Theme 7

Control and Conservation of Nature

ignou
THE PEOPLE'S
UNIVERSITY

UNIT 20 LOSS OF LIVELIHOOD AND MIGRATIONS*

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20.1 INTRODUCTION

Since pre-historic times human beings have been dependent on nature for survival. In the beginning humans collected their food from nature by gathering fruits, and hunting animals/birds. They were on the move, going from one place to the other. In fact, even when they settled down to practice agriculture, then also, they were regularly on move in search of fertile land so as to leave the exploited land to recuperate. Pastoralists were also migrated from one place to another in search of better pastures; most of the times these were seasonal movement. Along with seasonal climatic variations, climate variability often played important role in the migration. These migrations were part of mitigation strategy. Severe and/or prolonged climate variability also resulted in permanent migration also. Some of the historians/ archaeologists suggest that migration of inhabitants of Harappa civilisation and Akkadian Empire can be attributed to drastic changes in the climatic conditions. This indicates that (means of) livelihood and migrations are very closely related. It also appears that both livelihood and migration were not enigmatic as they are considered today and probably were never used or imagined the way they are now. There are trading communities who migrated to distant land and settled there to facilitate their livelihood. These diasporic communities maintained close connections with their ancestor lands. There are communities migrated due to loss of means of livelihood, such as fertile land, a forest, source of good water which forced them to look for alternate sources of livelihood. Livelihood is not only about poor people however, the impact of loss of livelihood affected different sections of society differently. Present Unit will discuss the impact of modifications/ alterations/degradation of the natural resources/landscapes, etc, leading to the loss of livelihood.

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20.2 MIGRATIONS AS ADAPATATION

Livelihood patterns have a great diversity, and it is very dynamic and fluid. Historically societies have been following a combination of livelihood patterns, rather those societies have survived where multiple ways of securing livelihood were available and practiced. You all are aware that even the transition from hunting gathering to agriculture was never absolute. If on the one hand, there were 'pure' sedentary agrarian societies then we also have evidences of Swidden agriculture. **Unit 10: Arid and Semi Arid Landscape: Grasslands, Deserts** discusses extensive prevalence of pastoralism and there was mutuality of interests between agriculturalists and the pastoralist. Most of the pastoralist communities followed seasonal migration in search of better pastures.

20.2.1 Seasonal Migrations

Neeladri Bhattacharya has documented the seasonal migration pattern of *Powindah*. He says, '[M]uch before the nineteenth century India was linked to Afghanistan through an important annual migratory flow between the two regions. *Powindah* was the term of reference for all the migratory Pathan tribes who came down to Punjab every year from their base in Central Asia. They came to India not only to trade, but in search of pasture, work, and a life away from the snowy uplands of Central Asia. Determined by geo-ecological conditions, their movements had a seasonal cycle. They assembled every autumn in the plains east of Ghazni with their families, flocks, herds, and long strings of camels laden with the goods of Bokhara and Kandahar. The caravans traversed the Gakkar and Waziri country, crossed the Sulemimans through the Gomal and Zhab passes, and entered Dera Ismail Khan. Here they left their families and flocks on the great grazing grounds on either side of the Indus. While some looked after the flocks and some wandered around in search of employment, others proceeded with the caravans and merchandise to Multan, Rajputana, Lahore, Amritsar, Delhi, Kanpur, Benaras, and sometime up to Patna. In spring they gathered again and returned by the same route to the hills around Ghazni and Kelat-i-Ghilzai. As the summer approached, the men moved off to Kandahar, Herat, and Bokhara with Indian and European goods acquired in 'Hindustan'. In October they would return and prepare once more to start their journey to India.' (Neeladri Bhattacharya, 1995)

Along with these long-distance seasonal migration he also documents seasonal migration associate with Alpine Pastoralism. Alpine pastoralism is usually sustained by a vertical movement between the summer pasture in the high mountains and the winter pasture in the low hills. Gaddis were the shepherds of the hills; and Ban Gujars were cowherds. In Kangra sheep and goats together numbered over six lakhs in the 1890s, constituting about half the animal population. On the hills flocks of sheep and goats could be more easily maintained than cattle.

In Kangra, pastures in the low hills were all divided among the shepherds. Each division or circuit was called a ban, and each ban was claimed by

some Gaddi family as its warisi. Summer pastures above the limit of forests in the high mountains were similarly divided. They first moved up to the forest grazing grounds just above the limits of cultivation, and then up to the nigahrs or grassy slopes above the limits of the forest. After two months at the nigahrs the flocks descended back to the gahrs, grazed there for six weeks, and then moved further down to the low hills. There were no exclusive hereditary rights over the pastures. (Neeladri Bhattacharya, 1995)

Across history, forests and open areas have functioned as seasonal grazing grounds. In Himachal Pradesh, herders traditionally made use of forest tracts for seasonal grazing, securing grazing rights leased by local villagers. In the pre-colonial era, the kings of Chamba recognized the economic significance of woods and granted property rights accordingly (Singh, 2018). Collective herders' rights governed alpine grazing in Central Punjab in commons and forest lands, making forest grazing a substantial aspect of the annual pastoral cycle (Bhattacharya, 1995, Delhi). Peasants and residents of forested areas jointly utilized forest lands on the peripheries of ryotwari villages. Specialized herdsmen, such as the Ahirs, Gowaries, and Banjaras, were engaged to lead cattle for grazing in the woodlands, earning compensation from individual peasant households. These seasonal migrations fostered close connections between the herders and forest dwellers.

20.2.2 Migration as Mitigation Strategy

Climate variability often caused disruptions in the livelihood patterns and communities chose to migrate in search of better opportunity, at least temporarily. It is important to mention that states, especially in South Asia till 19th century CE were very much concerned about the retaining the humans in their territories. James C Scott rightly points out that, 'The key to successful statecraft was typically the ability to attract and hold a substantial, productive population within a reasonable radius of the court. Given the relative sparseness of the population and the ease of physical flight, the control of arable land was pointless unless there was a population to work it.' (James C Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* Yale University Press, New Heaven, 1998, p. 185). Mayank Kumar has pointed out that '[I]n the agrarian economy of this semi-arid and arid region, failure of the monsoon very often led to drought. Excessive dependence on rain and the relative absence of perennial rivers further compounded the problem in Rajasthan. Possibilities of single crop a year in the arid parts of the region further restricted avenues of accumulation of grains. It adversely affected capacity of the peasantry to cope with the vagaries of the monsoon. Thus, famines hit the material base of the peasantry to a great extent. The high cost of seed and manure and the drying up of wells restricted the ability to irrigate the land. In such conditions, ploughing could not be done, thus affecting agricultural production in the region. The drought or infliction of crops, scarcity of fodder and drying of ponds also made the cattle vulnerable to adverse conditions thus affecting the pastoral communities of the region also. To mitigate against these conditions of hardship migration towards more favourable places such as Mathura, Gujarat, Malwa, was extensively practiced. But the state made all possible efforts to

stop the migration and often attempted retrieval of peasantry by offering remissions in land revenue demand. Famine hit the material base of the peasantry most crucially.' (*Monsoon Ecologies: Irrigation, Agriculture and Settlement Patterns in Rajasthan during the Pre-Colonial Period,* Manohar, Delhi, 2013, pp. 199-200.)

20.3 LOSS OF LIVELIHOOD

Since 18th century CE world has seen unprecedented growth in the human population and this period has also seen ever-increasing use of fossil fuel as source of energy. As has been discussed in the **Unit 19: Industrial Agriculture**, human capacity to extract and transport natural resources to long distance for human consumption has resulted in the over-exploitation of natural resources and green-house gas emissions leading to irreversible climate changes. These changes have affected the livelihood of many communities and have disrupted the natural availability of water. Following case studies discuss few specific cases of migration due to loss of livelihood.

20.3.1 Migration as Displacement

Mega Projects have usually resulted in loss of livelihood for the people whose land has been used for the development of Mega projects. The loss of biodiversity of the land occupied due to submergence of area under water and degradation of the landscape due to open cast mining, etc. have long term adverse consequences for the region. At times these mega projects have also been instrumental in the creation of alternative sources of livelihood. Most of times, loss of livelihood of those displaced has been compensated either in terms of monetary support or at times with alternative livelihood. D C Sah has termed it as 'involuntary Migration'. At times mega projects have generated debate over the issue of displacement and migration. The supporters of mega projects have argued that displacement and migration is part and parcel of 'development' projects which come with several benefits like access to better transportation and communication, better medical facilities and even more possibilities of livelihood. Nevertheless, the impact of the displacements/migrations due to mega projects have usually not been beneficial for the lower rungs of the society. Most of the better employment opportunities have been meant for the 'persons with technical knowledge.'

20.3.2 Bundelkhand

In the Year 2008, there were reports; newspapers coverage, regarding migration of lakhs of people from various districts of Bundelkhand (Bundelkhand is spread over both UP and MP. Seven districts of UP and six of MP) due to drought and the serious lack of water, often resulting in social tensions, cattle being abandoned and farmers' suicides. Five years before 2008, that is, in 2003, most areas in Bundelkhand had proper monsoon rains. After that either there was erratic rain or simply no rain. Lakes, talaabs/tanks, ponds (the Kirat Sagar lake, the Belataal, the Dharmasagar Talaab, the Gadh Kundar Talaabhad found mention in that Report) and rivers (as Chandrawal) dried up. Water levels in wells and hand-pumps receded till just a little water was sitting at the bottom of wells and bore-wells/hand-pumps. In the year 2008 it was seen that in some wells women used to climb down to the water

and collect the water by hand. And even for this there was a large number of people and wait for hours. Specially in Mahoba district a large number of hand-pumps had gone dry for 3-4 years, some others had to be vigorously pumped for half an hour for pressure to be created so that one gets a little water. Agriculture which was dependent on monsoon rains and/or irrigation from river, lakes etc. also stopped. Small herds of rickety cattle were seen wherever there was a little shade, waiting for fodder, water or death. People had to look for alternatives for survival-source of water, food and income. They had started migrating. Local railway stations were full with people heading for Delhi, Haryana and Rajasthan. The Census of India of 2011 puts the figure of migrants from Bundelkhand-UP only at 30,31,015 of which 23,73,246 were women and 1,76,319 were children between the age of 0 to 14. The figures for women and children, the most vulnerable sections of migrants, has been mentioned here to indicate the nature and intensity of the crisis from where they were emigrating.

