variations in the alternative data sets remains as an issue to be further discussed in the future.

This paper is organized as follows: Chapter 1 reconsiders the NSC Report and its background. Chapter 2 discusses in detail the divergences in the alternative data sets on the same subjects. Chapter 3 presents the basic issues in the approach adopted by the NSC, from the viewpoint of the Japanese Social-Scientific Statistics. Chapter 4 presents a further direction of this study.

Chapter 1. Reconsidering the Report of the Indian National Statistical Commission

1-1. Background

Over the decades, India has built a fairly sophisticated system of statistics, known to be the best among the developing countries. However, the loss of credibility of official statistics, especially in the 1990s, prompted the appointment of the NSC. The reasons were traced to '(a) deterioration in Administrative Statistics at the primary level; (b) weakening of the institutional mechanisms of vertical coordination between the Centre and the States; and (c) a similar weakening of the lateral coordination between the ministries at the Centre and the Central Statistical Organisation(CSO)' (NSC [1] 2.12.1).

Firstly, the NSC noted that 'over the years the administrative statistical system has been deteriorating and has now almost collapsed in certain sectors. The deterioration had taken place at its very roots, namely, at the very first stage of collection and recording of data....The foundation on which the entire edifice of Administrative Statistical System was built appears to be crumbling, pulling down the whole system and paralysing a large part of Indian Statistical System' (NSC [1] 14.3.10). Sample surveys, censuses and national accounts in India are largely dependent on the Administrative Statistical System. For example, the lists of factories maintained by the Chief Inspectors of Factories (CIF) provide a sampling frame for the Annual Survey of Industries (ASI). The Agricultural Census follows the method of re-tabulation of data from village land records in the temporarily settled States (accounting for 86% of the Indian total reporting area). Several estimates of National Account Statistics are derived from data generated as a by-product of the public administrative system (such as land records, enforcement of various laws regulating economic activities, collection of customs duties, etc.).

Secondly, in accordance with its federal structure, India has created a statistical system

that is both decentralised and centralised. That is, the Indian Statistical System is decentralised vertically between the Centre and the States, and horizontally between the ministries at the Centre and the CSO. On the other hand, however, large-scale statistical activities such as the Population Census, Economic Census and National Sample Surveys are centralised. In addition, the compilation of macro-economic aggregates such as national accounts, price indices and industrial production are largely centralised statistical activities. India currently requires some specific guidelines for strengthening its decentralised statistical system.

During the late nineties, the then Department of Statistics (the Statistics Wing in the Ministry of Statistics and Programme Implementation since October 1999) was designated as the nodal agency for real sector data categories of IMF's Special Data Dissemination Standards (SDDS). Faced with this responsibility, the Department of Statistics proposed the creation of a statistical authority with centralised control over all official statistical agencies. It also initiated a project in 1998 for the modernisation of the Indian Statistical System, which was to be financed through a loan from the World Bank. The main thrust of the project was to expand the National Sample Survey as an expedient means of data collection for GDP estimation. It was necessary to expand the National Sample Survey Organisation (NSSO) to replace the failing Administrative Statistical System (NSC [1] 14.3.16). Although the NSSO has an admittedly highly developed system of nationwide sample surveys, the view of the Ministry of Statistics and the World Bank on the Modernisation Project was not widely accepted in India. The employment of the National Sample Survey as an alternative system to the failing Administrative Statistical System was considered to 'divert attention from the solution of the real systemic problem of the decentralised Indian Statistical System' (NSC [1] 14.3.17). The project did not consider even the problem of the statistical system in the States. Thus, to overcome the view of the Modernisation Project, the systemic view of the essentially decentralised Indian Statistical System was prompted at the end of the nineties. As a result, the NSC was forced to shift its focus from the expansion of sample surveys to the improvement of the systemic issues of the Administrative Statistical System and the States' Statistical Systems (NSC [1] 14.3.20). Further, the NSC had to make several recommendations for strengthening the coordination in the decentralised statistical system at various levels.

1-2. Report of the National Statistical Commission

The Government of India initiated the NSC through a resolution dated 19th January 2000 by the Ministry of Statistics and Programme Implementation. Dr. C. Rangarajan, the Honourable Governor of Andhra Pradesh, was appointed as the part-time chairman of the NSC along with eleven eminent statisticians and economists as its part-time members. Dr. V. Saha functioned as the secretary to the NSC. The Government of India prompted the NSC 'to examine critically the deficiencies of the present statistical system' and 'to recommend measures to correct the deficiencies and revamp the statistical system to generate timely and reliable statistics' (NSC [1] 1.2.2).

The NSC's critical survey on the deficiencies of the statistical system had a whistle-blowing effect, because the NSC freely examined rich information provided by a great number of insiders within the Indian Statistical System. To assist the NSC, external experts and officials were associated with sub-groups, expert groups and committees under the NSC. In all, over one hundred people assisted the NSC in the examination of the technical aspects of the discussion. Further, the NSC requested all the State Governments, Union Territory administrations and Central Ministries and Departments to provide basic information on the data supplied by them and the perceived data gaps along with their suggestions.

The NSC submitted its final report in August 2001; the 19 months' labour of the NSC has produced a comprehensive report on all aspects of the Indian Statistical System. It is recognised to be the first post-independence report of a major Commission; there has been no comprehensive review of the Indian Statistical System that has emerged during the half-century since independence (Rath [2] p.707).

