

Statistics in the Context of National Development

by

S.P. Mukherjee

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Preface

‘Development’ naturally invites debates, discussions and decisions which are often reflected in dossiers and documents. It is a complex construct, involves difficult problems in developing unanimously or even widely acceptable operational definitions of various terms and phrases, mandates credible, adequate and timely data on various domains, takes advantage of different models, methods, techniques and software to process such data into meaningful summaries and, finally, holds out a picture of development, separately in each of several distinct frontiers of development viz. economic, social, cultural and environmental, besides providing some over-all idea of human development.

The real story of development in many sovereign states, however, is clouded—or, should I say—shrouded by narratives contained in reports, articles and notes published by different agencies like United Nations groups and organizations, university research centres, privately funded development research Centre’s, advocacy groups, national statistical offices, national government mouthpieces, and a host of similar other bodies. Most of these narratives, with a few exceptions, are intended to portray a certain intended picture of development rather than the one prevailing in reality. A great majority of people are gullible to narratives emanating from ‘visible’ local or regional or international sources and accepts definitions, measures and conclusions inserted therein. And many of such narratives suffer from deficiencies in their uses of statistics. Statistics—both as implying ‘data’ in a broad sense and as delineating a scientific method for data-based inferencing—should be involved in all aspects of discussions on all domains of development.

This book is meant to be a conspectus on the existing and potential uses of statistics in the context of development. Besides brief discussions on the development issues and the currently used methodologies in dealing with those, some relevant but rarely used statistical methods and techniques as well as some less known models have been touched upon by the author. Population projection and prediction, disability-adjusted life years and burden of disease, doughnut model to analyse planetary pressures, quantification of wastage in education, scenario generation for development planning, use of TOPSIS for developing composite indices, and holistic approaches to quantify human development illustrate this aspect of the book. The basic tenet that only comparables should be compared has been highlighted in the chapter dealing with international comparisons.

Deficiencies in content and in presentation should be and are being admitted. Comments and suggestions from readers will help removal or, at least, reduction in such frailties.

The author is grateful to one of his former students Mr. D. Mukhopadhyay for many useful discussions and for his help in some computation. Mr. Munna Saha rendered constant support in preparing the typescript as also in some computational work. My wife Reba has always remained a great source of inspiration and moral support and deserves my whole-hearted appreciation. I would like to put on record my sincere appreciation of the guidance and help extended by Ms. Sarah Palmer and Mr. Ben Williams from Ethics International Press during the entire work.

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Shyama Prasad Mukherjee

Chapter 1

Introduction

Prelude

The era we live in can be characterized by many extremes. Abject poverty and pompous affluence exist in close proximity, people enjoy unfettered liberty in some countries while basic human rights are trampled in some others, enlivening discussions to unravel some mysteries about the universe go on inside an institution while brawls are taking place over eking out some means of livelihood by people on the roads or in ghettos, few people getting rewarded for their sincere efforts to pull up the unfortunate many who struggle to meet basic needs of life, and some leaders are busy spreading the message of peace and harmony while wielding power and planning acquisitions through incursions. The story goes on. Thoughts and deeds of some visionary individuals and groups who have been working sincerely to make the planet a better place for living for all its denizens provide a silver lining.

A delayed realization or rather a bad necessity more strongly felt than earlier is a 'big push' for change -change for the better or improvement or progress. And such a change in all facets of our activities as also in the norms and mores in the society constitutes the backbone of development. In fact, the goal of even 'economic development' formally defined is not confined to creation of more wealth but is focused on well-being of the entire people. We now get swamped by a virtual deluge of debates and discussions, manifestos and mandates, articles and books, blogs and posts bearing on Development, emanating from a whole host of sources from informed authors and

development analysts to garrulous demagogues and even peoples' representatives some of whom are unable to read through tables and graphs. To make matters worse, gullible recipients of the narratives dished out by unscrupulous providers are too many.

Development narratives are often loaded with statistics- quite expectedly and not without any reason. Statistics implying 'whatever are given' by way of facts and figures, opinions and perceptions, guesses and predictions –collated and processed in a way that best suits a given 'purpose' dominate such narratives. These narratives involve a lot of quantification of inherently qualitative features in several alternative ways each having some desirable properties as also some fallibilities. Quite often, and for good reasons, simple numerical measures are incorporated, despite their shortcomings and neglect of some important associated aspects. Thus, complete expectation of life at birth (of a cohort) computed under some simplifying assumptions is taken as the index for health in HDI, neglecting morbidity and related concerns. While, Disease-adjusted life expectancy (DALE) is a much better indicator of health of a population, non-availability of data and non-uniqueness of the impact of morbidity -duration and severity- almost rule out its use.