As students of Environmental History, if we engage here to figure out why and how this happened in Bundelkhand we find the following.

It was noted in a book of 1933 (***A forest flora for Pilibhit, Oudh, Gorakhpur and Bundelkhand*** by P.C. Kanjilal, Deputy Conservator of Forests, Allahabad 1933, pp. xii) that the "extent of forest has been much reduced even within recent times, specially in the submontane tracts, due to the pressure of the agricultural population with a constantly increasing demand for land for cultivation." Trees were cut not to clear land for cultivation only. Timber is required for industry and urbanization. From firewood for brick-kilns to furniture of urban houses all need truck-loads of timber. Deforestation sets forth a series of interlinked consequences detrimental to availability of water and livelihood of the poor. With the disappearance of forest cover the temperature of the locality warms up and the top soil is exposed to vagaries of wind and rain which cause erosion of the soil and fertility decreases. Without the presence of greenery, the soil cannot retain water. This causes less water recharge for underground aquifers and so the water levels drop in wells, handpumps, and rivers. Urbanization, which has been mostly without any serious thought, has led to construction of concrete buildings on the water-sheds of talaabs, lakes and ponds, at times even on the bed of dried ponds and lakes. Such urbanization has on the one hand, diverted rain water to municipal drains depriving the waterbodies of some regular seasonal recharge, on the other sealed land and prevented water from entering the soil; thus making the drying up of waterbodies but inevitable.

The stone mining and quarrying in Bundelkhand began sometimes in 1990s. (**Source:** https://bundelkhand.in/info/mining-and-quarrying-in-bundelkhand). From Kabrai near Mahoba town loads of granite and other stones in trucks head for towns of UP such as Kanpur. Small mountains with whatever forest cover have been dug into to mine stones. In the process these have sped up deforestation. The explosives used to blast rocks also sent fine stone dusts into air and these dusts settle kilometres away on plants, houses, land and animals adversely affecting all including agriculture. These mines also use up plenty of water, mostly from underground sources adding to the water woes of the place.

Beside deforestation and urbanization, the change in agricultural practices too has adversely affected the water situation in Bundelkhand. The ***Bundelkhand Human Development Report 2012*** (Published in 2015/ 2016 by NITI Ayog and UNDP, pp. 48, Ref as BHDR hereafter.) had flagged the changing pattern of cropping. It said, "Undoubtedly, the choice of crops that demand a lot of water has impacted farmers adversely and the years of drought have made the situation even worse in many areas." And the 2008 Report had also mentioned switching to rice and mint which consume more water than the traditionally grown crops such as pasahi paddy, jowar (jundi), bajra, wheat, chana etc. Such shifts to more remunerative crops, it appears had been both the cause and effect of use of expensive technology of deep bore-wells. This expensive technology have been used by the rich farmers and the use have made them richer. The smaller or marginal farmers have been left behind as they could not afford the expenses of this technology and some of them under these circumstances preferred to surrender their land (through sell or otherwise) to the bigger and richer farmers. The use of deep bore-wells has been a process of privatization of common underground water resource. Some of the rich farmers have started selling water extracted from under the ground to their neighbours who can buy that. The private and uncontrolled extraction of water affects the common source of water exacerbating the crisis.

All these (water crisis, absence of rain, mining) over a period of time, which cannot be determined precisely, have led to a collapse of agriculture barring, of course the agriculture by the rich farmers. Without fodder/pastures and water, rearing of domesticated animals too became difficult in such circumstances. Thus, it was a question of survival for the larger part of the population which consisted of landless labourers, marginal farmers etc. Then they in search of alternatives emigrate from Bundelkhand of which we have spoken earlier. The BHDR (pp. 83-84) stated: "The period from 2007-08 to 2011-12 has seen a large amount of 'distress migration'. People often, at least in the initial years of this mass phenomenon, went to places unaware of the possible employment, kind of employment and wage rates at the destination. The primary cause of migration was failure of agriculture, low prevailing agriculture wages and water stress. In few cases, there has been permanent migration, as families have sold off all their assets, including land and livestock, to raise money and in other cases families are so deprived that there is nothing to come back to. Most of the migrating families belong to landless labourers and marginal farmers. Among the social groups, SC and ST communities tend to migrate the most. The people who are left behind – the aged, the women and the children face distressing living conditions."

What is important here is to note that the poorer, powerless, and marginalized in our society are the most who do not depend more on nature and less on the state and market to live. And when nature is degraded or nature is 'enrazed', it is that majority of our society who suffers most and forced to migrate.

20.3.3 The Amazon

In August 2022, there was a massive 'wildfire' razing in the Amazon basin in Brazil for some days. This was in news and everyone who knew about it was concerned. This fire was about climate change, about use or abuse of natural

resources, about birds and animals living in the forests, and about livelihood of forest dwellers, small farmers and indigenous people. We shall try to see some issues regarding the Amazonian Forest and its dynamics, and try to understand some questions regarding livelihood issues in the context of the degradation of the Amazonian Forest (of which this wild-fire is an instance). For this we will limit ourselves to the Amazonian Forest inside national borders of Brazil only, though Amazonian basin extends beyond that.

During the colonial times the Amazonian basin (also referred to as Amazonia) was site of extraction by the Portuguese state. The chief items of extraction were sugar from sugar-cane plantations using slave-labour. During the 19th century rubber was collected from the forests where it was/is a native species. Collection of rubber was labour-intensive and slow process. Here also slave labour was used as well as the aviamento system through which a labourer was perpetually kept in debt and was coerced to work. The 'rubber boom' lasted from 1850s to 1920s. Amazonian timber, aquatic animals as mantanee and turtles, gold from deep inside the forest were also of demand in Europe. After that the Brazil-nuts were the most profitable item to be collected from the Amazonia.

The 20th century witnessed a more aggressive extraction of the forest and mineral resources of the Amazon basin in Brazil. The resources were opened up for exploitation around the 1960s when the Belem-Brasilia highway was inaugurated. This was followed by the Trans-Amazon Highway project of the 1970s. Prior to that in the 1950s also there were some mining activities as in Amapa (manganese) and Rondonia (tin). And the road system (Highways and feeder roads) was instrumental in the opening of cattle ranches, mining activities and timber extraction from the Amazonian forests. In the 1970s the colonists were brought from the densely populated north-eastern part of Brazil and given land along the constructed roads of the sparsely populated areas, Para being one such province. The colonists were largely from poorer sections of the society, mostly landless labourers and small peasants. This colonization was organized by INCRA (Institute of colonization and Agrarian Reform) an agency of the government. Each colonist was given 100 hectares of land. But gradually the INCRA was overwhelmed with arrival of colonists from all over Brazil and INCRA did not have so much land. On the other hand, the rich farmers and investors were given vast stretches of land for ranches by SUDAM (Superintendency for the Development of Amazon) with financial incentives as tax-benefits. Some of these rich assignees of land were pure speculators meaning they took the land on offer only to retain possession and later to sale it when the prices of land shoots up. Speaking of the 'role of major agricultural properties' an author had calculated that 27 big farms registered with the INCRA had received 17 million hectares of land and were employing only 500 families for the maintenance of the ranches which could have been given to some 17000 families of small peasants 100 hectares each. (Armando Dias Mendes, Major projects and human life in Amazonia, in ***Change in the Amazon Basin, Vol-1, Man's impact on forests and rivers***, Ed. John Hemming, Manchester University Press, 1985. Pp. 48).

So, in the province of Para, land was available for cultivation, yet many remained deprived. Many of the colonists or rather newcomers who had

traversed long distances with the hope of a land, settled down themselves informally wherever they could find a parcel of land for themselves. Such inequality in getting land and competition for available land led to violent conflicts. These land-starved peasants or colonists were quickly dispossessed and were driven away once they had cleared the land and made it ready for agriculture. They either entered deeper into forest to clear another patch of land again to be evicted or returned to their native places. But all could not manage to return as they had no means to do so. Those who could not go back joined the ranks of 'vagrants'— with very uncertain and intermittent employment opportunity, no proper dwelling in the ever-growing shanties in urban settlements. During these times (1970s-80s) the Mega/Greater Carajas Projects were also undertaken. These included the open cast iron mining at the Carajas mountain, laying of railway tracks from the mining site to Sao Luis, the development of port at Sao Luis, the building of the biggest (of Brazil) hydroelectric project by damming the river Tocantis at Tucurui with a huge reservoir which permanently flooded settlements of peasants and forests forcing large scale migration. But these mega projects also did not have much to offer in terms of employment, health facilities, provision for education for the landless 'vagrants'.

We have mentioned the violent conflicts for land earlier. These conflicts soon became a bloody struggle for land since the later part of 1970s through 1980s centred around Maraba and Xinguara in province of Para. The ranchers, the land grabbers, land speculators, mining companies evicted smallholders. This was resisted initially and many of those rebel peasants or small holders who resisted were killed by gunmen or private militias of the ranchers. Then the Rural Workers Union was formed and it organised empate (stand-off, non-violent protest against tree felling) and legal battles too. As the struggle got organized it became more and more militant and radical. The Araguaia Guerillas, which had some association with radical student politics of the 1970s in Brazil, also had been part of this organised struggle of peasants in Para province. The guerrillas were 'eliminated' by the Brazil's military in 1975. Though Guerilla's presence was short lived and its influence probably was not deep and wide, yet it was indicative of freshness of ideological influence and experiment. In Maranhao, the Catholic Church was an active supporter of the possesorio (small holder or peasant) assertion of land rights. Father Paul and Sister Dorothy were very fondly remembered by the President of the Rural Workers Union. "To this day Sister Dorothy is much admired. She was a great source of strength here in the region. At the beginning which was a time of much repression by police and gunmen, she was a tremendous support. She was persecuted several times; she was shot at but never injured. She took part in meetings with peasant farmers and went with them to the government, to the authorities, to pursue these causes. A Sister who understands that we must change this society, with all its inequalities, is a source of great strength." (Joao Hebette and Jose Alberto Colares: Small-farmer protest in the Greater Carajas Programme, in ***The Future of Amazonia: Destruction or Sustainable Development?*** Ed. David Goodman and Anthony Hall, pp. 295-6).

