

## DATA MANAGEMENT SYLLABUS

1. Representation of data – Illustration with NSS reports
2. National Accounts Statistics
3. NSSO - Household Consumption Survey Rounds, Employment-Unemployment Survey Rounds
4. Population census 2011
5. RBI Statistical Handbook – CPI, WPI, Concept of Price Index , Measuring Inflation

### 1. Representation of data - Basics

Graphs are one way of not only representing, but also analysing numerical data. They exhibit the relation between data, ideas, information and concepts in a diagram. Graphs are fairly easy to comprehend and therefore, are one of the most important learning tools used.

Now the question is: what type of graphical representation should be used to represent a particular data? The choice always depends on the type of information which we wish to represent or convey. There are different types of graphical representation. Some of them are as follows:

- Line Graphs
- Bar Graphs
- Histograms
- Line Plot
- Frequency Table
- Pie Charts
- Stem and Leaf Plot

*(Students probably will be able to explain the usefulness of different types under different situations)*

**National Sample Survey Organisation – A brief outline** *(Actually, this outline is not really needed here: it rather should find a place in Unit 3)*

Professor P.C. Mahalanobish, who is regarded as a pioneer in both theoretical and professional statistics, was appointed as the first statistical adviser to the Cabinet, Government of India in January 1949. He was the architect of the statistical system of independent India. It was basically under his leadership and guidance that a large scale sample survey agency known as NSS (National Sample Survey) came into existence in 1950. ☐

Later, the work relating to finalisation of sampling design, schedules of enquiries, writing of instructions, training of field staff, processing of data and writing of reports was all entrusted to the Indian Statistical Institute. ☐ The Directorate of NSS was assigned the job of conducting the field work. ☐ In March 1970, the NSS was reorganized and all aspects of its work were brought under a single Government organization, namely NSSO.

The **Ministry of Statistics and Programme Implementation (MOSPI)** came into existence as an Independent Ministry on 15.10.1999 after the merger of the Department of Statistics and the Department of Programme Implementation. The Ministry has two wings, one relating to Statistics and the other Programme Implementation. The Statistics Wing called the National Statistical Office (NSO) consists of the Central Statistical Office (CSO), the Computer center and the National Sample

Survey Office (NSSO). So, NSSO as a separate organisation has ceased to exist, and the reports are published under the aegis of MOSPI.

NSS has been conducting **multi subject integrated sample surveys since 1950. Nationwide sample surveys relating to various socio-economic topics** are conducted to collect data for planning and policy formulation. The wide variety of subjects brought under the coverage of surveys conducted so far by the NSS can broadly be classified under four categories : (1) Household surveys on socio-economic subjects, (2) Surveys on land holding, livestock and agriculture, (3) Establishment surveys, and enterprise surveys (4) Village surveys.

There is a well defined cycle of the surveys extending over a period of 10 years. The Socio-Economic (SE) Surveys **are in the form of Rounds**, each Round being normally of one-year duration and occasionally for a period of six months. The first Round of NSS was conducted during 1950-51.

The subject coverage of SE inquiries for different Rounds is decided on the basis of a 10 year cycle. In this cycle,

- **1 year** is devoted to **Land and Livestock Holdings, Debt and Investment;**
- **1 year** is devoted to **Social Consumption (education, health care, etc.),**
- **2 years** is devoted to **quinquennial (five-yearly) surveys on household consumer expenditure, employment & un-employment situation** and
- **4 years** is devoted to **non-agricultural enterprises, namely, manufacturing, trade and services in un-organized sector.**
- **The remaining 2 years** are for **open Rounds** in which subjects of **current/special interest** are covered on the demand of Central Ministries, State Governments and research organizations.

For example, a very brief outline of some of the recent rounds is given below.

