SYSTEMOF REGIONAL ACCOUNTS FOR INDIA – Exploring alternative approach

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After working for 20 years or so on national accounts and thereafter in other institutionsI felt that although the System of National Accounts is based on a sound logic useful for decision making, but it is so complicated that (a) it is difficult to compile even by most of the developing countries, (b) it is going away from most of the specialized institution /subject matter Ministry involved in decision making and economic plan formulation, and (c) a large amount of data which is being collected and compiled by other specialized agencies remains away from the System. In the present paper a System of Regional Accounts having links with National Accounts has been proposed that makes an attempt to remove these limitations. The proposed system includes a set of accounts supported by an indicator system. The System would be utilizing most of the data collected by user agency to support its' need. It would provide macro-micro linkage to facilitate making policies according to ground realities and would be showing its magnitude at the macro (country/ state/ region) level. I am sure that even without the knowledge of national accounting, most of the statisticians would be able to support its compilation.

SECTION I: INTRODUCTION

1.1   System of Economic Accounts is a systematic arrangement, based on business accounting principles, of economic transactions relating to production, consumption and accumulation taken for a region bound by geographical boundary to support economic analysis and policy formulation. If the region is a nation, it is termed as "System of National Accounts" and alternatively if the region is defined by a (or group of) sub-national unit, it is termed as "System of Regional Accounts". The term "System" is used to indicate a group of accounts.Thus the national accounts provide a unique overview of national economies, their major groups of economic actors and the various economic flows, stocks and economic processes. The system so created has a number of advantages such as: (a) system is geo-referenced to facilitate integration of administrative, scientific (remote senescing & other methods), economic and physical data (see Annex 1 for details) for extended analysis of ecosystem, digital economy, monetary instruments, etc., and to support policy formulation as well as monitoring & evaluating impacts of policies;(b) increased inter-consistency of different data sets due to use of double entry

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[1]Views expressed are of the author and not of any institution.

accounting system; (c) horizontal and vertical integration of databases to support macro – micro linkage for analyzing importance of economic activities and the region. A framework for national accountinghas been formulated by United Nations (popularly known as UNSNA)jointly with other international agencies like World Bank, International Monetary Fund, OECD, etc. The system introduced in the year 1953 has been continuously revised to improve the base structure by making it comprehensive.

1.2   None of UNSNA version till 1968 made any recommendation on compiling Regional Accounts. The 1968 UNSNA for the first time recognized that development often does not take place in a uniform manner throughout a country and may lead to differential economic growth in various parts of a country. In many developing countries existence of traditional methods and advance technologies in the process of production and diverse availability of raw materialare the two main causes of different level of development. The productivity of labour employed in the relatively large scale units using advance technologies will usually be considerably higher than the traditional units. Similarly development of associated infrastructure becomes another factor needing attention.The 1968 UNSNA related this aspect with rural and urban areas and suggested compilation of accounts for areas. It has also recognized need of further work on extension of the SNA including regional accounting. Taking lead from the 1968 UNSNA, the further version of the system released in 1993 and subsequently in 2008 (Chapter 18, paragraph 18.45 to 18.54) made more specific recommendations on compiling regional accounts. The purpose of this paper is limited to proposing a logical system and a broad framework. The Section II presents the work done in India by the Regional Accounts Committee and other research workers on regional accounts. Section III briefly states recommendations of UNSNA in support of such analysis.The proposed system and a recommended framework have been presented in the Section IV.Details of the indicator system has been included in Section V. Section VI presents illustrative details of indicator system by taking agriculture activity as an illustration. It should not be difficult to get similar details for other economic activities.For creation of a comprehensive system by including all economic activities much more work would be necessary by reviewing the current status of official statistics, assessing data gaps and visualizing policy options.

SECTION II: REGIONAL ACCOUNTS WORK IN INDIA.

2.1   Considering need for development of macro-economic database at state level for strengthening policy formulation, a Committee on Regional Accounts (RAC) was set up by the Government of India in May 1972. The RAC submitted its First Report in 1974 and the Final Report in 1976. In the first report, the RAC recommended a set of eighteenStandard Tables giving details of state domestic product&its distribution, price & cost of living indices, indicators of regional development, etc.,mainly to meet the immediate requirements of the policy makers at the regional level. The committee submitted its second and final report to the Government in

September 1976. In the final report, the Committee recommended a System of Regional Accounts (SRA) consisting of three accounts, mentioned below:

- o **Consolidated accounts of the region**
  - Production account
  - Income and outlay account
  - Capital finance account
- o **Household accounts**
  - Income and outlay account
  - Total consumption and income of the population
- o **Accounts of State and Local Governments**
  - Production account of State Government Departmental enterprises
  - Production account of State Government non-departmental enterprises
  - Income and outlay account of State Government administrative departments and departmental enterprises
  - Income and outlay account of State Government non-departmental enterprises
  - Capital finance account of State Government administrative departments and departmental enterprises
  - Capita finance account of State Government non-departmental enterprises

2.2   RAC's System of Regional Accounts work relates to mid-seventies when work on development of macro-economic aggregates was at initial stages. Estimates of four main macro-economic aggregates (domestic product, capital formation, savings and private final consumption) were just developed at national level. At state level, state statistics bureau were in process of refining estimates of state domestic product. For all planning purposes to measure regional disparity CSO at central government has developed "Comparable State Domestic Product". The main stress of the RAC was,therefore, directed towards refining structure of accounts of the Public Sector and simplifying methodology for compiling estimates of SDP of supra-regional sectors for use of states. The Report also gave thoughts for compiling estimates of capital formation and private final consumption expenditure at state level. Thus a modest beginning was made in India towards formulation of Regional Accounts by taking 'State' as a region. CSO and some State Government made efforts to make a beginning. CSO conducted workshops for taking this work further. A number of research workers contributed papers on compiling estimates of capital formation and private final consumption which were discussed in the Indian Association for Research in National Income and Wealth (IARNIW) Conferences. In spite of repeated efforts by the CSO the work could not pick-up in states. Apart from having research interest, none of the State Statistical Bureaus took this work seriously as part of regular exercise. One main reason for this lack of interest is due to the fact that State Governments are

already compiling regional indicators recommended in the Report and further work did not enhance the availability of data for location planning or balance development of the state.

SECTION III: UNSNA 1993 & 2008

3.1   The System of National Accounts is a multi-purpose system designed for economic analysis, decision-taking and policy making. Latest system refers to the report released by UN et.al in 2008. The System can be used to create a macro-economic database suitable for analyzing and evaluating performance of an economy. Basic national accounting information covers different types of economic activities originating in different sectors of the economy. In the system consistent set of data on different flows are recorded both at current and constant prices. The System consists of a number of set of accounts where balancing items in each accounts can be used for monitoring movement of the economy. The report recognizes that the central framework of the System can be used in a more flexible manner to meet the specific needs of analyst. In other words suitableframework for any country may be formulated according to analytical requirements and data availability.

3.2   TheUNSNA 1993 and subsequently 2008 laid stress on compiling regional accounts for large countries to provide database for balanced economic growth. The concept given by the UNSNA 1993 was further refined by the UNSNA 2008 The SNA recognized the importance of regional accounts for relatively large countries where different regions of the country show disparities in economic and social development. It was also recognized that for each region similar full set of accounts as recommended for the nation as a whole cannot be compiled because of open economic boundaries. The UNSNA has recognized that in any country, depending on location of economic entities, three types of institutional units exist. These include units having economic activities only in one region or having establishments in number of regions and those economic entities which are operated and controlled by the Central Government.

3.3   Recognizing the conceptual difficulties in allocating output and resources to different regions, UNSNA mentions that it is not feasible to compile complete SNA accounts for every region and, therefore, in most cases regional accounts are limited to recording production activities by industry and more complete accounts for institutional sectors units controlled and operated in the region (such as households and local and state government units). UNSNA says that in spite of many limitations regional accounts are a very useful tool for formulation of economic policies. Partial regional accounts may be supplemented by a set of regional statistical indicators on labour participation, unemployment, poverty, etc. The greater the contrast between regions in a country, the more useful is such a system of regional indicators, including per capita value added, household disposable income and per capita household consumption. UNSNA recommends that it is for countries themselves to devise their own regional accounts and

statistical indicators, taking into consideration their specific circumstances, data systems and resources that might be devoted to this work.

