

Historical perspectives of land resource management in India: A Review

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Abstract

This paper focused on the historical aspects of land resources, land evolution, management since instigating, before and after the Ice age 5000 B.C. *Pre-Vedic* literature on origin of land, cutting of forest for land utilization mainly for agricultural activities has been elaborated largely. Then, agriculture land was started using for different purposes, such as constructing of houses, roads, dams, tanks etc. In addition this paper discusses the issues of wars for land and its management/administration by different dynasties (King's) in India. Besides acknowledged the traditional land management techniques, registration process, land transfer and color coding methods for isolation of land and it's utilization for different purposes. Further, circumstances of land degradation, regional conflicts and Governments programmes (Policies, Acts, Rules etc) for resource conservation and management were addressed including specialist perceptions on sustainable management.

Key Words: *Pre-Vedic*, Land evolution, Traditional management, Land degradation

Background¹

The origin and early evolution of land takes place in the mid-Paleozoic era, between 480 and 360 million years ago. It was an important event in the history of life, with far-reaching consequences for the evolution of terrestrial organisms and global environments (Kenrick, et al. 1997). The name *India* is derived from *Indus*, which originates from the Old Persian word *Hindu*. *Hindustan* was originally a Persian word that meant "Land of the Hindus";

The earliest anatomically modern human remains found in South Asia, approximately 30,000 years ago. Around 7000 BC, the first known Neolithic settlements appeared on the subcontinent in Mehrgarh and other sites in western Pakistan. These gradually developed into the Indus Valley Civilisation. The first urban culture in South Asia is flourished during 2500–1900 BC in Pakistan and western India. Centred around cities such as Mohenjodaro, Harappa, Dholavira, and Kalibangan, and relying on varied forms of subsistence, the civilization engaged robustly in crafts production and wide-ranging trade during the period 2000–500 BC, in terms of culture, many regions of the subcontinent transitioned from the Chalcolithic (Bronze age) to the Iron Age.

India officially the Republic of India (Bharat Ganarajya) is a country in South Asia. It is the seventh-largest country by geographical area, the second-most populous country with over 1.2 billion people, and the most populous democracy in the world.

¹ This is review paper based on the literature published in the subject. Sources are cited wherever necessary. However, citation may be at the end of sentence or in some cases at the end of the paragraph.

Bounded by the Indian Ocean at the south, the Arabian Sea on the south-west, and the Bay of Bengal on the south-east. It shares land borders with Pakistan to the west; China, Nepal, and Bhutan to the north-east and Burma and Bangladesh to the east. In the Indian Ocean, India is in the vicinity of Sri Lanka and the Maldives; in addition, India's Andaman and Nicobar Islands share a maritime border with Thailand and Indonesia.

The Indian subcontinent was identified with its commercial and cultural wealth for much of its long history. Four of the world's major religions Hinduism, Buddhism, Jainism, and Sikhism originated here, whereas Zoroastrianism, Christianity, and Islam arrived in the 1st millennium CE and also helped shape the region's diverse culture. Gradually annexed by and brought under the administration of the British East India Company from the early 18th century and administered directly by the United Kingdom from the mid-19th century.

India is a federal constitutional republic governed under a parliamentary system consisting of 28 states and 7 union territories. It is one among the five BRICS nations and also known to a pluralistic, multilingual, and multiethnic society.

The emerging urbanization and the orthodoxies created the religious reform movements of Buddhism and Jainism, both of which became independent religions. Politically, by the 3rd century BC, the kingdom of Magadha had annexed or reduced other states to emerge as the Mauryan Empire. The Mauryan kings are known for their empire-building and determined management of public life as for Ashoka's renunciation of militarism and far-flung advocacy of the Buddhist *dhamma*. The Sangam literature of the Tamil language reveals that, between 200 BC and 200 CE, the southern peninsula was being ruled by the Cheras, the Cholas, and the Pandyas, dynasties that traded extensively with the Roman Empire and with West and South-East Asia. By the 4th and 5th centuries, the Gupta Empire had created in the greater Ganges Plain a complex system of administration and taxation that became a model for later Indian kingdoms².

Natural sacred places consisting of geographical features are revered and are almost always associated with oral narratives about the location called *Stala Puranas*. The shared meanings and communicated oral histories of natural-scapes draw back to the deep connection of nature with the concept of earth or land (also called as *bhumi*). These oral histories therefore are not only embodied in architectures of the human being, but also include natural elements and natural objects, especially water, rocks, and trees, which form features such as rivers, lakes, mountains and forests. These locations are not *universal* places or generic features such as sacred groves or river confluences, but are *particulars* (specific to their cartographic positions). The particular and unique nature of each feature is given by mythical imaginations of journeys, events, and creation and often requires performances of

² <http://en.wikipedia.org/wiki/India#CITEREFSingh2009>. Accessed 20.10.2011

many ritual practices that may be religious or social in nature and reinforce the narratives again and again. The myths answer the question why the place is sacred and often include a name that is based on the theme of the myth. In such narratives, divine and superhuman events are claimed to have happened in a particular place and are recollected by a set of oral stories or mythical histories (Baindur, 2009).

Land is a finite resource and put to many competing uses. It comprises soils, minerals, water and biota. In India, 60 per cent (apart from forest) of the land is the source for the livelihood through agriculture and related activities. Population growth and the consequent demand for land, water and biological resources has put tremendous pressure on land. Agenda 21 recognizes the need to allocate land for sustainable uses and promote the integrated planning and management of land resources.

Table 1: Indian land system during different periods from medieval to modern India³

Medieval India	Early modern India	Modern India
The Indian early medieval age, 600 CE to 1200 CE, When Harsha of Kannauj, who ruled much of the Indo-Gangetic Plain from 606 to 647 CE, attempted to expand southwards, he was defeated by the Chalukya ruler of the Deccan. No ruler (Chalukya, Pala, Pallavas, Pandyas, Cholas) of this period was able to create an empire and consistently control lands much beyond his core region. By the 8th and 9th centuries, the effects were felt in South-East Asia, as South Indian culture and political systems were exported to lands that became part of	In the early 16th century, northern India, being then under mainly Muslim rulers, fell again to the superior mobility and fire power of a new generation of Central Asian warriors. Eschewing tribal bonds and Islamic identity, especially under Akbar, the Mughals united their far-flung realms through loyalty, expressed through a Persianised culture, to an emperor who had near-divine status. The relative peace maintained by the empire during much of the 17th century was a factor in India's economic expansion, resulting in greater patronage	Historians consider India's modern age to have begun sometime between 1848 and 1885. The appointment in 1848 of Lord Dalhousie as Governor General of the East India Company rule in India set the stage for changes essential to a modern state. However, disaffection with the Company also grew during this time, and set off the Indian Rebellion of 1857. Although the rebellion was suppressed by 1858, it led to the dissolution of the East India Company and to the direct administration of India by the British government. In the decades following, public life gradually emerged all over India,

