Land Accounting in India: Issues and concerns

S. Suresh Kumar[1]

Introduction

Land is scarce in India, even though the country has a land area of about 328 million hectares which is the seventh largest land area among the countries of the world. India is burdened with a population of 1210 million as per the 2011 census, which grew from 345 million in 1947 with a growth rate of 1.76 in the last decade. Population density has increased from 117 per sq.km in 1951 to 368 in 2011. The population to land ratio is what make land accounting a matter linked to human development concerns. As the pace of growth in non-farm employment avenues lagged behind the population growth, it forced upon more than half of the population (58%) to eke out their living from agriculture and allied activities. Further, the demand for land and other natural resources for non-farm use arising from urban spread and industrialization have not only shrunken the per capita availability of agricultural land in rural areas from 0.638 hectares in 1950-51 to 0.27 hectares in 1998-99 but strained its use, leaving devastating consequences on the quality and sustainable use of land. The direct and immediate impact of the deterioration in the quality of land is manifested on water availability and forest coverage, which has bearing on the vast section of the people who live in rural areas and use water as public and free good. It is important in India as 1/3rd of the population live below the officially defined poverty norms. Moreover, the productivity-fall driven decline in per capita availability of food, burdens that segment of the population, who suffer multifaceted deprivations such as lost entitlement to food due to state-supported encroachment of farm land, forest cover coupled with inadequate purchasing market power and accessibility in a competitive food market. Notwithstanding the fact described above, developing countries, in general, including India, lacks a scientific land accounting system to put in place a monitoring and regulatory system for the use of land. Taking cognizance of the startling reality and the emerging grim scenario, it is important to examine how best the scarce resource (land) can be put into use in a manner which should ensure its sustainability and accessibility defined from an egalitarian social order. Given the problematisation, the paper probes two important questions: (i) enumerate the Indian database on land-use; (ii) evolve a system of accounting which grafts the major social development indicators into the land use indicators. The discussion in the paper is organized into three sections. The first section discusses the System of National Accounts (SNA) and System of Integrated Environmental and Economic Accounting (SEEA) in the context of land accounting. Section 2 reviews the land use classification in India and the section 3 describes the social indicators to be grafted into the land accounting system, followed by remarks in lieu of a conclusion.

[1] The author is with Central Statistics Office, Ministry of Statistics & Programme Implementation, New Delhi, India. The views expressed in this article are personal to the author.

Section 1
Land Resource in SNA and SEEA

The System of National Accounts (SNA) is a framework of accounting procedures to estimate economic activities such as Gross Domestic Product (GDP), Gross National Product (GNP), saving rates, trade balance and so on. The concept of National Income Accounting was originated in the United Kingdom in the 1930s after the Great Depression. The basic idea was to supply a reliable database to assess the impact of public policy on the economy. The SNA constructed a group of indicators to capture the state of health of the economy. However, the environmental concerns do not appear to have been adequately addressed in the SNA primarily on account of the fact that environmental activities fall outside the domain of the conventional definition of *economic activity*. The SNA includes land in its asset category. The asset is defined by relating it to market in the sense that the commodity should command a price and is supplied and demanded in the market. The possession of land generates income for its owners and has a market which makes it different from other natural resources such as surface water, atmosphere and wilderness and therefore SNA has kept out such natural resources from its purview of accounting.

In 1993, United Nations Statistical Commission (UNSC) established an informal group of statisticians, called '*London Group on Resource Accounting*'. The objectives of the gathering was to evolve the best practice in theory and practice of environmental accounting confining to the framework of SNA and to supply a forum for sharing national and international developments in environmental accounting. It also aimed at promotion of best practices in the field through dissemination of the major findings of the group activity. The London Group broadened the conventional and rather rigid definition of assets adopted and followed under the SNA and developed an alternative system of national accounting incorporating all natural resource assets like land, soil, water, air etc., which form part of the environmental functions like waste absorption, ecological functions like habitat, flood and climate control, other non-economic amenities like wild biota, subsoil assets, land, water, air etc. 'The Handbook of National Accounting: Integrated Environmental and Economic Accounting' (SEEA) published in 2003, has evolved certain monetary evaluation techniques to value the non-market functions of the natural resources. The environmental assets identified by the SEEA are classed under the following categories: (a) natural resources; (b) mineral and energy resources; (c) soil resources; (d) water resources; (e) biological resources; (f) land and associated surface water; and (g) ecosystems. Those categories were useful to assess the impact on sustainability of natural resources and development. As the economic development and growth gather momentum, it should ensure ecological welfare by maintaining key environmental functions.