3.4   One of the reasons for compiling accounts at sub-national level is the policy interest in the production, income and welfare of households of the region. TheUNSNA strongly recommends sub-sectoring of each of the five institutional sectors (paragraph 4.33, UNSNA 2008). There are many useful ways in which each sector can be sub-sectored and statistical agencies are advised to give due consideration to the various possibilities. For formulating regional accounts household sector are more important as each region/ sub-region can be subdivided differently if there is a demand for different breakdowns of the households sector from different users, analysts or policy-makers.The division into sub-sectors can also be according to agro-climatic/ecological boundaries, and formal and informal sectors for arranging production activity into strata of uniform production technologies to incorporate developmental process.

3.5   Apart from making these recommendations for compiling regional accounts which analyses economic strength of the region, UNSNA in the latest revisions have made the system more flexible and introduced a few more extensions of the system which could be of immense utility for enhancing economic development in the region. These extensions have been presented below.

3.6   The present system incorporates social accounting matrix (SAM) and satellite accounting to support in depth economic analysis for enhancing production growth. The new term "macro-accounts" has been introduced by the UNSD for brining all these development together. Macro-accounts refer not only to national economic accounts but also include satellite accounting (in particular, integrated economic-environmental and socio-economic accounting) in which monetary as well as physical data are used. To study the issues and concern in depth a set of macro accounts for a region can be formulated using this extended concept of national accounting given in the UNSNA.

3.7.   The SNA recommends that a key sector accounts may be compiled in the framework of integrated economic accounts. The SNA does not try to provide specific and precise criteria for the definition of what a key sector or activity is. It is a matter of judgment in a given country/ region, based on economic condition and economic and social policy requirements. However following specific suggestions have been made:

- A goods and services account for the key products may be established showing the resources and uses of these products. A production account and a generation of income account for the key industries are built up. For both activities and products, detailed classifications have to be used to fully understand the economic process and the related

valuation procedures in this field. There generally exists a combination of market and administered prices, a complex system of taxes and subsidies, etc.

- The key products and key industries accounts may be analysed in the context of a supply and use table.
- A set of accounts, as complete as feasible, is compiled for the key sector, which has to be delimited.
- In many cases, government plays an important role in connection with key activities, either via taxes and property income receipts, regulatory activity and/or subsidies. Accordingly, the detailed study of transactions between the key sector and general government is very important.
- When the key activities are based on natural non-renewable resources, the key sector accounts have to record carefully the changes in these resources (new discoveries and depletion) in the other changes in volume of assets account and holding gains/losses on them in the revaluation account. These data are crucial for assessing correctly the economic performance of the economy in question. More broadly, the key sector accounts may also be extended in the direction of environmental accounting.

SECTION IV: SUGGESTED FRAMEWORK

4.1 Whenever we hear the term "National/ Regional Accounts", traditionally we start conceptualizing a framework consisting of economic activities and it's linkage with macro-economic aggregates to get an overview of economy. In the process sometime we forget that everything cannot be divided and if artificial sub-division is made, compiled results may lose economic utility of the data. To avoid this situation let us give a fresh look to our thought and start from ABC to understand –structural characteristics of the region,issues and concern and then design a possible suggested framework for regional accounts?

(A) Structural characteristics of the region

4.2 A logical official statistical system depend either on demand of economic planner and policy formulators or on refining existing data base to make it more precise. In the absence of a demand for regional accounts, let us review the structure of aregion (economy) and suggest a system which facilitates plan formulation and policy makingfor regional development[2]. For this purpose, I assume a region with three tier administrative system (nation, region i.e. state and sub-region i.e. district/division) having all categories of economic activities. When area unit is a nation it will have defined international data on trade with other regions, however, in case region is a sub-national unit, i.e. state, no such data exists due to open boundaries of the region.Further, in the former case objective of plan formulation at national level is primarily to make the country

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[2] For making a economic development plan for a state it is necessary to go one step down to division/district level for achieving balance development goal.

self sufficient by making optimum use of country's resources. Issue of balance development of all regions comes at the second level, whereas in the second case balance development by providing equal opportunity to each resident of the region comes at the first place. This basic difference makes two systems different.

4.3   UNSNA has suggested that in case of regional account an account of type of "Consolidated Accounts of the Nation" cannot be compiled. In my view, although it is true that the consolidated account of the nation is neither feasible nor desirable while formulating regional accounts, but it would be necessary to have an idea of the total economic activity of the sub-region and its share in the total economic activity of the region for which special efforts are required to improve welfare of the residents in the region.

4.4   In continuation let us look at economic activities of the region and formulate a feasible system of regional accounts. Alarge country like India with divers' terrine, varying agro-climatic conditions and a wide variety of natural resources would be an excellent example for recommending a system of regional accounts for economic development that eradicate poverty and save ecosystem.If we compile a complete set of economic accounts for each region of the country by partitioning national accounts it is not feasible. Creating such a set of accounts will also introduce artificial numbers based on imputationmethod. These numberswill not have any economic interpretation. To get a notional view of the size of economic activity estimates of state domestic product are already being compile taking income originating and location of assets concept. In this direction work has also been done on urban-rural income, district level income, estimates of capital formation and private final consumption expenditure. However, if one compiles indicators like capital-output ratio, capital-labour ratio, it will not give any meaningful interpretation. An alternative set can also be compiled by taking income accruing concept, but this data set will have the same problems. Taking lead from this one can compile a goods and service account only to get an answer to the question about share of the activity / trade in total.For studying other aspects accounts can be compiled separately. Compiling these two sets will lead to understand the share of economic activity / population that will benefit by the efforts by improving the production/ distribution process.

(B) Issues and concern

4.5   In a fairly large developing country major share of the population lives and works in rural areas where the principal economic activity is agriculture including forestry and fishery. Economic activity in small town/ semi-urban areas is manufacturing and trading whereas large cities will have administrative set-ups. Apart from this there are townships having mining and manufacturing activities. Other economic activities like trading & storage, transport & communication, financial and other services are spread in all regions of the country and are fairly dependent to the economic activities in the region and local needs. Policy issues generally faced

by policy makers are relatedto battering the condition of the population by raising levels of nutrition, standards of living of the peoples; securing improvements in the efficiency of the production and distribution; and improving the ecosystem; and thus contributing towards a sustainable development of the expanding economy.

4.6   Policy decisions would require multidimensional approach that considers people, institutions and the ecosystem in smaller homogeneous groups. The outline of use profile of statistics in the present context would be as follows:

a. Food and Livelihood Security: For the large population of the country, food and livelihood security is an important issue. Food security has three dimensions, namely availability of food, access to food and food absorption. Indian agriculture is characterized with the large number of small holdings being cultivated by schedule cast and tribes, female headed households and elderly people who are unable to move. A large group of landless labour and casual workers are located in rural areas. In spite of decreasing employment opportunities inter-linkages with several non-agricultural activities is rarely seen. In the circumstances availability and access to food to a sizeable rural population is limited. To mitigate the situation,statistics on large array of parameters such as production & productivity of food, surpluses, shortages and distribution thereof, production and productivity of non-food items (as a source of livelihood and food exchange power), production resources (land holdings, infrastructures and institutional support) and other socio-economic indicators such as opportunity of farming, labour force participation, farm income and viability of farm economy are of utmost utility.

b. Resource Use Planning: To meet the growing demand of employment for regional population and increase of income for the economically active population, it is necessary to increase the production capacities and productivity. In many areas production is being done in traditional system without taking into account new techniques and improved tools. In many areas infrastructures are week for forward linkages resulting in lower benefits to producers. To implement the modern technologies such as adoption of high-yielding variety, use of latest machineries, etc., large amount of data is required on production resources locally available as well as available in neighborhood.

