

Chapter 3

India - General Profile, Land Use Classification and Land Use Pattern

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Chapter 3

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Highlights of Chapter 3

India occupying only 2.4 % of the world's geographical area, supports about 16.2% of the world's human population. India also has only 0.5% of the world's grazing area but supports 18% of the world's cattle population. India is endowed with a variety of soils, climate, biodiversity and ecological regions. About 228 mha (69%) of its geographical area (about 328 mha) fall within the dryland (arid, semi-arid and dry sub-humid) as per **Thornthwaite classification**. The Thar Desert lies in the hot arid region of Western Rajasthan and is one of the most densely populated deserts of the world. The country has been classified on the basis of agro-climatic, agro-ecological and agro-meteorological zones for the purpose of planning and implementing various programmes and measures. Agriculture is the major sector of growth of the Indian economy. A large percent of the population is still dependent on agriculture for its sustenance. Of the total cultivated area of 142 mha, major part of agriculture in the country is rainfed, extending to over 97 mha and constituting nearly 68% of the net cultivated area. The Chapter also addresses the various land use patterns and land use changes over 40 years.

3.1 General Topography

India's mainland comprises four broad geographical areas: the Northern Mountains which has the great Himalayas, the vast Indo-Gangetic plains, the Southern (Deccan) Peninsula bounded by the Western and Eastern Ghats, and fourthly, the coastal plains and islands (Census of India, 1991).

(i) Northern Mountains: Corresponding with the Himalayan Zone, alongwith country's northern boundaries including the Jammu and Kashmir (J&K), Himachal Pradesh (H.P.), north-west Uttar Pradesh (U.P.), Sikkim, part of Assam, and the North-Eastern States of Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura and Meghalaya. The Himalayas comprise of mountain ranges which form an indomitable physical barrier as the world's biggest and largest mountain range. The Himalayas also contain the cold arid deserts and fertile valleys.

(ii) The Great Plains: Also known as the Indo-Gangetic plain is formed by the basin of three distinct river systems - the Indus, the Ganga and the Brahmaputra. The Plains extend from Rajasthan in the West to Brahmaputra valley in the East. This region covers the entire States of Punjab, Haryana, and the Union Territory of Chandigarh and Delhi and major parts of U.P., Bihar, West Bengal, and parts of Assam. These plains comprise one of the world's greatest stretches of flat and deep alluvium and are among the most densely populated areas of the world (456 persons per sq.km). The desert region, which contains the Great Thar desert, extends from the edge of Rann of Kutch to larger parts of Rajasthan (Western) and lower regions of Punjab and Haryana.

(iii) The Deccan Peninsula: This zone covers the whole of South India which includes the States of Tamil Nadu, Karnataka, Andhra Pradesh and Kerala. The Region also covers the State of Madhya Pradesh, and parts of Bihar, Orissa, Puruliya district of West Bengal. Density of population is 202 persons per km². The

Indo-Gangetic plains and the penninsular plateau are separated by mountain and hill ranges known as the Aravali, Vindhya, Satpura, Ajanta and Maikala ranges.

(iv) The Coastal Plains and Islands: The peninsula is flanked on either side by the Eastern Ghats and the Western Ghats. On either side of the Ghats outward to the sea lies a coastal strip. The western coastal plains lie between the Western Ghats and the Arabian sea in the West, whereas the Eastern Coastal Plains face the Bay of Bengal in the East. This is also a region with very high-density population (349 persons per km²).

Table 3.1: Profile of the Main Physio-Geographic Zones in the Country

Physio-Geographic Zone	Area		Population		No. of districts	Density of Popln.	Urban Centres (No.)	Population (in million) in Urban Centres	Villages (No.)	Population (in million) in villages
	in km ²	in %	in million	in %						
Northern Mountains	322158	10.5	28.04	3.34						
The Great Plains	730955	22.2	333.43	39.4	150	456	1516	74.03	235641	259.4
The Deccan Plateau	1525279	49.76	307.49	36.67	158	202	1785	78.13	266892	29.36
The Coastal Plains & Islands	486635	15.38	169.61	20.23	76	349	1031	58.76	67972	110.84

Source: Census of India, 1991

The country's geographical area of 328 mha covers only 2.4% of the world's total area, on which 16.7% of the world's population and about 18% of the world's livestock population survive. Of the total area of 328 mha, land use statistics are available for roughly 305 mha accounting for 93% of the total land area. Of this, roughly 264 mha of land is available for agriculture, forestry and related purposes. Land use is discussed in greater detail in sub-section 3.8 and 3.9.

3.2 Climate

India is mainly a tropical country but due to great altitudinal variations, almost all climatic conditions from hot deserts to cold deserts exist. There are four seasons: (i) winter (December-February), (ii) summer (March-June), (iii) South-west monsoon season (June-September), and (iv) post monsoon season (October-November). During the post monsoon season, commonly known as winter monsoon, monsoon rains begin over north India and pass over the Bay of Bengal before reaching the Andamans and the South-east coast. However, the south-west or the summer monsoon is the main source of rainfall in the country providing 80% of the precipitation.

3.3. Natural Resources

3.3.1. Land - Soils: India has a wide range of soils, each type being particular of a specific locality. Alluvial and black cotton soils are the two most important soil groups for agricultural production. Alluvial soils cover about 78 mha (about 24%) of the total land and occur in the great Indo-Gangetic Plains, in the valleys of Narmada and Tapti in Madhya Pradesh and the Cauvery in Tamil Nadu. These soils are considered

very good for the production of wheat, rice other cereals, pulses, oil seeds, potato, sugarcane, etc. The black cotton soils cover about 51.8 mha. and are found in the States of Maharashtra, Gujarat, Madhya Pradesh, Karnataka, Andhra Pradesh, Tamil Nadu, Uttar Pradesh and Rajasthan. These are also considered good for cultivation of cotton, cereals, pulses, oil seeds, citrus fruits, vegetables, etc. In addition, Red soils have been estimated to occur in 51.8 mha and are primarily found in Tamil Nadu, Karnataka, Kerala, Maharashtra, Andhra Pradesh, Madhya Pradesh, Bihar and West Bengal. These are most suited for rice, ragi (millet), tobacco and vegetable cultivation. Laterite and lateritic soils occur in 12.6 mha. These are not considered good for agriculture. The area of desert soils is about 37 mha. These are also not found suitable for agriculture.