Round No.	Topic/Subject covered	Period of Survey
71st	Social Consumption Education and Health NSS 71st Round	January 2014- June 2014
70th	Situation Assessment Survey of Agricultural Households , All India Debt and Investment & Land and Livestock Holdings in India	January 2013- December 2014
69th	Drinking Water, Sanitation, Hygiene and Housing Condition in India NSS 69th Round	July 2012- December 2012
68th	Employment & Unemployment and Household Consumer Expenditure	July 2011- June 2012
61st	Consumer Expenditure -, Employment & Unemployment Survey	July 2004- June 2005
60th	Morbidity, Health care and the Condition of the Aged	January - June 2004
59th	Land & Livestock holdings and Debt & Investment	January- December 2003

Source: MOSPI

Information is collected through interview method, using the uniform methodology and schedules that are specially designed for the survey. Various instruments, for example, inspection, scrutiny, super-scrutiny of filled-in schedules are used to monitor the fieldwork and

to ensure the quality of data collected in the field. Collected data is sent for processing to Data Processing Division. Various publicity measures through print advertisement and visual/digital media are taken to increase the awareness about these surveys among the public/respondents.

### **Graphical presentation of data in NSSO reports**

As can be expected, the NSSO (now MOSPI) publications contain a vast amount of data **in tabular form** on several socio- economic indicators. While a researcher will have to go through such tables to have an in-depth idea about the issues involved, they are not ideal for a non-researcher who might wish to have only a general idea about the topic.

In view of the above, MOSPI publications use the graphical methods to summarise the data, which are not easily comprehended when presented in a tabular form. For example, if we go through MOSPI summary of the 61<sup>st</sup> round and 68<sup>th</sup> round reports on employment and unemployment, we find an ideal use of the grouped bar chart method to present data on *“Percentage of regular wage/salaried employees who had no written job contract among regular wage/salaried employees in usual status in non-agriculture sector during NSS 61st (2004- 05), and 68th (2011-12) rounds.”* This piece of data contains information about rural male, rural female, urban male and urban female population. When the same data is presented in the usual tabular form, we find it very difficult to understand at first glance.

*As we know, grouped bar charts are a way of showing information about different sub-groups of the main categories. A separate bar represents each of the sub-groups (e.g. rural male and rural female) and these are usually coloured or shaded differently to distinguish between them. In such cases, a legend or key is usually provided to indicate what sub-group each of the shadings/colours represent.*

Let us take another example. The All-India Debt and Investment Surveys (AIDIS) are the primary source of data on various indicators of stock of assets, incidence of indebtedness, capital formation and other indicators of rural/urban economy. The NSS 70th round survey on Debt and Investment was carried out during January - December 2013. As usual, there is extensive tabular representation of data. However, in the summary portion of the report, we find wide use of the graphs and charts. For example, to represent the percentage shares of different components of assets in the total value of assets at all-India level for rural and urban households, **two pie charts** are used, with coloured segmentations of the different classes of assets (like *land, building, livestock and poultry, financial assets etc.*).

Again, where the average asset holdings across the ten decile classes of households are represented in a summary form, simply two **line diagrams** are used (one for the rural sector and one for the urban sector) which present the data in a clear way. The vertical axis show assets (in Rs.) while the horizontal axis show percentage of households below particular asset levels and we have a fairly good idea of quite a complicated set of data.

We wind up our discussion with one final example. In the 75<sup>th</sup> round of survey on social consumption on health, data is provided on the **break-up of average medical expenditure (Rs.) for hospitalisation, not only for the rural and the urban sector, but also for**

- **rural public hospitals,**
- **rural private hospitals,**
- **urban public hospitals and**
- **urban private hospitals.**

Along with such four-way division, data is also provided for disaggregation of actual expenditure, for example;

1. bed charges,
2. diagnostic tests,
3. medicines doctor's/surgeon's fee
4. package components and
5. other charges

*(It would be better if the students make themselves familiar with some of the diagrams)*

Therefore, four stacked bar charts are used by MOSPI to represent the data. They simultaneously represent all the data – the four bars represent the four types of health centres, and in each bar, the break-up of different types of health expenditures are shown in different segments.