Comparisons across countries or across regions/ states with a country or among different groups of people with a country or region or across periods of time in a country or a region or a population segment dominate development narratives. And entities under comparison are judged usually in terms of ranks assigned to them on the basis of some indicator or index reflecting some chosen aspect of development. The fundamental principle requiring comparison only among comparables is often ignored. Lack of comparability may be traced to differences in operational definition of any observed/ measured or computed (variable) parameter, methods of collecting relevant basic

data and corresponding credibility of data, sample sizes when using sample surveys, methods of estimation wherever involved), method of validation, etc. Employment has been variously defined: from engagement in production of goods and services for consumption by others against pay or profit on one hand to engagement in production of goods and services for own or/ and others' consumption and not necessarily involving and monetary transaction on the other. Even duration of engagement varies. The working age-group varies, so does the method of collecting information about employment status of individuals covered by the relevant survey. In an establishment-based employment survey, the same individual may be found engaged in more than one establishment and possibly counted as more than one worker. A properly planned household-based employment survey rules out this possibility. Some data providers use the mail-questionnaire method or a telephonic enquiry; others may use a computer-assisted personal interview (CAPI).

Narratives sometimes highlight short-term progress or improvement in performance with respect to some development indicator, a pointer to the current level achieved is a must for making a comparative statement. A developing country making a good stride up in any aspect of development deserves appreciation surely. But this may not justify claiming a proportionate jump in development as such. In terms of ranking based on the relevant index, the rank of the country may not change much.

Development Defined

Development is an enigma, with co-existence -mostly peaceful, occasionally disturbing-of waste-filled affluence on one hand and chill penury on the other, of sprawling compounds and filthy huts or tenements, of air travel and long march on cobbled roads, of enjoying food and fun late in the night and going to sleep with stomach partly

filled with whatever comes on the way, of receiving higher education in prestigious institutions abroad and struggling to pick up the three R's in a charitable school inside a ramshackle building, of working as the chief executive of a growing organization and cleaning and painting the organization's building, of foreign tourists flocking a posh super-market and beggars surrounding them for alms near the entry gates, and a host of similar paradoxes.

Development is enigmatic not because we come across these paradoxical situations in different countries or regions –some developed, some developing and others undeveloped—but because these are realities existing within developed and developing countries or regions. Looking beyond affluence and poverty, we notice a lot of inequality in access to public services for meeting basic needs for health and hygiene, social security and opportunities to develop one's own inherent ability. Enigma revolves around development narratives dished out even by states and international agencies, being miles away from stark realities.

Development refers to a big canvas, involving different dimensions, comprehended in terms of more than one connotation, implemented in diverse contexts and manifest in many forms, reflected in the Economy, Society and even Polity. It is quite appropriate to point out right at the beginning that Development is a multi-dimensional concept, embraces economic, social and cultural dimensions (not always collateral), and should improve Quality of Life for all. Development denotes a process as also the outcome of the process (a state of development). The 'process' implication is more important than the 'state' or 'outcome' connotation. As a process, Development involves a lot of continuing programmes as also *time*-bound projects targeted towards specific segments of the population as also towards achieving progress in fields which benefit the entire population like

education or health care or skill development and employment or control of vector-borne diseases or similar issues. As a process, it has to be planned, implemented according to the plan, monitored during implementation to ensure alignment with the plan and assessment of the outcome(s) relative to the goals and objectives set out in the plan. As an outcome indicating the current state of development-leading to categorization of countries as developed, developing and undeveloped or less developed-it should be perceptible and amenable to assessment.

Among many definitions of 'development', let us recall the one offered by the Organization for Economic Co-operation and Development (OECD viz. 'a multifaceted concept referring to sustained improvement in the material well-being of a society, encompassing not only economic growth but also social, cultural and institutional changes about enhancing Quality of Life enhancing income and resources and ensuring equitable distribution of wealth and opportunities'.