The Report is in two volumes; the first volume contains three chapters—chapter 1 describes the setting up of the NSC; chapter 2 provides an overview of the problem and the approach adopted by the NSC to counter it; and chapter 3 reproduces all the recommendations in the individual chapters in the second volume. The second volume contains 11 chapters, one for each major sector from which the statistics are collected and a final chapter (chapter 14) on the Indian Statistical System. The sectoral chapters are as follows: Agricultural Statistics (chapter 4), Industrial Statistics (chapter 5), Trade Statistics (chapter 6), Service Sector Statistics (chapter 7), Infrastructure Statistics (chapter 8), Socio-Economic Statistics (chapter 9), Financial and External Sector Statistics (chapter 10), Price Statistics (chapter 11), Corporate Sector Statistics (chapter

12) and National Accounts Statistics (chapter 13). Each sectoral chapter is further divided into subsections; for example, chapter 9 consists of sections such as Population and Basic Statistics at the Local Level, Health and Family Welfare Statistics, Labour and Employment Statistics, Educational Statistics, Gender Statistics, Environment Statistics, and Consumption Surveys and Levels of Living. A large part of the Report was devoted to describing the 'Current Status', 'Deficiencies' and 'Recommendations' on the statistical activities for each subsection. Volume 2 of the Report runs to about 700 pages. The full report of the NSC has been opened to the public at official website of the Ministry of Statistics and Programme Implementation (now available at <http://mospi.nic.in/nscr/hp.htm>).

To conclude the Report, the NSC proposes the establishment, by an Act of Parliament, of an independent statistical authority free from political interference, i.e. the National Commission of Statistics (NCS). 'The proposed establishment of the National Commission on Statistics as a nodal policy-making and supervisory non-official body with statutory backing and assisted by subject specific expert groups as also its executive organ, namely, the National Statistical Office with well-defined implementing powers and headed by a National Statistician are meant to strengthen coordination in the decentralised statistical system at various levels' (NSC [1] 2.12.2). The NSC is of the view that the NCS shall ensure a certain quality standard of statistical processes. However, the purpose of this paper is not necessarily to discuss the NCS in detail. In the next chapter, I shall limit the discussion to the approaches adopted by the NSC for examining the deficiencies of the statistical system.

Chapter 2. Divergences in the Alternative Data Sets on the Same Subjects

2-1. Reliability of Statistics

The NSC Report focuses on the process of data collection. It is a salient feature of the NSC Report. The NSC states that 'collection of numerical data for the purpose of understanding the behaviour of various socio-economic variables has a long history. The origin of the term "statistics" is associated with this concept, which is to describe the state. Of course, statistics, as a scientific discipline, goes beyond enumeration. Statistical inference is an important part of the discipline. However, inference will be

fruitless, if the basic data are faulty or inaccurate or unreliable. That is why we have to pay attention to data collection in all its dimensions' (NSC [1] 2.1.1). Further, the process of data collection in all its dimensions depends on the statistical system. From the figures alone, it is not possible to discern the method that was used to obtain the statistics (Morgenstern [12] p.217). That is why the NSC is required to examine the state of the Indian Statistical System for appraising the quality of data.

As mentioned before, one of the terms of reference for the NSC was 'to examine critically the deficiencies of the present statistical system in terms of timeliness, reliability and adequacy (NSC [1] 1.2.2).' In this context, timeliness, reliability and adequacy are the three main criteria for examining the deficiencies of the Statistical System. Timeliness relates to a time lag in compiling the statistics in question. In India, it is pointed out that there is a considerable delay in the reporting of statistics from the local level agencies, leading to a delay in the compilation of the statistics at the state and national levels. This is a critical issue. Adequacy seems to relate to the administrative and technical requirements for the statistical system in question, though the NSC Report does not provide any explicit explanation for this criterion.

It would be interesting to follow up the concept of timeliness and adequacy further, but this is not our present concern. In this paper, I would like to concentrate on the reliability of the Indian Statistical System.

Reliability relates to the basic quality of the statistics, i.e. how well the statistics reflect the true status of the social facts concerned. However, it will be helpful to distinguish between the two different concepts of reliability for appraising the quality of the statistics: (i) accuracy in statistics, given its definition and (ii) the validity of its definition. The former concept will be denoted by 'accuracy' and the latter by 'validity', though the NSC does not make such a distinction in the Report.

2-2. On the Wide Variations in the Statistical Data Sets on the Same Subjects

An outstanding feature of the NSC Report is that the NSC frequently attempted to provide a quantitative description of the reliability of the statistics in question. That is, the NSC examined divergences in the alternative data sets on the same subjects relative to certain sectors from which the statistics are collected.

Toward the end of the 1990s, an 'Expert Committee to examine wide variations in data

sets on the same subjects (Report released in February 2000)', had also studied the said divergences. V. Saha, Secretary to the NSC, had been the Chairman of this Expert Committee. He assisted the NSC by way of preparing agenda papers for the meetings. Therefore, it seems reasonable to believe that the NSC consciously adopted the approach to the divergences in the alternative data sets on the basis of studies prepared by this Expert Committee².