A struggle for land had also raised questions about inequality and change along with members of the progressive section of the Church. Further down

in its history the struggle also tried to address the questions of environment, deforestation and livelihood. The legendary leader from Acre province in south, Chico Mendes, his politics and his assassination by ranchers in 1988 marked that phase in the history of the Land Struggle in Amazonia. The state repression on the struggle was immense. The state has supported the big investors. Together they killed thousands of peasant rebels, imprisoned and tortured many more. In 1976 the INCRA increased the limits of possession of land initiating a process of very large acquisition of land by many big investors. But finally the state had to agree with the struggle and then another agency the GETAT- (Executive group for Araguiaia-Tocantin lands) was established to oversee the problem of land distribution and peasant resentment. The declaration of Extractive Reserves (the demarcated place from where timber etc. can be collected) in the Amazonia, one of its kind in the world, was also a contribution of this Land Struggle in Amazonia.

The environmental consequences of all Mega Projects mentioned above were disastrous in the least. Some studies around mining mountain have indicated the change in the quality of water and air. There has been an increase in turbidity of water, decline in the dissolved oxygen in the water which was said to be "pure and poor" (Harald Sioli, The Effects of Deforestation in Amazonia, ***The Geographical Journal, Vol. 151, No. 2***, July 1985, pp. 197-203) almost distilled water without any electrolytes due to the closed nutrient cycle of the Amazon Forest). And it goes without saying that such a change had affected the aquatic flora and fauna. The garimpeiros (or artisanal gold-miners) use mercury for extraction of gold in the region which contaminated both soil and water in the mining belt. The dedicated railway tracks from the mine to the Sao Luis port was itself an embankment and an interference with nature. Also, the nearly 900km long railway had been laid on land which was earlier dense rainforest. It had given life to many ancillary industrial units as pig-iron to railway sheds. The pig-iron foundries used charcoal sourced from the forest. All these led to the clearing of forest. Logging, both legal and illegal, were done recklessly with heavy machinery, foreclosing possibilities of regrowth. Cattle ranchers for quick production of fodder often set fire to natural species of undergrowth which presages forest fire of the kind that happened in August 2022. This led to further deforestation. Deforestation of the Amazonian Forest has serious consequences. It is a destruction of the carbon sink in the times of climate change. This also adversely impacts rainfall, soil quality. The last two effects became a curse to agriculture in general but more specifically to the poor peasants whose entire livelihood was based on small farming.

20.4 SUMMARY

Human-nature relationships has been very dynamic and human societies have been adapting to the changes in the environment. The relationship during the 'Holocene' has been described by Daniel Botkins as 'Discordant Harmonies'. However, past century has seen serious disruption in the 'harmony' often adversely affecting the livelihood of the people surviving on the margins of the society. The ever-increasing mechanisation of production system fuelled by consumerism has at times resulted in so much degradation of the livelihood that people were left no option but to migrate. We have discussed

only couple of cases where loss of livelihood has been very dramatic but there are several examples of irrepressible loss of livelihood. Water scarcity has become a regular feature in most parts of the world; several metropolitans are suffering from water scarcity. However, districts of Bundelkhand; one of the most remote and backward area of Uttar Pradesh suffers from severe water crisis, leading to large scale migration of the people. On the other hand uncontrolled extraction of natural resources of Amazon has adversely affected the communities leading to loss of livelihoods. The underlying unity in these instances is that it is about marginal sections of human society and their dependence on nature for livelihood. They are the people who have the least amount of resources. They are the ones in whom the states invest the least. They are the marginalized in the society. Their livelihood depends on nature (which could mean a forest nearby with its fruits, nuts, timber, games and/or waterbodies, the aquatic flora and fauna as fish, so on and so forth). But then there are other people in our society who depend on nature but for profit not for livelihood. They have reckless about the use of nature for which those who depend on it suffer in multiple ways.

20.5 EXERCISES

1) What do you understand by migration as mitigation strategy? Elaborate
2) Seasonal migration in response to the climate conditions has been integral part of livelihood pattern of several communities. Comment
3) Uncontrolled exploitation of natural resource at times leads to loss of livelihood. Explain with examples.
4) Contestation over natural resources of Amazon has created social tensions and affected livelihood patterns of communities. Comment.

20.6 RECOMMENDED READINGS AND REFERENCES

Bhattacharya, Neeladri, (1995) 'Pastoralists in a colonial world', in *Nature, culture and imperialism, essays on the environmental history of South Asia,* eds. David Arnold and Ramchandra Guha, Oxford University Press, Delhi.

Bhattacharya, Neeladri, *The Great Agrarian Conquest: The Colonial Reshaping of a Rural World*, New York Press, 2019

Sah, D.C, (2003) *Involuntary Migration: Evidence from Sardar Sarovar Project*, Madhya Pradesh Institute of Social Science Research, Ujjain and Rawat Publications, Jaipur.

Singh, Chetan, (2018) *Himalayan Histories: Economy, Polity, Religious Traditions*, Permanent Blach, Ranikhet.

Upreti, B C., Ed. (2015) *Migration, Refugee and Displacement in South Asia*, G B Books, New Delhi.

UNIT 21 FOREST CONSERVATION*

Structure

21.1 Introduction

21.2 Conservation and Contestations: Traditional Practices

21.3 Contestations, Exploitation and Deprivations

21.4 Forest Conservation: Colonial Approach

21.5 Forest Conservation: Independent India

21.6 Forest Conservation Movements

21.7 Changing Orientation- Biodiversity and Natural Parks

21.8 Summary

21.9 Exercises

21.10 Recommended Readings and References

21.1 INTRODUCTION

For Centuries past, India was a land with islands of cultivation in a sea of forests. However, now we see the reverse, India is now a land with islands of forests in an ocean of cultivation. The reversal is a very recent and the beginning can be traced to the 19th century. It is not that forests were not pushed back but the intensity and the permanence of push back in the last 200 years have been qualitatively and quantitatively different. Colonial exploitation coupled with ever-increasing demand of Industrial production, railways and shipping industry for wood led to deforestation. Growing scarcity of wood forced the colonial government to look for ways to ensure regular supply of the woods. Forest conservation, for commercial availability of wood, appeared to be the best way forward. This often resulted in monoculture and adversely impacted the biodiversity, including fauna and displaced traditional communities living on the diverse forest products for centuries. Independent India, in the beginning, saw the continuation of the colonial policy and resulted in protests against the commercialization of the forests. Serious revisit of forest policy was prompted by the concerns for the survival of the fauna in general and big carnivorous in particular. Protection of habitat played an important role in conservation of the forest, though there is intense debate regarding the role of the communities living in and around the forests. The Unit highlights the politics associated with forest conservation and an analysis of the forest conservation acts.

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21.2 CONSERVATION AND CONTESTATIONS: TRADITIONAL PRACTICES

Most of the traditional communities have practiced forest conservation, though it was usually not in response to the 'deforestation', rather it was shared cultural value and dependence on forest products and mutual interdependence with the communities living in the forests. In a couple of **Unit 9: Forests and Foragers; Sacred Groves** and **Unit 16: Deforestation, Reforestation and Aforestation** you have already read in detail about the history of society-forest relationships. As discussed in earlier units despite there being a duality between 'forest' and 'civilisation' the mutuality of interest ensured conservation of forest. It is important to restate the beginning statement of the Introduction of the unit: For Centuries past, India was a land with islands of cultivation in a sea of forests. In other words, due to sufficient availability, the contestation over forest and forest resources rarely threatened the survival of forests, therefore contemporary understanding of 'forest conservation' does not apply on past practices of forest conservation. We will briefly point out that forest conservation was not only about the conservation for religious and cultural purposes but also to ensure the regular availability of forest produce, livelihood of communities depended upon the forests and at times to get monetary benefits. There are references since ancient period that forests were abode of 'ascetics' and 'bandits' also along with several communities.

The governance of forests was complex before the onset of colonial rule, with local communities in and around these wooded areas exercising traditional rights and control alongside the authority of the King. This intricate system involved multiple entities managing the forests, ensuring a delicate balance to preserve the natural equilibrium and prevent further degradation of these essential resources. The Indian state's increasing control over forest resources began around 800 A.D., gaining momentum during the Mughal era and subsequent periods. Noteworthy instances include the Maratha kingdom seeking dominion over the Western Ghats forests for revenue generation and shipbuilding. Similarly, the governments of Travancore and Cochin asserted exclusive rights over their forests, while the Amirs of Sind fortified their hunting reserves through afforestation and conservation measures. Before colonization, state-regulated activities were limited to creating hunting reserves and the controlled harvesting of specific plants, such as Tipu Sultan's authority over sandalwood and certain animal species. Forest management was also considered crucial for military purposes, particularly in fort defense.

It was in times of dire need, however, that the importance of forest came to be fully realized. An early eighteenth-century description of famines in the regions of Palwal and Hodal (approximately 40 KMs from Delhi) brings out the crucial role of forests as a source of additional food. During the famine of 1713, we are told, 'Many repaired to jungles and collecting the leaves and blossoms of the *Karial* boiled them and subsisted on the same.'

In the following year, the rains came rather too late to benefit cultivation, but were sufficient to rejuvenate the vegetation in the forests. We learn that 'In the forest a kind of wild millet (*shamakh*) shot up so profusely that the people of that region, big or small, went daily to the forest and collected as much as each of them could bring, and thus gave themselves some energy. Thus, as a last resort, the forest was often of critical importance to famine-stricken people, a resource that stood between life and death.