Just as Quality (of goods and services) is not accepted as merely a stamp given by the producer/ provider. but is comprehended in terms of a realization and/or perception by the user/ customer, similarly Development is not what a state or a government or a political party claims, but reflects the perception of the people across the spectrum. Development is not truly perceptible in the height of some skyscrapers or the speed of some special trains or the number of tourists coming in or the value of investments (made or of the assets held) by some over-rich citizens made in a foreign country (expected to increase the gross national income of the parent country), but in the perception of people at large about the extent to which the quality of their lives and livelihood means has improved.

Sometimes, development manifest in one dimension may be over-shadowed by a lack of development in some other dimension. And assessment of socio-cultural or political development may not be amenable to quantification and, for that reason, to comparison across countries and contexts. Economic Development remains the bed-rock, but does not tell the entire story. We have instances of economic growth and even of economic development (implying less inequality and income poverty) co-existent with social and cultural backwardness manifest in divisions and lack of harmony among different segments of the population in terms of religion, caste and creed. In fact, deliberations on social and cultural aspects of development are quite often over-shadowed by discussions and decisions bearing on the economic aspect.

Towards an Operational Definition

Development defies a unique or even a consensus definition that can be used to operationalize this complex construct in terms of concrete entities which are amenable to observation and/ or measurement. Between the two broad components viz. economic and socio-cultural, even economic development has been comprehended in many different ways by eminent development economists over the last few decades. And a more difficult task is to operationalize environmental development, which has engaged the attention of many academics and professionals from diverse backgrounds offering quite a few frameworks for comprehending this domain of development. Of course, a lot of communality runs through most of them. Let us begin with economic development, which is possibly more amenable to operationalization and quantification compared to other domains of development.

While economic development (of a country or its people at large) and development of the country's economy may be taken as more or less

the same, a few differences between the two may be helpful in formulating a better idea about economic development in the sense we will be using. Development of an economy implies a process through which a primitive (mostly agriculture-based) and generally low income economy is transformed into modern industrialized and generally prosperous economy. This transformation is basically woven around the process of production (of goods and services), the people involved with their knowledge and skills, and the demand in domestic and international markets. The measure of development is essentially in terms of GDP or national income and hence is quantitative. The goal for this process is increase in national wealth. On the other hand, economic development has increase in well-being of the people at large as its goal and is conceptualized in terms of sustained improvement of the material well-being of a society, encompassing not only economic growth but also social, cultural and environmental changes, to be enhancing the Quality of Life, increasing income and resources along with ensuring equitable distribution of wealth and opportunities. Thus, economic development looks beyond growth, at structural transformation, at equity and welfare, as well as at sustainability

A widely accepted definition of Economic development puts it as a process whereby the real per capita income (of a nation or state) increases over a sufficiently long period of time (often taken as 2 or 3 decades) subject to the stipulations that

1. the number of persons below an absolute poverty line does not increase

and

2. the distribution of income does not become more unequal.

The first part relates to Economic Growth, while the stipulations imply Distributive Justice. Together, we have Economic Development.

Key tasks involved in this definition are:

Estimation of National Income

Estimation/projection of population, especially for years between consecutive census years and for specific age-groups or some other groups of interest

Deflation of Money Income using a suitable price index number (sometimes taken as cost-of-living index number)

Development of a Poverty Line based on cost of a minimum basket of goods and services required for a subsistence level of living

Estimating BPL (Below Poverty Line) population based on household income/consumption expenditure data

Estimating Inequality in incomes using some measure like the Gini index to the income / consumption expenditure distribution

Certain other stipulations which really capture holistic Development are

Gainful employment for all eligible persons

Availability of and access to public services like education, health-care, security and justice

Other forms of security relating to food, shelter, drinking water, sanitation, etc. which lead to well-being of the people at large

To sum up, development of an economy aims at creating more wealth, economic development encompasses fair and equitable distribution of wealth and development (as a comprehensive task) calls for a judicious use of wealth to improve the quality of life for all on this earth. An important question that raises doubts is about the appropriateness of aggregate national income or even income per capita as an indicator of development. National income generated during a year has no direct or immediate relation to expenditure on development during that or during the next year. In developed countries, a non-trivial and sometimes a significant part of the national income is spent on national debt-servicing, development aids to other countries, defence expenditure and even expenditure on items which have a bearing on development in future. It may be pointed out that in several developed countries the percentage of national income available for development expenditure does not exceed 60.

Tasks involved in operationalizing concepts and indicators of social development, cultural development and environmental development are quite involved, partly because several aspects of any dimension within any of these three domains of development do call for qualitative data like perceptions beyond metrics, as also because we require to incorporate guesses and crude estimates or estimates based on proxies (of the variables or indicators needed in the analysis). We will consider quite a few of these issues in subsequent chapters devoted to these domains.