The NSC compared figures from two statistical data sets, both of which described the same subjects. It then explored the cause of the divergences, if any, in these alternative data sets. There are numerous examples of such alternative data sets considered in the NSC Report; they are as follows:

- (α) Divergences between the crop area statistics generated by the primary reporting agencies in the villages and their physical verification under the scheme for Improvement of Crop Statistics (ICS) in the sample villages (NSC [1] 4.2.6)
- (β) Divergences between the results of crop-cutting experiments conducted under the General Crop Estimation Survey (GCES) and the supervisory check by ICS staff on the same operations in the sample villages, both of which aim to describe the yield rate of each crop (NSC [1] 4.3.2)
- (γ) Divergences between the estimates available from the Directorate of Economics and Statistics, Ministry of Agriculture (DESMOA) and from the National Horticultural Board (NHB), both of which aim to describe the production of horticultural crops (NSC [1] 4.5.2)
- (δ) Divergences between the estimates available from DESMOA and from the Cotton Advisory Board, both of which aim to describe the production of cotton (NSC [1] 4.6.1)
- (ε) Divergences between the estimates available from the Ministry of Water Resources and from DESMOA, both of which aim to describe the irrigated area (NSC [1] 4.8.7)
- (ζ) Divergences between the estimates available from the Forest Survey of India and from Land Use Statistics by DESMOA, both of which aim to describe the forest area (NSC [1] 4.17.6)
- (η) Divergences between the estimated total number of manufacturing and repairing units available from the Follow-up Enterprise Surveys (FuS) of

- Economic Censuses plus the ASI and the total number of manufacturing and repairing units as per Economic Censuses (NSC [1] 5.2.2)
- (θ) Divergences between the estimated total number of workers engaged in the manufacturing activities as per the FuS plus the ASI and the total number of workers as per the three other sources, namely, the Economic Censuses, Employment-Unemployment Surveys (EUS) of the NSSO and Population Censuses (NSC [1] 5.2.19)
- (ι) Divergences between the Population Census counts and the Post Enumeration Checks on the Population Censuses (NSC [1] 9.2.10)
- (κ) Divergences between the vital statistics available from the Civil Registration System (CRS) and from the Sample Registration System (SRS), both of which aim to describe various vital rates (NSC [1] 9.3.27)
- (λ) Divergences between the live register data of Employment Exchanges and the data available from the labour force survey of the NSSO, both of which aim to describe unemployment in India (NSC [1] 9.4.34)
- (μ) Divergences between the school enrolment data and the data on school attendance supplied by households, both of which aim to describe the number of children attending or not attending school at the village level (NSC [1] 9.5.15)
- (ν) Divergences between the data on merchandise trade available from the Directorate General of Commercial Intelligence and Statistics (DGCI&S) on a custom basis and from the Reserve Bank of India on a payment basis (NSC [1] 10.9.11)
- (ξ) Divergences between the estimates of private final consumption expenditure obtained by the commodity flow method in National Accounts Statistics and those of the quinquennial household consumer expenditure surveys available from the National Sample Survey (NSC [1] 13.4.7-13.4.8).

2-3. Case Studies

Further, the NSC examined in detail several factors that lead to the divergence between such alternative data sets. Consider, for example, the following cases: (α), (η) and (κ).

2-3-1. Case (α)—Crop Area Statistics

Statistics of the crop area are compiled with the help of the village revenue agency

(known as '*patwari* agency' in India) in the temporarily settled parts of the country that have detailed cadastral maps and land records³. The *patwari* agency makes a complete enumeration of all fields (known as '*girdawari*' in India) in every village during each crop season to compile the land use, irrigation and crop area statistics. Crop area statistics of the temporarily settled areas are considered fairly reliable because of the *patwari*'s (that is, the village revenue officer's) intimate knowledge of local agriculture and his ready availability in the village. However, due to an increasing range of functions being assigned to the *patwari*, the *girdawari* tended to receive low priority (NSC [1] 4.2.3).

In order to improve the timeliness and quality of crop area statistics, a scheme for the ICS has been in operation since the early seventies. Under the ICS scheme, an independent agency of supervisors conducts physical verification of the *patwari*'s *girdawari* in a sample village and makes an assessment of the extent of discrepancies between the supervisor's and *patwari*'s crop area entries in the sample village. The supervisor also scrutinises the summary of the village crop prepared by the *patwari* and checks whether it is free from totalling errors and whether it has been dispatched to the higher authorities within the stipulated time. About 8,500 sample villages are covered by the ICS in the temporarily settled areas. The National Sample Survey Organisation is responsible for the planning and operations of the ICS and employs full-time staff for field supervision (NSC [1] 4.2.6).

The NSC focused attention on a review of the ICS results for a four-year period ending 1998-99, which shows that village crop statements are received at the processing centre from only about 78% of the sample villages (i.e. a non-response of 22%) and only about 45% by the due date (Table 1); crop entries of the *patwari* and supervisor do not tally with each other in about one third of the survey numbers inspected, despite the *patwari* being aware that his work will be subjected to technical supervision. The NSC pointed out that the ratios mentioned above are of the same order as those obtained in a previous study of ICS results for the four-year period ending 1988-89. These results lead the NSC to the conclusion that 'The above findings are a clear indication of the *patwari*'s neglect of one of his major functions. It is a matter of concern that this has continued for several years, evidently with the knowledge and indulgence of the higher-level officials of the State departments of revenue and land records.' Therefore, the findings of the ICS cast doubt on the reliability of land records updated by the *patwari* agency.

The NSC acknowledged that the *patwari* agency is overburdened with multifarious functions and has to cope with a large geographical jurisdiction, typically four or five villages and in some States, extending to over 10 villages (Bihar, Himachal Pradesh, Orissa and Uttaranchal) (NSC [1] 4.2.13). The NSC, therefore, recommended that the *patwari* and his supervisors should be mandated to accord the highest priority to the work of the *girdawari* and if necessary, the *patwari* should be excused from other duties during the *girdawari* period. Moreover, the NSC recommended that this be rigorously implemented in the case of the 20% sample villages (NSC [1] 4.2.15).

2-3-2. Case (η)—Number of Manufacturing Enterprises

Though the total number of manufacturing and repairing units covered by Economic Censuses should closely tally with the total number of the same units estimated by FuS and ASI, the NSC found that these alternative data widely differ.