The asset classification under SEEA included soil, land and surface water. Soil resource classification takes into account the degradation of agricultural soil due to soil erosion or extraction of top soil. Land and surface water are defined as areas within the national territory and provide direct and indirect use benefits through the provisions of space for economic and non-economic human activities. This category is further sub-

classified into: (a) land underlying buildings and structures, (b) agricultural land and associated surface water, (c) wooded land and associated water surface, (d) major water bodies, and (e) other land. SNA covers the land underlying buildings and structures except for the recreational land. This classification is further bifurcated into areas lying in the urban and outside urban areas. Agricultural land and associated surface water is divided into cultivated land, pasture land and other agricultural land. Wooded land and associated water surface includes forested land and other wooded land. Major water bodies are defined as the water bodies large enough to be separately identified from the surrounding land. Other land is the residual category includes all land not previously allocated to one of the other categories explained earlier. However, land use statistics were developed and operationalised in individual nations much before the establishment of SNA and SEEA and the own system of land use statistics was primarily concerned with regional specificities and patterns in land use rather than striking compatibility with the international system. International compatibility is important because certain concerns of land use at the global level needs to be accounted for and a close perusal of the Indian system of land statistics assumes special significance in this context.

Section 2
Evolution, Development and Compatibility of Land-use Statistics in India

The evolution of land-use statistics in India dates back to 1866 when the British administration took interest in the compilation of land data to enhance its revenue collection. The data collection further refurbished by adding crop forecasts. The wheat forecast was introduced in 1884 and further improved the system in 1900 by adding more crops like oilseeds, rice, jute, indigo and sugarcane. The recommendations of the Royal Commission on Agriculture in 1928 further strengthened the statistical system and increased the coverage. The need for reliable data on area under food crops and food production was felt when there was shortage of food and the great famine of India just after the Second World War. The statistical system of the erstwhile British era identified 5 board indicators like (1) forest, (2) area not available for cultivation, (3) other uncultivated land excluding current fallows, (4) fallow land and (5) net area sown.

India became independent in 1947 and the new government was formed under the leadership of Pt. Jawaharlal Nehru. He had envisaged five year plans to strengthen India by giving thrust to selected areas of development and agriculture being the main theme in the 1st five year plan as the majority of the population depended on agriculture for their sustenance. Schemes were introduced to strengthen the agricultural production in India. A Technical Committee on Coordination of Agricultural Statistics constituted by the Ministry of Agriculture in 1949 identified major gaps in the existing data collection on agriculture and suggested to add four more categories to make it a 9-fold classification of the total land available. The following are the 9-fold classification followed in India since independence:

(1) Forests
(2) Area under non-agricultural uses
(3) Barren and uncultivable land
(4) Permanent pastures & other grazing land
(5) Land under miscellaneous tree crops
(6) Culturable waste land
(7) Fallow land other than current fallows
(8) Current fallows and
(9) Net area sown

Table 1: Land Use Classification in India since Independence (in Million Hectares)