Inclusive and Sustainable Development

Of late we have been dabbling in 'inclusive development' -a holistic concept that implies participation of every eligible individual as a contributor to the process of development and/or coverage of all individuals as beneficiaries of development (as an outcome of the

process). The first part of economic development boils down to something like full (gainful) employment of all eligible members of the population in the relevant age-group viz. 15+ in many countries and not afflicted by any physical or mental disability. 'Employment' has been variously understood by different groups in different contexts. In the context of creation and distribution of national income, employment is taken as engagement for a minimum duration on each day during a minimum fraction of the reference period (to which the employment-unemployment situation relates) in economic activities meaning production of goods and services meant at least partly for exchange in the market against pay or profit. These minima are most often quite small. Longer time engagement in non-market activities is not regarded as 'employment'.

Engagement in economic activities recognized by the System of National Accounts may take place by way household activities carried out within the household or in some establishment(s) located outside. Besides members of the households, workers may or may not be hired for these household enterprises. It has been argued in some concerned quarters that a significant segment of our labour force is 'unemployable', lacking necessary knowledge and skills. As competition grows, as we move towards a globalized market, as we embark on rapid innovation in products and processes, and as we introduce more and more automation in the production process, the required set of knowledge and skills gets more focused on a higher level and the gap widens, threatening a larger extent of unemployment. Somewhat belated is the appreciation of the fact that without a conversion of the entire labour force into a productively engaged manpower stock, a country cannot aspire to be recognized as 'developed', even if the per capita income is quite high-possibly through the very high incomes earned by a very few rich persons. In fact, we talk about a Ministry of Human Resource Development which

should go much beyond a ministry supporting, guiding and regulating education at different levels only or stretching itself to embrace needs of research and development. A major responsibility of the national polity should be to ensure employability of the entire labour force. The first suggestion would be a two-fold exercise viz, to expand the gamut of production activities to produce more of existing as well as new products and services and then, to launch a massive drive to impart necessary knowledge and skill to man such enhanced production activities. A second and a less sensible suggestion would be to find out ways and means of engaging the unabsorbed segment of the labour force in labour-intensive production processes that can utilize such indigenous resources as are plentifully available and can be renewed as much as possible. Another intriguing phenomenon is the appearance of big businesses who work online or with a few people threatening job losses in the unorganized sector in India.

To quote official figures on unemployment rate in our country as also in many other developing countries would be a cruel joke and an unkind cut on those who are completely unemployed or are grossly under-employed.

Coming to the second part of 'inclusive development', one finds a gloomy and a depressing picture in the recently released report of the Socio-Economic and Caste Census (conducted in India in 2011). 3.5 million households have no income; 4 million have a rag-picker and 100,000 a beggar. Sixty million urban households have no electricity connection and 5 million do not have water supply within their premises. Nearly 24 million people live in houses with no more than one room, kutchra roof and walls No member above age 25 is literate in 42 million (23.5%) households, 51.4% of households depend on casual, manual labour. While debates go on about criteria to recognize a household as 'below poverty line', 87 million (48.5%) households are

deprived on one count or the other. Reports of Annual Employment-Unemployment Surveys conducted by the Ministry of Labour and Employment indicate nearly half of those who are reported as employed' on the usual principal status basis are self-employed that too, not for the entire reference period and not generating reasonable earnings. Quite a few other countries present a similar situation.

One wonders if we should forget, for the time being, the aphorism 'inclusive development' and focus our attention on the basics of human resource development on a national scale. The creation of the National Skill Development Council may be one step in this direction-let us hope.

To generate and distribute wealth, we need to produce more and better goods and services. Obviously, any production process involves the use of materials and capital-both natural and man-made. And unless we can optimally use such resources which are limited in availability and some of which are non-renewable, we will not be able to proceed towards sustainable development. Also required in this context is due attention to impact of production, distribution and consumption of various goods and services. Continuing growth in production and consumption of goods and services with a lot of hidden or neglected wastes implies continuing depletion and/ or degradation of natural as well as man-made capital. Starting with the Report of the Club of Rome entitled 'Limits to Growth: A Strategy for Survival' to the Report on 'Our Common Future' by the Brundtland Commission, we now stand in a situation where thinkers have been referring to sustainability as a myth.