c. Demand Supply assessment and planning: An economic activity eventually provides goods for intermediate and final consumption for meeting demand of household and institutions. Parts of goods and services are locally needed and part is traded out of the region. Goods and services going out need trading and transporting costs which makes the product costlier. To increase profit margin detailed data are required for demand / supply assessment and infrastructure.

d. Price Monitoring: Producer and consumer are two stakeholders of one key parameter for exchange of commodities i.e. price. Price statistics in itself is manifold larger than the data profile of production, resource use,etc because of large number of transactions are taking place at different points of time of the same product. The prices at farm/ factory gate, in wholesale transactions and transactions at retail levels are relevant for measuring incomes, market margins and consumers interest. Since it is dynamic over time and space, and has capacity to modulate production response price remains relevant in various dimensions of economic activities.   The contemporary need of monitoring the sector in the wake of globalization has enhanced the importance of price statistics for measuring marketing efficiency, competitiveness, and trade vulnerabilities.

e. Investment Planning: Investment is essential for development and growth of the region. Data on existing resources, production, growth potential and post production disposal requires specific investment planning according to product. Needless to say that adequate statistics on existing resources and future needs are required in finer details.

e. Procurement, Storage and Public Distribution: This aspect is linked not only to food and livelihood security but production process also. On one handthe Government owes large responsibility of maintaining food security, particularly in the context of paradoxical coexistence of macro food security with large prevalence of poverty and hunger but also to provide production support to activities of the region. The management of more than 200 million tonne of food grain production and its flow through market and non-market channels to different population strata of economic diversity requires elaborate system of procurement storage and distribution. The profile of agricultural statistics needed for this purpose is not only of aggregate production and supply but also covering location of production in regions, inputs, market behavior, prices and competing demands in the domestic and international market segments.

f. ***Inter Sectoral Linkages:***   Production, consumption and investment involve a large amount of goods and services which internally linked in many ways. For example, the agriculture sector has vital backward and forward linkage with the non-agricultural sectors. The backward linkages of agriculture sector cover a range of inputs such as fertilizers, pesticides, farm implements and support of financial institutions. The forward linkages relate to a range of activities in post harvest management of produce such as rural infrastructure, marketing services, processing industry, packaging, transport, warehouses, grading and testing laboratories and other trade channels.These linkages have become strong with the induction of technology in the sector and its greater market integration. The demand and supply of these elements entirely depends upon the profile of structure. Like this, linkages exist for all economic activities. The situation becomes more complex when we are compiling regional accounts due to inter-regional trade.

g. Trade: Over the years a significant change in the form of liberalization of trade is taking place. The era of globalization has opened both the chapters exploring opportunities for domestic marketable surplus in the global market as well as acting on the threats posed by supply by different countries. It requires not only a comprehensive statistical profile of domestic production but also a regular comparison with the respective statistics of other producing regions /countries.

h. Environment planning: The sustainable development has lately emerged an area of prime importance. Agriculture in Indian sub-continent is already putting high stress on natural resources. The issue of management and conservation of natural resource-base and orientation of technology and institutions in the development of agriculture is becoming important. Similar problems relating to disposal of waste material, rising level of pollution, increase in atmospheric temperature due to green house gases immersion, etc., are being faced by other economic activities. To conserve the ecosystem detailed statistics are needed.

4.7   A properly organized statistical system can play a critical role for taking appropriate decisions by different stakeholders for improving the economy:

For Farmers
- To decide what to grow and when to grow and how to increase productivity

For Entrepreneur
- To decide what to produce and where to sell
- To decide when to sell (i.e. whether or not to store)
- To estimate likely level of revenue and profit

For Government Administration
- To decide on management of extension programs and development of infrastructure
- Early warning about level of production
- To decide on taxes &subsidies and fixation of procurement/support prices
- To decide on issues relating to exports/imports and consumer/ producer support

For Business community
- Trends in market arrivals including likely level of shift in producer choice
- Inter and intra country comparisons
- Impact of import

For Consumers
- Market transparency

4.8 System of Regional Accounts, therefore, might be formulated to meet the need of analysts for formulation of the appropriate policies and monitoring the progress of activities relating to issues listed above.Following core data sets would be required at various levels (national/ state/ local):

- Data on production, inputs and labour force
- Data on socio-economic conditions of households (access to means of production such as land, water, inputs, credit, etc.).
- Data on infrastructure for production andtransfer of supplies and output.
- Data on climate, incidence of drought and desertification, pests, erosion of biological diversity, and degradation of land and aquatic-based natural resources including water and watersheds in depleted and overexploited areas to combat environmental threats to achieve greater production as well as to restore and rehabilitate the natural resource base.
- Data on trade, marketable surplus, prices and cost structures to promote appropriate trade policies to enhance sustainable growth.

(C) Proposed Framework of Regional Accounts

4.9 Proposed framework of regional accounts needs to include all above data sets which are linked to economic activities of the region. Taking leads from the discussion above, it is proposed that the structure of regional account should have a central accountto show size and type of economic activities in the region along with a number of satellite accounts to go into depth of functioning of various types of producers classified by type of economic activities. Although the UNSNA has demonstrated that environmental issues can be incorporated in the central framework of the account, for the regional accounts it is not feasible. This is mainly because boundaries of natural resources have different boundary as compared to general administrative set-ups. Therefore, for the present, it is recommended that various physical databases may be shown as satellite statements having desired boundaries according to economic activities. More details about the satellite statements will be discussed later after describing accounting framework.

4.10 An overview of the economic activity of the region can be seen from the domestic product of the region. A more useful format to show domestic product is a 'goods and services accounts' which will help in depicting use of domestic production inside the region as final consumption and intermediate consumption as well as other economic activities.Format of this account will be somewhat similar to the format given by UNSNA paragraph 2.133/2.134 and table 2.15 with some more details based on the need of policy formulation.

4.11   Structure and format of Satellite Accounts of the system are based on logic given by the UNSNA. In general, target of policy for regional economicplanning aims action on three types of economic entities:

- *Product:*Only data which can be collected on individual product produced in a region isquantum and value of the product and inputs being used in its production process. This data determine the quantum of production as well as inputs/resources requiredforcarrying out the activityfor analyzing various issues relating to supply/ demand for final and intermediate consumption for making economic plans for the region. For example, data on product wise output /input are required to work out projections of inputs required by the sector; the introduction of new technologies; the preparation of extension services and plans for research, education and training; the formulation of export and import policies relating to the product; and the development of ancillary industries, etc. for framing policies for removing regional disparities and making economic plans for balanced regional development. However, since the product is one of the products being produce by an establishment, it is not feasible to determine amount of investment required for the production of the product.

- *Establishment:* An establishment is an economic unit for production of goods and services under single management without regard to title, legal form or size. Generally each establishment will be engaged in production of single principle product.However, the establishment can produce other secondary products and by-products also. Data on establishments are required to make decisions on production technologies. These data are used for measuring productivity, output-input and capital-output ratios, etc.for taking decisions on capital and labor substitution and demonstrating improved technologies.These data are also useful for fitting production functions, compiling economic and environmental indicators and initiating research and extension programs.

- *The institutional unit:* An institutional unit is responsible for managing the economic operations at establishment level. An institutional unit may have one or more establishments for carrying out production activity. Each establishment under an institutional sector may produce same or different product. The unit is responsible for making technical and economic decisions for carrying out all economic activities associated with establishments as well as other socio-economic activities associated with the institutional unit. Thus, an institutional unit is a real economic unit. By definition, it is capable of owning assets and incurring liabilities in its own right. It can receive and spend income, borrow and lend, and so on. Depending on its function, such a unit can be placed into one of the five institutional sectors: households, non-financial corporation, financial corporations, general government and non-profit institutions serving households. These units can also be grouped by industries taking into account its principal economic activity. Data for such units are useful to study the

impact of various policy measures on the socio-economic conditions of the population. Data on institutional units are also useful for measuring poverty and determining the living standards of families and compiling terms of trade between output and input from the point of view of producers. Such data are also used for making government policies relating to taxes and subsidies and formulating macro models.