3.3.2. WATER

3.3.2.1 Rainfall: India receives annually about 4000 cubic kilometres of water through precipitation. About 80% of the country's annual rainfall is mainly from the South-West monsoon season of June to September, followed by the North-West monsoon in November-December. Most of rainfall is therefore few months in a year, the country remaining dry for almost the rest of the year. Also, the rainfall is highly variable both spatially and in quantity among the 35 meteorological sub-divisions, the country has been divided into (Section 3.8.3). It varies from as low as 100 mm in western Rajasthan to as high as 9000 mm in Meghalaya in the north-east India. Monsoon rainfall is usually torrential in intensity. This results in tremendous run-off resulting in soil erosion (Sharma & Paul, 1999).

3.3.2.2. Water Resources: It is estimated that out of the total precipitation of around 400 million hectares metres in the country, the surface water availability is about 187 million hectares. Of this only about 50% can be put to beneficial use because of topographical and other constraints. Of the country's utilisable water resources of about 1100 cubic kilometres, surface sources, e.g. rivers account for roughly 60% and groundwater sources, e.g., wells account for the remaining 40%.

Surface Waters: The country has been divided into 20 river basins- comprising of 12 major river basins, each having a catchment area exceeding 20,000 sq.km and eight composite river basins (Sharma & Paul, 1999). In addition, other water resources include reservoirs, tanks, ponds and lakes which cover about 7 mha of the surface area of the country. India has 14 major river systems. The rivers may be classified as: (i) Himalayan Rivers, (ii) peninsular rivers, (iii) coastal rivers and, (iv) rivers of inland drainage basin. Because of the uneven precipitation, the availability of renewable freshwater varies enormously in different river basins. The Himalayan rivers are snow-fed and perennial. The peninsular rivers are rainfed and therefore fluctuate in volume. The coastal rivers are short in length with limited catchment areas. The rivers and tributaries of the peninsular and coastal rivers are intermittent and non-perennial in nature. The streams of the inland drainage basins of western Rajasthan are few and with little water holding capacity. Floods and drought affect vast areas of the country. A third of the country is drought-prone. Floods affect an average area of around 9 million hectares per year. According to the National Commission on Floods, the area susceptible to floods is around 40 million hectares.

Groundwater: The groundwater potential varies in different regions of the country. Due to heavy extraction of groundwater and its limited recharge, the groundwater is getting depleted at a fast rate. This depletion is particularly marked in most of the dryland regions of States such as Andhra Pradesh, Karnataka, Rajasthan, Madhya Pradesh, Orissa and Maharashtra.

3.3.3. Forests: Indian forests show greatest variation and range depending upon rainfall, soil topography and climatic factors. The forests range from tropical rainforests to dry thorn forests and mountain -temperate forests. There are four major forest types and 16 detailed forest types in the country (Table 3.2). More than half of the forest area in India is tropical-moist and dry-deciduous types. Forests are both a resource and a habitat for a rich flora and fauna found in the country. Of the 16 forest types in the country, the tropical deciduous form the major forest type of India with 38.2 % of the total forest area. Other predominant forest type is the moist deciduous covering 30.3 % of the forest area of the country.

Box. 3.1. Benefits of Natural Forests	
Benefits of Natural Forests	Soil protection. Soil fertility. Water conservation. Conservation of flora & fauna. Micro-climate Conservation of genetic resources Use of varieties for genetic breeding and biotechnology. Integrated watershed management. Conservation of soil and regeneration of ecosystems as windbreaks and shelterbelts.

Forestry is an important part of landuse. Land allocation for forestry includes: (i) areas set apart as forestland, (ii) non-forest land (agroforestry, farm woodlots, windbelts, and shelter belts, avenue trees, urban forests/parks, homestead forests and sacred groves). As per the Forest Resources Assessment of FAO in 1995, the situation of the natural forests of India is as given in Table 3.3 below.

Table 3.3. State of Natural Forests in India

Area of natural forests	:	51.73 mha
Total growing stock in natural forests	:	2431.3 million cu.m
Total biomass in natural forests	:	4805.7 million tonnes

Source: NFAP, MOEF, GOI, 1999

countless non-wood forest products are removed from the forests annually. At a conservative level of pricing (Rs.500 per tonne of fuel/fodder), the value of these commodities is estimated to approximately aggregate to over Rs. 300,000 million per annum (NFAP, MOEF, 1999).

3.3.4. Biodiversity: India is rich in biodiversity because of its diverse physiography and climatic conditions. India falls in the confluence of three major bio-geographic realms - the Indo-Malayan, Eurasian and Afro-Tropical. The country is divided into ten biogeographic zones: (i) Trans-Himalayas, (ii) Himalayas, (iii) Indian Deserts, (iv) Semi-Arid areas, (v) Western Ghats, (vi) Deccan Peninsula, (vii) Gangetic Plain, (viii) North-East India, (ix) Island and (x) Coasts. India is one of the 12 mega biodiversity countries of the world. Out of the 18 unique biodiversity 'hotspots', which contain about 20% of the world's flora, two, namely - north-eastern Himalayas and the Western Ghats are located in India. In order to protect and conserve the biodiversity, a number of 'Protected Areas'- in the form of National Parks and Sanctuaries have been set up. The biogeographic locations of these are given in Table 3.4.