Role of Statistics

Statistics-both as figures and as a scientific method that can yield such figures, apart from its use for extracting relevant information,

drawing inferences in different situations and deciding on appropriate actions- becomes essential in the context of Development. In fact, Statistics is involved right from developing an operational definition which will be amenable to data-based analysis, through development of suitable indicators of development in its various facets, to managing the development process and evaluating the state of development in a given context (country and period) and enabling valid comparisons across countries or over time periods. It may be incidentally mentioned that even in dealing with vibrant though intangible aspects of cultural development, the UNESCO Institute of Statistics came up in 2025 with a global comprehensive Framework of Cultural Statistics to harmonize definitions, classifications and indicators used to measure economic and social impacts of culture, including heritage and creative industries, besides the role played by culture through its transformation over the years in the context of sustainability. The Framework helps governments in developing their culture-related policies.

Even nation-wide sample surveys to yield data on a variety of items have to be properly designed to provide estimates at some desired level of dis-aggregation. It is worth mentioning that some recent developments in survey sampling methodologies have come up to meet requirements of providing reasonable estimates of some parameters like worker-population ratio or unemployment rate for successive periods of time which really correspond to a time series. The use of fixed or rotating panels finds use here.

In fact, modern techniques to combine survey data with administrative records and tools for sifting through large volumes of data at micro-levels collected by different agencies to decipher patterns of inter-dependencies among different sectors of the

economy, among different economic agents within the same sector, and the like are gaining ground quite fast.

Fundamental requirements for sustainable development include

1. mapping of natural (and man-made) resources and estimating rates of their depletion/ deterioration over time
2. working out current needs for goods and services, and noting priorities among these needs, calling for greater attention to food, fodder and fibre as also to building materials
3. finding ways and means for deploying available resources effectively and efficiently to meet such needs-with due care about distributive justice
4. taking steps to renew / restore resources for future consumption and
5. reducing consumption of goods and services and hence, of resources, in keeping with the depleting stock of all resources.

A very important role of Statistics is to offer appropriate yardsticks to monitor an ongoing development programme and, definitely, to provide a comprehensive assessment of a completed development activity in terms of its impact both on the people and on the ecosystem. And, for the latter purpose, official statistics should go much beyond data covered through censuses and sample surveys of households and establishments to address depletion, degradation and deterioration of the natural resource base as also activities towards the restoration and replenishment of that base.

All these steps / tasks call for appropriate methods and tools for estimating stocks / reserves of natural resources, efficient extraction and beneficiation and conservation of such resources, optimal allocation of resources among various meta-level activities, planning agricultural and industrial production processes to maximize output

and minimize harmful effects on the environment that serves as a source of all natural resources, working out needs for sustenance as also of excellence keeping inherent diversity across the spectrum ensuring that outputs of production reach potential beneficiaries to enable the latter maintain levels of living they deserve and developing and deploying technologies to ensure continued availability of resources for generations to come.

Quantitative methods, taken in a broad sense to include methods and techniques used in Statistics, Operational Research and Decision Theory, have been involved to a large extent and in many ways to develop indices for development --over-all or domain-specific. Right from selection of indicators or variables (varying over time or across countries/ regions/ provinces) to their standardization or normalization, assignment of weights to different indicators or to different component indices (in developing a composite index), aggregation of indicators or component indices and assessment of robustness of the resulting composite indices, these quantitative methods play a significant role in comparing performance of any country or region or province in any chosen domain or in a selected dimension within a domain either with other countries or over time. Even ranking different countries in a given year based on any chosen composite index poses problems in the sense that a particular country may be assigned different ranks according to different related indices reflecting on development and it will be unfair to take the average rank without assessing the agreement or concordance among the alternative rankings provided by the indices under consideration. The question of rank reversal when a new country is added to the existing list of countries under consideration or when some country(ies) is (are) withdrawn from the list for comparative purposes has also to be addressed while developing any composite index.

For fixation of weights to be given to component indices (or indicators) in developing a composite index, principal component analysis along with data envelopment analysis (DEA) and its variant DEA-BoD (Benefit-of-the-doubt) and a few multi-criteria decision-making tools like Analytic Hierarchy Process (AHP) and Technique of Ordered Preference based on Similarity to the Ideal Solution (TOPSIS) have been tried out by several Research workers. It may be added here that parsimony in selecting indicators and simplicity in developing the composite index are crucial for eventually accepting any composite index for official purposes.