4.12   An institutional unit is a complete economic unit. These units can do production and generate income.It can also be involve in consumption and investment. It can accumulate assets and incur liability. Some of the important characteristics of institutional unitsare given below:

- The UNSNA strongly recommends sub-sectoring institutional sectors. There are many useful ways in whicha sector can be sub-sectored and statistical agencies are advised to give due consideration to the various possibilities according to the needs of different users, analysts or policy-makers.Sectors can be subdivided according to area (rural area, tribal area, agro-climatic / agro-ecological zone, etc.,) of their place of activity or by economic activity (agriculture, sugarcane grower, fishery, mining, agro-industries, etc.,) they are engaged in.Sub-sectors can be created by a combination of area and economic activity (e.g. agro-industries located in rural areas) and two subsectors can be overlapping. Sub-sectoring of the household sector is one important area for compiling regional accounts and to analyse infrastructural and other requirements of the region. An inter-regional comparison of such homogenous groups can lead to increase in productivity.

- International Standard Industrial Classification (ISIC) of all economic activities gives how a Sector/ Sub-Sectors can be associated with an economic activity. Various suggestions made by the ISIC are related according to value added or output or employment. While using such criteria it is essential to carefully understand implication of the concept. For example, one of the useful ways to classify household sector is according to the type of economic activity. For determining whether a household is an agricultural household or not, a household can be defined in four ways - (i) taking the economic activity of the head of the household (i.e. whether the head of the household is operating an agricultural holding), (ii) taking the major source of income of the household, (iii) considering if any member of the household is operating an agricultural holding, or (iv) considering if any member of the household is engaged in the agricultural activity irrespective of fact that he is operating an agricultural holding or working on someone else's holding. The four approaches lead to different measures of the population dependent on agriculture and serve different analytical objectives. The first approach assumes that the head of the household normally operates the holding (as it is the case in many developing countries) and by convention the household is an agricultural household. This concept is also important as the head of a household has an important role in taking decisions about the current and future (investment related) activities of the

household. The second approach limits the area of study to those households who depend on agriculture to earn their livelihood. Although this group is important for many practical considerations, it has its limitation concerning data collection. In the third approach all the households operating agricultural holdings are covered. One can assume that by and large this will cover the total area under agriculture operated by households. In the fourth approach all the households dependent (fully or partially) on agriculture are included. This concept provides a comprehensive coverage of the population dependent on agriculture. Thus, defining concepts and definitions play an important role in sub-sectoring sectors.

- Institutional units, keeping in view decision making process, could be divided into three groups as describe in following discussion:

1. Institutional units whose economic activity is mainly confined in one region: This group includes units like households, corporationswhose all establishments are all located in the region, local and state governments and many NPISHs.These units have full control on their assets and liabilities and create their own plans for undertaking economic activity. Activities of such units are guided by locally available raw material & labour force and need of the region. Compiling economic account of such units does not present any conceptual problem for formulation of a complete set of economic accountsas recommended by the UNSNA. It is, therefore, easy to make interregional comparison for formulating development plans and taking policy decision by local authorities for the enhancing economic activities of such units in the region for balanced growth.

2. Institutional units having a number of establishments which are located in more than one region: Many corporations and a number of NPISHs are in this group. Assigning the contribution of such multiregional units between various regions raises more difficulties. Centre of economic interest of such units generally lies in the region where their head office is located or in the region where major portion of their economic activity lies. In such cases, unit may be associated and analyzed as per location they are registered. For other regions data on only their establishments located in the region or their products can be collected and analysed.

3. National units controlled by Central Government whose economic activities are for total population of the country: This group includes entities like railways, postal & communication services, electricity generation & flood control, etc. This group is popularly known as 'Supra-regional' sectors. It is generally feasible to compile only notional income generated and assets formation by such units in the region to get an overview. Any effort to compile indicators like input-output, capital-output, etc. has no meaning for the region.

- Institutional units are complete economic units and can engage in full range of transactions and are capable of owning assets and incurring liabilities. As such a complete set of accounts recommended by UNSNA can be compiled for these units. However, institutional units in the categories 2 and 3 above will have establishments in more than one region. For such units artificial division of the unit by imputing various data sets to compile complete set of accounts for each region is not recommended. Such accounts do not provide any data for economic analysis.

4.13 Having insight in the structure of the economy, recommendedframework for regional account is given below. In this connection it may be mentioned that the proposed framework is being recommended to create a sound database. At present, all details may or may not be available. Furthermore, it is needless to say that for the sake of having better intra / inter regional comparability the system should totally depends on concepts, definitions and guiding principle laid down by UN system.Proposed System of Regional Accounts would have four sets of accounts and supporting statements:

1. A goods and service account: The format of this account as suggested above will be same as given in the UNSNA. However, for each year there will be three additional columns giving break-up of totals into products from in-side the region, imported from other regions and imported from rest of the world. Output and inputs will also be having product-wise details based on CPC.The list of products need not be comprehensive and can be limited to major items of interest only. The account will cover total economic activity of the region and share of multi-regional (including governmental) units will be based on methodology for supra-regional sectors being used by the present system.

2. There will be three sets of satellite accounts for products, establishments and institutional units of the region. Accounts in these sets will not be covering entire economic activities of the region and would be based on the choice of policy makers. For each year, a different set can be compiled and repeated at periodic interval. Format for product accounts will include details of value addition and for establishments and institutional units will be same as recommended by UNSNA.

3. The third component of the framework would be a set of satellite statements giving breakup of totals for products included in the accounts as well as items of infrastructure which are located in other regions and are also used by the region. For example, area under various crops can be classified according to agro-climatic zones to work on improved technology. Similarly infrastructures like bank, post office, storage, railway stations can be included within certain distance.

4.14 Accounts in itself provide limited information in the form of structural indicators. Sometime it is difficult to compile accounts to show some important characteristics of the region. Satellite set of statements, therefore, have been included in the system either to give further

details of attributes included in the system (e.g., further details of output, input, capital formation classified in more than one way) or to give special features of the region (land use, population, labour force, infrastructure in the region, etc,). Statements can include either as absolute data or ratios, proportion, etc. in the form of indicators.Basic data collected for creatingaccounts using standard concepts and definition can be used for creating a set of indicators which are useful for intra & inter regional and international comparison as well as for formulating & monitoring economic plans and policies.

SECTION V: INDICATOR SYSTEM FOR DECISION MAKING

5.1   Indicators have long history of use for formulation of plans and program as well as for monitoring and evaluation of progress of program. Use of such indicators has been advocated by UNSNA as well as by other forums. Conferences/ Submits held in recent time have taken support of indicators for measuring progress of decision taken in the meetings (see Annexure II).

5.2   A comprehensive discussion on Indicator System is given in Annexure III. Criteria used by Organisation for Economic Cooperation and Development (OECD) in the selection of indicators are as follows:

Policy relevance – This criterion has been developed in relates to agri-environmental issues in the Driving Force –State- Response (DSR) framework, which is of importance to policy makers. Specifically, a selected indicator should *inter alia* be able to quantify the components and issues described in the DSR framework; be relevant to an environmental issue that policies. It can potentially address and contribute to the analysis of the environmental and sustainability of the activity linkages described in the DSR framework.

Analytical soundness – This requires that the selected indicator should be able to explain a link between the activity and an environmental issue and be able to show trends and ranges of values over time. Even though some countries have been able to establish targets and threshold values to reflect the choices and standards that policy makers may wish to achieve, further analysis is considered necessary for comparing these thresholds with actual values of an indicator.

Measurability – This relates to the data available to measure an indicator. It is considered appropriate to develop the indicator from established national or sub-national data, preferably using a long time series where this is available and where, given the lengthy time period, it becomes possible for many environmental effects to become apparent. Even though a considerable database exists in OECD countries from which to calculate indicators, it is recognized that problems of data collection and methods of indicator measurement remain obstacles to advancing the work on certain indicators.