For the collection of data relating to manufacturing and repairing activities, all units pursuing such activities in India are grouped into one of the two categories, namely, registered units and unregistered units. 'Registered units' refers to the units registered under Sections 2m (i) and 2m (ii) of the Factories Act, 1948, or under the *Bidi* and Cigar Workers (Condition of Employment) Act, 1966, i.e. those employing 10 or more workers and using power and those employing 20 or more workers but not using power, respectively. Data on registered manufacturing and repairing units are collected through the ASI and data on unregistered manufacturing and repairing units are collected through the FuS of the Economic Census. For the selection of units in the ASI, the lists of factories maintained by the States' CFI are used as the sampling frame. The sample units surveyed in actuality for ASI are obtained by subtracting the non-operating units from the sampling frame. On the other hand, FuS, which adopt a stratified two- or three-stage sampling design, with villages and urban blocks as the first-stage units (FSUs) and unregistered manufacturing and repairing units as the ultimate-stage sampling units, generally use the lists of villages and blocks with information on the number of enterprises and workers as per the Economic Census as the sampling frame for the selection of FSUs.

The CSO in collaboration with the Directorates of Economics and Statistics (DES) conduct the Economic Census for a complete enumeration of all types of enterprises (including all own-account enterprises) irrespective of their registration status. The

Economic Census and FuS define an enterprise in exactly the same manner.

Here, the NSC focused attention on a comparative picture of the estimated number of enterprises as per the alternative sources as included in the report of the Expert Committee, to examine the wide variations in the data sets on the same subjects.

With regard to the registered units, Table 2 presents the number of units as per three sources: the ASI 1994-95, the FuS 1994-95 and the Economic Census 1998. This table shows the seriousness of the problem of non-inclusion of eligible units in the ASI frame. As mentioned above, the ASI is based on the lists of factories maintained by the States' CIF as the sampling frame. Although it is claimed that there are built-in mechanisms for updating the ASI frame every year, Table 2 clearly demonstrates, as the NSC emphasised, that several units that are eligible to be listed in the ASI frame are not included in it. The Economic Census counts the total number of units that are eligible to be listed. However, it is likely to be larger than the number of registered units estimated by ASI. Further, the FuS considers only those units that are not included in the ASI. The units included in the FuS 1994-95, therefore, represent the units that are outside the ASI frame. The findings of the study, given in Table 2, reveal that: (a) during 1994-95, as estimated by the FuS 1994-95, about 1,45,000 *eligible* units (i.e. employing 10 or more workers and using power, or employing 20 or more workers but not using power) were not included in the ASI frame; and (b) of these 1,45,000 missing units, about 1,19,000 units belonged to the employment size class 10 to 19, and the rest (i.e. about 26,000 units) belonged to the employment size class 20 or more. Further, the FuS estimate of the total number of missing units does not include units that operated for less than 30 days (15 days in the case of seasonal enterprises) during the year preceding the date of survey. The ASI, on the other hand, includes factories operating for any number of days during the previous year. Thus, the number of units missing in the ASI frame is likely to be larger than 1,45,000. From what has been discussed above, the NSC concluded that this huge magnitude of units missing from the ASI frame seems to raise serious doubts about the efficacy of the functioning of the CIF in maintaining up-to-date registers of factories (NSC [1] 5.1.19).

With regard to the total units, including unregistered units, Table 3 presents an extremely wide divergence between the Economic Census, 1990, and the FuS, 1989-90. Although the Economic Census and FuS define an enterprise in exactly the same manner, the total number of manufacturing enterprises in the country, as estimated by

the Economic Census, 1990, and the FuS, 1989-90, are about 5,400,000 and 14,400,000, respectively. Thus, the FuS estimate is about 2.7 times that of the Economic Census despite the fact that the FuS considered only the unregistered enterprises as against the Economic Census, which took into account all types of enterprises, irrespective of their registration status. The NSC referred to the studies conducted in the past, which had revealed that the divergences in the number of enterprises as per these two sources are mainly due to an under-listing of enterprises by the enumerators in the Economic Census (NSC [1] 7.3.6).

As we have seen, the FuS estimates play a pivotal role in the examination of the deficiencies of the ASI and Economic Census in the NSC Report. However, the results of the FuS, which was conducted at different points of time and following similar concepts and definitions, are not consistent. The examination of key results of the previous three surveys shows a decline in the estimated number of unregistered manufacturing enterprises at the all-India level during the periods 1994-95 and 1998-99 (12,400,000 and 10,100,000, respectively). But a high growth rate in the estimated number of unregistered manufacturing enterprises is observed during the following year (14,300,000) (NSC [1] 5.2.21). This seems to raise doubts on the reliability of the FuS estimates.

Taking note of the extent of divergences in these alternative data sets, the NSC recommended that the National Sample Survey Office regularly study the extent of divergences in the alternative data sets in order to identify the reasons for the divergences and suggest remedial measures. Further, since the village- and urban-block level data of the number of enterprises and workers as per the Economic Census are used as the sampling frame for the selection of villages and urban blocks in the FuS, necessary measures must be taken in the Economic Census to enhance the quality of the data (NSC [1] 5.2.20).

2-3-3. Case (κ)—Statistics of Births and Deaths

The CRS of India has been suffering from incomplete coverage. It plans to record each and every incidence of a vital event for legal purposes and, in the process, captures a large amount of information on the various characteristics of these events, which help in the compilation of a continuous series of vital events. The enactment of the 'Registration of Births and Deaths (RBD) Act, 1969' and the Model Rules framed under

the Act aimed to have a uniform system of registration and data collection on vital statistics. The Act provides for compulsory registration of births and deaths in the country. The RBD Act has provided for a hierarchical setup for the registration machinery in the country, headed by the Registrar General of India (RGI) at the Centre. The Chief Registrar of Births and Deaths is the chief executive authority in the State for implementing the provisions of the Act. There are more than 2,00,000 reporting units in the country and more than 1,00,000 local registrars involved in the actual work of registration. However, based upon the reports received by the RGI, only 55% of births and 46% of deaths are registered. The poor registration level in the rural areas of the country is the main reason for incomplete registration. Further, the levels of registration of births and deaths vary widely across the States (see Table 4).