Moving a bit away from these issues involving use of statistical and related methods and techniques, we should also look at their prospective use in specific areas of interest. Thus, one comes across the Leslie matrix for population projection, computation of disease - adjusted years of life for estimating length of healthy life, use of Markov chains and transition probability matrices to study inter-generational social mobility and intra-generational occupational mobility, and use of directed graphs for analysis of social networking, application of factor analysis to identify major factors to explain cross-cultural differences, and similar other applications. Some of these have been briefly outlined in concerned chapters.

Some attempts to use tools for statistical inference which require an observed data set to be treated as constituting a random sample from a 'conceived' population or looking upon the data as being 'fuzzy' raise eyebrows. While use of descriptive statistics—even sophisticated ones—to provide a better understanding of the underlying situation or of the prospective emerging situation should be welcomed, inferences based on assumptions which are hardly warranted by facts may not be well-received by scrupulous research workers.

Development Narratives

Development is a complex phenomenon that concerns us all--all those who have a location on this planet. No wonder, development is a buzz-word. Loose talks, crowd-pulling debates and discussions, serious research work on different facets of development, manifestos and mandates bearing on development, deliberations involving different countries and development partners, simply indicate the growing concern for development. With the surge of communication media and their growing impact on people's perceptions, development narratives emanating from a whole host of institutions including state agencies, public and private think-tanks, research organizations focused on development, political parties and even development analysts individually leave people from different backgrounds, with different leanings towards political systems and different capabilities to scoop out the real points from the narratives fed to them, suffer from confusion or use or mis-use the narratives to promote their individual or group identities.

Some narratives are poorly prepared to the effect that deficiencies in data used, analysis carried out, findings reported and conclusions drawn can be detected rather easily. Some others are carefully crafted with selectivity in data, analysis and interpretation to convey a particular message or portray a particular picture of current development. Some are limited to situations in some country or in some region or in some group, while others may contain comparative pictures involving various countries or regions or groups.

Development narratives, irrespective of their origins, suffer from deficiencies attributable to the lack of an unequivocal operational definition of some concept involved in some indicator of some aspect of development, the method of estimation of some parameter, the method of measuring or determining some parameter of interest, the

various substitutions and approximations used in developing an indicator or a component of a composite index of development. A simple illustration is provided by the estimation of adult literacy from household surveys carried out by national statistics offices. In computing the apparently simple adult literacy rate, we take the adult population in the age-group 15+ or 18+ in the denominator while the numerator is to be number in this group who are 'literate'. With 18+ defining adults and census totals in 5 year age-groups like 5-9. 10-14 etc. being usually available for the purpose, we need to estimate the adult population by using a suitable interpolation formula which is not unique. This is not as serious a problem as the issue of getting the number of literates among the adults with a majority having spent some years in the formal education system, maybe with grade repetition and little effective learning. Given that in household-based surveys the informant is often not the person concerned, to find out if an adult can read or write a simple sentence 'with understanding' receives a jolt. Large-scale use of mobile phones or simple pocket calculators makes a check of 'numeracy' somewhat difficult. The importance of functional literacy and digital literacy - defined in some non-uniform manner-has been in some situations, excluded in others. All this along with some more related issues makes the rate somewhat doubtful for purposes of inter-country comparisons. Employment is a greater concern to more people and narratives about unemployment provided by different agencies often portray different pictures, based on different implications of the 'employed' status. While the usual principal status or the usual principal and subsidiary status is quite likely to provide a larger rate of unemployment than the current weekly status, in respect of contractual and casual workers and even self-employed people, general audience of development narratives is more confused than duly informed about the true situation in respect of employment-unemployment. And rarely is a reference to under-

employment and disguised employment made out in a development narrative.

Consider the problem in estimating the amount of carbon emitted by a country through a particular activity during a year. Reports indicate that the global average per capita carbon emission per annum is 4.8 metric ton, the figure standing at 14-15 for USA, 8 for China and 6-9 for European Union and 2 for India. Carbon Emission Amount is estimated for a given activity like fuel-based transportation by the formula

$$E = A \times EF \times (1 - ER/100) \text{ where}$$

A indicates the level of the activity like amount of fuel used or miles travelled

EF stands for the amount of emission per unit of the activity and

ER takes care of efforts to reduce emissions.