Table 3.2: Major Forest Types Found in India

Forest Type (in mha)	Sub-Type	Area	%	Occurrence in States/Union Territories
Tropical	Tropical Wet Evergreen Forests	4.5	5.8	Arunachal Pradesh, Assam, Karnataka, Kerala, Mizoram, Manipur, Nagaland, Tamil Nadu, Sikkim, Andaman & Nicobar Islands, Goa.
	Semi-Ever-Green Forest	1.9	2.5	Assam, Karnataka, Kerala, Maharashtra, Nagaland, Orissa, Tamil Nadu, Andaman & Nicobar Islands, & Goa.
	Moist Deciduous Forest	23.3	30.3	Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Tripura, Nagaland, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal, Andaman & Nicobar Islands, Goa, Dadra & Nagar Haveli.
	Littoral Swamp Forest	0.7	0.9	Andhra Pradesh, Gujarat, Maharashtra, Orissa, Tamil Nadu, West Bengal, Andaman & Nicobar Islands.
Sub-Tropical	Dry Deciduous Forest	29.4	38.2	Andhra Pradesh, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, J&K, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh.
	Thorn Forest	5.2	6.7	Andhra Pradesh, Gujarat, Haryana, Himachal Pradesh, Madhya Pradesh, Karnataka, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh.
	Dry Evergreen Forest	0.1	0.1	Andhra Pradesh, Tamil Nadu.
	Subtropical Broadleaved Hill Forest	0.3	0.4	Assam, Meghalaya.
	Subtropical Pine Forest	3.7	5.0	Arunachal Pradesh, Himachal Pradesh, J&K, Manipur, Meghalaya, Nagaland, Sikkim, Uttar Pradesh, Haryana, Punjab.
	Subtropical Dry Evergreen Forest	0.2	0.2	Himachal Pradesh, J&K.
J&K, Himachal Pradesh	Montane Wet Temperate Forest	1.6	2.0	Arunachal Pradesh, Karnataka, Manipur, Nagaland, Sikkim, Tamil Nadu.
	Himalayan Moist Temperate Forest	2.6	3.4	Himachal Pradesh, J&K, Uttar Pradesh.
	Himalayan Dry Temperate Forest	0.2	0.2	
Alpine	Sub Alpine Forest]		
	Moist Alpine Scrub] 3.3	4.3	J&K, Uttar Pradesh.
	Dry Alpine Scrub]		

Source: Forest Survey of India (1995) in NFAP, MOEF, GOI, 1999.

In India, forests meet nearly 40% of the energy needs of the country of which more than 80% goes for energy needs of the rural areas and about 30% of the fodder needs of the cattle population. It is estimated that about 270 million tonnes of fuelwood, 280 million tonnes of fodder, over 12 million cubic metres of timber and

Table 3.4: Bio-geographic Zones of Protected Areas in the country

Bio-geographic Zone	Number of National Parks and Sanctuaries	Area (Sq. km.)	Area of Bio-geographical Zone (%)
Trans-Himalaya	7	17002.5	9.2
Himalayas	67	20890.52	9.92
Deserts	6	16076.08	7.45
Semi-Arid	91	15302.6	2.8
Western Ghats	56	13425.01	10.12
Deccan Peninsula	137	51151.74	3.71
Gangetic Plain	36	7648.92	2.16
Coasts	26	5619.58	6.79
North-East	27	4354.12	2.54
Islands	103	1529.27	18.54
Total	556	153000	

Source: WII, 2000

3.4. Agriculture

Agriculture contributes to 29.93% of India's GDP. The overall growth of the Indian economy has depended much on the performance of agriculture. With a share of 2.7% of the world agricultural production, India is ranked sixth in the world. Major part of agriculture in the country is rainfed, extending to over 87 mha and constituting nearly 61% of the net cultivated area. The wide variation in rainfall and potential evapo- transpiration (PE) decides the actual land use and vegetation cover available. Presently a large percentage area of cultivation growing the coarse cereals (90%), pulses (81%), oil seeds (76%), cotton (65%) and rice (50%) are rainfed. Agriculture also is the single largest source of employment in India, even though its contribution to the national economy has been shrinking over the years (MOA, 1996). In 1990-91, of the total main work force of an estimated 285.42 million, 64.90% constituted the agricultural workforce.

Expansion of irrigation has played an important role in the development of agriculture and of various States. The full irrigation potential of the country has been estimated to be 113.5 mha (revised to 139.5 mha), comprising 58.5 mha from major and medium schemes, 15 mha from minor irrigation schemes and 40 mha (revised to 66 mha) from ground water exploitation. India's irrigation potential has increased from 22.6 mha in 1951 to about 90 mha at the end of 1995-96. Against this the utilisation of irrigation potential at the end of 1995 was 78.5 mha. Though water is a precious and scarce resource, its application and use efficiencies have been low. Most irrigation projects are operating at a low efficiency in the range of 30-40%, thereby losing 60-70% of the irrigation water during conveyance. It is estimated that even after achieving the full irrigation potential, nearly 50% of the total cultivated area will remain rainfed. Of the net canal irrigated area of 17 mha, 3.4 mha are estimated to be under varying degrees of water logging and soil salinity (this is discussed in greater detail under Chapter 5: Sub-Section 5.2, Processes of Desertification).

3.5. Population Demography

3.5.1. Human: The human population estimates¹ as of March 1, 2001 is 1027 million. The annual compound growth for human population is estimated to be 1.93. A matter closely related to the problem of environmental

security in India is the issue of scarcity of natural resources vis-à-vis human carrying capacity. For instance, arid zone standards, drylands of India have a high population density (in fact the Thar Desert in the Indian Arid Zone is considered the one of the densest deserts of the world), and the Great Gangetic Plains has an average of 456 persons per sq.km. The rate of growth of population during the decade 1981-1991 in dryland region has been 29 percent as against 23 percent for the country (MOEF, 1996). The population of India has increased from 16.2 % in 1991 to 16.7% of the world's population in 2001.

Table 3.5: Increase in population from 1951 to 2001 (in million)

	1951	1961	1971	1981	1991	2001 ²
Total	361	439	548	683	846	1027
Rural	298	360		439	525	
Urban	62	79		244	321	

Source: Information upto 1991: Census of India, 1991, for 2001: Provisional Census Report, 2001

Of the total 452 districts in the country as of 1991, 224 districts showed population growth rate higher than the national average of 23.85% as of 1991. Seven districts in Rajasthan showed very high growth rate of 30-35%. The State of Uttar Pradesh is the most populated in the country - 166.0 million population as of 2001 and more than doubled from 1951 (54.59 million).

3.5.2. Livestock

Man and livestock have long had a close association since the early history of mankind. The livestock population in India is one of the highest in the world (Table 3.6):

Year	Total Livestock Population* (in ,000)	Cattle (in ,000)
1977	369,645	180,140
1982	419,742	192,453
1987	445,286	199,695
1992	470,860	204,584

Source: Agricultural Statistics at a Glance, 2001. Directorate of Economics & Statistics, Min. of Agriculture.

* Total Livestock includes cattle , buffaloes, sheep, goats, horses, pigs, donkeys & mules, camels, yaks, 'mithuns'

Over the four decades -1951 to 1992, the years for which livestock census are available, the number of bovine increased substantially viz., 45 per cent. Sheep and goat population were 39 million and 47 million respectively in 1951 and the same grew to 51 and 115 million respectively in 1992. Thereby increasing by 30% to 144% respectively over the period. The annual growth rate (%) during these two periods for bovine, sheep and goats were 0.9, 0.64 and 2.20 respectively. The population estimates for total livestock in 1992 was 470 million.