On the other hand, the SRS was initiated by the RGI. The SRS is a dual record system with the main objective of providing reliable estimates of birth and death rates at the state and national levels. The field investigation consists of a continuous enumeration of births and deaths by a resident enumerator, generally a teacher, as well as an independent survey conducted every six months by computer supervisors. The data obtained through these two operations are matched. The unmatched and partially matched events are re-verified in the field, and thereafter, an unduplicated count of births and deaths is obtained (CSO [5] p.41-42 and Registrar General [14] p.xxvi). However, the SRS estimate is made available only at the state and national levels. The sample unit in the rural areas is a village or segment of a village. In the urban areas, the sample unit is a census block with a population of between 750 and 1,000. These SRS estimates can be compared with the number of registered events in the CRS at the state and nations. This is the reason why we can easily assess the extent of registration of births and deaths at the state and national levels. The numbers of vital events as per these two sources should ideally be in close agreement. However, as mentioned above, the CRS suffers from incomplete coverage. Therefore, the NSC recommends using the SRS as a means of validating the data generated from the CRS.

There are various factors that lead to incomplete registrations in India. Firstly, the NSC noted that a combination of administrative factors is responsible for the poor registration levels of vital events. Except for a few States and Union Territories, multiple agencies are generally involved in the registration work at the sub-national level. This poses considerable problems in coordination, monitoring and supervision,

which directly affect the quality and timeliness of data. Although high-level inter-departmental committees exist, they have remained ineffective in improving the situation in most of the States. Secondly, the NSC notes that the registration functionaries at all levels do the work of registration in addition to their other normal duties in an honorary capacity, generally, without any incentive; this is why the work of registration, preparation and submission of statistical returns does not get due attention and priority. Thirdly, the NSC pointed out the other factors that lead to incomplete registrations: a general lack of awareness in the public about the statutory requirements and procedures of registration, lack of demand of birth and death certificates in rural areas, acceptance of alternate documents as proof of death, and lack of perception of any benefits of registration by the people.

Recognising the increasing role of local self-governance in the light of the 73rd and 74th Constitutional Amendments and considering that quite a few States in the country have already taken the initiative in this direction, the NSC stated that the *panchayats* in the rural areas and municipalities in the urban areas should gradually be assigned the responsibility of registration of births and deaths.

2-4. Results

The NSC analysed various data sets generated from different data sources such as administrative records, censuses, sample surveys and so on⁴. However, the divergences between Administrative Statistics and sample survey data are the most important measures for appraising the deficiencies of the Indian Statistical System⁵. The failure of the Administrative Statistical System is, as we have seen, the major problem facing the Indian Statistical System today (NSC [1] 14.3.10). Indeed, incomplete coverage of the Administrative Statistics discussed in cases (α), (η), (κ) and (λ) shows the seriousness of its deterioration. The coverage is evidently one of the measures for appraising the reliability of Administrative Statistics. On the other hand, we can observe that various sample surveys have been functioning in India as parallel surveys that verify the Administrative Statistics. For example, the supervisory surveys under the ICS scheme, the FuS of the Economic Census, and the SRS are considered in parallel with the *patwari*'s report on the crop area, the lists of factories maintained by the States' CIF with regard to the organised sector, and the CRS, respectively.

Taking note of the divergences in the various data sets on the same subjects, the NSC

recommended that regular interaction be maintained between the agencies concerned, with a view to taking necessary corrective steps for improving the quality of data (NSC [1] 5.2.26). The NSC noted that there is currently no regular mechanism for a post-survey evaluation of the survey results that allows the results to be cross-validated with those available from alternative sources (NSC [1] 5.2.22). The findings of wide variations in the statistical data sets on the same subjects are considered a reason to urge vertical or lateral co-ordination between the agencies concerned.

Thus, we can say that divergences in the data sets on the same subjects lead us to a debate on the deficiencies of the statistical system. Once wide divergences in the data sets on a subject are demonstrated, (1) the concerned deficiencies of the statistical system cannot be ignored, (2) the agencies concerned will be accountable to the public for the divergences, and (3) a numerical target will be presented for reforming the concerned statistical system.

Therefore, this approach adopted by the NSC is fairly effective not only in critically examining the deficiencies of the Indian Statistical System but also in prompting necessary corrective steps for improving the system.

However, this approach is effective only in sectors in which the statistical system is highly developed, i.e. in sectors such as agriculture and industry. Different agencies are required to collect data on the same subjects in the sectors. For example, there are many data gaps in India in sectors such as Trade Statistics, Infrastructure Statistics, Health and Family Welfare Statistics and Environment Statistics. In these sectors, even a single data cannot be found, let alone multiple data sets on the same subjects.