## 2. National Accounts Statistics

In January 2015, India's Central Statistical Office (CSO) introduced the new series of *National Accounts Statistics* (NAS) with the base year 2011-12, replacing the earlier series with 2004-05 as the base year. This is a routine matter for the CSO – as with statistical offices of most countries – **to change the base year of the NAS periodically to account for**

- structural changes in the economy,
- relative prices, and to
- replace older survey data with newer ones

**Why is it done?** Simply, to better capture the economic activities which undergo various kinds of changes with time. This time, however, the revision had another objective, that is, **to update the underlying methodology of NAS to the most recent international guidelines, namely, the UN System of National Accounts, 2008 (SNA 2008)**. For a developing country like India, with **vast unorganised (or informal) sector and uneven quality of economic statistics used in the estimation of NAS**, base year revision is important in order to (i) improve the methodologies, (ii) bring in newer and better databases, and (iii) address long held shortcomings in the national accounts estimates.

### Some basic concepts revisited

**Gross value added (GVA) at factor cost** = *Output – Intermediate consumption (value of Inputs)*

**Gross Domestic Product (GDP) at factor cost** = *Sum of GVA at factor cost*

**GDP at Market Prices** = *GDP at factor cost + (taxes – subsidies) on production and export/import*  
**(production method)**

= *final consumption expenditures + Changes in inventories + Gross fixed capital formation + acquisition less disposals of valuables + exports of goods and services – Imports of goods and services* **(Expenditure method)**

= *compensation of employees + operating surplus / mixed income + Consumption of Fixed Capital (CFC) + (taxes – subsidies) on production and export/import* **(Income method)**

**Gross National Income (GNI) at market prices** = *GDP at market prices + (taxes - subsidies) on production and imports + Compensation of Employees (Net receivable from abroad) + Property income (Net receivable from abroad) Net National Income*

**(NNI) at market prices** = *GNI at market prices - CFC*

**Net National Disposable Income (NNDI)** = *NNI + net taxes on income and wealth receivable from abroad + Net social contributions and benefits receivable from abroad*

**Net saving + net capital transfers receivable** = *Gross fixed capital formation – CFC + Changes in inventories + Acquisitions less disposals of valuables and Non-produced non-financial assets + net lending/ net borrowing*

**The Consolidated Accounts of the Nation** are compiled for a comprehensive picture of the macro-economic behaviour of the country. The different estimates are put together in the form of a set of national accounts for presentation of the overall picture of the economy. This system consists of:

**Account 1:** Gross Domestic Product and Expenditure;

**Account 3:** National Disposable Income and its Appropriation;

**Account 5:** Capital Finance Account; and

**Account 6:** External Transactions.

### **Different methods of estimation**

We know that the national income of a country can be measured in three different ways, from the **angle of production**, from **income generation** and from **final utilization**.

These three forms are basically circular in nature.

- **It begins at the production stage** where the productive units engage capital and labour and turn out goods and services, the total measure of which gives the **national product**.
- This production process **generates a given amount of money income** which is distributed by the productive units to the factors of production, namely, capital and labour. The measure of income this way indicates the share of national product distributed to the factors of production or simply the **national income by factor shares**.
- The **income thus received by the factors of production** is then spent either by :
  - (i) the labour in their capacity as households in terms of acquisition and consumption of goods and services or
  - (ii) the producers in acquiring more capital and thus increasing the physical assets of their production units.

The **national income by definition is the same** whether measured at the **point of production** or at the **point of income generation** or at the **point of final utilisation**. In other words, the total of net output, income flows and final expenditure will be identical. The significance of each arises from the fact that they reflect total operations of the economy at the levels of three basic economic functions, namely, **production, distribution and disposition**.

### **Measurement**

**For measurement of national income** at the **point of production**, the method generally followed is:

- (i) to divide the whole economy into a given set of economic activities,
- (ii) to estimate the total value of output,

- (iii) to estimate the corresponding value of inputs of raw materials and services used for production and then
- (iv) to arrive at the value added of each sector as a total value of output minus the value of inputs of raw materials and services. In the case of services, value added is measured in terms of the total amount of money paid in return for the services received minus the cost of inputs like expenditure on transport, advertisement, and other miscellaneous services.