³ <http://en.wikipedia.org/wiki/India#CITEREFSingh2009>. Accessed:25.11.2011

<p>modern-day Thailand, Laos, Cambodia, Vietnam, Malaysia, and Java. After the 10th century, Muslim Central Asian nomadic clans, using swift-horse cavalry and raising vast armies united by ethnicity and religion, repeatedly overran South Asia's north-western plains, leading eventually to the establishment of the Islamic Delhi Sultanate in 1206. The sultanate's raiding and weakening of the regional kingdoms of South India paved the way for the indigenous Vijayanagara Empire.</p>	<p>of painting, literary forms, textiles, and architecture. By the early 18th century, with the lines between commercial and political dominance being increasingly blurred, a number of European trading companies, including the English East India Company, had established coastal outposts. Company to gain control over the Bengal region by 1765 and sideline the other European companies. By this time, with its economic power severely curtailed by the British parliament and itself effectively made an arm of British administration, the Company began to more consciously enter non-economic arenas such as education, social reform, and culture.</p>	<p>leading eventually to the founding of the Indian National Congress in 1885. The rush of technology and the commercialisation of agriculture in the second half of the 19th century, little industrial employment was generated for Indians. After World War I, in which some one million Indians served, a new period began. It was marked by British reforms but also repressive legislation, by more strident Indian calls for self-rule, and by the beginnings of a non-violent movement of non-cooperation, of which Mohandas Karamchand Gandhi would become the leader and enduring symbol. Economic liberalisation, which was begun in the 1990s, has created a large urban middle class, transformed India into one of the world's fastest-growing economies, and increased its geopolitical clout. There are unresolved territorial disputes with China, which escalated into the Sino-Indian War of 1962; and with Pakistan, which flared into wars fought in 1947, 1965, 1971, and 1999.</p>
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Indian geography

India's defining geological processes commenced 75 million years ago when the Indian subcontinent part of the southern supercontinent Gondwana, began a north-eastward drift across of the Indian Ocean. The subcontinent's subsequent collision with, and subduction under, the Eurasian Plate bore aloft the planet's highest mountains, the Himalayas. The original Indian plate survives as peninsular India, which is the oldest and geologically most stable part of India; it extends as far north as the Satpura and Vindhya ranges in central India. Constituted in such fashion, India lies to the north of the equator between 6° 44' and 35° 30' north latitude and 68° 7' and 97° 25' east longitude.

Table 2: History of an Indian subcontinent⁴

<i>Ages</i>	<i>Period</i>
<i>Stone age</i>	7000–3000 BC
<i>Bronze age</i>	3000–1300 BC
<i>Iron age</i>	1200–26 BC
<i>Classical period</i>	1–1279 CE
<i>Late medieval age</i>	1206–1596 CE
<i>Early modern period</i>	1526–1858 CE
<i>Other states</i>	1102–1947 CE
<i>Colonial period</i>	1505–1961 CE
<i>Kingdoms of Sri Lanka</i>	543 BC–1948 CE

History of Land - Global View⁵

About 5,000 BC: The *last Ice age ended* when the ice sheets finally retreated from Scandinavia and the glaciers in Scotland disappeared. People, animals and plants invaded the appearing land after the ice had disappeared.

⁴ http://en.wikipedia.org/wiki/List_of_Indian_monarchs. Accessed: 10.12.2011

⁵ http://www.eh-resources.org/timeline/timeline_prehistory.html Accessed: 08.12.2011

Around 7,500 BC: The melting of the ice sheets resulted in the flooding of the North Sea basin and the *disappearance of the land bridge connecting Britain to the continent* by 8000 years ago.

During 6,000 - 2,500 BC: *Holocene Climate Optimum*. Sea level reached slightly higher than today coinciding with the warmest period of the past 10,000 years with temperatures about 2 degrees Celsius higher than today.

Environmental upheavals linked to severe climate variability characterized during the period from 1300 to 1400. Written records from the 14th century provide accounts of severe weather in the period from 1314 to 1317, which led in turn to crop failure and famine. This episode of failed harvests and its consequences known as "The Great Famine". Notwithstanding these ecological calamities, the population of northern Europe was at an all time high by the second quarter of the 14th century. However, the arrival of the Black Death, in Europe in 1347 pushed the European population into a century-long demographic decline and caused long term changes in economy and society.

Land establishment in India

The Pythagoras, the Greek philosopher is believed to have learned in India not only his theory of transmigration but also his theory of numbers from Indian Sankya system. In addition, Dr. Goldstucker and Mr. Bhandarkar refer the Grammarian Panini to this period and if it is correct will bring the history of South India with the North. In the centuries on either side of 750 B.C. the Aryans begin penetrating into the Mahakantata (round about the Vindhya), the memory of which is preserved in the tradition regarding Agastia's advent into the south. The Agastia a Rishi introduced reclamation of the jungle into arable land. Agastia's criticism of Panini appears to be in evident in one of the very few quotations that have come down. It would thus appear that the Aryan migration into South India has to be referred to this period of the Sutras (Aiyangar, 1941).

A history of India, must necessarily be the story of the predominant dynasties in the country. Elphinstone acted upon this principle in his classic work, and practically confined his narrative to the transactions of the Sultans of Delhi and their Moghal (or Mughal) successors. Twice, in the long series of centuries dealt with in this history, the political unity of India was nearly attained; First in the third century B. C., when Asoka's (or Ashoka) empire extended to the latitude of Madras; and again, in the fourth century A.D. (or CE), when Samudragupta carried his victorious arms from the Ganges to the extremity of the Peninsula. Other princes, although their conquests were less extensive not yet succeeded in establishing paramount powers (Smith, 1904).

Land Information System

According to *Crain (online)*, information systems facilitates as a data bank, information manipulation, retrieving, updating and presenting the information. In addition, many literatures are extensively reviewed and reported the different information channel. Another commonality among information systems is an independent application, whether it is a personnel system, financial system, management system. These stages are typical and perhaps necessary for successful land information system. Systems may die, or assassinate, mainly for their inability to evolve. In generalized sense, geographic information systems are no different to succeed must be capable of following the same evolutionary pattern.

We need to record the details of land parcels with a cadastre system for better administration of land. Land is the ultimate resource for all the wealth. Improvement in the management of land is essential for the betterment of both rural and urban poor. Inadequacy of land information poses a serious constraints on what can be accomplish. Without the knowledge of who owns the land, development cannot take place. In such consequence, emphasis in many development programmes is now being placed on ensuring that rights of land are identified, recognized by the state and recorded in some suitable form. The whole of this process is referred to as cadastre⁶.

History of Agricultural Revolution in India

During the later Middle Ages, slowly but steadily farmers started to experiment with new agricultural methods, in order to adapt for unpredictable climates and also stimulated by the growth of profitable markets in growing cities and long distance trade.

This agricultural revolution could not have succeeded when new ships to withstand the harsher climatic conditions imported large amounts of grain form the Baltic, undermining local grain production. These grain imports made the Flemish and Dutch economy independent from climatic fluctuations causing famine⁷.

Indian agriculture began by 9000 BC as a result of early cultivation of plants, and domestication of crops and animals. Soon after settled the life then followed the implements and techniques being developed for agriculture. Double monsoons led to two harvests being reaped in one year. Indian products soon reached the world via existing trading networks and foreign crops were introduced to India. Plants and animals considered essential to their survival by the Indians came to be worshiped and venerated. Wheat, barley and jujube were domesticated in the Indian subcontinent by 9000 BC. Then, domestication of sheep and goat were followed.

⁶ <http://www.gisdevelopment.net/application/lis/overview/lisrp0004.htm> Accessed: 01.11.2011

⁷ http://www.eh-resources.org/timeline/timeline_prehistory.html. Accessed: 28.12.2011

This phase also saw the first domestication of the elephant. Crops like barley and wheat were started cultivating with the assist of domesticate cattle, primarily sheep and goat and these were visible in Mehrgarh by 8000-6000 BC.

Irrigation was developed in the Indus Valley Civilization by around 4500 BC. The size and prosperity of the Indus civilization grew as a result of this innovation, which eventually led to more planned settlements making use of drainage and sewers. Sophisticated irrigation and water storage systems were developed by the Indus Valley Civilization, including artificial reservoirs at Girnar dated to 3000 BC, and an early canal irrigation system from circa 2600 BC.