Livestock population and density in the arid region is very high (Table 3.7). The region also has a number of wild life such as the 'Chinkara', Blackbuck, peacocks and the Great Indian Bustard, which is an endangered bird species.

¹ and ² Census of India, 2001- Provisional Report

Table 3.7: Estimated Population of Livestock in the Hot Arid region.

LIVESTOCK	POPULATION
Camels	1,001,000
Sheep and Goats	155,910,000
Cattle	199,695,000
Horses, Donkeys, & Mules	1,922,000
Yaks	-
Elephants	
Buffaloes	75,677,000
Others	175,000

Source: ICFRE, 1999

3.5.2.2. Income and employment from Livestock

Livestock is an important source of supplementary income of rural households; a nation wide survey of the National Council of Applied Economic Research (NCAER) survey indicated that income from livestock averages 22.5 per cent of total household incomes (MOA, 1996). Livestock in the Indian context, is thus a major instrument for improving rural employment, particularly rural self-employment. In 1991, 65 per cent of the total Indian working force of 185 million people was dependent on agriculture; 80 per cent of these involved in livestock production, either as producers or as workers. The family women carry out some 60 percent of the work related to care and management of live stock in households. The total value of livestock asset in 1993-94 was Rs.669 billion. This has increased to Rs.1302 billion in 1999-2000 as per the latest estimates of National Accounts released by the Central Statistical Organisation. The GDP from livestock sector is around 5-6% over the years and it is 5.5% in 1999-2000 at current prices. The value of output (excluding draught power) Rs.436 billion, at 1996 price level. The draught output was valued at Rs.22 billion on fuel equivalent basis. The livestock sector thus represents amongst the lowest capital/output ratios in the economy while displaying high capacity for labour absorption. The livelihood challenge in the livestock sector is of improving the productivity of and returns to the labour deployed on it (MOA, 1996). Livestock in India is characterised by very large numbers and very low productivity, across all species. Yield of milk per cattle head is poor compared to other countries.

Livestock production in India, is characterised by widely distributed small stock holdings, millions of them, across the length and breadth of the country, stock holding size averaging from two to three animals per holding for bovine, except in the nomadic herds of Gujarat and Rajasthan. For goats too this pattern prevails – holding size increases for goats as part of the nomadic herds in Rajasthan and Gujarat. Sheep are usually held in large flocks and are seldom found in small holdings – the flock size varies from a few heads to several hundreds and are localised in specific areas in the state of Gujarat, Rajasthan, Uttar Pradesh, Tamil Nadu, etc. Rural employment in livestock grew at 4.15 per cent between 1972 and 1982, a growth rate much higher than of agriculture (1.15) and the entire rural sector (1.75). Since the organisation of livestock production has largely maintained unchanged, the employment growth is on account of increased output, growing marketisation, and increased activity level in intermediate processing and value addition.

3.5.2.3. Feed and Fodder for livestock

Livestock production in India is entirely dependent on crop residues and crop by-products. The total supply

of feed and fodder in 1993 was straw 398 million tons, green fodder 573.50 million tons, and concentrates 41.98 million tons (MOEF 1993 estimates). While estimates of feed and fodder, past, current as well as future, portray huge deficits (demand-supply gap), the livestock population increased across all species, 40-300 per cent, and output of the sector tripled or quadrupled, all taking place within the supposedly diminishing feed and fodder supply base. It is difficult to understand how this happens – either, it is unlikely that the deficits are of the magnitude portrayed or all the increase in numbers and incremental production have taken place at the expense of the ecology. However, fodder development continued to remain marginalised even in the Seventh Plan – despite growing concern over the acute scarcity situation. The devastating effect of the two-year stretch of severe drought, almost countrywide during the 1985-87 period focused attention on the need for alternate strategies for feeding the livestock. The Seventh Plan however could not rise above the usual departmental approach of fodder development schemes, mini kits, etc.

About a third of the total feed intake of the ruminants in India, large and small, is by grazing on common property resources (CPRs). Overgrazing by herds far larger than what the land can sustain, year after year, has progressively rendered them marginal or waste lands, grossly eroded - some estimates put annual erosion of top soil at 6000 million tons - reduction in water points 55 to 92 per cent (MOA, 1996), and changing plant association, making them unsuitable for bovines and fit only for sheep and goats.

3.6 Socio-Economic Development

Though agriculture has been the main occupation of the bulk of the Indian population, the founding fathers of independent India had visions of the country becoming a prosperous and Modern State and accordingly established a good industrial base. Since then, India has achieved a good measure of self-sufficiency in the manufacture of a wide variety of basic and capital goods. However, even as of today, a large percentage of the population in the country is dependent upon subsistence economy.

However, agricultural sector continued to receive the attention it deserved in the successive Five-Year Plans, which provided momentum to the agricultural production and resilience to the economy. India today is not only self-sufficient in grain production, but also has a substantial reserve, which helps in overcoming the effects of drought and occasional failure of monsoon. In 1998-99, the primary sector comprising agriculture, forestry and logging, fishery, mining and quarrying is estimated to have contributed 29 percent to the Gross Domestic Product (Min. of Finance, 2000) and provide livelihood to about 67.5 percent of the work force in the country (Census of India, 1991).

Rural employment in livestock grew at 4.15 per cent between 1972 and 1982, a growth rate much higher than of agriculture (1.15) and the entire rural sector (1.75). Since the organisation of livestock production has largely maintained unchanged, the employment growth is on account of increased output, growing marketisation, and increased activity level in intermediate processing and value addition.

The statistical profile of the country is summarised in Table 3.8.