Chapter 3. Discussion from the Viewpoint of the Japanese Social-Scientific Statistics

3-1. Viewpoint of the Japanese Social-Scientific Statistics

As we have seen in the previous Chapter, the process of data collection in all its dimensions and the system supporting the process is the primary focus of the NSC Report. These aspects of statistical activities are also the focal point of the Japanese 'social-scientific statistics'. The term 'social-scientific statistics' does not mean statistics for sociology or social-statistical materials, but it means statistics based on social sciences in contrast with mathematical statistics. The Japanese social-scientific

statistics is a unique paradigm developed in Japan, primarily based on the statistical theory established by G. von Mayr, F. Zizek and P. Flaskämper from the late 19th century to the 1930s in Germany (Mayr [6] , Zizek [7] and Flaskämper [8]). From the viewpoint of official statisticians, the German statistical theory focused on the production of statistics. Though the German approach has since lost its influence in Germany, some Japanese researchers have been attempting to advance their theory toward social-scientific statistics in a unique way (Ninagawa [9])⁶. The Japanese social-scientific statistics have emphasised the critical viewpoint of general users, especially the public⁷. The public is mostly concerned with the reliability of the official statistics and relevance of government statistical services. Therefore, the Japan Society of Economic Statistics (JSES) was founded in 1953 by some members of the Japan Statistical Society (JSS) that had founded in 1931. '*Toukeigaku*' (Statistics), the Japanese journal of the JSES was founded in 1955. The JSES devotes itself to discussing matters related to the social-scientific statistics, while the JSS is organised by statistical researchers from various fields ranging from natural to social sciences. Most current statistical researchers are likely to hold the view that statistical theory is the same as mathematical statistics. The Japanese social-scientific statistics, however, attaches great importance to the theoretical framework that is specific to the statistics for the society⁸⁻⁹.

National and international statistical agencies are currently involved in discussions related to 'data quality in official statistics'. For example, the IMF presented the Special Data Dissemination Standard (SDDS) in 1996. India is one of the member countries that subscribed to the SDDS. Further, the IMF presented another guideline, the General Data Dissemination System (GDDS), in 1997. It can be said with fair certainty that the NSC Report is considerably influenced by these emerging approaches. The problem of data quality in official statistics is obviously focused on the process of data collection and the statistical system supporting the process. Therefore, these approaches to data quality are familiar to Japanese researchers involved in the social-scientific statistics. Eventually, critical analysis of data quality by the Indian National Statistical Commission may attract a vast amount of interest from the Japanese social-scientific statisticians.

3-2. Basic Issues of the Approach adopted by the NSC

As mentioned earlier, since the NSC succeeded in their interaction with insiders within

the Indian Statistical System, its analysis of the deficiencies of the system was surprisingly deep and comprehensive. With respect to Japan, there has never been such a large review of the statistical system. Moreover, it is marvellous that the NSC attempted to provide a quantitative description of the reliability of statistics on the basis of this rich information. This approach made possible a broad dimensional check on the quality of statistics. This may be highly regarded from the viewpoint of the Japanese social-scientific statistics.

However, the NSC did not reveal the theoretical framework for examining wide variations in statistical data sets on the same subjects. The meaning of these wide variations is not clear in the NSC Report, primarily because the concept of reliability is unclear. As mentioned earlier, the NSC does not distinguish between the two different concepts of reliability, i.e. (i) the accuracy in statistics, given its definition and (ii) the validity of its definition. O. Morgenstern similarly pointed out these two different concepts in his review of the U.S. statistical system. When discussing the ‘divergences among principal labour force series’, he noted that ‘we will discuss two different concepts of error applicable to employment statistics: (a) inaccuracies in a measure, given its definition and (b) divergences between two or more measures that are often related for the purpose of economic analyses but are based on differing definitions. The latter concept will be referred to as “divergency” or “discrepancy”. The former will be denoted by “error” or “inaccuracy”’ (Morgenstern [12] p.218). The cases (α), (β), (ι) and (κ) mentioned in the previous Chapter reflect inaccuracies in a measure, given its definition, while the other cases reflect the divergences (according to Morgenstern, “divergency”) between two or more measures, which are based on differing definitions. It is a challenging problem to provide an interpretation of the divergences in alternative data sets that are based on differing definitions. The extent to which the observed divergences are explainable by the differences in the definitions needs to be assessed.

It is fairly important for the Japanese social-scientific statisticians to distinguish between these two concepts of reliability, especially for the following reasons:

(i) The validity of a definition in statistics is not only an administrative and technical matter but also a matter of public debate or social science. The NSC attempted to offer a clear definition of ‘infrastructure’ in chapter 8 of the Report for the purpose of developing infrastructure statistics in the Indian context. However, we cannot find such a basic consideration in the other part of the NSC Report.

(ii) The accuracy in statistics, given its definition, is not only dependent on administrative and technical requirements but also on the social context of the statistical system. The NSC stated that the failure of the Administrative Statistical System is but a corollary of this deterioration of the system of Government administration. If this is true, we have to examine the system of Government administration in the social context of India. Besides, the NSC pointed out, for example, that reluctance on the part of the enterprises to supply correct information in the FuS is one of the likely reasons for the underreporting of receipts and the gross value added. Assuming that this hypothesis is correct, we must examine the various reasons in the social context, such as apprehension that the information supplied may be utilised for taxation purposes etc., as the NSC noted (NSC [1] 5.2.23).

The NSC did not ignore these problems, but it did not explicitly reveal the theoretical framework for examining these matters. The NSC examined them, especially in term of its administrative and technical requirements.

Traditionally, the Japanese social-scientific statistics also attaches great importance to the statistical system, supporting the process of data collection (Kimura [10] and Ohya [11]). The primary reason that the NSC was able to examine the wide variations in the statistical data sets on the same subjects is that the Indian Statistical System is decentralised as is the Japanese Statistical System. Different agencies are required to collect data on the same subjects. Moreover, an overlapping of the information system of these agencies is also required. The second reason is that India has a highly developed nationwide sample survey system, i.e. NSSO. As we have seen, the sample survey system in India has been designed to operate in parallel with the Administrative Statistics or Censuses and have verified the collected data. As I mentioned in 2-2-2 of this paper, it does not mean that we should place absolute trust in data from nationwide sample surveys. It calls for further investigations. Thus the NSC's systemic review of the Indian Statistical System will also attract a vast amount of interest from the Japanese social-scientific statistics.