Level of aggregation – This criterion seeks to determine the level (establishment, sectoral, regional or national) at which an indicator can be meaningfully applied. In particular, it addresses the issue of spatial and temporal diversity of the environment; and the possibility of aggregating information according to the Geographic Information Systems (GIS) and the other data already collected at the administrative unit level.

5.3   The policy indicators need to fulfill above listed requirements. They should be comprehensible, transparent, be capable of straightforward interpretation and be based on a data having macro-micro linkages.This modular approach of creating a data bank in the framework of regional accounts would be flexibility to respond to these needs of policy analysts and would minimize differences in data availability and its reliability.Many issues like sustainable development, ending of poverty, ending of hunger, sustainable use of land and water resources, increasing productivity and income etc., can easily be analyzed for effective policy making at lower level of administration with the help of this database. Another benefit of such data sets would be possibility of aggregation of the data to analyze quantum of impact at various level of administration. This data-set should also be useful in the context of quantitative models of policy impacts and market projections.

5.4   In general Satellite Indicator System in the regional account report should comprise two types of indicators:

- An overall set of indicators (*headline indicators*) which describe existing structure and current developments of the economy. These indicators are used to determine relative level of development of the region vis-à-vis other regions to frame general strategy /objectives for development.
- A detailed, specific set of baseline indicators which addresses individual action areas to determine type of developments required to meet the strategic objectives.

These set of indicators are updated periodically to monitor ongoing progress.Indicators for both the parts can be compiled from the data sets generated in the framework and ancillary data collected from other sources. The biggest advantage of creating indicator system linked with the set of accounts is that analyst can study impact of the aggregate by institutional sectors and study its incidence at national and sub-national level.

5.5   Macroeconomic aggregates such as SDP, investment, and the share of different economic activities arising from this compilation have traditionally been used as a general-purpose indicator to describe the level of economic growth of the region. Thesecond set of indicators can be compiled from the detailed disaggregated data contained in the accounts and ancillary data collected for specific economic activity. These indicators qualify two important criteria. First, is related to specific geographical area. Each data-set in the database has uniformly the same coverage

(as missing data are imputed as part of compilation exercise keeping in view geographical area).Second these indicators refer to the same type of analytical unit (product, establishment and institutional unit) to point out area of action. The important data-sets in the accounts, namely, the output and input along with other physical data, therefore not only reveal performance of the region but also characteristics of the area in meaningful manner for each sub-setcovered in the satellite groups.

SECTION VI: ILLUSTRATIVE FRAMEWORK FOR AGRICULTURE

6.1   Comprehensive set of regional accounts for any country will be huge in size and would require large amount of data on different economic activities. In real practice, as we take different economic activities in different years for collecting detailed data, regional account should synchronize with such a plan and construct detailed account for any selected activity. For other economic activities overview of the economy (central framework) and selective set of indicators only be updated. To make the suggested framework transparent, let me formulate a system keeping agriculture economic activityas the area of action. Framework of economic accounts including satellite statement for agriculture activity has been presented by the FAO (1996) in the publication entitled "A System of Economic Accounts for Food and Agriculture (SEAFA). Guidelines for compiling SEAFA in developing countries have been presented in the Handbook on Compilation of Economic Accounts for Agriculture (FAO 2002). The handbook gives concepts and definition and method of estimation for each important aggregate. The handbook also define concept of broad agriculture to show backwards and forwards linkages to the basic agriculture activity.This System can be taken to represent the central framework of the system with minor modification. Without going further in the details of framework of accounts, let us proceed to indicator system useful for policy makers, which is not included in the FAO work. Proposed set of indicators here are in addition to the set of indicators recommended in the first report of the RAC giving details of state domestic product & its distribution, price & cost of living indices, indicators of regional development, etc. which are useful for immediate requirements of the policy makers at the regional level.

6.2   Agriculture, which can provide employment to a large number of people, is also the centre of strategies for planned socio-economic development for economies in which major share of people lives in rural areas. Principal target for regional development of such areas is to achieve high rate of growth of agriculture and rural income. It is, therefore, essential to have agricultural policies which can help in achieving sustainable agricultural development with full growth potential of its different regions. Experience reveals that the pattern of growth of agriculture can sometimes result in uneven development, across regions/areas and crops as also across different sections of farming communities. The indicator system should guide policy makers to these issues as well as protect natural resources. To highlight these issues indicator system for supporting the regional accounts have been presented below on next page:

(a) General Purpose Headline Indicators

6.3   As the present objective is to reveal the state of agricultural, instead of a more comprehensive analysis of the cause of differential growth a logical set of General Purpose Headline indicatorare given below. Some of the indicators included in the list have been recommended by the Commission of Sustainable Development (CSD) to depict the current status of agriculture and make inter regional comparison.

Pressure Indicators:

6.4   Three indicators dealing with status of agricultural production, land and labour have been selected to indicate pressure of agricultural activity on agricultural land.

P.1 Pressure for food and agriculture production for a region has been measured through net export (i.e. export value *less* import value) of agricultural and food production at base period price. This indicator can be positive or negative depending on the extent of dependence on the rest of the regions. Values with a positive sign of the indicator reveal a comfortable situation for the region. Net product has been divided by total population to compare magnitude of the pressure among regions.

P.2   Agricultural land per agricultural worker (labour force) reveals pressure of economic activity on agricultural land. The smaller the value of the number indicates more pressure on the land.

P.3   Both the indicators "Number of live animals per hectare of permanent pastures" and "Number of live animals per hectare of agricultural area" presents the livestock – land ratio. Keeping two similar indicators has been considered appropriate as in some of the developing countries livestock also depend on agricultural waste.

State Indicators:

6.5   Twenty one indicators have been selected to reveal the current and changing state of agricultural. These indicators highlight: (a) importance of agricultural activity in the region and among the workers (three indicators), (b) distribution of land use (five indicators), (c) use of agri-chemicals and machineries (five indicators), (d) status of irrigation (two indicators) and (e) status of animal husbandry and fishery. While studying use of agri-chemicals, indicators can be constructed using arable land or total agricultural land keeping in view differences in the agricultural practice. Similarly, in the case of status of irrigated land both agricultural areas as well as area under temporary and permanent crops are used as indicators. Selected indicators are:

S.1 Share of agricultural GDP in total GDP

S.2 Share of population dependent on agriculture in total population

S.3 Share of agricultural labour force in total labour force

S.4 Share of agricultural land in total area

S.5 Share of arable land and land under permanent crops in total agricultural area

S.6 Share of arable land in total agricultural land

S.7 Share of land under permanent crops in the total agricultural land

S.8 Share of land under permanent pastures in the total agricultural land

S.9 Average size of land holding

S.10 Number of farmers in different land size group

S.11 Fertilizer consumption per hectare of arable land

S.12 Fertilizer consumption per hectare of agricultural land

S.13 Pesticide consumption per hectare of arable land

S.14 Pesticide consumption per hectare of agricultural land

S.15 Number of tractors used per hectare of arable land

S.16 Share of irrigated land in total agricultural land

S.17 Share of irrigated land in total land under temporary and permanent crops

S.18 Number of genetically improved livestock & poultry as a percentage of total number of livestock

S.19 Production of fodder per livestock

S.20 Production of milk, eggs and meat per animal

S.21 Marine and inland fish production per fisherman

Response Indicators:

6.6   Four indicators have been selected to indicate response of agricultural activity on agricultural land. In the present case response has been defined in two ways: first, by looking at land and labour productivity and second, by the response of society by providing resources for the improvement of agriculture. The indicators are:

R.1 Value of agricultural production per hectare of agricultural area

R.2 Agricultural GDP per agricultural worker (labour force)

R.3 Agricultural investment per hectare of agricultural area

R.4 Assistance to agriculture per hectare of agricultural area

6.7   Data contained in these indicators can provide important information on rate of growth, input management investment in agriculture, productivity analysis etc. which are important determinant to study intra and inter regional variation and frame agriculture policies.These indicators could also be used for evaluating the agricultural policies by comparing targets and achievements. Data would also be useful for formulating models and studying multi-factor productivity.