Chetan Singh, 'Forests, Pastoralist and Agrarian Society in Mughal India', in Meena Bhargava, Ed. *Frontiers of Environment: Issues in Medieval and Early Modern India*, Orient BlackSwan, Hyderabad, 2017, pp.71-97.

Mayank Kumar on the basis of seventeenth-eighteenth Century records from Rajasthan, has pointed out that, 'In Rajasthan, especially in the central and western regions, vegetation was very sparse; there were very few forests. In such a situation it was necessary to protect the existing ones with care. Village Revenue Officer Lalchand complained to the Amber ruler about tree felling in his *pargana* (Sawai Jaipur) and expected punishment for the culprit. In village Saithal, *pargana* Bahatri, in 1745 vs./A.D. 1688, a person was punished for cutting a *neem* tree. Similar cases were reported from numerous villages and *qasba*. A *patel* (headman) of village Kharkhura was punished in 1780 vs./A.D. 1723 for the same crime. It appears that trees could be cut with the permission of the state authorities. The *patel* of village Kundala, *pargana* Mariana, was punished in 1789 vs./A.D. 1732 for the "unauthorised" cutting of trees in his area. This also suggests the control enjoyed by the state with respect to vegetation. …The usage and appropriation of forest resources has been very actively debated. The question of whether forest resources were shared by the society at large or owned exclusively by the state is at the centre of this debate. However, we have records not only for reserved forest, but also of auction of forests which suggest that the state enjoyed considerable property right over forest resources. There were no widespread protests against such actions and it appears that state intervention had a customary sanction. Nevertheless, it is important to note that the cutting of green tree without permission was punished by state, but state does not ask for re-plantation of trees and forest to compensate the trees which have been illegally cut. Rather State imposes and collects fine in cash. (Kumar, 2005)

21.3 CONTESTATIONS, EXPLOITATION AND DEPRIVATIONS

While forest removal did occur in pre-colonial times for strategic and commercial reasons, conflicts over forest resource control were not as intense as during the colonial era. In the period before colonial rule, there was a system of user-rights hierarchy instead of the notion of absolute ownership over arable and forest land. This was particularly evident when arable land was abundant, and the scope of official authority was limited.

Since the coming of European trading companies in general and British and French East India Companies in particular, the demand of wood from India started growing. It was primarily to cater to the growing Ship building industry. Already under pressure, the inauguration and expansion of railways in Indian subcontinent, deforestation took place at unprecedented rate. Initially, forests of Nilgiri Mountains were depleted but soon it started impacting almost entire forests cover, wherever British could reach and fetch wood. The depletion of forest cover and declining availability of wood prompted colonial power to move towards forest conservation.

Growing trade relations between India and Europe after the coming of several European Trading companies, there was a steep rise in the ship building activities. Requirements of timber for ships kept growing. Given the experience of Indian and other European trading companies regarding feasibility of Indian teak for ships, by 1780s English East India Company prompted them to regulate the use of forests. There were teak forests in the Northern Circars near the port of Rajahmundry on the east coast but British focused on the west coast especially Bombay for the construction of ships. The teak available on the west coast was extensively being used by the Britishers and soon questions of sustainability of supply raised questions of conservation.

> Naval rivalry accentuated the problem of the shortage of timber within Britain. By 1760 the demand for the Royal navy had resulted in a scarcity of oak along the Welsh coastline and in parts of England. …There were very large oak trees left in English Royal Forests such as Woolmer and planting has been persistently neglected. (Rangarajan, 1996)

Subsequently, with the growth of Railway in India the demand for timber grew exponentially. Mahesh Rangarajan has calculated the magnitude of forests required to cater to the needs of the growing network of Railways in India, ship building industry and other commercial uses of wood. 'The building of the first railway line from Bombay to Thane in 1853, and the subsequent expansion of the railways, generated a high level of demand for wood. A mile of broad-gauge rail track required about 1,800 to 2,000 sleepers. By 1878 over two million sleepers had been used for the construction of railway lines. Other than deodar trees from the Himalayas, sal and teak were the main source of wood. In addition to timber, railways generated a demand for fuel, especially in areas like Punjab where there was no coal.' Subsequently, '[B]etween 1860 and 1862 alone, about 15000 logs were required for the Jabalpur branch of the Great Indian Peninsula railway and over 100,000 trees were felled. (Rangarajan, 1996)

During the colonial era, a significant transformation occurred in the nature of forest rights, as observed by Richard H. Grove (1998). The shift toward exclusive state control over forests resulted in rapid state-sponsored deforestation in pre-colonial South Asian states. The colonial administration acknowledged the pivotal role of forests and wasteland in rural settlement

patterns. The decline in forest cover during the early 19th century was driven by military requirements and the expansion of cultivation, aimed at enhancing the revenue-resource base of the Raj. The colonial administration actively advocated for sedentary agriculture as a component of its strategy to settle and govern nomadic and pastoral communities. This encouragement involved urging tribal populations to forsake traditional practices such as slash-and-burn agriculture or hunting-gathering lifestyles. The ecological transformations of the late 19th century were primarily fueled by commercial interests, with indigenous elements, including merchant-cum-usurers, playing a role. However, the institutional and ideological framework driving these changes was distinctly colonial, encompassing Forest Acts, bureaucratic measures, settlement policies, etc.

A conflict for forest usage rights emerged as the colonial state, revenue rights holders, and their tenants found themselves entangled in a three-way struggle due to the policies imposed on forests during colonial times. The colonization of land was profoundly shaped by the Forest Department's control over extensive areas of cultivable waste, a result of the colonial state's redefinition of property rights. This reinterpretation empowered the Forest Department to manage vast expanses of cultivable waste, playing a pivotal role in the process of land colonization.

This situation led to significant shifts in both social and economic dynamics, giving rise to conflicts and confrontations over forest and pasture lands, as well as disputes concerning the exercise of customary rights by local social groups. In response to these challenges, indigenous communities employed various forms of resistance, including migration, defiance of forest laws, legal claims for their rights to open protests, or outright rebellion. These actions served as expressions of their discontent with the collaboration between the colonial state and moneylender/trader. These conflicts led to the stigmatization of numerous individuals, villages, tribes, and organizations as "criminal tribes." The legal terminology devised by colonial authorities specifically targeted tribes residing in forests and pastoral communities that operated outside the wage labor and established agriculture systems. This deliberate legal categorization marked a significant social and legal shift, escalating tensions between the colonial government and indigenous populations.

This discussion lays the groundwork for further exploration into the idea that the primary motivation for such control was the management of the forest's resources, a topic we will delve into in the next section.

21.4 FOREST CONSERVATION: COLONIAL APPROACH

The scale of deforestation brought about by the expansion of railways was significant enough to create a scarcity of timber. Pallavi Das has demonstrated how deforestation and the shortage of timber threatened

railway expansion leading to the implementation of forest conservation by the colonial state to maintain timber supplies. In fact, both Bombay and Madras Presidencies had Conservators of Forests appointed, the Scottish surgeons Dr Alexander Gibson and Dr Hugh Cleghorn respectively, to streamline the timber trade. However, the indiscriminate felling of trees particularly in the southern region also raised anxieties and alarm among colonial officials like Gibson and Cleghorn who were also studying the degradation of forests and natural resources and perceived the destruction of forest cover as leading to dessication or the drying of land further resulting in soil degradation and erosion, shortage of rainfall and silting of rivers. As Richard Grove has depicted such dessicationist ideas were germane to the evolution of conservationist thought in the subcontinent but were not enough to stall the exploitation of forests. (Grove, 1994)

Scientific forestry largely organised forests through their mapping and survey and systematized large-scale operations to extract timber. In the name of scientific management of forests, the colonial state introduced a range of practices including silviculture, monocultures, taungya system, and the control of forest fires and insects. Colonial foresters brought out working plans to centralise the procedure of working the forests in the subcontinent. Colonial conservation thus combined utilitarian and developmentalist ideas in environmental management, underpinning soil conservation, water management, sustained yield forestry and so on. Even so, such efforts did not translate into stalling the rate of deforestation in the subcontinent. The establishment of the Indian Forest Service in 1864 and the introduction of forest legislation from 1865 were significant steps in extending state control over forests but also ensured a sustained supply of timber harvested through scientific principles to meet the requirement for various colonial development initiatives, chief among them, the railways.

The 1865 Indian Forest Act established state monopoly over forest areas, whereas the 1878 Indian Forest Act regulated local use (Guha, 1992). These acts granted irrevocable authority to the state over forest resources, relegating customary rights of forest dwellers, pastoralists, and agricultural communities to the pleasure of the state. Even privileges, such as the right to pick firewood and grass, were subject to government regulations (Prasad, 1998). This marked a departure from customary rights, following an ‘annexationist’ position that viewed local customs as privileges rather than inherent rights (Guha, 1990).

The restructuring of forest laws aimed to maximize revenue and control the entire agrarian economy. The debate between an annexationist position and a more reconciliatory approach proposed by the first Inspector General of Forests, Dietrich Brandis, highlighted the complex dynamics of colonial forest policies (Guha, 1996). Brandis suggested a restricted takeover of forests by the state, acknowledging the exercise of rights in village forests under state control.

The second proposition posits that mono-cultivation had a detrimental impact on forest biodiversity, while the third point emphasizes the outcomes of state control over forests and the advent of scientific forestry, leading to the displacement of local communities and the estrangement of their forest rights. Scientific forestry, introduced during the colonial period, is deemed a "colonial watershed" that commercialized forest use, leading to unprecedented destruction. The state reservation of forests altered the ecology, with commercially valuable species such as teak, pine, and deodar replacing indigenous varieties like Oak and Terminalia, which were crucial for the fuel, fodder, manure, and small timber needs of local communities. The colonial administration discouraged traditional practices like shifting cultivation (Jhum) and promoted sedentary agriculture, emphasizing revenue generation potential (Guha, 1990).

Forest conservation policies of the Colonial government has been discussed in **Unit 16: Deforestation, Reforestation and Aforestation**. Following sections will deal with the changing orientation of the forest conservation policies in Independent India.