Chapter 4. A Further Direction of This Study

This paper has reconsidered the final report submitted by the NSC. The NSC examined

the wide variations in the statistical data sets on the same subjects for the purpose of providing quantitative descriptions of the reliability of statistics in India. This approach is fairly effective not only in the examination of the deficiencies of the Indian Statistical System but also in prompting necessary corrective steps for improving it. This approach will be highly regarded from the viewpoint of the Japanese social-scientific statistics.

On the basis of this approach, the NSC looked into several deficiencies of the Indian Statistical System. However, further research on the history and current status of the Indian Statistical System will be needed to assess the work of the NSC.

Moreover, the NSC Report exclusively discussed the macro level divergences of data concerned. The NSC Report did not give any pictures of the complicated social contexts in the *panchayats* and municipalities level for examining the statistical divergences. In order to explore the social contexts of the statistical system, it will be necessarily to discuss the issues not only at the macro level but also at the micro level. For this purpose, we must conduct a survey on the social contexts at the village or urban block levels. It is desirable to reconcile the wide variations in statistical data sets on the same subjects to the greatest extent possible, which can be attempted only at the micro level.

The increasing role of local self-governance in the light of the 73rd and 74th Constitutional Amendments is recognised, and the micro-level planning at the *panchayats* and municipalities in the rural and urban areas, respectively, is currently under consideration in India. Thus, a further direction of this study must be to explore the various factors at the micro level that lead to wide variations in alternative data sets. This study will evidently go beyond the NSC Report. Further, it will be a pioneering work for the Japanese social-scientific statistics.

NOTES

Introduction

1. Japan Statistical Society (JSS) has also discussed various issues of the official statistics.

Chapter 2

2. This view was supported by a personal interview with Dr. V. Saha on 26 February 2003 at New Delhi. However, I have not got access to the report of the Expert Committee to examine wide variations in data sets on the same subjects, which was

submitted in February 2000.

3. The temporarily settled area accounts for 86% of the total reporting area. The other area has no land revenue agency at the village level. As regards the other area, see NSC [1] 4.2.1-4.2.2.
4. Case (δ) refers to a non-official data source; the Cotton Advisory Board is a type of trade organisation (NSC [1] 4.6.1).
5. One exception to this is case (ν), in which the two different Administrative Statistics concerning merchandised trade are compared.

Chapter 3

6. Ninagawa [9] is recognised as one of the canons of Japanese social-scientific statistics.
7. Over the decades, the Radical Statistics Group in Britain has developed a similar approach. From the viewpoint of critical sciences, the Radical Statistics Group studies the process of data collection and the statistical system supporting the process. See Irvine et al. ed. [15] and Dorling and Simpson, ed. [16] . As for the U.S.A., see, for example, Maier [17] .
8. Likewise, the Japanese social-scientific statisticians discuss the reliability of the System of National Accounts generated from various primary data. With regard to the use of statistics, several social-scientific statisticians are sceptical and look severely upon the excessive use of mathematical statistics for analysing social and economic matters, because they believe that social and economic phenomena do not necessarily allow assumptions such as future predictions of a simple extension of past trends, normal distribution and probability.
9. However, the existence of such school of statistics in Japan has not been widely known in the world, because most of their contributions were published in Japanese. The 301 members belonged to the JSES in June 2003, while the 1,546 members belonged to the JSS in January 2003. Quite a few members belong to both Societies.

TABLES

Table 1
Scheme for Improvement of Crop Statistics (ICS)
Review of Findings 1995 - 1999

Submission of crop statements by the <i>patwari</i>					
Percentage of villages	Season	1995-96	1996-97	1997-98	1998-99
Statement submitted by due date after completing <i>girdawari</i>	<i>Kharif</i>	41	44	46	45
	<i>Rabi</i>	41	36	41	43
Statements submitted without completing <i>girdawari</i>	<i>Kharif</i>	11	11	10	9
	<i>Rabi</i>	11	11	8	9
Total Statements submitted for processing	<i>Kharif</i>	77	78	80	78
	<i>Rabi</i>	80	79	78	77

Source: NSSO's reports on the Status of Estimation of Crop Production in India for the years 1996-97, 1997-98 & 1998-99
(*qtd.* In the NSC Report as Annexe 4.1)

Table 2
Number of Manufacturing and Repairing Units as per ASI 1994-95,
FuS 1994-95 and Fourth Economic Census (EC 1998) **

India (excluding Arunachal Pradesh, Mizoram, Sikkim and Lakshadweep)

Employment size class	Estimated number of working units (registered) ASI ' 94-95	Estimated number of units (unregistered) FuS ' 94-95	Number of units (registered and unregistered) EC ' 98 (excluding Orissa)
0 - 9 #	29,619		
10 - 12	11,958	72,647*	&
13 - 15	10,598	28,210*	&
16 - 19	10,159	17,910*	&
10 - 19	32,715	1,18,767* (1,60,502)	96,954* (1,79,218)
20 - 49	31,321	23,566	71,638
50 - 99	16,768	2,791	19,701
100 - 199	7,366	254	9,122
200 - 499	4,247	0	4,078
500 +	2,499	0	1,792
20 or more	62,201	26,611	1,06,331
10 or more	94,916	1,45,378* (1,87,113)	2,03,285* (2,85,549)@
All (incl. <10)	1,24,535		

Notes: ** ASI, FuS and EC results quoted here are based on quick special tabulation of corresponding data, undertaken the CSO (Industrial Statistics Wing) and NSSO, and may not tally with the official results;

Eligibility criterion for the factory being included in the frame permits the factory having less than 10 workers as per actual survey data;

* Considers only those units using power in 10-19-employment size class category;

& Break-up was not readily available;

() Includes all units irrespective of whether they use power or not;

@ Excludes Orissa State for which the number of units in 10 or more size class was 3699 in EC ' 90.