Table 3.8: Statistical Profile of India

A. Total Land Area	328.7 mha
Area which is enumerated in the census	306.50 mha
Forests	67.0
Area under non-agricultural use	21.8
Barren and Unculturable Land	19.4
Permanent Pasture and Grazing Lands	12.0
Fallow Lands	24.0
Cropped Area	142.5
- Area under Food Grain Cultivation	123.5
- Of this, Area under Rainfed Farming Systems	89
B. Administrative Divisions (as on March 2001)	
Number of States (includes three newly formed States of Uttaranchal, Chattisgarh and Jharkand)	28
Union Territories	7
City Corporations (Cities of one million or more population) (1991)	18
Other Cities and Municipal Towns (approx.) (1991)	4,500
No. of Districts (as on 2001)	593
Villages (approx.) (1991)	600,000
C. Human Population (2001 Census) Provisional Report	
Total Population (in millions)	1027 (as against 846 in 1990-91)
Rural Population (in millions)	
Population (annual exponential) growth rate (in %)	1.93 (as against 2.14 in 1990-91)
Decadal Growth (1991-2001) (in %)	21.3 (as against 23.85 in 1999-91)
Average Population Density (per square km)	324 (as against 267 in 1990-91)
D. Livestock Population (in thousands) (as in 1992)	470, 860
E. GDP Total	Rs 7,161,110 million
Of this: (in %)	
Agriculture	29.93
Of this, forestry (incl. Under Agriculture)	1.25
Mining & Quarrying	2.37
Manufacturing	17.07
Trade, Hotels, etc.	12.84
Construction	5.56
Electricity, gas, etc.	2.79
Transportation	8.03
Financial Services	8.35
Social/Personal services	11.77
NNP per capita	
One US\$ = Rs. 46.56 (as on 1 st March 2001)	
F. Social Indicators	
Life Expectancy (in years, 1998)	62.9
Adult Literacy (in % above 15 (2001)	65.3
Population below poverty line (1999)	19%
Infant Mortality Rate (per 1000 births, 1999)	70
Sex Ratio ((No. Females per 1000 males) (2001)	933
G. India in Relation to the World (% of Total)	
Area	2.4%
Forest Area	1.8%
Grazing Land	0.5%
Human Population (as on March 2001)	16.7
Cattle Population	18.0

Source of Inf: (i) GOI: Directorate of Economics and Statistics (1996) Agricultural Statistics at a Glance, (ii) World Bank (1996), (iii) India: Country Economic Memorandum, (iv) Census of India, 1991, (v) Provisional Census Report, 2001, (vi) UNDP Human Development Report, 2001, (vii) NFAP, 1999 and (viii) Census of India, 2001.

3.7 Land Use Classification

India has a diverse agro-climate, topography and soil types on the basis of which it has been categorised into various regions. Major part of the country is rainfed. Rainfall, therefore, constitutes an important parameter in the classification of the country into various regions for the purpose of planning.

3.7.1 Agro-Climatic Regions: India has been divided into 15 agro-climatic zones on the basis of climate, in combination with soil and other factors that affect the agriculture in the region. This classification originated in 1979 by the Indian Council of Agricultural Research (ICAR) through the National Agricultural Research Project (NARP). These are:

1. Western Himalayan Region.
2. Eastern Himalayan Region.
3. Lower Gangetic Plains Region.
4. Middle Gangetic Plains Region.
5. Upper Gangetic Plain Region.
6. Trans Gangetic Plains Region.
7. Eastern Plateau and Hill Region.
8. Central Plateau and Hill Region.
9. Western Plateau and Hill Region.
10. Southern Plateau and Hill Region.
11. East Coast Plains and Hill Region.
12. West Coast Plains and Ghat Region.
13. Gujarat Plains and Ghat Region.
14. Western Dry Region.
15. Island Region.

3.7.2 AGRO-ECOLOGICAL REGIONS (AERs) AND SUB-REGIONS (AESRs)

Agro-Ecological Regions: The country has also been categorised into 20 Agro-Ecological Regions on a 1:4 million scale map, based on physiography, soils, climate, growing period and also taking into account available water capacity of the soil, etc. The mapping and classification of the various parts of the country for generation of agro-ecological regions involved the superimposition of four base maps, namely physiography, soils, bioclimate and length of growing period and have been used for resource planning at national level.

Agro-Ecological Sub-Regions (AESRs): The agro-ecological regions (see section 3.8.2) were subsequently refined to prepare a 60 Agro-Ecological Sub-Regions (AESR) Map for regional level planning using the detailed soil information at subgroup level, physiography at land form level, and bioclimate (refined limits of arid, semi-arid and sub-humid bioclimate) (Annex, 3.) types and length of growing period (LGP) at 30 day class interval. The AESR map is useful for regional level planning and resource allocation. The information of length of growing period as well as agro-ecological zoning supported by moisture availability index can act as an excellent base for crop modelling and crop suitability evaluation.

3.7.3. Bio-Climatic Regions

The agro-ecological regions fall into 6 major climatic regions as given below:

- (i) **Arid**
- (ii) **Semi-arid**
- (iii) **Dry Sub-humid**
- (iv) **Moist Sub-humid**
- (v) **Humid**
- (vi) **Per-humid**

Based on the classification laid down by the National Bureau of Soil Science and Land Use Planning (NBS&LUP) in the publication “Agro-Ecological Sub-regions of India for Planning and Development” (Velayutham 1999) and the Method of the dryland classification of bioclimatic zonation of the country, main areas/districts in the concerned regions falling in the various bioclimatic regions are given in Annex-3. **It is important to note that the Thornthwaite system of classification is used for agricultural planning in the country considering the annual rainfall, moisture index and other aspects such as the growing period of crops.**

DRYLAND (ARID-SEMI ARID- DRY SUB-HUMID) REGIONS OF INDIA

According to NABBLUP, Nagpur the arid, semi-arid and dry sub-humid regions constituting the ‘drylands’ (as per Thornthwaite Classification) cover about 228.3 mha (69.6%) of the total land area (328 mha) of the country (Table.3.9). A large number of States fall within the drylands. However, almost the entire North-Eastern Region covering the States of Assam, Meghalaya, Nagaland, Tripura, Manipur, Mizoram, Sikkim and Arunachal Pradesh), and the State of Uttaranchal in North India do not fall within the dryland region. In addition, parts of Jammu & Kashmir, parts of Himachal Pradesh, coastal areas of Karnataka, Maharashtra, Goa, and major parts of the States of Kerala, Orissa, West Bengal and the Islands of Andaman & Nicobar and Lakshwadeep and Minicoy, which are predominantly humid/perhumid also do not fall within the dryland regions. It is however important to note that land degradation is a serious problem even in the humid/per-humid regions of the country, particularly in the hilly regions, where the main process of land degradation is water erosion resulting in high losses of top soil and fertility. Major part of the dryland regions in the country are rainfed, while some are irrigated. **The country’s programmes are therefore, not targeted to addressing land degradation in the drylands alone, although special emphasis is given to rainfed regions.**

(I) ARID REGION: According to NBSSLUP, about 50.8 mha (15.8%) of the country’s geographical area is arid (Table 3.8).