21.5 FOREST CONSERVATION: INDEPENDENT INDIA

During the 1930s, when the idea of planning was being formalised by the Indian National Congress under the leadership of Subhash C. Bose through the National Planning Committee, the agenda of aforestation and soil conservation was considered important enough to constitute an expert subcomittee on it. This subcommittee proposed to deal with issues of aforestation, soil erosion and soil conservation. In the national concern on environment, aforestation was an important aspect of the larger environmental concern. The National Forest Policy of 1952 committed itself to evolving a balanced and complementary system of land use and check denudation, erosion and deforestation. It envisaged the necessity to maintain 33 per cent of land under forest cover and also affirmed the need for aforestation while sustaining timber yields for nation building projects. Despite the lofty agenda and goals, forest legislation after independence merely replicated the forest policies of the colonial era. Moreover, with the task of industrial production for nation building taking precedent and the need to ensure food security for an increasing population deforestation continued unabated.

Ever increasing conflict between requirements of conservation in the context of consumption needs of the human growing population and role of state under democratic set up has been examined extensively by environmental historians, conservation scientists, and others especially in the context of forests and cultivation. Through the period of independence, Indian forestry has largely remained commercially oriented leading to the rise of ecological movements like Chipko. Other environmental movements like the Silent Valley movement, Appiko movement, the Narmada Bachao Andolan, and the

movements to save the Western Ghats and Nilgiris have stemmed from a range of environmental factors with the degradation of forests often being a significant concern. In the 1970s, social forestry emerged as an alternative strategy to manage and protect forests, aforest deforested land while also balancing the needs of local forest dependent communities. The recognition of the need to preserve forest cover and natural biodiversity has also led to largescale replanting of trees. The introduction of participatory conservation schemes like the Joint Forest Management programme in the 1980s was aimed at involving local communities in the process of decision making while assuring them a fairer share of forest resources.

The Department of Environment (1980) which later became the Ministry of Environment, Forests and Climate Change, guided by the goal of sustainable development, reaffirmed its commitment to aforestation and regeneration of degraded areas. It is the nodal agency that constantly monitors the state of forests and the level of deforestationin in the country. The National Forest Policy of 1988 further focused on the protection, conservation and growth of forests while involving local communities to achieve this goal and meet their subsistence requirements too. It further reiterated its committment to maintain 33 per cent of land under forest cover. However, the relentless pressure of development and land use have eluded such prescribed targets.

In the twenty-first century, India has seen a sharp rise in deforestation especially between 1990 to 2020 losing around 668,400 ha of forests and the country's rising demography bears the blame for it. India also has the second highest rate of deforestation globally after Brazil. Today, the phenomenon of deforestation is directly linked to climate change. Only about 11 per cent of the landscape in India has dense forests and the percentage of primary or naturally regenerated forests is not even one per cent. (Mosley, 2010) The reduction in forest cover is a global concern but is a greater challenge for developing countries like India where the agenda of economic growth and development (notwithstanding the rhethoric of sustainability) continues to take a toll on our ecological resources and wellbeing. India's commitment to halt deforestation by 2030 remains an uneasy goal. In order to address the social need for development and urgency of forest conservation, on one hand made it mandatory to secure Environment Impact Assessment done for a project and also made provisions for compensatory afforestation at another place. Pankaj Sekhsaria has pointed out that to compensate the loss of forest in the Great Nicobar Island in the Bay of Bengal, over 10,000 acres of land spread over the Gurugram and Nuh districts of the Haryana have been earmarked.

21.6 FOREST CONSERVATION MOVEMENTS

In independent India, the Chipko movement of the early 1970s remains a hallmark of the local protest evoked by the right given to a private company to fell trees in the Kumaon region. More generally, it was a wave of protest against commercial logging encouraged by the state and that had led to

significant deforestation in the Himalayan foothills. As Guha has shown such popular protests in the Kumaun and Garhwal hills had a colonial legacy. As scientific forestry transformed forest access and use and with increasing forest control by the state, forest communities in various parts of the subcontinent found their customary and usufructuary rights of forest use curtailed. Similarly, since the late nineteenth century, the constant sourcing of timber from the rich deodar and chir forests in the princely state of Tehri Garhwal and the British ruled Kumaun division had led to heavy encroachment on customary rights. In Tehri, forest grievances arising from such encroachments were an important cause of local protest and resistance which often took the form of collective violation of forest laws or attacking forest officials. In the adjoining Kumaun region, popular protest was directed at the colonial state and its visible targets i.e., the forest department and official establishment with resistance reached a critical point in 1921 when large areas of pine forests were set on fire. Eventually, the British government abolished the system of forced labour and loosened their control over forests by accommodating to local needs as well. Protests against forest regulations were not always direct as everyday forms of resistance were often resorted to by local communities. For instance, peasants in Jaunsar Bawar (Dehra Dun) used extra-legal modes of protest to violate state monopoly over forests and restrictions over forest access.

21.7 CHANGING ORIENTATION- BIODIVERSITY AND NATURAL PARKS

Growing concerns for the conservation of bio-diversity and protection of natural habitat of the wildlife provided a very important impetus to the efforts of forest conservation. India has been signatory to several very important Global/UN Conventions related to conservation of threatened flora and fauna which makes it obligatory for the Government to draft policies for the protection and conservation of natural habitats. The complexity of forest conservation as such and especially within India can be gauged by the fact that, 'India has over 25,000 species of flowering plants, 500 species of mammals, and 1,200 species of birds in about 2 per cent of the world's land area.' [Sivaramakrishnan, 2014] Several National Parks, Biosphere reserves, Protected forests, Wildlife sanctuaries have been notified where conservation of natural vegetation is mandatory. Conservation of forests for wildlife requires that the natural diversity of forests may be protected and conserved. These areas sometimes have a 'core' area where human settlement is not allowed, neither the neighbouring communities are allowed to collect minor forest products. A detailed discussion on National Parks and Zoological parks can be seen in **Unit 22**. In what ways reduction of forest cover is leading to more and more Human-Wildlife conflicts and therefore significance of Forest Conservation has been discussed in **Unit 33**.

The changing orientation towards forest conservation was also seen policies and regulations related to mining. As pointed out in **Unit 23: Mining**, 'Mines and Minerals (Regulation and Development Amendment) Act of 1986 was the first systematic legal intervention to address questions of deforestation and loss of biodiversity related to mining. Act of 1986 made specific

provisions to ensure the rehabilitation of flora destroyed as a part of mining. The Mines Concession Rules of 1987 included provisions to make the state assess environmental damages associated with mining and held the owners of mines responsible for deforestation and compensation by planting trees. Subsequently, the Mineral (Conservation and Development) Rules of 1988 included provisions to minimize environmental damage including deforestation among other concerns. Taking cognizance of adverse impact of mining on forests and efforts of forest conservation Government notifications and judicial innervations made environmental clearance a mandatory condition for mining industries.

21.8 SUMMARY

The growing need and demand of a democratic developing nation with a population of over 140 Crores, which is nearly 18% of global population living on less than 2.5% of total geographic landmass of India, is immense. Such a large population thus, generates contestation over the nature of land use among, forests, urbanisation, industry, infrastructure. It is not easy to maintain the balance. Government of India is well aware of the severity of the situation and has been proposing modification in its' forest policy, mineral policy, industrial development policy to accord the due recognition to the significance of forest cover. It will not be erroneous to suggest that deforestation in independent India has continued unabated despite the growing legal ambit to protect the environment. In the twenty-first century it remains to be seen whether India will be able to halt deforestation without compromising on her developmental initiatives and goals.

21.9 EXERCISES

1) Do you think that commercial needs, as opposed to conservation ones, shaped early colonial policy?

2) How Forest dwellers' traditional rights were altered by colonial forest policy?

3) Discuss the term "Scientific forestry" and how it affected colonial-era societies?

4) Do you agree that there is a sort of dichotomy between the requirements of the industrial development and imperatives of forest conservation in India? Explain.

21.10 RECOMMENDED READINGS AND REFERENCES

'Why It Matters | India lost 668,400 ha of forest cover in the last 30 years', https://www.thehindu.com/sci-tech/energy-and-environment/ why-it-matters-india-has-lost-668400-ha-of-forest-cover-in-the-last-30years/article66645294.ece

Bhattacharya, Neeladri, (2019) *The Great Agrarian Conquest: The Colonial Reshaping of a Rural World*, New York Press, New York.

Das, Pallavi V., (2015) *Colonialism, Development, and the Environment: Railways and Deforestation in British India, 1860-1884*, Palgrave Macmillan, New York.

Fernades, Walter, Geeta Menon, and Philip Viegas, (1988) *Forests, Environment and Tribal Economy: Deforestation, Impoverishment and Marginalisation in Orissa*, India Social Institute, New Delhi

Grove, Richard, (1996) *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860,* Cambridge University Press, Cambridge.

Guha, Ramachandra and Madhav Gadgil, (1992) *This Fissured Land: An Ecological History of India*, Oxford University Press, Delhi

Habib, Irfan, (2002) *A People's History of India 2-The Indus Civilization*, Tulika Books, New Delhi.

Kumar, Mayank, (2005) **'**Claims on Natural Resources: Exploring the Role of Political Power in Pre-Colonial Rajasthan, India', *Conservation and Society*, Vol. 3, No. 1.

Mosley, Stephen, (2010) *The Environment in World History*, Routledge, London.

Prasad, Archana, (1998), 'The Baiga: Survival Strategies and Local Economy' in Colonial Central Provinces' *Studies in History*, Vol. 14, No.2.

Rangarajan, Mahesh, (1994), 'Imperial Agendas and India's Forests: The Early History of Indian Forestry, 1800-1878', *The Indian Economic and Social Historical Review*, Vol.31, No.2.

Rangarajan, Mahesh, (1996), *Fencing the Forests: Conservation and Ecological Change in India's Central Provinces 1860-1914*, Oxford University Press, Delhi.

Sivaramakrishnan, K. and Mahesh Rangarajan, Eds. (2014) *Shifting Ground: People, Animals and Mobility in India's Environmental History*, Oxford University Press, New Delhi.