Classification	1950-51	1960-61	1970-71	1980-81	1990-91	2000-01	2007-08
Total Geographical Area	328.37	328.37	328.37	328.37	328.37	328.37	328.37
Reporting Area for land use statistics	284.32	298.46	303.75	304.16	304.86	305.18	305.67
Forest	40.48 (14.2)	54.05 (18.1)	63.83 (21.0)	67.46 (22.2)	67.81 (22.2)	69.53 (22.8)	69.63 (22.8)
Not Available for Cultivation	47.52	50.75	44.61	39.55	40.48	41.48	43.22
(a) Non-Agrl Uses	9.36 (3.3)	14.84 (5.0)	16.48 (5.4)	19.60 (6.4)	21.09 (6.9)	23.89 (7.8)	25.92 (8.5)
(b)Barren and Uncultivable land	38.16 (13.4)	35.91 (12.0)	28.13 (9.3)	19.96 (6.6)	19.39 (6.4)	17.59 (5.8)	17.29 (5.7)
Other uncultivated land excl. fallow land	49.45	37.64	35.13	32.31	30.22	27.74	26.82
(a)Permanent pastures and other grazing land	6.68 (2.3)	13.97 (4.7)	13.26 (4.4)	11.99 (3.9)	11.40 (3.7)	10.67 (3.5)	10.39 (3.4)
(b)Miscellaneous tree crops and groves	19.83 (7.0)	4.46 (1.5)	4.37 (1.4)	3.58 (1.2)	3.82 (1.3)	3.44 (1.1)	3.31 (1.1)
(c)Culturable Waste land	22.94 (8.1)	19.21 (6.4)	17.50 (5.8)	16.74 (5.5)	15.00 (4.9)	13.63 (4.5)	13.12 (4.3)
Fallow land	28.12	22.82	19.33	24.55	23.37	25.07	25.15
(a)Fallow land other than current fallow	17.45 (6.1)	11.18 (3.7)	8.73 (2.9)	9.72 (3.2)	9.66 (3.2)	10.29 (3.4)	10.34 (3.4)
(b)Current fallow	10.68 (3.8)	11.64 (3.9)	10.60 (3.5)	14.83 (4.9)	13.70 (4.5)	14.78 (4.8)	14.81 (4.8)
Net Area Sown	118.75 (41.8)	133.20 (44.6)	140.86 (46.4)	140.29 (46.1)	143.00 (46.9)	141.36 (46.3)	140.86 (46.1)

Source: Data Book-2011, Indian Agricultural Statistics Research Institute, New Delhi

India is the 7th largest country in the world with a total geographical area of 328.37 million hectares of which 305.27 million hectare the reporting area. Table 1 shows the land use pattern during 1950-51 to 2007-08. Following observations can be made from Table 1. (i) forest cover in absolute as well as relative terms has significantly increased from 14.2 percent to 22.80 percent of the total geographical area; (ii) area not available for cultivation has declined over the years indicating the spread of farm land while the pace of growth in land put in non-agricultural uses has outpaced the rate of growth in area available for cultivation; (iii) net area sown has not increased in proportion to the rate of growth in population is worth taking note of.

The land use statistics in India was developed as a source of information for planning of agricultural production. Around 93 percent of the agricultural land is covered in the agricultural statistics since 1972 which was again enhanced to 94 percent in 1998. The agricultural statistics is captured through complete enumeration for 80 percent of the geographical area and the rest by sample surveys and conventional estimates. However, this classification system and the statistics using this fail to capture the issues concerning environmental accounting which is otherwise possible through the classification of SEEA. A transition of land-use classification to environment linked hybrid classification needs to be put in place to take into account equation determining economic development through development approach with environment as the linking factor.

In order that we can make a comparative analysis, the statistics that are available with the help of the broad land related categories identified under the SEEA classification need to be presented on the counter-passes of the land use classification. The contrast objectives of the two classifications being the predominant factor in establishing a meaningful convergence of data, such a comparative analysis should be able to throw light on how an element like asset, as defined in linkage with 'land' based classes of SEEA for the purpose of environmental accounting, can be derived from the existing land use classification. With focus on 'use', land use classification is supposed to have a bearing on the economic value of the environmentally-equated land resources. The following section presents the data that can be aligned with the SEEA classes followed by a simple framework for establishing a concordance between SEEA based statistics and land use statistics.

2.1. Land Degradation

Table 2: Land Degradation in India

Causes of Land Degradation	Area Affected (in Million Hectares)
Water Erosion	93.68
Wind Erosion	9.48
Water Logging	14.3
Salinity / Alkalinity	5.95
Soil Acidity	16.03
Complex Problems	7.38
Total Degraded Land	146.82

Source: National Bureau of Soil Survey and Land Use Planning, 2005

The pressure on land has been mounting up at an alarming rate. Population growth, expansion in live stock population, urbanization and industrialization are major contributory factors to it. India occupies 2.4 percent of the total land area of the world, but supports 16.7 percent of the world population. The unscientific and unplanned exploitation of this limited resource takes its toll in terms of degrading the land. Water erosion, wind erosion, water logging, salinity/alkalinity, soil acidity etc are important factors. The land degradation is a complex issue stemming from various factors like deforestation, unsustainable fuel wood and fodder extraction, shifting cultivation, encroachment into forest land, forest fires and over-grazing. The degradation is further aggravated through natural hazards, non-adoption of adequate soil conservation measures, improper crop rotation, and excessive ground water extraction beyond its recharging capacity. Here the problem is the lack of time series data disaggregated by locale specific micro-data, which could be analyzed for assessment of situation change over time at specific problem areas.