HOT ARID REGION: These include the hot arid regions that occupy major parts of Rajasthan (Western), Gujarat, southern parts of Punjab and Haryana and a small portion of Deccan Penninsula in the States of Andhra Pradesh, Karnataka, Maharashtra. Roughly, three-fourths of the State of Rajasthan, comprising of 12 western districts falls within the hot arid zone. These are the districts of: Barmar, Bikaner, Churu, Sri Ganganagar, Hanumangarh, Jaisalmer, Jalore, Jhunjunu, Jodhpur, Nagaur, Pali and Sikar (Faroda, A..S, 1999).

Table 3.9: Classification of 'dryland' regions in India using Thornthwaite Classification

S.N.	REGION	ANNUAL AV. RAINFALL (in mm)	MOISTURE INDEX (As per Thornthwaite Classification)	GROWING PERIOD (in days)	TOTAL LAND AREA	
					in mha	in %
1.	Glaciers & Others	-	-	-	5.2	1.5
2.	Hyper Arid	<100	<-83.3	0-60	22.9	7.0
3.	Typic Arid	100-500	-66.7 to -83.2	60-90	22.7	7.0
4.	Semi-Arid (dry)	500-750	-50 to -66.6	90-120	51.2	15.6
5.	Semi-Arid (moist)	750-850	-49.9 to -33.4	120-150	72.2	22.0
6.	Sub-humid (dry)	850-1000	-33.3 to 0	150-180	54.1	16.5
7.	Sub-humid (moist)	1000-1500	0 to 20	180-270	39.8	12.1
8.	Dry/Moist Sub-humid transition	1000-1500	0 to 20	210-270	21.0	6.4
9.	Humid		21 to 99.9	210-330	16.6	5.1
10.	Perhumid	>2500	>100	>300	20.5	6.3
11.	Transition Humid/Per humid	-do-	>100	-do-	1.8	0.5
12.	TOTAL				327.9	

The area of bio-climatic regions 1-6, which fall under the dryland regions (as per Thornthwaite Classification)
= 228.3 mha

Source: National Bureau of Soil Survey and Landuse Planning (NBSSLUP), 2001.

The hot arid region suffers low and erratic rainfall, frequent droughts, high evaporation, intense heat and high winds. The soils are not conducive to intensive crop production. The human population in the Indian arid zone is high, a part of which is nomadic maintaining a high livestock population. The density of both human and livestock population is high as compared to national average, which has put the scarce natural resources under severe stress. There are a number of tribes such as the *Gujjars, Bakarwals, Gaddis, Rathis, Banjaras, Raikars and 'Rabaris'* which are nomadic and follow a pastoral systems of living. The nomadic lifestyle has over the years being replaced by agrarian in regions not suitable for arable cropping systems, which has further degraded the fragile ecosystem. In arid areas the growing season being very short millets and short duration pulses dominate the cropping systems. Livestock farming forms an integral part of this ecosystem.

THE GREAT INDIAN THAR DESERT

The Great Indian Desert also known as the 'Thar' Desert, lies in Western Rajasthan and comprises of an area of 196,150 sq.km. (Table 3.10).

COLD ARID REGION: In addition, an area of about 15.2 mha of cold desert are located in Jammu and Kashmir and the Lahul-Spiti region in Himachal Pradesh.

Table 3.10: General Information on Thar Desert

Population engaged in (in million)	1980	1990	
Agriculture	13.48		17.50
Animal Husbandry	2.84		3.20
Household Industries	0.13		0.15
Landuse in the 'Thar' Desert			
Area in km ²	1980	1990	1993
Desert Area of no or minimal value			4270
Area in danger of desertification			134300
Cultivated area	128300	131670	123378
Pastureland	59760	53800	52284
Others	2840	3880	4285

Source: Report of MEA submitted to the CSD in 1995.

(II) SEMI-ARID

About 123.4 mha (37.6%) of the country's geographical area consists of the semi-arid region. (NBSSLUP, 2001). The semiarid tropical areas (SAT) can be further classified into dry and wet. In the SAT, the crops and cropping systems are quite diverse depending on the soil type and the length of growing season. Sorghum, cotton, soyabean, groundnut and pulses are the major crops grown in this zone.

(III) DRY SUB-HUMID

About 54.1 mha (16.5%) of the country's geographical area falls within the dry sub-humid region. The dry sub-humid region receives fairly high rainfall providing ample opportunities for water harvesting. This can be effectively integrated with the safe disposal of excess runoff to overcome water congestion of soils for crops (other than rice). Rainfed rice is the predominant crop followed by pulses, oilseeds and to some extent, vegetables. Fruit crops particularly in Orissa are also an important component of the production system.

3.7.4 AGRO-METEOROLOGICAL REGIONS

The country has also been classified into 35 agro-meteorological divisions for the purpose of monitoring rainfall intensity and drought. These are given in Table.3.11 below: The concept of drought on a sub-divisional/district scale is presently under review.

3.8 Land Use Pattern in India

The pattern of land use of a country at any particular time is determined by the physical, economic and institutional framework taken together. In other words, the existing land-use pattern in different regions in India has been evolved as a result of the action and interaction of various factors, such as the physical characteristics of land, the institutional framework, the structure of other resources (capital, labour etc.) available, and the location of the region in relation to other aspects of economic development e.g. those relating to transport as well as to industry and trade. The present pattern can, therefore, be considered in some sort of static harmony and adjustment with the other main characteristics of the economy of the region. A close study of the present land-use pattern and the trends during recent years will help to suggest the scope for planned shifts in the pattern.