The third five - year plan (1961-66) stressed further on agriculture and improving production of wheat, but the brief Sino-Indian War of 1962 exposed weaknesses in the economy and shifted the focus towards the [Defense industry]. In 1965-1966, India fought a [Indo-Pak] War with Pakistan. Due to this war there was a severe drought in 1965. The war led to inflation and the priority was shifted to price stabilization. The construction of dams continued and many cement and fertilizer plants were also established. Then, Punjab began producing an abundance of wheat.

Box 1: Initiation of Farming System

Chandraguptas brother-in law Pushyagupta, who was deeroy of the western provinces, saw that by damming up a small stream reservoir of great value for irrigation. He accordingly formed a lake called Sudarsana, 'the Beautiful,' between the citadel on the side of the hill and the 'inscription rock' further to the east, hut failed to complete the necessary supplemental channels (Smith, 1904). These were constructed in the reign of Chandragupta's grandson Asoka under the superintendence of his representative Tushaspa, the Persian, who was then became a governor. These beneficent works constructed under the patronage of the Maurya emperors and endured for four hundred years. But in the year 150 A. D. a storm of exceptional violence destroyed the embankment, within the lake.

Occupations during the Ancient India

During the ancient India we have observed that some of the Aryan families had already begun to practice of agriculture. The fertility of the Indian soil was moist and stimulus for cultivation. In the *Rig-Veda* we found that agriculture became the main occupation of the people, though they still kept large herds of cattle and drove them out to pasture. Wheat and barley were the chief grains of their diet, but they did not disdain the use of animal food, and there are frequent allusions in the hymns

to the killing of cattle and to the cooking of their flesh for human consumption. They even made use of an intoxicant, indulging freely in a fermented liquor made from the juice of a plant called Soma. In one of the hymns the process of preparing the juice is described as a sacred rite: more than this, Soma was even deified, and one whole book of the Rig Veda is dedicated to it. Their constant wars with the aborigines and with each other naturally turned their attention to the improvement of weapons and the construction of shields and protective armour. They were thus led to acquiring considerable skill in metal work; and hear of their putting it to other than warlike uses, for mention is made of metal ornaments, of golden crowns, necklaces, bracelets, and anklets (De La Fosse, 1918).

Land Management

Basically, Indians are Philosophical People who believes in Deeds and Acts and determines that the Karma is the resultants of life. And India is also known as Karma Bhoomi and “Karma” literally means “Deed” or “Act”, and more broadly names the *Universal Principle of Cause and Effect, Action and Reaction*, which Hindus believe governs all consciousness. Karma is not Fate, for man acts with free will creating his own destiny. According to the Vedas, if we sow *goodness*, we will *reap integrity*; if we sow *evil*, we will *reap wickedness*. Karma refers to the totality of our actions and their concomitant reactions in this and previous lives, all of which determine our future⁸.

The relationship between humankind and land will always be dynamic and changes at different rates across countries and regions as a result of varying economic, social and environmental pressures. The direction which that dynamism takes is dependent on the society’s priorities. The current western trend towards tempering economic imperatives and planning decisions with more community-based concerns such as the environment and native title is likely to lead to a new direction for land administration (Ting, online).

It has been universally accepted that principle rulers of the State are entitled to a portion of the produce of the land from those who utilize it as a price for the protection of their life and property and also to meet the common expenses of the community. The concept of collection of revenue that necessitated the maintenance of land records, although in a rudimentary form, in ancient times. The Arthashastra is the first Indian work to mention regarding the village officers known as “gopa” whose duties include preparation of various registers for the village fields, transfers, due taxes, etc. Attempt to reform the system were first made by Sher Shah whereby land was categorized, measured and a schedule of crop rates fixed. This was further

⁸<http://udayabhaaskarbulusu.wordpress.com/the-ancient-indian-civilization-culture-science-technology-and-management/the-ancient-indian-civilization-culture-science-technology-and-management-1-introduction/>. Accessed: 25.12.2011

developed during the regime of Akbar, who with the assistance of Raja Todar Mal, fixed cash rates on a more scientific and rational basis. Elaborate methods were devised for determining the average produce of each class of land and for commuting grain rates into money rates. In fact Akbar's settlement widely resembles the later settlement effected under British rule. Subsequently during 1822 regulations were introduced for detailed surveys and regulations. The primary interest of the British rulers was the collection of land revenue and consequently the system of land records was also organized to serve that purpose.

The foremost records being maintained are as follows:

1. Village map: A pictorial form showing the village and field boundaries.
2. Field books or khasra which is an index to the map, in which changes in the field boundaries, their area, particulars of tenure-holders, methods of Irrigation, cropped area, other uses of land etc. are shown.
3. Records of Right also known as khatouni, in which the names and classes of tenure of all occupants of land are recorded⁹.

Evolution Concepts of Land Property

Territoriality is the preliminary expression of social power in the country. Its changing function facilitates us to understand the historical relationship between society and space. "Perhaps, throughout history, one of the strongest drivers for territoriality and associated expansionist claims is the desire for commercial growth". It can be argued that from a western perspective, the drive for international territoriality that characterized the colonial era has been reinterpreted in modern times to the expansion of capital in the form of multi-national corporations (Ting, online). This ascendance of capital has tended to reduce land to simply another trading commodity, albeit a useful investment alternative to: "money, bonds, debentures, shares, [land], houses, paintings or antiques.

Ownership in the Crown: The Normans extended and developed the feudal system after the Conquest of England in 1066. Under the feudal system, all land was owned directly or indirectly by the king. He granted use of these lands to his subjects in return for the rendering of military or other services. The tenant and his heirs were bound in feudal service even if they had sub infeudated to another party. "The collective power vested in the institutions of royal authority or 'state' would in theory function as a medium through which those holding property could acquire wide ranging influence and achieve high status...that collective power would be able to shape the institutional structures of society (Ting, online).

⁹ <http://www.gisdevelopment.net/application/lis/overview/lisrp0004a.htm>. Accessed: 15.11.2011

Table 3: Deeds/Title Registration

System	Deeds System	Title System
Content	Who owns what	What is owned by whom
Register	A register of owners	A register of properties
Legal effect	Registration of the transaction the title is not guaranteed	Registration of the title Guaranteed by state.
Actors	Notaries/Registrars	Lawyers/Surveyors
Role of the Cadastre	Taxation Purposes	Identification purposes
Boundaries	Sketch for the deed	German and Torrens: Fixed English: General

Source: (Enemark, 2003)

Systems of land tenure

The system of land tenure governs the traditional or legal rights to individuals or groups to have land. Each component is the system of land ownership and system of labor organization. Systems of land tenure are not immutable. On the contrary, they are subjected to a continual process of change. Changes in the natural conditions and economic factors, technological innovations, and changes in the size of the population, also influence the emanating the political power structures and brought the changes in the land tenure system. Land tenure systems are institutionally established and are difficult to alter. So political power structures; cooperative ties and class, cultural, and ethnic interests and motives all work towards maintaining the established forms. Agriculture-cultivation and use of the land - is a form of production based on the process of growth of animals and plants. In its original form, man creates food and other articles of consumption by using his labour to cultivate a piece of land.

Land Tenure system during Ancient India

Ancient record illustrate that land has been under cultivation in India for more than 5,000 years. In the beginning, tribes exercised and control (especially delimitation and defence) over the areas they had taken possession. This precise of the conqueror was the initial form of land right. The tribes allotted to the individual families for their utilization, usually by means of shifting cultivation.