About 130 Mha of land area is affected by soil erosion through ravines and gullies, shifting cultivation, cultivated wastelands, deserts and water logging. In India, most of the rivers are originating from forests and mountains inducing excessive soil erosion and high rate of sedimentation in the reservoirs and removal of fertile top soil in the banks of the major rivers. The soil erosion by rainfall and rivers in the hilly terrains causes floods and landslides. The erosion rates ranges from 5 tonne to 20 tonne per hectare.

2.2. Forest Cover

As per definition 'Recorded Forest Area' is the area recorded as forest in the government records. Recorded forest area largely consists of reserved forests and protected forests as per the Indian Forest Act, 1927. As per the 2007 figures, the Recorded Forest Area is 76.9 Mha (23.4 percent of the Total Geographical Area). The Forest Cover, by definition, is all lands more than one hectare in area, irrespective of its ownership status, with a tree canopy density of 10 percent. The following table gives an idea about the tree cover in India.

Table 3. Forest Tree-cover

Year	Area (in Ha)	Change over previous period	% change over previous period
1989	662803		
1991	662308	-495	-0.07
1993	662334	26	0.00
1995	660273	-2061	-0.31
1997	659550	-723	-0.11
1999	664737	5187	0.79
2001	668806	4069	0.61
2003	686767	17961	2.69
2005	690171	3404	0.50
2007	690899	728	0.11

Source: State of Forest Report, 2009

The forest cover has been changed over the years due to the reforestation policies of the government from time to time. At the same time, 954,839 Hectares of forest area (from the recorded forest area) have been diverted for non-forest use during 1980 and 2004.

2.3. Water Bodies

River basins are considered to be the basic hydrologic unit for planning and development of water resources. India has 12 major rivers with a catchment area of 20000 km^2 and above. There are 46 medium river basins with catchment area between 2000 km^2 and 20000 km^2. The total catchment area of the medium river basins is about 250,000 km^2. The major and medium river basins cover about 81 percent of the geographical area. Major north Indian rivers are originated from the Himalayan region and the flow in the rivers are ensured due to the glaciers in the Himalayan region. The Geological Survey of India (GSI) estimated that there are 9575 glaciers available in the Indian Himalayas. The Indian Himalayas spread over an area of 8.44 million km^2. An altitude wise distribution of Himalayas is given in the following table.

Table 4: Distribution of areas at different altitudes in the Himalayas

Altitude	Area in Million km2
Above 5400 M	0.56
Above 3000 M	3.28
Above 1500 M	4.60
Total	8.44

Source: Primary Consolidated Report of Effect of Climate Change on Water Resources, Ministry of Water Resources, 2008.

2.4. Land-fill sites

Adequate database on landfill sites are yet not available. A study conducted by National Environmental Engineering Research Institute (NEERI) with the assistance from Central Pollution Control Board covered 59 cities in India, but the data do not contain a proper land cover estimates of the landfill sites. The NEERI study points some major issues related to landfill sites in India like lack of segregation of waste collected, uncontrolled disposal of municipal solid waste on specified /unspecified land practiced in most of the cities, non-availability of sanitary landfills, and inadequate recording system by the corporations to record the waste generated and disposed.

2.5. Housing Stock

The census data on housing stock situation in India is presented in the following table. The houses are classified into 4 categories like Pucca, Semi-pucca, Katcha and Others. The pucca house refers to those houses having roofs and walls made from bricks, cement, stones, timbers etc. The semi-pucca houses are having walls made out of the material used for building pucca houses, but the roof is made out of the materials other

than the pucca houses. The katcha house is defined as those with wall and roof and built with materials like bamboo, semi-burnt bricks, grass, reed, thatch, loosely packed stones etc. Others include those not covered in the aforesaid 3 categories.