(b) Indicator for in-depth analysis

6.8   Sustainable agriculture is an important aspect of rural and agricultural development. A high rate of growth of agriculture should not be the sole objective for any planning exercise. The policy should seek to promote technically sound, economically viable, environmentally non-degrading use of country's resources namely land and water. Two types of indicators are compiled to provide a detailed, specific action area toimprove production and productivity with a view to increase household income. In this group it would be necessary to analyze different aspects of agriculture like production, market intelligence, infrastructure developments, environmental issues, etc., separately. To study this aspect it would be necessary to into further disaggregation of data used in compiling macro accounts. For example output & input may be disaggregated into yield, area and price and re-aggregated according to agro-ecological zones. In general, such analysis needs to be done in selective groups for selective issue. For the present purpose only crop husbandry activity has been taken for illustration purpose.

Crop Production

6.9   Let us start from crop production. To analyze issues relating to crop production two aspects viz., local practices and technical constrains need to be analyzed. To study the local practice we need to study factors like seed variety, time of sowing, etc. data collected in crop cutting experiments can be used. For planning a proper crop cutting experiment[3]in a most objective manner a large amount of preparations are required which involves at least two visits to the selected plots. In these two visits a large amount of data, which are generally used to cross check the results, are collected. These data include area of the field, date of sowing the crop, likely & actual date of harvesting, variety of seed sown, the name and time of the crop which was sown earlier on this plot, soil type of the field, source & number (frequency) of irrigation, seed rate, amount of fertilizer given in basal dressing & at subsequent stages, use of pesticides & insecticides, yield, plan for next crop on the same field, cultivator's remarks on factors effecting crop productivity, etc. This information can be used for agricultural planning in most efficient /scientific manner. The data collected in two

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[3] While planning crop cutting experiments additional data like use of high yielding varieties, organic farming, integrated pest management, mechanization of farming and post farming activities, soil erosion/degradation, water resource management (area dependent on rain water, area under drip irrigation), status of ground water table, etc., can easily be collected to compile indicators for technology diffusion to formulate policies at national and sub-national level (Narain, 1994).

visits can be used to generate following simple two/three way statements presenting distribution of crop yield, such as:

(i) Date of sowing & date of harvesting in rows and columns -to locate most suitable time for sowing any crop in the region for important varieties of the crop,

(ii) Amount of fertilizer (total i.e. used as basal dressing as well as top dressing) and number of irrigations in rows and columns - to work out optimum combination of irrigation and fertilizer for different varieties of seed,

(iii) Varieties of seed and doses of pesticides - to find out disease resistance of different varieties, etc. in the region.

Such simple statements substitute complicated statistical work like fitting of production function and at the same time these statements are more flexible, easy to compile and easy to interpret. Moreover, such analysis can be done by agro-ecological zones which can form part of global data base for many scientific researches.This information will be useful for policy formulation if aggregated by institutional sectors at national and sub-national level.

Agri-environmental issues

6.10   For studying the agri-environmental issues,it would be useful to divide whole country into homogeneous groups using agro-ecological zone concept to minimize expenditure on data collection to study impact of land degradation, soil erosion, etc. For example let us take a simple example to study land use change in a country. For policy action first we need to divide country according to the geographical characteristics, namely, fragile ecosystem of mountain areas, dry region, high rainfall fertile region, arid to semi-arid region with a highly developed irrigation system and create indicators to study:

• Whether deforestation is taking place and, if so, whether deforested lands are being converted to shifting cultivation, permanent crops, or for urban use, and at what rate.
• Whether pasture lands are being degraded due to overgrazing, and as a result is there a trend towards desertification; if so, what are the rates at which these changes are taking place.
• Trend in the extension of cultivation on climatically marginal or fragile drylands, steeplands, and other infertile lands (which is often indicative of a shortage of fertile lands).
• Whether irrigated lands are being abandoned due to salinization, and if so, at what rate.

- Trend in practising monoculture (particularly for maize or other food crops) without following crop rotation or multiple cropping practices (this is often indicative of a land shortage or of likely stress upon soil resources).
- Whether fallow periods have been shortened in an attempt to increase production levels (which may reduce soil fertility in the long run) and if so, at what rate.

6.11   Detailed description of this type of study issues such as use of nutrients, use of pesticides, use of water particularly for agriculture, agricultural land use and conservation, agricultural soil quality, including degradation of soil resulting from erosion and chemical and physical deterioration, water quality, greenhouse gases, biodiversity of domesticated species used by agriculture as well as of wild species, wildlife habitats, farm management practices, farm financial resources, socio-cultural issues in relation to agriculture have been discussed in detail in the FAO (2002) handbook[4] entitled "Handbook on the collection of data and compilation of agri-environmental indicators – A step-by-step guide".

6.12   Advantage of such a system would provide: (a) data sets would be geo-referenced and non-overlapping with adjoining geo unit, (b) consistent use of monetary and physical data collected using administrative system, socio-economic surveys and scientific & technical operations like soil surveys, remote sensing technique and (c) data sets could be easily aggregated/disaggregated to link various geographical levels. These data sets can be super-imposed on each other to construct indicators for policy use.

SECTION VII: CONCLUDING REMARKS

7.1   After conceiving format of the regional accountsnext natural question comes about feasibility of compiling the set. Unless rigorous efforts are made it will not be an easy task to compile the proposed set of accounts. Although it is not easy to describe a comprehensive guideline for compiling regional accounts in abstract, yet let me attempt to give a step-by-step guideline for compiling the System:

Step 1:   A beginning may be made with 'Supply and Use Account' at national level keeping ground level needs in mind and perform A, B, C analysis to create an industry wise list of product of manageable size. Prepare a numeric code list of these products with industry code at first two digits and next three digits for product code (CPC). Create linkage with HS code. In this manner we are ready with a comprehensive list

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[4]The Handbook recognizing that while some countries are facing problems in selecting appropriate indicators to meet their requirements, others are finding it difficult to define the data needed for compiling indicators aims to address these two issues. The four major issues that agri-environmental indicators should address are: sustainable use of land, water, nutrients and pesticides for agriculture. Details included are selection of indicators for a given region, concepts and definitions of the data (including concepts of soil, land, agri-chemicals, weather, etc.) going in compilation of indicators and guidelines for collection of data.

of products inter-linking industry code, product code and trade codes. A sub list from this list can be compiled to select items which should go in the Goodsand Services Accounts for a region for which we are compiling the regional account.It should not be difficult to introduce additional products if in some more details are required at middle (state) level.

Step 2: Start from the Comparable Estimates of State Domestic Product and create a matrix of domestic production and intermediate & final consumption for the list of products arrived in Step 1. A more comprehensive statement can also be compiled in the form of a Satellite Statements.

Step 3: Using the data available from Foreign Trade and Goods and Services Tax (GST) we can compile a trade matrix having Rest of the World as another destination. Truncated data for the selected region and product would be useful for completing the Goods and Services Account.

Step 4: In this manner we can arrive at a data set having details of domestic production, intermediate & final consumption by type of institution. This could be further disaggregated by goods & services produced from domestic source so that the balance can be considered as from rest of the world (i.e. which should be equivalent to products imported from outside). This database will support analysis for future development.

Step 4: Data collected from census, surveys and administrative records may be tabulated for supporting goods and services account and compiling Satellite Accounts for products, establishments and institutional sectors recommended in part 2 of the proposed system. As a usual procedure of national account compilation this will also provide essential items for use in goods and services accounts. This step will provide indicators for intra and inter regional comparisons and would be helpful in understanding goals of development process.

Step 5: Compile Satellite Statements giving indicators as per specific needs of policy makers.

7.2   The effort would need coordinated efforts[5] of Central and State Governments. Subject matter ministries at centre and states involvement would be essential. Needless to say, if such a system is developed it will provide a strong statistical system to support policy making. As mentioned in the beginning a complete job is difficult, but if the System is useful for decision making and the job is to be done, a strong unit at national level is a must. Leaving the work on regional government will not give any useful results. It would be a shear waste of time and resources.