UNIT 22 NATIONAL PARKS AND ZOOLOGICAL PARKS*

Structure

22.1 Introduction

22.2 National Parks, Wildlife Reserves and Zoological Parks

22.3 National Parks and Zoological Parks in India

22.3.1 Difference between National Parks and Zoological Parks

22.3.2 National Parks and Zoological Parks: A Brief Historical Overview

22.3.3 Some of the Popular National Parks and Zoological Parks in India

22.4 Project Tiger and Project Elephant

22.5 Summary

22.6 Exercises

22.7 Recommended Readings and References

22.1 INTRODUCTION

Wildlife in India is quite diverse. Besides being a form, albeit a crucial one of environmental heritage, it also often attracts the gaze of the tourists. National parks and zoological parks, in addition to wildlife sanctuaries and biosphere reserves, which, as mentioned before, play an important part in promoting tourism, also help in conserving those species of animals which are endangered. Also, 'wildlife tourism', which basically is a form of tourism undertaken by people to view wild animals in their natural habitat, but from a safe distance, is vital to the existence and development of the two sites under consideration, viz., national parks and zoological parks. In addition to maintaining balance in the eco-system, the two places are considered ideal as far as the preservation of wild fauna and flora is concerned. 'Wildlife watching', it should be borne in mind, is quite different from other wildlife related activities, such as hunting and poaching. Moreover, while 'wildlife watching', as the name suggests, involves observing animals and their behaviour, on occasions it also lead to feeding or touching of select animals under supervision.

National and zoological parks are protected sites, in the same way as reserve forests, marine and community reserves, among others, are protected zones. It may be underscored that even though wild animals and birds (as well as domesticated varieties of these) are scattered throughout the Indian subcontinent, not every area where they are located will have a national park. There are only specific areas which are ear-marked by the government, after taking into consideration several aspects, where either national or zoological

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parks are developed. Among others, two important objectives for developing such places are the preservation of wild animals and flora and restoring environmental balance. These issues, it may be mentioned, will be discussed in the specific context of the Indian subcontinent, particularly India.

22.2 NATIONAL PARKS, WILDLIFE RESERVES AND ZOOLOGICAL PARKS

Development of places such as national and zoological parks as well as wildlife reserves is, according to environmental historians, an outcome of several factors including urbanization, population explosion, industrialization and human activities such as hunting and poaching, to name a few. These and several other facets have acted as catalysts in adversely affecting the nature as well as many of its resources. The rapid expansion of national parks, zoological parks and wildlife reserves in, not just India, but throughout the globe, is suggestive of the fact that humans are quite concerned about the existing human-nature relationship which, to say the least, is fraught with problems. The scenario also reflects the imbalance in the eco-system and the growing danger it poses to the existence of humans on this planet. Rather than perceiving nature as inexhaustible, most of the contemporary scholars agree upon the fact that nature is unable to defend itself through 'inaccessibility' or 'remoteness'. Given this, quite alarming, scenario it has been realized that the establishment of national and zoological parks, as well as other similar kinds of reserves, may help, to an extent, in addressing issues of exploitation of nature and disturbed human-nature relationship. In addition to these primary objectives, founding of such habitats is critical for humans as far as maintaining their spiritual, physical and psychological well-being is concerned. Moreover, national and zoological parks, it has been suggested, act as a sort of 'remedy' for the fast-paced urban and 'artificial' life. Significantly, the aforementioned factors are common to almost all the wildlife parks scattered throughout Asia, Africa, South America, North America and Australia. While we are on the subject, it may be of interest to note, that 'national park' is not a term which is employed universally. In some parts of the world terms like 'Game Reserve', 'Game Park', 'Wildlife Sanctuary', 'Wilderness' and 'Biosphere Reserve', to name a few, are used to denote such places where wild flora and fauna are conserved. Further, it may be mentioned, that while some animals, such as different types of deer, are common to almost all the national and zoological parks in India, as well as around the globe, there are quite a few animals (and also species of birds) which are specific to a particular park. Elephants, Tiger, Lion, Giraffe, Zebra, Chimpanzee, Gorilla, Koala Bear, Panda Bear, various kinds of reptiles and wild cat, among others, are unique to particular national and zoological parks located across the continents.

Although obvious, it may be worthwhile to reiterate that national and zoological parks (as well as other similar kinds of reserves) vary in 'size', 'type', 'objectives', and principles of management. No two zoological or national parks are identical. There are several factors which decide the aforementioned facets of a park. Some of these include political and socio-

economic scenario of the region, environmental aspects as well as the geographic location. However, there are some objectives which are shared by all such heritage sites. Among others these include conservation, preservation, protection, education as well as recreation.

While at various points of time, attempts have been made to define national parks (and also zoological parks), it is the definition that the International Union for Conservation of Nature (IUCN) provided in its 10th General Assembly held in 1969 in Delhi, which is now accepted globally by environmentalists, conservationists as well as administrators of national and zoological parks. Some of the salient features of this definition are delineated here,

- area-wise a national or a zoological park is quite large.
- it is an area where a single or multiple eco-systems exist and they are not altered in any way by human intervention.
- it is a region in which diverse species of flora and fauna as well as geomorphological habitats and sites exist which are considered important from a scientific, educative and recreative perspectives. Moreover, these heritage places are usually located in regions with exquisite landscape(s).
- these are areas which are ear-marked by the central or state governments for the protection and conservation of particular types of flora and fauna. At all such sites it is expected that encroachment by humans will be discouraged and exploitation of resources will be banned. Moreover, the local inhabitants of the area should be made aware of the importance of protecting nature and its elements including animals, and by extension establishment of national and zoological park.
- and it is a restricted area where humans are allowed to enter under strict supervision. They are allowed to enter such area in order to gain insights about wild animals and their behaviour as well as, to an extent, relax.

22.3 NATIONAL PARKS AND ZOOLOGICAL PARKS IN INDIA

There are a number of national and zoological parks in India and before venturing further it is important to discuss the differences between a national park and a zoological park. A discussion on some of these will help us map the spatial distribution of the national and zoological parks in India.

22.3.1 Difference between National Parks and Zoological Parks

Although both, national parks and zoological parks, harbour diverse kinds of animals, birds and plants, trees and shrubs, there are facets which are unique to each of them, which make them distinct. In the present section an attempt will be made to highlight some of these distinctions. National parks operate under strict supervision and entry into them is highly restricted. Further,

national parks are divided primarily into three zones, viz., Core, Buffer and Transition. Core zone is an area which is strictly protected. It's an area where human activities are prohibited. Buffer zone is an area where human activities, albeit on a limited scale are allowed. These activities relate primarily to research and eco-tourism. Lastly, Transition zone is a region within the national park where activities, such as farming and forestry, pertaining to sustainable development are encouraged. There are no such zones in zoological parks. Furthermore, while it is quite cumbersome to enter many of the national parks; official permits are required to enter them, formal permissions of any kind are almost never required to enter into a zoological park. Again, unlike zoological parks where several people can enter the premises at the same time, in national parks, especially those where endangered species of animals outnumber other kinds of fauna, people are allowed to enter in batches. As a matter of fact the number is usually decided by the particular park's conditions. Lastly, although boundaries of any national park are clearly delineated, animals and birds in it are allowed to roam freely and exploit their natural habitat. This is quite different from zoological park, where animals, birds and reptiles are placed in small and large enclosures. Besides being displayed to public, species of animals and birds are also cared for and, from time to time, are examined by researchers and zoologists. In fact a zoological park may be described as an ex-situ site meant for conservation of animals. Here animals are removed from their natural habitats. It may be of interest to mention here that in the period just after the Second World War, especially in the 1950s and 60s, capturing wild and exotic animals for zoos (and also circuses) by professional game catchers was a common practice. In fact it was widely prevalent in parts of Africa, especially in the eastern parts of the continent. Hollywood movies like *Hatari!* (1962), starring popular Hollywood actor John Wayne, have beautifully captured this practice in all its glory.

Furthermore, national parks are almost never privately owned. Almost all of them located in India and outside India are governed by either central or the state governments. The same is the case with majority of zoos scattered all over the world. However, there are few zoos which have, in the not so remote past, been owned privately. And even in our own times there are zoological parks which are owned privately by individuals and organizations. Such zoological parks are also referred to 'menageries'. These zoos are, to an extent, different from non-private zoos, in that they are not open to every individual. The admission to these zoos is entirely dependent on the whims and fancies of the owner. Also, while private zoos usually never charge any admission fees, there have been few instances where the owners of such zoos have charged hefty admission fees. A case in point is the Zoological Wildlife Foundation, in Miami (United States of America), who's owner Mari Tabraue, charges hefty admission fees. While we are on the subject of zoos, it is worthwhile to mention that in the past these sites have been used as tools of propaganda by governments. In this regard we may cite the example of the Berlin Zoo. This Zoo was used extensively by the Nazis to propagate their ideas of race and purity. Under the management of Hermann Göring, Joseph Goebbels, and the father and son duo of Ludwig Heck and Lutz Heck, the

Zoo soon became an important site for experiments which played a critical role in making anti-Semitic and racial policies of the Nazis popular throughout Germany from 1933 onwards.

Finally, before concluding our discussion on this theme, it may be worthwhile to mention that in national parks, normally, animals, plants and birds which are natural inhabitants of that particular region are found. In zoos, on the other hand, non-local, and on occasions exotic, varieties of flora and fauna are also found, along with locally found varieties of the same are found. As a matter of fact, governments all over the world regularly enter into trade and diplomatic pacts with each other, wherein various species of animals and birds are either bought or loaned. There are examples from past when animals were exchanged as gift between rulers. Akbar has sent Rhinoceros to king of Portugal, where it was on displayed as *Ajaib* or exotic.

Concepts like national and zoological parks, in the final analyses, signify co-existence of humans with nature. This is especially true in the case of the national parks. National parks in parts of Africa, including in countries like Kenya (mainly central parts of it), Tanzania (northern parts of the country) and Rwanda, all in East Africa, encapsulate this idea brilliantly. In central Kenya and northern parts of Tanzania, for instance, the most dominant tribal group, the Maasai Warriors, co-exist peacefully with nature and reside in the precincts of the prominent national parks of these countries, including Amboseli National Park, Maasai Mara National Park and Ngorongoro National Park.