The Moghuls who conquered India in the 12th century left the land to the cultivators at first in exchange for the usual taxes. Often, former small rulers were employed as tax collectors and were given 10% of the collected amount as remuneration for their trouble. They were even allowed to keep the land they had held before and were exempted from paying taxes. They were strictly controlled to prevent them from

collecting more taxes than was lawful. Emperor Akbar (1556-1605) implemented radical reforms. He replaced the payment of taxes in kind by a monetary tax which was no longer fixed as a share of the actual but rather of the average yield. Thus, it was not calculated according to the yield, but according to the area sown, and the cropping risk was shifted to the cultivators. In addition, the taxes were increased to amount to half of the average yield. Although this resulted in evil times for the rural population, the Moghuls did not make any claims to the land itself after their conquest. Tax administration was high level; a land register was introduced; and taxes were levied according to criteria such as quality of the soil, and so on. After Aurangzeb's death in 1707, the power of the central government decreased rapidly, and the control over the tax revenues was lost. In order to obtain revenues at all, tax collectors' posts were leased to the highest bidders in exchange for fixed sums. On the basis of their knowledge of the local conditions, the tax collectors were free to extort as much as possible from the rural population and keep for themselves the difference between the collected taxes and the amount to be remitted¹⁰.

In the case of villages which held land rights jointly, the village community claimed the right to all land within the village boundaries and allotted it to individual families for utilization. The administration was not carried out by a village headman, but by the panchayat, a village council in which the individual families had their say. Soon, however, it became obligatory to deliver a share of the grain yield- in other words-, a tax was introduced. The king was thus only given a right to a share of the yield, but no rights to the land and its utilization. However, he was entitled to all the uncultivated land that lay between the villages. It was necessary to establish an official hierarchy to collect the taxes.

In order to appreciate the evolution of Revenue Administration during the British period, it was pertinent to know the different land revenue systems introduced by British India such as 1. Zamindari System, 2. Ryotwari System and 3. Mahalvari System.

1. Zamindari System

Cornwallis, who was appointed as the Governor General in 1786, was especially directed to devise a satisfactory solution of the land revenue system which would ensure the Company's interest as well as that of the cultivators. Commenting on the company's revenue policy, Cornwallis remarked in 1789 that "one-third of the company's territory in Hindustan is now jungle, inhabited only by wild beasts". Cornwallis held prolonged discussions on three vital questions.

1. With whom was the settlement to be made-the Zamindars or the actual tillers of the soil?
2. What should be the State's share in the produce of land?

¹⁰ <http://www/professor-fritjof-kuhnen.de/publications/man-and-land/2-2-2/htm>. Accessed: 18.12.2011

3. Should the settlement be permanent?

Under Zamindari or permanent settlement system introduced in 1793, feudal lords (Zamindars, Jagirdars etc.,) were declared as proprietors of land on the condition of fixed revenue payments to the East India Company. This system prevailed over most of North India, including present-day Uttar Pradesh (except Oudh and Agra), Bihar, West Bengal most of Orissa and Rajasthan (except Jaipur and Jodhpur), and covered around 57% of the total area cultivated. (Rao, online p.15)

In most states the Zamindari system was mostly abolished in India soon after its creation with the 1st amendment to the constitution of India which amended the right to property as shown in Article 19 and 31. This allowed the states to make their own "Zamindari Abolition Acts". The term is usually associated with the aristocracy as Zamindars are still considered to be of the landed gentry¹¹.

Darbhanga Raj, also known as Raj Darbhanga and the Royal Family of Darbhanga, were a family of Zamindars and rulers of territories that are now part of Mithila and Darbhanga district, Bihar, India. Their seat was at the city of Darbhanga. The estate of Darbhanga Raj was estimated to cover an area of 2,410 square miles (6,200 km²), incorporating 4,495 villages within 18 circles in Bihar and Bengal and employing over 7,500 officers to manage the estate. It was the largest Zamindari in India and was the best managed estate at the time of abolition of Zamindari¹².

2. Ryotwari System

The other major system was the Ryotwari system introduced in Madras Province in 1802 and in Bombay in 1817-18. In this case, individual cultivators i.e, ryots were recognised as proprietors of their land with the rights to sublet, mortgage and transfer their lands by gift or sale. Their tenure of land was secure so long as revenue payments were paid directly to the Collectors. This system prevailed over most of South India including present day Maharashtra, Karnataka, Tamil Nadu, Kerala, Andhra Pradesh and most of Madhya Pradesh and Assam. The princely states of Jaipur and Jodhpur in Rajasthan also fell under Ryotwari-type systems. Pockets of Zamindari-type tenure existed within these Ryotwari areas, particularly which were administered by local rajas or nawabs. Ryotwari systems accounted for around 38% of total cultivated area (Rao, online, p.16)

3. Mahalwari System

This system was introduced between 1820 and 1840 in Punjab (including both present-day Punjabs in Pakistan and India, and the State of Haryana), parts of what are now Madhya Pradesh and Orissa and the princely states of Oudh and Agra in

¹¹ <http://en.wikipedia.org/wiki/Zamindar>. Accessed: 05.01.2012

¹² http://en.wikipedia.org/wiki/Raj_Darbhanga. Accessed: 10.12.2011

Uttar Pradesh. This tenure system was much less extensive and accounted for some 5% of the cultivated area. Under this system, the village lands were held jointly by the village communities, the members of which were jointly and severally responsible for the payment of land revenue. Land revenue was fixed for the whole village and the village headman (Lumbrdar) collected it for which he received 'panchatra' i.e. 5 per cent as commission. (Rao, online, p.17).

Box 2: Invading of Zamindari system and its drawback¹³

Introduction of Zamindari system by the British, where the peasants were ruined through exorbitant charges made from them by the new class of landlords. The craftsmen were destroyed by the influx of the British manufactured goods. The religion and the caste system which formed the firm foundation of the traditional Indian society were endangered by the British administration. The Indian soldiers as well as people in administration could not rise in hierarchy as the senior jobs were reserved for the Europeans. Thus, there was all-round discontent and disgust against the British rule, which burst out in a revolt by the 'sepoys' at Meerut whose religious sentiments were offended when they were given new cartridges greased with cow and pig fat, whose covering had to be stripped out by biting with the mouth before using them in rifles. The Hindu as well as the Muslim soldiers, who refused to use such cartridges, were arrested which resulted in a revolt by their fellow soldiers on May 9, 1857.

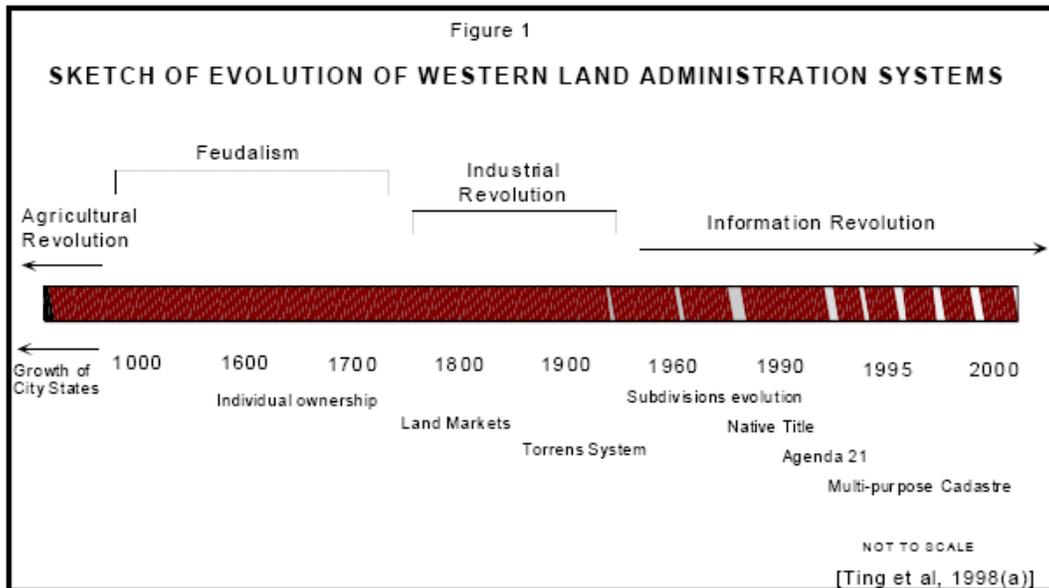
Advancement in Land Administration

Table 4: Evolution of Western Land Administration systems

Variables	Feudalism - 1800	Industrial revolution 1800- 1950	Post-war reconstruction 1950-1980	Information revolution 1980-
Human kind to land evolution	Land as Wealth	Land as a commodity	Land as a scarce resource	Land as a community scarce resource
Evolution of cadastral applications	Fiscal cadastre. Land valuation and taxation paradigm	Legal cadastre. Land market paradigm.	Managerial Cadastre. Land management paradigm.	Multi-Purpose cadastre. Sustainable development paradigm.