Table 3.11: Agro-Meteorological Regions of the Country

1	Andaman & Nicobar	21	Gujarat Region
2	Arunachal Pradesh	22	Saurashtra & Kutch
3	Assam & Meghalaya	23	Konkan & Goa
4	Nagaland, Mizoram & Tripura	24	Madhya Maharashtra
5	South West Bengal	25	Marathwada
6	Gangetic West Bengal	26	Vidarbha
7	Orissa	27	Coastal Andhra Pradesh
8	Bihar Plateau	28	Telangana
9	Bihar Plains	29	Rayalaseema
10	East Uttar Pradesh	30	Tamil Nadu & Pondicherry
11	Plains of West U.P.	31	Coastal Karnataka
12	Hills of West U.P.	32	North Karnataka
13	Haryana, Delhi & Chandigarh	33	South Karnataka
14	Punjab	34	Kerala
15	Himachal Pradesh	35	Lakshadweep
16	Jammu & Kashmir		
17	West Rajasthan		
18	East Rajasthan		
19	West Madhya Pradesh		
20	East Madhya Pradesh		

Source: India Meteorological Department (IMD)

3.8.1 CLASSIFICATION OF LAND USE

Out of the total geographical area of 328.73 million hectares, land use statistics are available for roughly 305 million hectares, contributing 93 per cent of the total. Till 1949-50, the land area in India was classified into five categories known as the five-fold land-utilisation classification. This five fold land utilisation classification was however, a very broad outline of land-use in the country and was not found adequate enough to meet the needs of agricultural planning in the country. The states were also finding it difficult to present comparable data according to this classification, owing to the lack of uniformity in the definition and scope of classification covered by these five broad categories. To remove the non-comparability and to break up the broad categories into smaller constituents for better comprehension, the Technical Committee on Co-ordination of Agricultural Statistics, set up by the Ministry of Food and Agriculture, recommended a nine-fold land-use classification replacing the old five-fold classification. Based on the nine-fold classification, the all-India data on land utilisation pattern since 1950-51, is given in Table 3.13. The State-wise pattern of land utilisation as in 1990-91 is given in Table 3.14.

3.8.2 Area under Agricultural uses

The states of Haryana, Punjab, West Bengal, Maharashtra, Uttar Pradesh, Kerala, Karnataka, Gujarat, Bihar, Pondicherry, Delhi and Union Territories of Laccadive, Minicoy and Amindive Islands (Lakshadweep), cultivate more than 45 per cent of their reporting area. In some of the states like Haryana and Punjab, which lie in the fertile Indo-Gangetic plains of India, the net area shown is between 60 and 70 per cent of the corresponding reporting area. Maharashtra has the highest net area sown in the country. The states of

Maharashtra, Madhya Pradesh, Karnataka, Gujarat and Bihar account for more than three-fourths of the country's net area sown.

3.8.3 Land under non-agricultural uses

This category includes all lands occupied by buildings, roads and railways, or under water, e.g. rivers and canals, and other lands put to uses other than agricultural. During recent years, there has been an increase in the area put to non-agricultural uses, as expected, because as a result of increase in the developmental activities, more and more land is being used for industrial sites, housing, transport systems, recreational purposes, irrigation systems etc. The states where the proportion of land under non-agricultural uses is higher than the all-India average are Haryana, Jammu & Kashmir, Kerala, Orissa, Uttar Pradesh, Andhra Pradesh, Punjab, Tamil Nadu, Bihar, Assam, Goa, Delhi, Pondicherry and the Union Territory of Daman and Diu. The states which account for more than two-thirds of the land under non-agricultural uses are Andhra Pradesh, Madhya Pradesh, Uttar Pradesh, Bihar, Tamil Nadu, Rajasthan, Orissa and Karnataka.

The other types of areas, which are covered under barren and unculturable lands, are generally unsuitable for agricultural use either because of the topography or because of their inaccessibility. Instances are the desert areas in Rajasthan, the saline lands in parts of the Rann of Kutch in Gujarat, the weed infected and ravine lands in Madhya Pradesh and alkaline lands in Uttar Pradesh. The proportions of barren and uncultivated lands to the reporting areas are higher in the states of Rajasthan, West Bengal, Assam, Gujarat, Manipur, Nagaland, Meghalaya, Arunachal Pradesh and Mizoram. The states of Rajasthan, Gujarat, Uttar Pradesh, Madhya Pradesh, Meghalaya, Assam and Maharashtra together account for more than 67 per cent of the land under this category in the country.

3.8.4 Area under Forests

The recorded forest area of the country is 76.52 mha as reported by the State Forest Departments (FSI, 1999). This area has been classified into Reserved, Protected and Unclassed forest, which constitute 54.44, 29.18 and 16.38% of the forest area respectively. As per data from remote sensing on the basis of data and the FSI assessments, only 63.73 mha is estimated to be under actual forest cover as of 1999. The discrepancy is basically due to differences in methods of data collection, legal records and ground truthing. Any plantation which is less than 20 ha block cannot be interpreted by satellite imagery as per existing technology.

Box 3.2 Classification of Recorded Forest Area	
Reserved Forest	An area notified under the provisions of Indian Forest Act having full degree of protection. In reserved forest, all activities are prohibited unless permitted.
Protected Forest	An area notified under the provisions of the Indian Forest Acts having limited degree of protection. In protected forests, all activities are permitted unless prohibited.
Unclassed Forest	An area recorded as forest but not included in reserved or protected forest category. Ownership status of such forests varies from state to State.

Table 3.12. Forest Area Statistics

CLASS	Area in Sq.Km	Percentage of Geographical Area
Dense Forest	377,358	11.48
Open Forest	255,064	7.76
Mangrove	4,871	0.15
Total	637,293	19.39

Source: State of Forest Report, FSI, 1999

The ownership of forest rests mainly with the Government. However, in the North-Eastern States, the communities and clans also own significant areas of unclassified forests. Forests in India have been shrinking for several decades owing to pressures of population on land for competing uses such as agriculture, industry, roads etc. That forests are inadequate in India is evident from the fact that the prevailing forest area available per capita is only 0.08 hectares, whereas at current levels of consumption of forest produce and productivity of forests, it is estimated that each Indian would require at least 0.47 hectares of forest to meet his basic needs (SOE, 1995). The potential areas for expansion of forest cover are culturable wastelands covering 13.94 mha and part of fallow land and land other than current fallows, covering 9.89 mha (FSI, 1999).