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[5] National Accounting Unit at Central Government and State Statistical Bureaus at regional level could work on accounts while Ministries can provide support for SatelliteIndicator System.

7.3   The proposed framework is my dream project on which I am working since 1993. After working for 20 years or so on national accounts, I felt that although the System is based on a sound logic useful for decision making, but it is so complicated that (a) it is difficult to compile by any developing countries, (b) it is going away from most of the specialized institution involved in decision making and economic plan formulation and (c) a large amount of data which is being collected and compiled remains away from the System. The proposed System would make an attempt to remove these limitations. It will be utilizing most of the data to support users' need, would provide macro-micro linkage to facilitate making policies according to ground situation and showing its magnitude at the country level. The System could be used even if a complete framework is not compiled.

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ANNEXTURE I

MAIN SOURCES FOR CORE DATA

1.   The statistical system of any country are generally developed over the years primarily to meet the needs of the country's administrative set-up. In any statistical system part of the data originates from information contained in different administrative (official) returns which individuals and corporations submit to the government while a part of data are collected through sample surveys and censuses organized by the statistical counter-part of the administration to meet special needs. With the technological breakthrough in the field of information science and growing information need of policy makers to manage the fragile ecosystem, satellite based technologies like remote sensing techniques form another important source of data which may be different from other socio-economic data sets. Thus there are three main kinds of sources which provide core data for developing an information system. Each of these sources has different role in developing a statistical system as well as has their own limitations. In the following discussion we describe roles and limitations of these three kinds of sources.

(1) Administrative Sources

2.   Administrative set-up of each government department, depending upon their functions, regularly collects information on different aspects for meeting their own day-to-day needs. Most common example of this type of information is the information on ownership of land, collection of direct and indirect taxes, quantum and value of goods and services exported and imported, birth & death, prices of different commodities in different type of markets, number of different types of vehicles on road, number of residential and non-residential buildings, etc. In most of the countries with centrally planned economies (like Eastern European Countries) a large amount of information on economic activities is kept in administrative registers could also be included in this category. The basic objective of collecting such information is to monitor the tax collection system or making economic and financial policies for the country. Some of the basic characteristics of this source of information are:

(a) Cost of data collection is relatively negligible as the information flows through its normal administrative channel. As this information is collected using normal administrative system, the collected information also contains information from remote and inaccessible areas.

(b) Theoretically administrative data should be more reliable than the data collected in censuses and surveys. This is mainly because (i) the format for collection of information is fairly known to respondent, and (ii) the process of collection normally has a strong legal backing and consequently the system permits the person responsible for collection of information to review and verify accuracy by going through basic documents. However, at times two sets of data, although collected and compiled using

same concepts, may result into different estimates. Sometimes the reasons for these discrepancies are known (e.g. time or place of recording), but sometimes it may not be feasible to reconcile or explain these differences.

(c) The objective of collecting administrative information is different from the data collection process adopted in statistical inquires. Administrative information may or may not have well defined concepts and definitions.

3.   Making effective use of administrative data for statistical purposes is a challenge. The statistical system's needs are not normally high on the priority list of most administrative information system developers. The latter are relatively rigid about the content and methods of collecting information. Often, it is not feasible to incorporate additional information in the "form (administrative return)" for adjusting concepts and definition of the information to meet the statistical needs. Never the less administrative information has numerous uses in developing a sound statistical information system:

- The information could be used for creation and maintenance of a frame for collection of statistical information and as an aid for improving sampling design. Information could be used to make clusters or for stratification of "the population" for creating homogeneous groups.
- The information could also be used for validating data collected from other sources.
- The information could also be used for making assumptions for imputing missing data either collected in a survey/census or supplement the data collected in a survey/census.
- The information could also be used to reduce respondent burden.

4.   However, to make this information useful for developing a statistical information system it is necessary to (a) make adjustment in the concepts and definitions using information from other sources or making assumptions, (b) re-tabulate the information according to the coverage required under the information system, and (c) compile averages to present the true picture by making the series continuous and giving appropriate weighting system.

(2) *Statistical Censuses and Surveys*

5.   Statistical censuses and surveys have long been used for collection of data on various aspects. These statistical inquiries are conducted to collect various data on population, labour force, nutritional status, poverty, manufacturing establishments, research and development activities, etc. Traditionally the census is a means to collect data with comprehensive coverage (complete enumeration) while survey techniques have been developed to reduce cost and time in collection of data. Some of the well known issues for collecting data through these statistical inquiries are:

a. Collected agricultural data can be incomplete in terms of (i) the range of commodities covered (for example, in many cases only large farms are covered only), (ii) coverage of the nation (sometimes parts of the country are excluded from the national statistical reporting system), and (iii) to maintain cost or for other practical reasons some time limits are imposed in these inquiries in terms of volume or value of the output. etc.

b. Data collected in various surveys/censuses follow different sampling frame or do not relate to same population, making any integrated analysis difficult.

c. Concepts and definitions used in different statistical inquiries are very often different.

d. Sometimes there are aggregation issues due to differences in level of non-response and precision.

e. Even when data are available, their reliability is often questionable due to presence of sampling and non-sampling errors.

(3) Data collection using satellite system and remote sensing techniques

6.   In late seventies and early eighties sustainability of agriculture was considered as one of the important area for decision making. It was thought that agriculture may be treated as an industry rather than as a traditional occupation. Agricultural practices may be developed to maximise the socio-economic benefits and should aim at (a) raising the level of farm productivity which could be sustained or enhanced over a period of time, (b) minimising adverse impacts on the natural resources, and (c) reducing use of agri-chemicals which may effect quality of soil or ground water. This aim needed an information system which could take into account quality of land along with risks associated with the vagaries of climate. Since quality of land and soil are closely related to various acts of human activities and impact of climate, the agricultural information system need data not only on the principal forms of soil degradation (water erosion, wind erosion, soil acidification, salinisation, soil structure, etc.) but also data on host of variables such as emission of greenhouse gases, temperature, rainfall, cloud cover, sunshine hours. These sets of data which are highly scientific in nature are generally collected using satellite system and remote sensing techniques. It is evident that these data are different from other socio-economic databases in terms of unit of measurement as well as area to which they are related. In spite of this basic difference in the nature of such databases, it is useful to have an integrated view to make plans and take policy decisions.

7   The utility of national accounting framework in integrating various data sets is well known. There are certain limitations in what can be accommodated in national accounting framework as the accounting structure is based on monetary system. However, in several cases additional or different requirements necessitate the development of complementary or alternative categories and concepts for collection of data. The UNSNA realizing this need expanded the analytical capacity of national accounting for selected areas of social concern in a flexible manner, without overburdening or disrupting the central system and recommended use of satellite accounts. The satellite accounts are useful in integrating physical and monetary data. On the one hand, satellite accounts are linked with

the central framework of national accounts and through them to the main body of integrated economic statistics. On the other hand, as they are more specific to a given field or topic, they are also linked to the information system specific to this field or topic. In this manner it allows for better integration of monetary and physical data.

8   In a satellite account it is desirable that the concepts, accounting structure and classifications should be tailored to the specific analytical purposes which facilitate data integration. Satellite accounts can focus on the role of people or natural resources. This calls for extra breakdown of economic sector for conceptual and numerical linkages among all kinds of related monetary and non-monetary phenomena, which may be expressed in different measurement units.

9   To understand the dynamic nature of the economic system in terms of the social, economic and demographic characteristics of the population, it is essential to integrate information/data on various aspects. This task requires some basic considerations for collection and compilation of statistical data. Some guiding principles to achieve this in a cost-effective manner are to establish linkages between data at micro level and areas requiring decision making. This could be achieved if:

   i.   The stratification for the collection of statistical data is the same as that of the administrative regions for which policies are generally framed. The coverage of both should be examined and stratification may be adjusted so that it should be possible to construct data sets for administrative regions.
  ii.   The collection of statistical data should keep in view the need for uniformity with the decision making process.
 iii.   The concepts and definitions used in the collection of statistical data should be examined carefully and matched with those required in the system for making administrative decisions. For example, it may be necessary to include some extra details in statistical inquiries that may have help in making adjustments to the administrative data.
  iv.   The derived secondary statistics generally some imputed values for non-market activities are included. The basic assumptions followed in these imputations should be examined and checked with corresponding administrative information if available.
   v.   The data requirements and statistical methods should be coordinated across the different levels of government. In many countries the provincial governments produce statistics to satisfy their decision making requirements and do so independently of the central government. Meanwhile, the central government is also producing statistics. Confusion results when the summation of data across states differs in level and concept from the centrally derived data.
  vi.   There should only be a single source for each set of "official" statistics.
 vii.   There should be a data dissemination policy that provides the public open and equal access to all data in the government information systems.