The statistics on the land utilization for houses and buildings are not available for the public consumption. In order to get some insight into the total land use for houses, an estimation is made. But there are limitations in this estimation as it does not take care of the houses enumerated in multi-storied buildings, due to lack of such data.

Table 5 reveals the following: (i) it is evident that there is a significant increase in the number of households and the total floor area of the houses; (ii) human settlements are mostly around the cultivable lands where water and basic amenities are available indicating further demand for land in the category of 'land not available for cultivation'.

Table 5: Housing Pattern in India

Census Year	Households (Mn)	Total Housing Stock (Mn)	Total Floor Area (Sq.km)	Pucca (Mn)	Total Floor Area (Sq.km)	Semi-Pucca (Mn)	Total Floor Area (Sq.km)	Kutcha Serviceable (Mn)	Total Floor Area (Sq.km)
1961	14.9	13.30	**466.2**	6.44	289.8	4.90	137.2	1.96	39.2
1971	19.1	18.50	**699.8**	11.80	531.0	4.35	121.8	2.35	47.0
1981	29.3	28.00	**1066.7**	18.09	814.1	6.80	190.4	3.11	62.2
1991	40.7	39.30	**1580.0**	29.79	1340.1	6.21	173.9	3.30	66.0
2001	55.8	50.95	**2112.9**	41.17	1852.7	8.08	226.2	1.70	34.0

Source: Registrar General of India, various years (Average floor Area has taken from NSS Report No.488: Housing Condition in India, 2002)

2.6. Transport and Communication Infrastructure

Indian Railways is one of the mass communication medium in India and its inception dates back to the 18th century. Railways have a track length of 108,706 kms and 7083 stations across the country and enjoy a vast area of land under its custody. The data on the total land used by railways for track as well as other infrastructure are not available in the public domain. The fast economic development in the last two decades and demand for more infrastructure facilities compels railways to take up new projects and thereby further stress on land.

2.7. Comparison between Asset (land) classification of SEEA and Indian 9-fold classification

The land-use categories defined in SEEA and Indian 9-fold classification have deviations in respect of concept, definition and treatment. Hence a one-to-one correspondence cannot be established between the datasets. As mentioned elsewhere, the 9-fold classification followed in India was evolved as a source of information for agricultural production. A comparative analysis between the two sets of data brings out the following facts:

(1)In India, ***forest*** is defined as all lands classed as forests under any legal enactment dealing with forests or administered as forests, implying those lands which need not have a tree cover. In SEEA, the ***wooded land and associated surface water*** includes forested land and other wooded land. Forested land is defined as land under cultivated or non-cultivated stands of trees irrespective of its ownership rights.

(2) Indian classification defines ***area under non-agricultural uses*** as all lands occupied by buildings, roads, and railways or under water (eg. rivers and canals) and other lands used for non-agricultural purposes. ***Land underlying buildings and structures*** defined in SEEA does not correspond with the Indian classification due to the fact that the latter one includes more components than the former. Moreover, recreational land is not recognized separately as it was culturally not considered necessary or form part of any agricultural activity.

(3) ***Barren and uncultivable land*** includes all barren and uncultivable land like mountains, deserts etc. In India, about 6 percent of the total geographical area comes under this category and there are human settlements in such areas. In SEEA, there is no similar classification defined or the ***other land*** covers such areas only partially.

(4) ***Permanent pastures and other grazing lands*** include all grazing lands where they are permanent pastures and meadows or not. Village common grazing land is included under this head. SEEA has a similar classification like ***pasture land*** which is used for grazing of livestock and includes both land which has been improved through drainage or clearing and land which is in an essentially natural state.

(5) ***Land under miscellaneous tree crops and groves etc.,*** includes all cultivable land, which is not included in 'Net Area Sown' but is put to some agricultural uses. Lands under Casuarina trees, thatching grasses, bamboo bushes, and other groves for fuel, etc which are not included under 'Orchards' are classified under this category. ***Other agricultural land*** defined in SEEA includes small areas of wooded land, surface water, feedlots and miscellaneous land found within agricultural holdings. A similarity can be established with these two categories.

(6) ***Culturable wasteland*** includes lands available for cultivation. Such lands may be either fallow or covered with shrubs or jungles, which are not put to any use. Land once cultivated but not cultivated for five years in succession should be included in this category at the end of the five years. SEEA does not have a similar classification.