Source: (Enemark, 2003)

¹³ http://india.gov.in/knowindia/culture_heritage.php?id=4. Accessed: 08.01.2012

Figure 1: Evolution of Land Administration

Source: (Ting, online)

Land Revenue Administration (Tax Collection) in Colonial Period

Land revenue in India during British times was primarily based upon the mode of money collection by the tax farmers, who in turn would receive this money from the local land owners (or termed as Zamindars). In such a process of intermediary, the poor and helpless farmers remained absolutely exploited, with maximum of the moolah going to British tax farmers and the Zamindars, as denominated by the British. After such hard work and toil in the fields for day and night, the only thing they received in turn were floggings and caustic comments from the lord class. The British land revenue system in India had shattered and devastated the native agrarians from the core psyche, with practically nothing left for them to call their own. The rules were always set leaning towards the benefit and relaxation of the higher strata of the society with Zamindars and English demanding the most. Lord Cornwallis's Permanent Settlement Act 1793 had tried to do some bit of amending, which again was thrown to plundering by Governor General Warren Hastings and his five-yearly inspections and collection of revenue¹⁴.

The Revenue Department is the oldest arm of the Governments existing from times immemorial in the Country. The process of Revenue Administration was started by Sher Shah Suri (1540-45). It was continued and improved upon under the reign of the Mughal Emperor Akber (1556-1605). From times immemorial, the Land Administration / Revenue Administration centered around collection of taxes/land revenue, which was the main source of revenue to Rulers. The village was the basic

¹⁴ http://www.indianetzone.com/40/british_land_revenue_system_india.htm. Accessed: 05.01.2012

unit of administration and has remained so throughout the centuries. The history of Land Administration dates back to the olden days of kings and kingdoms. According to classical 3 doctrine, all lands belong to the King / State which can alienate some of it for cultivation and other purposes to individuals (Rao, online, p2).

Right from the time of Manu, the Land Revenue has been a major source of income of the sovereign. During the Mauryan and Gupta periods, the revenue was collected by the paid officials, which resembles the present day Revenue Administration system. During the Post Mauryan and Gupta periods, the State revenue was collected by donees of Brahmadeya, Devadana, and Agrahara Lands. The donees were feudal intermediaries who passed on a part of the revenue they collected to the King. Later, in place of the above Revenue Collectors, the Jagirdars, Subedars and Inamdars who were intermediaries passed on the revenue to the kings during the rule of Sultanates which extended for more than 300 years. During their rule the source of Revenue was twofold, religious and secular. The Revenue Administration was systematized scientifically during British rule by introducing "permanent settlement" (by Corn Wallis - 1793) and Ryotwari system by Sir Thomas Munro -1802). The colonial Government out of its interest to administer the country effectively, did not make any substantial changes in the land - revenue systems but promoted the class of non-cultivating intermediaries. The British inherited the institutional form of agrarian system from the Mughals. The British superimposed a system over the existing pattern in tune with British customs and laws relating to land. During the British times the Revenue Department was the pivot of Administration. After Independence, by and large, the same institutional structure has been adopted with a few changes for better delivery of services. One of the many areas concentrated upon by the successive Indian Governments has been the "land reforms" and "agrarian reforms". (Rao, online, p3 &4)

Mughal Empire land administration

The Mughal Empire began in 1526; at the height of their power in the late 17th and early 18th centuries, they controlled most of the Indian Subcontinent extending from Bengal in the east to Balochistan in the west, Kashmir in the north to the Kaveri basin in the south. Its population at that time has been estimated was between 110 and 150 million, over a territory of more than 3.2 million square kilometres (1.2 million square miles).

A major Mughal contribution to the Indian subcontinent was their unique architecture. Also, Mughal influence can be seen in cultural contributions such as:

- Centralized, imperialistic government which brought together many smaller kingdoms.
- Persian art and culture amalgamated with Indian art and culture.
- New trade routes to Arab and Turkic lands.

- The development of Mughlai cuisine
- Mughal Architecture found its way into local Indian architecture, most conspicuously in the palaces built by Rajputas and Sikh rulers.
- Landscape gardening

Although the land, the Mughals once ruled has separated into what is now India, Pakistan, Bangladesh, and Afghanistan, their influence can still be seen widely today. Tombs of the emperors are spread throughout India, Afghanistan and Pakistan. There are 16 million descendants spread throughout the Subcontinent and possibly the world¹⁵.

The Mughal Empire in India lasted from 1526 to 1858. The Mughal dynasty was established by able Muslim rulers who came from the present day Uzbekistan. The Mughal rule in India saw the country being united as one single unit and being administered less than one single powerful ruler. During the Mughal period, art and architecture flourished and many beautiful monuments were constructed. The great rulers of Mughal Empire are Akbar, Aurangzeb, Babar, Humayun, Jahangir and Shah Jahan¹⁶.

Table 5: Land Administration by King - Chronology (Approximate) of Saisunga And Nanda Dynasties

Sl. No.	King (Vayu Purana)	Length of Reign		Probable data of Accession B.C.	Remarks	
		Vayu P.	Assumed			
Saisunga Dynasty						
1	Sisunaga	40	136	81	600	Nothing known
2	Sakavarana	36				
3	Kshemadharman	20				
4	Kshattraujas	40				
5	Bimbisara	28	28	519	Built New Rajagriha; annexed Anga; contemporary with Mahavira and Gautama Buddha; voyage of Skylax, <i>circ.</i> 500.	
6	Ajatasatru	25	32	491	Parricida; death of Mahavira, <i>cir.</i> 490; death of Buddha, 487; built fort of Pataliputra; wars with Kosala and Vaisali.	
7	Darsaka(Harshaka)	25	25	459	Nothing known	

¹⁵ http://en.wikipedia.org/wiki/Mughal_Dynasty. Accessed: 08.01.2012

¹⁶ http://www.iloveindia.com/history/medieval-india/mughal_empire/index.html Accessed: 06.01.2012

8	Udaya	33	33	434	Built city of pataliputra.	
9	Nandivardhana	42	85	40	401	Nothing known
10	Mahanandin	43				
Nanda Dynasty						
11	Mahapadma & c.					
12	9;2 generations					
Maurya Dynasty						
13	Chandragupta	24	24	321		
14	Bindusara	25	25	297		
15	Ashoka	36	40	272	Tibetan tradition reckons	
	Death of Ashoka			cir.232	10 reigns from No.6,Ajatasatru, to No.15	
	End of Maurya Dynasty			cir.184	Ashoka, inclusive; and places Ashoka's accession in 234. A.B.(Rockhill, <i>Life of Buddha</i> ,pp.33,233).He is said to have visited khotan in 250 and 254 A.B (J.A.S.B.1886,part 1,pp.195,197)	

Source: (Smith, 1904)

According to Baindur, (2009) the conceptualization of nature within the Indian worldview is constructed to a great extent by mythical and cultural narratives as well as rituals. The idea of a non-human nature does not make sense to the Indian people at large because almost all of nature is still perceived from a deeply humanized perspective given by worldview that encompasses not just earthly but a larger cosmic reality. People speak of and interpret realities not as they are, but as they occur or as they are meant to occur within these world views.