(*qtd.* In the NSC Report as Annexe 5.5)

Table 3

Number (in '000) of Enterprises engaged in Unregistered Manufacturing Activities According to Economic Census (EC) 1990 and 1989-90 Follow-up Enterprise Survey (FuS) in the Major States.

State and UT	All unregistered manufacturing enterprises						Unregistered manufacturing establishments+					
	Rural		Urban		Combined		Rural		Urban		Combined	
	EC '90	FuS '89-90	EC '90	FuS '89-90	EC '90	FuS '89-90	EC '90	FuS '89-90	EC '90	FuS '89-90	EC '90	FuS '89-90
Andhra Pradesh	439	1229	136	268	575	1497	88	73	42	48	130	121
Assam	33	125	14	14	47	139	13	17	10	7	23	24
Bihar	187	883	48	92	235	975	30	81	23	23	53	104
Gujarat	115	240	139	225	254	465	29	47	76	124	105	171
Haryana	42	81	42	60	84	141	8	7	20	22	28	27
Himachal Pradesh	44	135	4	5	48	140	5	12	2	2	7	14
Karnataka	186	586	120	205	306	791	52	42	54	45	106	87
Kerala	150	471	70	95	220	566	56	72	38	31	94	103
Madhya Pradesh	349	499	139	119	488	618	28	18	35	27	63	45
Maharashtra	236	591	248	302	484	893	43	72	145	143	188	215
Orissa	247	928	27	52	274	980	27	18	11	11	38	29
Punjab	45	123	65	99	110	222	11	15	36	48	47	63
Rajasthan	160	390	93	184	253	574	21	27	32	33	53	60
Tamil Nadu	312	742	251	572	563	1314	84	104	106	128	190	232
Uttar Pradesh	359	1651	254	275	613	1926	68	131	105	120	173	251
West Bengal	479	2418	161	331	640	2749	69	114	86	109	155	223
Delhi	4	4**	88	88	92	92	3	4**	68	73	71	77
All India *	3430	11189	1921	3210	5351	14399	647	862	901	1004	1548	1866

Notes: + Enterprises employing at least one hired worker.

* Excluding Jammu & Kashmir;

** Only Directory Establishments (i.e. establishments with 6 or more workers), since figures of Own Account Enterprises and Non-directory Establishments (i.e. establishments with 5 or less number of workers) are not available for rural Delhi.

(qtd. In the NSC Report as 5.15)

Table 4
Level of Births and Deaths Registration during 1985–1995

India/State/Union Territory	Level of Birth Registration		Level of Death Registration	
	1985	1995	1985	1995
India	39.0	55.0	32.7	46.0
States				
Andhra Pradesh	26.9	34.4	21.1	30.5
Arunachal Pradesh	19.7	66.3	13.4	21.2
Assam	N. A.	N. A.	N. A.	N. A.
Bihar	20.0	18.7	22.5	25.6
Goa	105.2	120.6	86.5	111.9
Gujarat	62.1	96.3	40.3	69.0
Haryana	60.8	73.4	58.2	70.6
Himachal Pradesh	57.9	71.7	37.4	50.2
Jammu & Kashmir	46.4	N. R.	51.7	N. A.
Karnataka	40.4	86.5	42.3	86.9
Kerala	94.8	101.7	78.7	86.1
Madhya Pradesh	46.3	50.8	44.8	53.3
Maharashtra	64.7	80.3	66.8	69.1
Manipur	7.5	14.0	5.9	16.0
Meghalaya	N. A.	44.5	N. A.	52.7
Mizoram	N. R.	N. R.	N. A.	N. A.
Nagaland	60.9	N. R.	49.8	N. A.
Orissa	47.6	58.6	40.8	47.0
Punjab	74.2	92.4	75.7	84.3
Rajasthan	16.4	23.7	17.8	27.3
Sikkim	N. A.	24.4	N. A.	8.6
Tamil Nadu	67.7	90.3	55.1	75.5
Tripura	41.7	108.9	18.5	46.0
Uttar Pradesh	13.6	40.6	7.7	31.1
West Bengal	N. A.	64.3	N. A.	27.4
Union Territories				
Andaman & Nicobar Islands	73.3	128.1	52.8	88.7
Chandigarh	112.7	126.6	213.9	205.1
Dadra & Nagar Haveli	48.6	85.9	50.8	66.1
Daman & Diu	96.4	148.7	46.1	92.2
Delhi	85.3	116.0	83.0	110.6
Lakshadweep	93.7	86.5	96.7	73.0
Pondicherry	182.9	198.8	132.7	131.5

Notes: 1. The level of birth/death registration is the percentage of registered births/deaths to the SRS estimated births/deaths

2. The level of registration exceeds 100% in these States/Uts because the people from the neighbouring areas outside these States/Uts come here to avail of better medical facilities and due to the de facto method of registration all such births get registered in these States/Uts. In SRS such births are accounted at the place of usual residences of the mother.

NA: Annual Statistical Report is not available. NR: SRS data is not available.

NC: Not calculated due to non-availability of data from major states.

Source: Registrar General, India. For the details, see Registrar General [13].

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