Importantly, while the primary objective of national parks (and zoological parks), as mentioned before, is conservation and protection of wild animals, birds, reptiles and flora, there are few national parks, especially those located in the United States of America and United Kingdom, where hunting of specific varieties of animals and birds like fox and grouse are still allowed. At times the type of guns and bullets to be used is also defined. However, such hunting exercises are governed by strict rules laid down by the government which pertain to the seasons in which hunting can take place and the animals which can be hunted. Moreover, only those individuals who have got a license which is issued by the governments of these countries can indulge in such practices. But it should be mentioned that in more recent times there has been a strong criticism of such practices, and the management of such national parks have objected to such traditions of hunting, and in some cases have been able to successfully curtail the same.

22.3.2 A Brief Historical Overview

National Parks and Zoological Parks have long antecedents. Before the establishment of the first modern national park, namely, the Yellowstone National Park in Wyoming in the United State of America, in 1872 (a group of naturalists have, however, argued that the oldest national park is the Bogd Khan Mountain National Park which was established in 1778 in Mongolia), through a legislation which was signed by the incumbent President of the United States of America, Ulysses S. Grant, many of the regions where these

sites came up acted as hunting reserves of royal elites as well as colonial officials. The abundance of wild animals in such areas helped in popularizing the hunting practice. This was especially true for large parts of Africa and Asia, including India, where the big and small 'games' were easily available.

In India, since the pre-colonial period, hunting was an established practice. Large swathes of land were reserved, as mentioned before, for royal elites and colonial officials exclusively for hunting. Details of hunting in the pre-colonial era have been discussed in **Unit 14: *Shikar* and Gun Powder.** With the ascendency of the British rule in the nineteenth century, newer avenues were opened up for hunting. However, unlike the pre-colonial era, hunting in this period was seldom done for subsistence. Animals, especially tigers and elephants, were hunted primarily as a sport and prize. Again, hunting was now referred to by various names including 'shooting' and 'capture'. Though used interchangeably, the each of these terms were used at times in specific contexts. For instance while tigers were always 'shot', elephants, rather than being 'shot', were 'captured'. It is not inappropriate to mention here that the art of hunting continued unabated in several post-Mughal states, such as Awadh and Hyderabad as well as in princely states like Patiala and Junagadh. As a matter of fact it were the hunting retreats of some of the princes of these estates, where British colonial officials were invited for hunting expeditions, that got converted, during the course of the national movement, into national parks.

Although the practice of hunting wild animals in India continued with minimal restrictions till 1972 (when it was banned under the Wildlife Protection Act passed by the government), protecting certain wild species of animals was an established practice in many parts of South Asia. Epigraphic records (like the Major Rock Edict I of Ashoka), religious as well as philosophical tracts, among other contemporary sources, emphasis upon twin concepts of respect and protection of nature and all its elements including flora and fauna. References to *Abhayaranyas*, which denoted something similar to modern-day sanctuaries, occur frequently in some of the ancient and early-medieval texts. From their description found in the literary records, it seems that these were places where animals were protected and conserved, instead of being hunted. While at a few such sites only specific types of fauna were protected, at others multiple animals were conserved. Moreover, it was not unusual to breed animals in such sanctuaries for hunting as well as the royal dining table.

Conservation of wild animals, however, took off in real earnest during the first half of the twentieth century, under the British rule. Two sanctuaries, for instance, were set up in 1908 to protect lions and one-horned rhinoceros. These were the Gir sanctuary, which was established during the tenure of Nawab Sir Muhammad Rasul Khanji Babi (*c.* 1858-1911), the titular head of the princely state of Junagarh; and the Kaziranga 'Reserved Forest'. Created in 1936, the Hailey National Park, named after Sir Malcolm Hailey, the incumbent Governor of United Provinces, was the earliest national park to be set up, not just in India, but Asia. In the National Park, hunting was strictly

prohibited. Only timber cutting and that too for domestic purposes was allowed. As a matter of fact strict rules banning the killing of animals, birds and reptiles residing within the Park were enforced. It may be mentioned, that during the Second World War, the Park became a victim of large-scale poaching and timber cutting. This National Park continued to remain important in the post-independent period. The Park was rechristened as Ramganga National Park in 1954-55. However, in 1955-56, the Park was once again re-named. It was now called Jim Corbett National Park, after the naturalist and author, Jim Corbett (*c.* 1875-1955). The much popular wildlife conservation project, 'Project Tiger', was too launched from this Park, in 1974. It may be appropriate to mention here that prior to the establishment of this Park, a wildlife 'game' sanctuary was established by the British officials. It was named the Manas Sanctuary and is today located in the modern-day state of Assam. The Sanctuary was set up in 1928. It was only in 1950 that it was converted into a national park and in 1973 it became part of 'Project Tiger', once it was declared a 'Tiger Reserve'. We will be discussing this initiative at some length in one of the forthcoming sections.

Let us now shift our attention to the origins of zoological parks. Zoological parks or zoos are, as has been mentioned before, are sites where a large number of animals, birds and reptiles, brought together and kept in enclosures. Fauna and flora in zoos are meant for public display. Like national parks, zoos too have an elaborate history. While humans have been in possession of several types of wild animals for very long time, the pre-modern collection of such animals, was quite different from modern zoos. The earliest types of zoos which came into existence were primarily private collections which were owned by the elite section of a society. In fact, there is historical evidence to suggest that as early as circa 2500 BCE zoos or menageries were established. That this was the case is indicated by the wall carvings which have come to light from various sites in Egypt and Mesopotamia. From the literary and archaeological records of these ancient civilizations, it seems that expeditions were regularly conducted by the people here in order to bring exotic animals such as elephants, giraffes as well as dolphins and birds. The evidence, moreover, indicates that 'zoo' handlers residing in different parts of these civilizations hired animal handlers so as to ensure the well-being of their collection. It may be mentioned, that 'zoos' continued to thrive in some of the major later-day civilizations too, such as China, Greece and Rome. Importantly, what may be considered as one of the earliest animal collections in the western parts of the globe, was maintained by Montezuma II (*c.*1466-1520), the Aztec Emperor, in the modern day region of Mexico. The Emperor's 'zoo' was obliterated during the Spanish conquest of the Aztec Empire in 1520 by the head of the conquistadors, Hernán Cortés (*c.* 1485-1547).

It was in Europe that some of the earliest 'modern' zoos came into existence in the seventeenth and the eighteenth centuries, coinciding with the 'Age of Enlightenment'. The emergence of zoos in these centuries was partly due to the development of science and reason. Man was curious to understand about

many of the things which co-existed with them, including animals and birds. People with scientific bend of mind wanted to gain knowledge about the anatomy and behaviour of animals. Given this people who managed zoos as well as scientists began keeping these non-human species in enclosures which resembled, to an extent, their natural habitats.

It was in France that the first modern zoo was established. It was set up in Paris in 1793. Interestingly, during the course of the French Revolution (1789-99), the animal collection of the aristocrats of the country, which included the monarch, Louis XVI and the queen, Marie Antoinette, were taken and relocated by the revolutionaries to the Ménagerie du Jardin des Plantes. This, like other early day modern zoos, was more like a museum where live animals were housed, albeit, in their natural habitats. And all animals (and also birds) were kept in display areas which were rather small. In due course of time several types of zoos, including 'urban' zoos, 'sub-urban' zoos, and 'petting zoos' came into existence in various parts of the world. 'Urban' zoos, as the name suggests, are located in big cities and, to an extent, resemble the smaller zoos which were in existence a couple of centuries ago. Several urban zoos are heritage sites. Urban zoos are quite popular in Europe. 'Suburban' zoos are those site which are located in the suburbs. These are usually open-range zoos. Given that these zoos are located in sprawling parks, animals are provided with, relatively, more territory to roam around. These zoos also try to provide the residing animals with their natural habitats. As a matter of fact there is a term, 'landscape immersion', to denote this type of technique of creating realistic habitats. Suburban zoos are widely prevalent in the United States of America. Of the many, the San Diego Zoo, in southern California, is, by far, the largest suburban zoo in the United States of America. 'Petting' zoos are primarily located within the 'urban' as well as 'suburban' zoos. Normally, in such zoos docile animals, including donkeys, rabbits, sheep and goats, to name a few, are present. On occasions, petting zoos in mobile vans accompany carnivals and fairs from town to town.

We have discussed here the three most commonly found types of zoos. However, to this list we may add another type of zoo, which no longer extant, was quite prevalent in the eighteenth and the nineteenth centuries. These were called, 'Human zoos', also referred to as ethnological expositions. In these 'zoos', instead of animals, specific groups of humans were displayed, in their 'natural' state. In these centuries almost all the colonial powers of Europe, without exception, were engaged in establishing such zoos in their respective countries. Indigenous people, especially from Africa and Southeast Asia, were 'imported' and displayed either in specially designed cages or fenced areas. These 'zoos' fed into imperialist notion of race. The expositions advocated that there were societies which were 'inferior' to European civilization and therefore, the latter was justified in colonizing the former. As a matter of fact, it may not be inappropriate to suggest that the basic framework of racial discrimination, which was witnessed in its full force in Germany (and parts of Europe), during the reign of the Nazis (1933-45), and

in South Africa during the Apartheid era (1948-1994), was laid in these centuries. The concept of 'Human zoos' was abolished soon after the Second World War (1939-45). In the wake of the Nazi war crimes and anticolonial sentiments, which were gathering strength, it was no longer possible to hold such expositions. It may be mentioned, however, that while the practice of establishing these 'zoos' was abolished by 1945, in few countries, including France, Germany, England and Australia, such expositions were being setup, on and off, till as late as the second decade of the twenty-first century.