3.8.5 Area under Grazing

The other uncultivated land, excluding current fallows, covers areas classified under permanent pastures and grazing lands, the areas under miscellaneous tree crops and groves and culturable wasteland. About 11.8 mha of land in the country is recorded as permanent pastures and grazing land (Table 3.12). These lands are in community use. The states which have considerable proportions of areas under permanent pastures and grazing lands are Himachal Pradesh, Karnataka, Madhya Pradesh, Gujarat, Rajasthan, Tripura and the Union Territory of Dadra and Nagar Haveli. Madhya Pradesh accounts for a large percentage of land under pastures and grazing lands. About one-third of the country's land under miscellaneous tree crops and groves lies in Uttar Pradesh. The states of West Bengal, Orissa, Andhra Pradesh, Karnataka and Tamil Nadu also have sizeable areas under this category. The states with substantial proportions of areas under cultivable wastelands are Rajasthan, Orissa, Goa and the Union Territory of Daman and Diu. The states of Rajasthan, Madhya Pradesh, Uttar Pradesh, Andhra Pradesh, and Orissa together account for more than three fourths of the nation's land resources under this category.

3.8.6 Area classified under Common Property Resources (CPRs)

There are no official estimates of CPRs in India. The CPRs provide basic need and services to vulnerable sections of the rural poor. For instance, they provide resources such as village forests, grazing lands, rivulets, and watershed drainage, and help farmers through crisis periods. It is important to note that a distinction be made between Common Property Resource (CPR) and wasteland. While CPR is a matter of defining a particular type of property rights on land in the class of variety of property rights, the latter is a case of identifying a specific ecological characteristic for making developmental programme for recovery of degraded lands, irrespective of property rights.

Property : State : Owned by Govt., forests or national park.
Private : Private lands, wells within private lands, crop lands
Common Property : Community property where individuals have claims on collective goods as members of recognised community, village, and panchayats. In all CPRs, no single individual has exclusive property rights. Example, community grazing and pasture lands, community wells, and other water sources such as ponds, tanks, etc.

Velayutham (2000) has shown that area of CPRs has come down from 1950-51 to 1997, whereas livestock population during the same period has increased from 292 million to 467 million thereby further increasing the grazing pressure and consequent land degradation. Overgrazing by herds far larger than what the land can sustain, year after, has progressively rendered most CPRs into marginal or wastelands, grossly eroded making them unsuitable for bovines and fit for only sheep or goats.

Table 3.13: Land Utilisation Trend in India

Classification	1950-51	1960-61	1970-71	1980-81	1985-86	1990-91	1997-98 (in %)
1. Geographical area	328.73	328.73	328.73	328.73	328.73	328.73	328.73
2. Reporting area	284.32	298.46	303.76	304.15	304.66	304.87	304.92 (100.0)
(i) Forests	40.48	54.05	63.91	67.47	67.04	68.00	68.86 (22.6)
(ii) Not available for cultivation (a+b)	47.52	50.75	44.64	39.62	40.71	40.90	41.56 (13.63)
(a) Non-agricultural uses	9.36	14.84	16.48	19.66	20.54	21.20	22.53 (7.4)
(b) Barren and uncultivable	38.16	35.91	28.16	19.96	20.17	19.70	19.03 (6.2)
(iii) Other cultivated land (excluding fallow land) (a+b+c)	49.45	37.64	35.06	32.31	31.11	30.50	28.36
(a) Permanent pastures and other grazing land	6.68	13.97	13.26	11.97	11.97	11.80	10.91 (3.6)
(b) Miscellaneous tree crops and groves	19.83	4.46	4.30	3.60	3.45	3.70	3.57 (1.2)
(c) Cultivable wasteland	22.94	19.21	17.50	16.74	15.69	15.00	13.88 (4.57)
(iv) Fallow land (a+b)	28.12	22.82	19.88	24.75	24.88	23.40	24.12
(a) Fallow land other than current fallows	17.44	11.18	8.76	9.92	10.02	9.60	9.76 (3.2)
(b) Current fallows	10.68	11.64	11.12	14.83	14.86	13.80	14.36 (4.7)
(v) Net area sown (vi-iii)	118.75	133.20	140.27	140.00	140.92	142.20	142.02 (46.6)
(vi) Gross cropped area	131.89	152.77	165.79	172.63	178.83	185.50	190.76
(vii) Area sown more than once	13.14	19.57	25.52	32.63	37.91	41.62	48.74
(viii) Net irrigated area	20.85	24.66	31.10	38.72	42.08	45.14	54.57
(ix) Gross irrigated area	22.56	27.98	38.19	49.78	54.65	59.64	72.78

Source : Agricultural statistics at a glance, 2001- Directorate of Economics & Statistics, Ministry of Agriculture, GOI.

Table 3.14: Pattern of land utilisation - State-wise - 1990-91 (000 hectares)

State/Union Territory	Total Reported Area	Forest Area	Area not available for cultivation	Permanent pastures and Other grazing lands	Land under misc. tree crops	Cultivable waste land
Andhra Pradesh	27440	5836	4529	881	264	864
Arunachal Pradesh	5486	5150	55	-	35	47
Assam	7852	1984	2455	184	247	104
Bihar	17329	2923	3012	146	255	396
Gujarat	18825	1882	3785	847	4	1955
Goa	361	105	33	1	1	99
Haryana	4391	169	391	28	1	23
Himachal Pradesh	3325	923	393	1202	40	128
Jammu & Kashmir	4505	2747	584	125	75	149
Karnataka	19050	3061	1963	1156	351	461
Kerala	3885	1081	345	4	47	129
Madhya Pradesh	44210	14003	4603	2785	142	1687
Maharashtra	30758	5350	2790	1548	179	1023
Manipur	2211	602	1445	e	24	e
Meghalaya	2249	812	316	17	145	454
Mizoram	2102	1303	211	4	3	74
Nagaland	1698	863	28	-	186	96
Orissa	15540	5574	1173	711	719	463
Punjab	5033	220	519	3	1	40
Rajasthan	34234	2248	4458	1824	26	5777
Sikkim	710	257	270	69	5	1
Tamil Nadu	12994	2091	2348	138	186	299
Tripura	1049	606	130	e	51	2
Uttar Pradesh	29830	5133	3489	351	541	1104
West Bengal	8846	1091	1631	7	57	176
A & N Islands	790	694	17	5	26	9
Chandigarh	11	1	8	-	-	a
D & N Haveli	49	20	3	1	-	a
Delhi	148	2	68	11	10	-
Daman & Diu	10	-	3	-	a	4
Lakshadweep	3	-	a	-	2	2

Source : Agricultural Statistics at a Glance (1993). Directorate of Economic and Statistics, Ministry of Agriculture.