The ancient kingdoms of the south, although rich and populous, inhabited by Dravidian nations not inferior in culture to their Aryan rivals in the north, were ordinarily so secluded from the rest of the civilized world, including Northern India, that their affairs remained hidden from the eyes of other nations; and native annalists being lacking, their history, previous to the year 1000 of the Christian era, has almost wholly perished. Except on the rare occasions when an unusually enterprising sovereign of the north either penetrated or turned the forest harrier, and for a moment lifted the veil of secrecy in which the southern potentates lived enwrapped, very little is known concerning political events in the south during the long period extending from 600 B. C. to 1000 A. D.

The long series of Chinese Buddhist pilgrims who continued for several centuries to visits to India, which they regarded as their Holy Land, begins with (Fa-hsien); who started on his travels in 399 A. D., and returned to China fifteen years later.

Figure 2: Land Status and its Utilization during the 326 B.C.



Source: (Smith, 1904)

Ashoka Empire in land management

Asoka was one of the most powerful kings of the Indian subcontinent. A ruler of the Mauryan Empire, Ashoka ruled over the country from 273 BC to 232 BC. The reign of Emperor Asoka covered most of India, South Asia and beyond, stretching from present day Afghanistan and parts of Persia in the west, to Bengal and Assam in the east, and Mysore in the south. However, the Battle of Kalinga changed King Asoka completely. From a power hungry emperor, he turned into a Buddhist follower and started preaching the principles of Buddhism throughout the world.

Ashoka's Policy

Buddhist Emperor Asoka built thousands of Stupas and Viharas for Buddhist followers. One of his stupas, the Great Sanchi Stupa, has been declared as a World Heritage Site by UNESO. The Ashoka Pillar at Sarnath has a four-lion capital, which was later adopted as the national emblem of the modern Indian republic. Throughout his life, 'Asoka the Great' followed as the policy of nonviolence or

ahimsa. Even the slaughter or mutilation of animals was abolished in his kingdom. He promoted the concept of vegetarianism. The caste system ceased to exist in his eyes and he treated all his subjects as equals. At the same time, each and every person was given the rights to freedom, tolerance, and equality¹⁷.

Ashoka was a very intellectual statesman. He ruled over Magadha wisely and competently. The council of ministers and officers of state were obedient, dutiful and able. Therefore peace and plenty brightened about the land. At the same time Kalinga was a rich and had fertile land between the Godavari and the Manhandi. The people of Kalinga were patriots and loved freedom. They were ready to fight and die in defense of their motherland. Ashoka worked hard especially for the spread of education in his land. During the period Nalanda was famous in history; it was the center of education and the University of Magadha. It is said that university of Magadha was established by Ashoka. Students of that university were very much respected. During his time trade with foreign countries was carried on by sea routes. He encouraged agriculture, trade and industries. There were canals to help out irrigation. All the money paid into the Government treasury was spent for the welfare of the people¹⁸.

The Indo-Greek and ISDO-Parthian Dynasties (50 B.C. TO 50 A.D)

The story of the native dynasties in the interior must now interrupted to admit a brief review of the fortunes of the various foreign rulers who established themselves in the Indian territories once conquered by Alexander, after the sun of the Maurya Empire had set, and the north-western frontier was left exposed to foreign attack. The daring and destructive raid of the great Macedonian, as we have seen, had affected none of the permanent results. The Indian provinces which he had subjugated, and which Seleukos had failed to recover, passed into the iron grip of Chandragupta, who transmitted them to the keeping of his son and grandson. I see no reason to doubt that the territories west of the Indus ceded by Seleukos to his Indian opponent continued in possession of the successors of the latter, and that consequently the Hindu Kush range was the frontier of the Maurya Empire up to the close of Asoka's reign (Smith, 1904).

¹⁷ <http://www.culturalindia.net/indian-history/ancient-india/ashoka.html>. Accessed: 15.01.2012

¹⁸ <http://www.yousigma.com/biographies/ashoka.html>. Accessed: 15.01.2012

Table 6: Land Management by King - The Maurya Dynasty (Chronological order)

Sl. No.	Year B.C	Event
1	326 or 325	Chandragupta Maurya in his youth met Alexander the Great.
2	Sep.325	Alexander quitted India.
3	Feb.324	Alexander, while in Karnataka, received of the murder of his satrap philippos, in India; and placed Eudamos and Ambhi, king of Taxila, in charges of the Indian provinces.
4	June,323	Death of Alexander at Babylon.
5	Oct,323-322	Revolt pg panjab under chandragupta Maurya.
6	321	Destruction of Nanda dynasty of Magadha; accession of chandragupta Maurya as emperor of India.
7	315	Seleukos Nikator compelled by Antigonos to retire to Egypt.
8	312	Recovery of Babylon by Seleukos
9	Oct. 1,312	Establishment of seleukidan era
10	306	Assumption by seleukos of title of king
11	305 or 304	Incasion of India by Seleukos .
12	303	Defeat of Seleukos by Chandragupta;treaty of peace; cession of a large part of Ariana by Seleukos.
13	303-301	March of Seleukos against Antigonos.
14	302	Megasthenes ambassador of Seleukos at Pataliputra.
15	301	Defeat and death of Antigonos at Ipsos in Phrygia.
16	297	Accession of Bindusara Amitraghata as emperor of India.
17	Circa 296	Deimachos ambassador of Seleukos at pataliputra.
18	285	Ptolemy philadelphos,king of Egypt,acc.
19	280	Seleukos Nikator,king of Syria,d; Antiochos Soter,his son,acc.
20	278 or 277	Antigonos Gonatas, king of Macedonia, grandson of Antiochos I,acc.
21	272	Alexander,king of Epirus, son of Pyrrhus, and opponent of Antigonos Gonatas,acc.
22	272	Accession of Ashoka-varadhana as emperor of India.
23	269	Coronation (abhisheka) of Ashoka.
24	264	Outbreak of First Punic War.
25	261	Conquest of Kalinga by Ashoka; Antiochos Thoes,king of Syria,son of Antiochos Soter, acc.
26	259	Ashoka abolished hunting, instituted tours devoted to works of piety, and dispatched missionaries.
27	258	Magas, king of Cyrene, half-brother of Ptolemy philadelphos, died;(?) Alexander,king of Epirus, died.
28	257	Rock Edicts III and IV of Ashoka, who instituted quinquennial official progresses for progresses for propagation of Law pf pietu (dharma), and dedicated cave-dwellings at Barabar for the use of the Ajivikas

Source: (Smith, 1904)

Third-world leaders are basically facing the same challenge that politicians of western nations dealt with some 100-200 years ago: massive informality appears when governments cannot make the law coincide with the way people live and work (Ting, *online*). The difference is that today, thanks to dramatically larger populations and the communications revolution, there has been a much speedier consolidation of informal property law Land administration systems and land registration in particular, are means to an end. As Hernando de Soto stated, it is certainty of ownership that is the ultimate aim of an effective land/titles registration system.

Land Registration-Comparing Land Registration systems

Box 3: Parameters for comparison

- Property Definition
 - Where and how is it defined.
 - Legal/Economic/physical concept.
- Property Determination
 - General / Fixed Boundaries.
 - Determination process.
- Property formation
 - Process, Institutions and actors – who does what
 - Role of the surveyors.
- Property Transfer
 - Process, Institutions and actors – who does what
 - Legal consequences.