For example, EF is 0.82 kg of CO₂ per kilowatt-hour use of electricity

While EF has been available on a more or less standardized basis, it is pretty difficult to get at the figure for ER in a given context. One may possibly argue that changes in figures for EF and ER are likely to be pretty small. However, it should be remembered that the ultimate figure will be affected by a huge multiplier in terms of A, in terms of the number of electricity users or the number of miles travelled. Nearly half of the total carbon emission is removed by natural carbon sinks viz. plants and oceans, of course with diminishing efficiency to absorb. And the shrinkage of both these sinks as also their diminishing capacity to absorb carbon await full investigations.

An indicator of development like the Global Hunger Index (GHI) with a direct bearing on under-nutrition and undernourishment but no necessary linkage with poverty and associated lack of food intake is quite vulnerable to biased interpretation leading to confusing narratives. GHI is based on four components viz. proportion of the entire population who are under-nourished in terms of inadequate calorie intake, child stunting in terms of children who have heights lower than the normal heights for their respective ages, child wasting in terms of under-weight children and child mortality, given respective weights as $1/3$, $1/6$, $1/6$ and $1/3$. While under-nutrition including acute and severe under-nutrition, are quite likely to yield high scores on each of the four components, incidences of these unfortunate cases may arise from situations not linked to under-nutrition. And nutrition or nourishment is not well reflected in calories intake only.

Several parameters relating to the entire population involved in the derivation of some indicator of development are generally estimated from household survey data using a pretty low sampling fraction and, in some cases, excluding some types of households from the coverage, with some adjustments of the estimates by using relevant administrative records. Even a low sampling fraction can ensure a very small relative standard error of the estimate, but representation of different segments of the population in respect of the underlying variable(s) may be a casualty.

Development being a people-centric concept and development process calls for people's participation in identifying needs for the majority of people -specially for the disadvantaged sections – and in supporting planned implementation of the process as also in assessing and reporting the impact of the process on the lives of people at large, development narratives have an important role to properly inform the

people across all levels about the current state of development so that the latter can feel the impact and raise their voice about lapses and deficiencies. Thus, narratives form the basis of checks and balances on the development initiatives being taken up from time to time by concerned agencies ostensibly to improve quality of life of the people.

Narratives should be carefully prepared and disseminated with due explanations of all so-called 'technical' terms and phrases. Narratives should be duly supported by authenticated data or, at least, by summary measures computed from such data as can be accessed, if needed, and should contain impersonal and objective interpretation of the findings in an unequivocal manner. Pitted against such desiderata, narratives -often replete with data and based on some analysis-are found on print and electronic media as also on a host of recently emerging modes for communication to portray a picture about development that runs contrary to reality on the ground. Irrelevant data, relevant data not checked for validity, incomplete data with or without imputation and even cooked-up data are processed in a simplistic and sometimes biased manner to bring out a pre-planned panorama and uphold a pre-meditated stand by the producer on prevailing situation.

Development and Governance

Relations between development and form of government (authoritarianism/ dictatorship vs. democracy) are quite complicated. As pointed out by Bardhan (2008), authoritarianism is neither necessary nor sufficient. On the other hand, democracy does offer some help to development avoiding catastrophic mistakes and exhibiting greater resilience. At the same time, democracy often breeds slow decision-making and pulls back rapid strides of developmental efforts in some areas. Democracy and Development are often regarded as inter-twined concepts, democracy looked upon

as a vital foundation for human development and societal progress. No doubt, democracy supports development by enabling more citizens to contribute in different ways to the process of development, building up a more productive and innovative workforce and working out peaceful solutions to conflicts of interest. Development supports democracy by making people more informed, enabling them to be more involved in identifying development needs and formulating development policies, empowering people in larger numbers to access and use better facilities for education, healthcare and even leisure.

What has a greater impact on development is 'governance' rather than 'government'. Governance is the broad framework of principles, policies, processes and procedures through which the state serves the people at large, people participate in state policies and programmes and the pace and benefits of development are realized. Governance is reflected through the plans and actions of the democratic institutions, which in many democracies are found to be weak and ineffective instruments for ensuring corruption-free, procrastination-free and accountable completion of all development-related plans and projects. And this is why the question remains -Which form of governance democracy or authoritarianism supports development better- a topic for debate.

Sen (1999) argues that the following five freedoms are central to the achievement of development: Political freedoms (political and civil rights)

Economic facilities (the use of economic resources for consumption, production and exchange) Social opportunities (education and healthcare}