(7) ***Fallow lands other than current fallows*** are defined as all lands, which were taken up for cultivation but are temporarily out of cultivation for a period of not less than one year and not more than five years. Though SEEA does not have a separate category to include this, ***cultivated land*** category has provision to include that land normally cultivated but allowed to go temporarily fallow.

(8) ***Current fallows*** represent cropped area, which are kept fallow during the current year. For example, if any seeding area is not cropped in the same year again, it

may be treated as current fallows. As mentioned above, the ***cultivated land*** category of SEEA partially address this category too.

(9) ***Net Area Sown*** represents the total area sown with crops and orchards. Area sown more than once in the same year is counted only once. ***Cultivated land*** defined in SEEA is the land used for growing crops on a cyclical basis or a permanent basis. Hence both the categories are similar in nature, though comparability could not the established due to the inclusion of ***fallow land*** in this category.

It is evidenced from the above discussion that the comparability between the Indian 9-fold classification and SEEA land categories cannot be established due to the inherent definitional issues. Disaggregation of the ***cultivated land*** category of SEEA may be a feasible solution to resolve the issue to the extent to which fallow land is concerned.

Table 6: Asset (Land) Classification in SEEA and the 9-fold classification of India

Indian 9-fold classification	SEEA Asset(Land) Classification	Deviation with respect to Indian 9-fold classification	Indian database	
			Geographical Unit	Periodicity
Forest	Wooded land associated surface water	By definition	District-wise	Biennial
Area under non-agricultural uses	Land underlying buildings and structures	Includes **buildings**, roads, railways, under water, other lands used for non-agricultural purposes	District-wise	Annual
Barren and uncultivable land	Not Available		District-wise	Annual
Permanent pastures and other grazing lands	pasture land		District-wise	Annual
Land under miscellaneous tree crops and groves etc	Other agricultural land		District-wise	Annual
Culturable wasteland	Not available		District-wise	Annual
Fallow lands other than current fallows	cultivated land	Partially covered	District-wise	Annual
Current fallows	cultivated land	Partially covered	District-wise	Annual
Net Area Sown	cultivated land	SEEA category covers fallow lands and current fallows in this category	District-wise	Annual

From the foregoing analysis, it is evident that land-use statistics based on land use classification has to evolve as a source of statistics beyond the scope of agriculture alone. This is possible only if the land use classification is expanded with adequate subclasses to take into account use of land for other than agricultural purposes. This extension has also to ensure that the human development issues around land use are addressed, so that a number of human development concerns built around use of land as asset by public and private entities including households can be statistically measured. In the following section some of the human development issues, which are somewhat relevant to the limited scope of this paper has been discussed. However, these may be extended to issues

of food, water and nutritional security, secure tenureship, access to household assets for women, hygienic practices, civic amenities etc.

Section 3
Social Development and Land Use Statistics

The land accounting system enables resource accounting. In natural resource accounting, sustainable development is the underlying and uncompromising stand point enshrined with equitable distribution of an entitlement to resources. To analyse the inter-linkages between the land resources and the agriculture dependent population, an accounting system of land and its ecosystems need be grafted with social and economic need of the population in question. In other words, the regional specificities should be taken into account in land use system without compromising the concerns at the global level.

Like many other developing countries in the world, population growth in India is yet to be stabilized near the replacement rate. This in turn implies that the demand for non-farm use of land such as housing, infrastructure development and generation of non-farm employment are likely to outpace the rate of growth in demand for food and it leaves a mismatch between per capita food availability and land available for farm use. It is hard to strike the balance as the demand from both sides is equally pushy on an uncompromising position. Another factor assuming significance in this context is the slow rate of growth in the withdrawal of population from the farm sector and the observed trend is attributable to the high capital intensive production techniques employed in the industrial sector. Table 7 clearly indicates that the farm dependent population in India has been, to a great extent, remained stagnant around 60 percent while the contribution of the sector to national income has been falling at an alarming rate (Table 8) . About 60 percent of the agrarian dependent population is bound to share only 12 percent of the GDP. An immediate offshoot of the mismatch is the development of the petty production in the non-farm sector which is economically unviable to observe environmental safety measures as their net income from family labour based production is barely sufficient to meet even the livelihood requirement. An industrial development policy in particular and non-farm sector development in general need therefore be evolved and strictly adhered to in the policy frame of the government. Enlargement of the organized production sector which is covered under the purview of the environmental regulatory system and its supervision by the state machinery does not make operational in the case of the unorganized non-farm production sector. In India, quite contrary to it, the growth and absorption of labour in the organized sector has been falling alarmingly, pose serious threat to land quality and environmental protection.