Source: (Enemark, 2003)

Colour Coding for Land Uses

According to Jeer, (1997) land-use maps are the most common way of presenting land-based data. They show land uses by rendering them in different colors. They effectively illustrate land-use concepts by graphically displaying land-uses, roads, public infrastructure, and community facilities. Planning agencies have been using one color scheme since the 1950's that has become a defacto standard. This standard is also being frequently recommended to planners across the country. The following are traditional coloring schemes. Maps generally use a different color for each of the major land-use categories. For example, it is common to render:

- Yellow for residential uses such as single-family and town houses.
- Browns for multi-family and high-rise residential
- Reds for retail and commercial uses
- Purples for industrial uses
- Blues for institutional and public facilities

- Greens for recreational uses
- Grays for industrial utilities

The above primary and secondary colors generally serve basic land-use maps that do not have complex land-use categories. When they do, it is common to find additional colors in shades closer to secondary and tertiary colors. Beyond this traditional color scheme, systems vary widely on how many colors to show on a map and which colors denote what land uses. Because some colors are close to others and easily discernible, elaborate coding schemes also specify the appropriate Prisma color number (Prisma Color is the trade name and manufacturer of popular color pencils). On black and white maps, colors replace monochrome patterns of varying crosshatched lines.

Land Degradation - India

The World Bank (2006) says, at present, land use practices in many developing countries are resulting in land, water, and forest degradation, with significant repercussions for the countries agriculture sectors, natural resource bases, and eco environmental balances. Land degradation can be defined as the loss of land productivity through one or more processes, such as reduced soil biological diversity and activity, the loss of soil structure, soil removal due to wind and water erosion, acidification, salinization, water logging, soil nutrient mining, and pollution. Land degradation is a global phenomenon that endangers the livelihoods of rural farmers—indeed, of the population at large—as well as a country’s ability to produce crops, livestock, and products from other natural resources. Population pressure, disparities in access to the more productive lands, and civil strife have all pushed farmers into cultivating ever-steeper slopes for small-scale food crop production. For example, in many African, Central American, and Southeast Asian countries 50 to 70 percent of total agricultural output value comes from hillside farms, a semi-subsistence regime whose practitioners are among the smallest and poorest farming households.

Ministry of Agriculture (2000a) estimated that about 174 million hectares of land (53%) suffers from different types and varying degrees of degradation. About 800 hectare of arable land is lost annually due to ingress of ravines. And also estimated that more than 5000 million tonnes of topsoil are eroded every year (MoA, 2000a). All this has a direct bearing on food production and the livelihood of the people.

Table 7: Extent of soil degradation (human-induced) under the different degradation types¹⁹

Degradation type	Area affected (m ha)	
	Total	Percent
Water erosion	148.9	45.3
Wind erosion	13.5	4.1
Chemical deterioration	13.8	4.2
Physical deterioration	11.6	3.5
Land not fit for agriculture	18.2	5.5
Soils with little/no degradation problem	90.5	27.5
Stable terrain (under natural condition)	32.2	9.8
Total geographical area	328.7	100.0

Land degradation strongly associated with the influence of macroeconomic forces, for example building the roads. Often paid for by logging companies or through international aid, new roads open up forest areas, first for wood extraction and then for the expansion of agriculture. New migrants colonize roadsides and use roads to obtain inputs and deliver their produce to markets. By linking forested areas to the broader economy, roads lower costs and increase the returns of conversion, heightening the sensitivity of these areas to changes in macroeconomic conditions.

Habitat loss and its impacts

Habitat loss poses the greatest threat to species. The world's forests, swamps, plains, lakes, and other habitats continue to disappear as they are harvested for human consumption and cleared to make way for agriculture, housing, roads, pipelines and the other hallmarks of industrial development. Without a strong plan to create terrestrial and marine protected areas important ecological habitats will continue to be lost²⁰.

Sacred groves are outline of resource conservation

The existence of sacred groves in India most likely dates back to an ancient pre-agrarian hunter-gathering era, and their presence has been documented since the early 1800s. Believing trees to be the abode of gods and ancestral spirits, many

¹⁹ <http://envfor.nic.in/divisions/ic/wssd/doc2/ch13.pdf> accessed: 27.12.2011

²⁰ http://wwf.panda.org/about_our_earth/species/problems/habitat_loss_degradation/ accessed :23.12.2011

communities set aside sanctified areas of forest and established rules and customs to ensure their protection. These rules varied from grove to grove but often prohibited the felling of trees, the collection of any material from the forest floor, and the killing of animals. Presiding deities administered punishment, often death, to individuals who violated the rules, and sometimes to the entire community in the form of disease or crop failure. As a result of these protective restrictions, preserved over countless years, sacred groves are now important reservoirs of biodiversity²¹.

Regional Issues/Conflicts in Land Management

The word 'conflict' carries negative connotations (Warner, 2000). It is often thought of as the opposite of co-operation and peace, and is most commonly associated with violence, the threat of violence or disruptive (nonviolent) disputes. This view of conflict as negative is not always helpful. In non-violent settings it can often be seen as a force for positive social change, its presence being a visible demonstration of society adapting to a new political, economic or physical environment. Different types of conflicts can be categorized in terms of whether they occur at the micro-micro or micro-macro levels, i.e. among community groups or between community groups and outside government, private or civil society organizations (Warner, 2000)

Box 4: Types of conflicts arising in NRM

Intra micro-micro conflicts:

- Disputes over land and resource ownership, e.g. between private and communal land owners;
- Disputes over land boundaries between individuals or groups;
- Latent family and relationship disputes;
- Disputes due to natural resource projects being captured by elites and/or those who happen to own
- Resources of a higher quality;
- Breaking of CPR constitutional or operational rules, such as protection agreements for grazing areas,
- Fish net sizes, forests, or misappropriation of funds, etc.;
- Disputes over the unfair distribution of work and profits.

Inter micro-micro conflicts:

- Conflict between land-owners and resource users;
- Conflict between indigenous CPR groups, and more recent settlers;
- Disputes generated by jealousy related to growing wealth disparities;
- Lack of co-operation between different community groups;

²¹<http://www.sacredland.org/sacred-groves-of-india/>. accessed :23.12.2011

- Disputes over renewal arrangements for leased land;
- Internal land ownership disputes ignited by the speculation activities of commercial companies;
- Resentment built up due to lack of representation on village committees.

Micro-macro conflicts:

- Contradictory natural resource needs and values, e.g. between wildlife habitat protection and local
- Livelihood security;
- Cultural conflicts between community groups and outsiders;
- Disputes over project management between community groups and outside project-sponsors;
- Disputes caused by political influence (national, provincial or local);
- Disputes arising from differences between the aspirations of community groups and expectations of
- NGOs or commercial companies;
- Off-site environmental impacts affecting unintended third-parties.

Source: (Warner, 2000)

Conflicts arising from poor enforcement of natural resource management regulations include:

- Private companies avoiding compliance and sanctions by threatening to withdraw their investment or by
- Manipulating the courts.
- A general lack of understanding of environmental laws and regulations by industries, governmental
- Agencies and the general population.
- Non-compliance arising from unrealistic requirements for pollution control technology and poor
- Implementation of environmental impact mitigation plans.
- Failure of the courts to enforce regulations because of prolonged legal processes, with the outcome often
- Unsupported by one or more parties.
- Perverse incentive structures promoted by conventional cost-benefit analysis.

The conflict management plan describes the overall strategy for managing the conflict, combined with the proposed process of consensus-building and an initial set of conflict mitigation or prevention options. The components of a conflict management plan will vary with each situation.