**Income method:** We have already mentioned that the net value added available for each unit of production is equal to the amount of income generated by the unit in the process of production. This income is distributed between the two primary factor inputs, namely, **capital and labour**. In other words, income is distributed in the form of either **capital income to the owner of the capital/asset** or **labour income** to the labour employed. The distinction between employment income and profits (operating surplus) cannot be made in the case of incomes of persons working on their own account. **Such incomes are, therefore, separately classified as mixed income of the self employed.**

Thus the **total income generated in the form of factor shares** consists of:

- (i) Wages & salaries (ii) interest, (iii) rent, (iv) dividends, (v) undistributed profits, and (vi) mixed income of self employed.

**Expenditure:** The income available to the individuals in the form of labour income or capital income or to the productive units in the form of retained income is spent. This utilisation of the income can take various forms, namely, (a) household consumption expenditure, (b) government consumption expenditure, and capital formation comprising fixed capital formation, and stock accumulation.

**The household consumption expenditure** referred to as private final consumption expenditure (PFCE) in National Accounts Statistics (NAS), consists of expenditure by households (including non-profit institutions) on non-durable consumer goods and services and all durable goods **except land and buildings**.

**Government Expenditure-** In the course of organising collective services such as defence, justice, health and education, government purchases the services of its officials and also many non-durable goods and other services from other suppliers. Since these services are rendered free, these do not appear in the household consumer expenditure. As these services are of economic value, it is, therefore, necessary to reckon them in the national expenditure. Since these collective services are not sold, they can be valued in money terms only by adding up the money spent by the government in buying these services of teachers, doctors, public administrative employees, the armed forces etc., together with the goods and other materials purchased. This total is the consumption expenditure of the government and it consists of purchase of non-durable goods and services by the government. By convention, expenditure on durable goods which are used for defence is also treated as part of consumption expenditure of the government.

**Gross capital formation** consists of the acquisition of fixed assets and the accumulation of stocks. Fixed assets are physical productive assets, examples of which are buildings, civil works, machinery, vehicles etc. The stock accumulation is in the form of changes in stock of raw materials, fuels, finished goods and semi-finished goods awaiting completion. Thus gross capital formation is that part of country's total expenditure which is not consumed but added to the nation's fixed tangible assets and stocks.

### **The new series:**

There have been many changes in the new series compared to the old series. It is claimed that the new series improves upon the system in several ways, as briefly outlined below.

#### **Improvements in coverage**

These includes better representation of *corporate sector data*, data on *local bodies and autonomous institutions and Financial corporations*.

Thus, the three major changes in the data coverage are:

- (1) Changes in corporate sector and financial sector data
- (2) Data for the government sector; and also
- (3) Changes in trade sector data: wholesale and retail

#### **Methodological Changes**

- (i) Estimation of GVA for the unincorporated manufacturing and non-financial enterprises

Usually the base year revision leads to a marginal rise in the absolute size of the aggregate measures as economic activity get better represented. However, annual growth rates of these estimates do not invariably change – implying that though the absolute size of the economy may have got altered in the base year, its rate of change would not vary.

But the recent revision was different. While the absolute size of gross domestic product at current prices in the base year (2011-12) was marginally smaller (by 2.1 percent) compared to the earlier estimates, there was a significant change in the growth rates for the subsequent years, namely, for 2012-13 and 2013-14 (Figure 1 a, b). For instance, annual economic growth for 2013-14 at constant prices, according to the new series, is 6.2 per cent compared to 4.8 per cent according the old series. More dramatically, manufacturing sector growth rate in real terms for the same years changed from negative 2 per cent to positive 6 per cent. Moreover, the revised estimates did not seem consistent with other macroeconomic indicators such as corporate earnings or credit growth (Figure 2 (i) and (ii))