In the land use pattern, another area of serious concern is the fall in per capita availability of cereal and food production in India over the years. The per capita availability of food has declined from 186.2 Kgs per annum in 1991 to 167.4 Kgs per annum in 2010. The production of food grains has increased over the years albeit it

lagged behind the population growth. The productivity augmenting measures using chemical fertilizers add to land degradation and depletion of natural characteristics of the soil, which would trap the mutually opposite directional moving phenomena of population growth and food production fall in a vicious circle.

Table 7: Trends in agricultural dependent population:1981-2001

Year	Cultivator (in million)	Agricultural labourer (in million)	% Share of agricultural dependent population in the total workforce
1981	92.50	65.50	64
1991	110.70	74.60	59
2001	127.30	106.8	58

Source: Census of India, respective years

Table 8: Agriculture GDP as a Percentage of GDP

Year	Agriculture GDP as % of GDP
2004-05	15.90
2005-06	15.30
2006-07	14.50
2007-08	13.90
2008-09	13.20
2009-10	12.80

Source: Agricultural Statistics at a Glance, 2010

No less important is the water availability. Water availability is multi faceted in the sense that it has to have quality and quantity parameters uncompromised. Recently observed pattern in India is the spread of water born diseases in urban slums and drought prone areas in India. The shortage of quality of water, emerging from the lack of planned use of land and growth of industrialization help develop a water market which invariably exclude a vast section who found it difficult to fetch home even basic necessary wage goods. It is worth mentioning in the context that the poverty estimates in India has not yet included cost for drinking water in the basket of commodities assuming that water is still a free and public good. The commodity characteristics of water from a free good to marketised one leave profound impact on the 400 million people in India who live below poverty line under the most conservative official estimates of the Planning Commission in India. Majority of the population in India depend rivers, wells, lakes and ponds for their water consumption including agricultural activities and feeding their livestock. The rivers in India are depending on precipitation including snowfall. It is estimated that about 1869 km^3 of water could be made use of through surface water and replenishable ground water, through the total precipitation amounts to 4000 km^3. On account of various constraints of topography, uneven distribution of resources over space and time, it has been estimated that only about 1123 km^3 including 690 km^3 from surface water and 433 km^3 from ground water resources can be put to beneficial use. Many Indian rivers are perennial, though few are seasonal. India is known for its extreme events connected with the monsoon rains and the summer. Intermittent droughts and floods are major concerns in India. It has been estimated that 40 mha (12% of the total geographical area) of the

area is flood-prone and 51 mha (16% of the total geographical area) is drought-prone. The per-capita availability of water is on the decline from 5177 m^3 per year in 1951 to 1654 m^3 per year in 2007.

In lieu of conclusion

In SNA the asset coverage is rigidly defined and limited to assets which have ownership rights and provides economic benefits to its owner. On the other hand, the SEEA takes into consideration all natural resources and recognizes its non-economic functions for the sustenance of life on earth. It is widely accepted that land being a scarce resource, has to have a better evaluation system and its use pattern is inevitable for planning in a country like India. Bearing the international comparability of a land use statistical system, the SEEA has proposed a methodology and a data framework. However, the proposed international statistical system on land use does not appear to have accounted for regional diversity in the use of land primarily as a source of livelihood to millions in a country like India.

It is worth mentioning that India has a history of more than 130 years in land use statistics and has been evolved as a source of information for planning and agricultural production. However, the present 9-fold land use classification in India deviates from the asset classification proposed in the SEEA document with respect to concepts, definition and treatment. The information gathered in India is very elaborate and has considered geographical diversity and function of land as principal source of livelihood. It is important to take note of the fact that the enumeration of land resource in isolation of social and economics of land use may not fulfill the objective of a land use statistical system in the Indian context. In other words, it underlines the regional specificities which should go into the framing of land use statistics system at the global level.

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