10   A statistical system conceived in this way would be well suited for the integration of statistical data and administrative information for analytical purposes. Another alternative to integrate physical data with other monetary data is the use of the Geographical Information System (GIS).

ANNEXTURE II
RECENT SUMMITS ADVOCATING USE OF INDICATORS

I. *The 1992 UN Conference on Environment and Development (Earth Summit)*

1   Agriculture has an important place among various economic activities, not only because it is a principal user of natural resources but also because it is a user as well as a producer of eco-products (marketable products, recreation, maintenance of species, environmental quality, etc.). Per capita arable land has shown a progressive decline associated with increasing population density in rural areas. Like land resources, water resources are not evenly distributed and several countries face scarcity constraints. The intense pressure on land and water resources often leads to their misuse. The area under cultivation is being expanded by cultivating marginal lands including sloping lands, and lands which have been deforested. To obtain higher production levels, measures are being taken to improve yields per hectare but these involve the application of heavy dosages of agricultural chemicals, and expansion of irrigation, which, unless managed properly, can have adverse environmental consequences. Thus, the extensive use of fertilisers is often linked to eutrophication of water bodies, soil acidification and contamination of the water supplies with nitrates. The problem of excessive use of nutrients is confined to developed countries and some developing countries only. In fact, in many developing countries, nutrients being applied per hectare are insufficient to replace those that are removed by crops. The increase in the use of pesticides in response to rising pest problems is also having a negative impact on the environment. The management of water resources too is posing problems in many areas. In water scarce areas, water withdrawn from aquifers is accompanied by a relatively low rate of recharge. This puts a tremendous stress on available water resources. In several other areas where irrigation is practised without adequate drainage, over-watering often results in waterlogging and salinization. The impact of climate change on agriculture and the ecosystem is becoming an additional source of concern.

2   The Earth Summit was convened to address such urgent problems of environmental protection. Agenda 21 addresses the pressing problems of today and also aims at preparing the world for the challenges of the twenty-first century. It reflects a global consensus and political commitment on environmental development. National strategies, plans, policies and processes are crucial in achieving this. The summit recognised that, although countries have the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, they cannot cause damage to the environment of other States or of areas beyond the limits of national jurisdiction. They have therefore to co-operate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. The implementation of the developmental and environmental objectives of Agenda 21 will require a substantial flow of new and additional information / data on natural resources.

3   Environmental statistics are of a multidisciplinary nature. They include a large set of physical databases on climate (solar energy and light, water, wind, heat and temperature), flora, fauna, etc., which are collected using various techniques and methods for a comparative analysis of their impact on the ecosystem and the social, demographic and economic conditions of the people. In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

II.   The 1995 Copenhagen World Summit for Social Development (Social Summit) and the 1996 Rome World Food Summit (Food Summit)

4   At the World Food and Social Summits it was recognized that world population is growing and steps need to be taken urgently for eradicating hunger and malnutrition. The World Food Summit calls for determined economic policies that will permit producers of agricultural products to adopt appropriate input technologies, farming techniques, and other sustainable methods. The Summit also stressed that production increases need to be achieved without further overburdening natural resources. Establishing sustainable and diverse patterns of production should take into account the present and future needs of the people as well as the natural resources potential and limitations. It was recognized that developing countries are generally poorly equipped in terms of technical and financial resources and educational infrastructure, in particular in rural areas. In these areas, lack of income opportunities, failure of crops due to flood and drought, inadequate commodity (inputs and consumer goods) distribution networks, limited access to public services and the poor quality of these services are all fundamental aspects that need to be considered with regard to rural food security. Generally such socio-economic conditions and ecosystem degradation create a vicious circle. Therefore, it was recognized that the policies that provide an effective incentive structure for sustainable management of natural resources will help ensure that national agricultural practices are developed and implemented in a holistic approach.

III.   Millennium Development Goals and Sustainable Development Goals

5   In the year 1998 it was decided to hold a Millennium Assembly in the fifty-fifth (2000) Session of the United Nations to discuss international agenda for the 21st Century for peace and prosperity and setting deadlines for many collective activities already going around. In the process, while reviewing socio-economic aspects, work done and objective set by various Summits etc. were examined and a series of time-bound targets with a deadline of 2015 were framed. These targets, known as Millennium Development Goal, were commissioned by the United Nations Secretary-General in 2002 to develop a concrete action plan to reverse the poverty, hunger and disease affecting billions of people. In 2005, the independent advisory body headed by Professor Jeffrey Sachs, presented its final recommendations to the Secretary-General

in a synthesis volume "Investing in Development: A Practical Plan to Achieve the Millennium Development Goals."

6   In 2016, seventeen Sustainable Development Goals (SDGs) officially came into force with a target date of 2030. It was decided that over the next fifteen years all countries will mobilize efforts to end all forms of poverty, fight inequalities and tackle climate change, while ensuring that no one is left behind The SDGs have been build on the success of the Millennium Development Goals (MDGs). The new Goals recognize that ending poverty must go hand-in-hand with strategies that build economic growth and addresses a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection.

7   At the global level, the 17 Sustainable Development Goals (SDGs) are having 169 targets of the new agenda that would be monitored and reviewed using a set of global indicators. These targets are broader in scope and go further than the MDGs by addressing the root causes of poverty and the universal need for development. The new Goals are universal and apply to all countries, whereas the MDGs were intended for action in developing countries only. The global indicator framework developed by the Inter Agency and Expert Group on SDG Indicators (IAEA-SDGs) will become basis for various countries to develop their own national indicators to assist in monitoring progress of SDG.

ANNEXURE III
INDICATORS SYSTEM

1   In addition for taking action to develop environmental statistics, the UN Secretariat as well as the Organisation for Economic Cooperation and Development (OECD) has taken initiatives to develop and employ indicators of sustainable development and of the environment. In the UN, the work on the development of sustainable development indicators received attention following the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992. The Conference adopted a broad action programme for sustainable development, called Agenda21. The need for developing indicators was discussed in Chapter 40 of Agenda 21. A review of literature highlights the following frameworks that were employed recently for the development of indicators of sustainable development and the environment.

- Framework for the Indicators of Sustainable Development (FISD), which is a modified version of Framework for Development of Environment Statistics (FDES). While the information categories included in FISD are the same as those in FDES, the components of the environment categories or issues included in FISD are based on Agenda 21 clusters (economic issues, social/demographic issues, air/climate, land/soil, water, other natural resources, waste, human settlement and natural disasters, institutional support).

- Pressure–State–Response (PSR) Framework of OECD, which is similar to FDES but is based on a concept of causality. It implies that human activities exert pressure on the environment and change quality and the quantity of natural resources; society responds to the changes through environmental, general economic and social policies; and the responses in turn influence pressures through human activities.

- Driving Force–State–Response (DSR) Framework utilized by the UN Commission on Sustainable Development (CSD). This is the same framework as the PSR except that the term 'Driving Force' is used instead of 'Pressure', which had a negative connotation.

2   Even though PSR/DSR frameworks are similar to FDES in a broad way, there is one important difference with respect to the State category. While in FDES, this category is divided into two classes - the impacts, and the inventories/stocks/background conditions - in the PSR/DSR, these two classes are combined into the single category 'State'. The PSR framework has been adopted by many OECD countries and by the World Bank for environmental reporting. Currently OECD and its member nations generally employ the DSR framework.