Government Instigation on Land Conservation/Management

The Constitution of India enables the Central Government and the states to enact laws for the preservation and conservation of natural resources. Article 39(b) and (c) of the Directive Principles of State Policy lays down as the duty of the state and the Centre to develop natural resources for common good. There is a constitutional provision for the involvement and participation of the people at local level for participatory planning and decision-making. The Eleventh schedule (Article 243-G) of the constitution lists matters pertaining to land improvement, implementation of land reforms, land consolidation, soil conservation, and watershed development and management under powers, authority and responsibilities of Panchayats (rural local bodies). The Twelfth schedule (243-W) lists urban planning and regulation of land-use under the powers, authority and responsibilities of municipalities (urban local bodies). The following table presents the important policies formulated, programmes implemented and the institutional framework adopted in India for the best possible use of land as well as sustainable and integrated management of land resources (Land 13, online).

The first five-year plan (1951-1956) addressed, mainly, the agrarian sector, including investments in dams and irrigation. The agricultural sector was hit hardest by the partition of India and needed urgent attention.^[3] The total planned budget of ₹ 2356 crore was allocated to seven broad areas: irrigation and energy (27.2 percent), agriculture and community development (17.4 percent), transport and communications (24 percent), industry (8.4 percent), social services (16.64 percent), land rehabilitation (4.1 percent), and for other sectors and services (2.5 percent). Many irrigation projects were initiated during this period, including the Bhakra Dam and Hirakud Dam.

Table 8: Policies, Acts, Programmes by Govt. on Land Resources²²

Year	Initiatives	Features
	National Land Reforms Policy	<ul style="list-style-type: none"> • Abolition of intermediary tenures • Tenancy reforms • Ceiling on agricultural holdings and redistribution of surplus land • Updating and maintenance of land records • Consolidation of land holdings • Distribution of government wasteland
1972-73	Drought-prone Areas Programme	<ul style="list-style-type: none"> • Minimize adverse effects of droughts on the productivity of land, water and human resources • Promote overall economic development and

²² Land 13. <http://envfor.nic.in/divisions/ic/wssd/doc2/ch13.pdf>. Accessed:27.12.2011

	(DPAP)	<p>improve the socio-economic condition of poor and disadvantaged sections inhabiting the programme areas</p> <ul style="list-style-type: none"> • Capacity building and empowerment of village community, ensuring participation of Panchayati Raj Institutions and NGOs in programme implementation at grassroots level and transfer of funds as well as decision-making power to the local people • Since 1995-96, a watershed development based approach has been adopted
1977-78	Desert Development Programme (DDP)	<ul style="list-style-type: none"> • Mitigate adverse effects of desertification and adverse climatic conditions on crops, human and livestock population • Restoration of ecological balance by harnessing, conserving and developing natural resources, i.e. land, water, vegetative cover, and raise land productivity • Capacity building and empowerment of village community, ensuring participation of Panchayati Raj Institutions and NGOs
1985	National Land Use and Conservation Board	<ul style="list-style-type: none"> • Formulate a national policy and perspective plan for conservation, management and development of land resources of the country • Review of the progress of implementation of ongoing schemes and programmes connected with conservation and development of land resources and soils • Take measures to restrict the conversion of good agricultural land to non- agricultural uses • Co-ordinate the work of State Land Use Boards
1985	National Wastelands Development Board (NWDB)	<ul style="list-style-type: none"> • Formulate perspective plan and programmes for the management and development of wastelands in the country • Identify the wastelands in the country • Review the progress of implementation of programmes and schemes for the development of wasteland • Create a reliable data base and documentation centre on related aspects of wasteland development
1988	National Land Use Policy	<ul style="list-style-type: none"> • To install an efficient and effective administrative structure for prescribing and regulating land by all concerned and revitalize the land-use boards in this respect

		<ul style="list-style-type: none"> • Prevent further deterioration of land resources • Restore the productivity of degraded lands • Allocate land for different uses based upon land capability, land productivity, and national production goals • Complete the inventory of land resources based on the prescribed land-use
1989-90	Integrated Wastelands Development Project (IWDP)	<ul style="list-style-type: none"> • Adopt soil and moisture conservation measures such as terracing, bunding, trenching, vegetative barriers, etc • Encourage natural regeneration • Enhance people's participation in wasteland development programmes at all stages resulting in equitable sharing of benefits • Employment generation, poverty alleviation, community empowerment and development of human and other economic resources of the village. • Training, extension and creation of awareness among the participants
1992	Constitution (Seventy Third Amendment) Act, 1992	<ul style="list-style-type: none"> • Gives land related subject to the Panchayat Raj Institutions (local self governments) at the village, block and district levels to ensure participatory planning, decision making, and monitoring of programmes by the local self governments
1992	Constitution (Seventy Fourth Amendment) Act, 1992	<ul style="list-style-type: none"> • Regulation of land use and urban planning were brought under the functional domain of urban self-governing bodies
1999	Department of Land Resources	<ul style="list-style-type: none"> • Coordination of land administration in India • Formulation of integrated land resources management policies • Implementation of land based development programmes

The 73rd and 74th, Amendment Acts (1992) of the constitution brought the land use, conservation, management and related issues under the purview of local bodies in both rural and urban areas. The initiatives taken by other Ministries also have a bearing on the prevention of degradation of lands. Some of these are:

- Improved policy framework for natural resource management
- Improved data on land resource degradation and its management
- Draft grazing and livestock management policy, 1994

- Draft national policy for common property resource lands (CPRLs) (under formulation)

Future Considerations for Land Resources Conservation

Efforts of different Ministries/Departments/Organizations should be integrated to harmonize the delineation, codification and land capability classification. Detailed soil data (physical, biological, chemical and microbial) based on effective soil testing are pre-requisites for all lands under both rainfed and irrigated agriculture to address the issues related to soil health *vis a vis* agriculture production. Such soil data will be vital for setting up Village Resource Centres for benefit of the farming community. Necessary financial and human resources should thus be assigned for the purpose. Central and State Land Use Boards should be reorganized and empowered to lead this work. Further, we must implement the unimplemented agenda of land reform with particular reference to tenancy laws, land leasing, distribution of ceiling surplus land and wasteland, providing adequate access to common property and wasteland resources. Following the conferment of land rights to women under the Hindu Succession Amendment Act (2005), the provision of appropriate support services to women farmers has become urgent. Moreover, as far as possible, agricultural land should not be diverted to non-agricultural use (GoI, Planning Commission, 2007).

Strategies for Sustainable Land Management

- Tenth Five-Year Plan assigns high priorities to area specific programmes such as watersheds, river valleys, arid areas, wastelands.
- Public policies towards land use and the influence of subsequent land uses on natural resources
- Coordinate the activities of all line departments and adopt an integrated approach
- Expansion and intensification of irrigated agriculture
- Weaknesses in land use policies as well as options that are available to better address natural resource management and conservation issues in the interface
- Establish the horizontal linkages between various agencies that are involved in land resource management
- Involve the stakeholders from the planning stage onwards and address other socio-economic and poverty issues in land development programmes
- The government would take the lead role in capacity building at the grassroot level by planning, implementing and monitoring integrated land resources management programmes
- Intensification of high-quality rain-fed lands

- land is not accounted for, especially when land quality deteriorates or the ecosystems functions change
- Intensification of densely populated marginal lands
- Increasing women's access to productive land by regularizing leasing and sharecropping of uncultivated agricultural land by women's groups, encouraging collective efforts in bringing wastelands under cultivation and providing policy incentives to women in low-input subsistence agriculture, will have immediate benefits for women's empowerment and household food security
- Expansion of farming into sparsely populated marginal lands
- The rise of urban and periurban farming with accelerated urbanization
- Natural resource managers and local planning officials need to understand the role each plays in protecting natural resources in the interface. In particular, natural resource managers need to better understand and influence public policies related to natural resources

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