In India, zoological parks have had a slow start. In pre-1947 period, for instance, only twenty-two zoos were established, with the earliest one being setup in 1801 at Barrackpore (Calcutta). Barrackpore zoo was, however, closed down in 1878 (and it was shifted to Alipore, also in Calcutta). Jodhpur zoo was the last one to be established just before India gained independence in 1947. The zoo was established in 1936. In between these years, zoos were built in the British capital of Calcutta (Marble Palace zoo, 1854, and Alipore zoo, 1875); as well as princely states of Trivandrum (1857), Junagarh (1863), Jaipur (1877), Udaipur (1878), Baroda (1879), Mysore (1892) and Gwalior (1922). In Bikaner and Kota too, zoos were established in 1905 and 1922, respectively. In addition to these the Jagirdars of Awadh, on the suggestions of Sir Harcourt Butler, the incumbent governor of Awadh, founded a zoo. Named as the Prince of Wales Zoological Gardens, the zoo was established in 1921 in Lucknow, to commemorate the visit of Prince of Wales to the city. The zoo is in existence even today but has been renamed as Nawab Wajid Ali Shah Prani Udyan. It may be worthwhile to mention that it was the establishment of public zoos by the colonial rulers in Madras (1855) and Bombay (Byculla, 1863), that drove the princes of many of the princely states mentioned here to build zoos in their own estates.

One of the earliest zoos to be built in the post-independence period was the Delhi zoo. It was built soon after the landmark decision to the effect that every important town and city should have a zoo, was made by the Indian Board of Wildlife in 1952. Established in 1959 (the construction began in 1955), the zoo boasted of a collection that included several endangered species of animals, birds and reptiles. It was in 1982 that it got the status of National Zoological Park. At the time it was conceived as a model zoo. In order to make it a world-class zoo, the incumbent central government sought the services of Carl Hegenbeck, the owner of the Hamburg zoo. In addition to Hegenbeck, help from the Director of Colombo zoo, for assisting the officials in the construction of zoo, was also taken. The heritage site, besides housing such animals and birds in their natural habitat, also gives them an opportunity to breed in captivity. In subsequent years, zoological parks, big and small, were established in majority of regions in India. In fact, in line with the resolution of the Indian Board of Wildlife (1952), state governments of Assam, Andhra Pradesh and Orissa established large and well-planned zoos in Guwahati (1957), Hyderabad (1959), and Bhubaneswar (1960), respectively. In addition to these zoological parks, for hill animals, a zoo was established jointly by the central government's Department of Science and

Technology, and the government of West Bengal, in 1958. Established in Darjeeling, the zoo was renamed as Padmaja Naidu Himalayan Zoological Park. Padmaja Naidu was the daughter of Sarojini Naidu and was the governor of West Bengal from 1956-67. The Central Zoo Authority of India (CZA) (which is an associate member of the World Association of Zoos and Aquariums), is the apex body which governs all the zoos in India. This body, however, came into existence only in 1992. Again, there are several zoological parks which are operated by respective state governments. Zoos in India are equipped to provide specially designed artificial environment for certain species of animals, birds and reptiles. These are usually those species which belong to either cold climate or tropical zone. Additionally, Indian zoos, like zoos in other parts of the world, frequently engage in 'importing' and 'exporting' exotic as well as endangered species of animals, birds and reptiles from other countries.

22.3.3 Some of the Popular National Parks and Zoological Parks in India

National parks in India, like zoological parks were being built since the colonial era. We have already alluded to the earliest national park which was built in India, viz., Jim Corbett Park. From 1947 onwards these sites were built regularly at various places in India. And at present there are approximately 106 national parks in India. Geographical factors of a particular region, we may mention, dictate the size of many of these national parks. While in 1970, there were only five national parks, their number increased following the enactment of Wildlife Protection Act and Project Tiger in 1973. In 1980s and 1990s a slew of legislations were enacted to further strengthen the protection of the wildlife. Again, while in almost all the national parks several types of animals, birds and reptiles peacefully co-exist, there are national parks in which a specific specie outnumbers other wild animals. As a matter of fact, there are national parks which are known by a particular wild specie which inhabits them. Kaziranga National Park (known for one-horned Rhinoceros), Jim Corbett (known for Tiger), Gir National Park or Sasan Gir National Park (known for Asiatic Lion), Ranthambore National Park (also known for Tiger), Periyar Tiger Reserve (known for Tiger, Asian Elephant and the rare lion-tailed Macaque) and Rajaji National Park (known for Asian Elephant). Besides attracting large number of tourists during operational periods, national parks such as the Kaziranga National Park and the Sundarban National Park, among others, are also UNESCO World Heritage sites. Moreover, unlike zoological parks, almost all the national parks in India, are financed and managed by the central government.

Hunting, as has been mentioned before, is strictly prohibited in all the national parks in India. However, poaching is a major concern for some of the national parks. This is true, for instance, for national parks like the Kaziranga National Park and Rajaji National Park, where poaching of one-horned Rhinoceros and Asian Elephants, respectively, has been cause of concern. Officials are appointed by the respective state and central

governments, regularly to keep a check on such activities. Before concluding our discussion on this theme, it is pertinent to highlight one issue. Developments like the rampant clearance of forest lands and urbanization, have, in recent years, adversely affected some of the national parks in India. The natural habitat of wild animals, rather than getting protected, have become victim of human intervention and encroachments. Given this scenario, some species of wild animals wandering into areas inhabited by humans have become a regular occurrence. **Growing Human-wildlife Conflicts** have been discussed in the **Unit 33**. WWF-India, Centre for Science and Environment, Wildlife Trust of India and similar research institutes have a series of reports on the conservation efforts of wildlife and habitats.

22.4 PROJECT TIGER AND PROJECT ELEPHANT

Among the several initiatives that successive Indian governments have taken in recent decades, two stand out for their popularity and success. These are, namely, Project Tiger and Project Elephant. Launched in 1973 and 1992, respectively, these projects were to check the dwindling number of two most widely dispersed animals of India, tigers and elephants. Through both these initiatives the central government of the time aimed to establish dedicated tiger and elephant reserves for sustaining the population of these animals. The central government through Project Tiger and Project Elephant, attempted to provide technical and financial assistance to various Indian states. The assistance was particularly directed towards those states which had free ranging tiger and elephant population. Apart from protecting these animals as well as their habitats and migration corridors, these Projects also made attempts to address the problem of human-animal conflict. Project Tiger and Project Elephant also tried to promote the welfare of tigers and elephants which were in captivity. Both these initiatives, it may be mentioned, undertook tasks which were aimed primarily at designing infrastructure and constructing other facilities for conservation of these animals. Field force training, veterinary care and capture and translocation of tigers and elephants and providing caretakers for these animals as well as spreading awareness about these animals among the local population, are just some of the important activities which are carried out as part of these two projects. Project Tiger and Project Elephant, also facilitate scientific research on these two types of animals and facets associated with them and their habitats. Although these projects have been fairly successful in states where they been introduced, there have been a few challenges that they have had to face. Of the several, large-scale deforestation, concretization, financial irregularities in the bureaucratic setup, and poaching, are just some of the major challenges which those involved in these projects face on a regular basis. It may be mentioned that while both these projects are headquartered in Delhi, they have regional offices located in several places including, among others, Bengaluru, Guwahati, and Nagpur.

22.5 SUMMARY

In the present Unit, we have made an attempt to highlight, apart from the primary differences between zoological and national parks, the salient features of the evolutionary history of national parks and zoological with respect to, not just India, but also world. Besides discussing some of the prominent zoos and national parks, the chapter, has underscored some of the important initiatives that successive Indian governments have undertaken in the post-1947 period. Wildlife Protection Act, establishment of the Indian Board of Wildlife and The Central Zoo Authority of India, Project Tiger and Project Elephant, are just some of such initiatives which have been discussed in the foregoing pages. Finally, the Unit has tried to make students aware of the pivotal role that national and zoological parks play in the conservation and protection of wild fauna and flora, especially the endangered species.

22.6 EXERCISES

1) Outline the salient features of a national park and a zoological park.
2) Delineate the evolutionary history of zoological parks, with special reference to India.
3) What is a menagerie? How is it different from modern zoo?
4) Discuss in detail some of the important initiatives which have been undertaken with regard to conservation and protection of wild animals in India in the post-1947 period.

22.7 RECOMMENDED READINGS AND REFERENCES

Singh, Bindra Prerna, Sonali Ghosh and Anuranjan Roy, (2019) *Wild Treasures: Reflections on Natural World; Heritage Sites in India- An Anthology*, Aryan Books International, Delhi.

Randhawa, M.S., (1950) *Beautifying India*, Rajkamal Publication, Delhi.

Rangarajan, Mahesh, (2001) *India's Wildlife History: An Introduction*, Permanent Black (in association with Ranthambore Foundation), Delhi.

Rangarajan, Mahesh, ed., (2007) *Environmental Issues in India: A Reader*, Dorling Kindersley (India), Delhi.

Thapar, Valmik, Romila Thapar and Yusuf Ansari, (2013) *Exotic Aliens: The Lion & Cheetah in India*, Aleph Book Company, New Delhi.

Trautmann, Thomas R., (2015) *Elephants & Kings: An Environmental History*, University of Chicago Press, Chicago.

UNIT 23 MINING*

Structure

23.1 Introduction

23.2 Mining and Environmental Transformations in the Premodern World

23.3 Colonialism, Industrialisation and the Modern Histories of Mining

23.3.1 Fossil Energy and Planetary Environmental Transformations

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23.5 Summary

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23.1 INTRODUCTION

The history of mining goes back to the early pre-historic period when man started using stone for tool making. Preparation of tools for hunting and food processing activities required careful classification, sorting, and the quarrying suitable stones. Subsequently, with the development of agriculture, human societies the significance of rock as a crucial resource enhanced. The development of urbanised state-level societies involved the expansion of mining activities to produce metal, initially tin and copper and later iron. In the later phases, human societies expanded mining activities to access coal, and other sources of fossil remains to harness energy for production and transportation. Conventional historiography uses developments in mining and metallurgy as a periodization device. Nineteenth century historians classified early human history into stone, bronze and iron ages. Metallurgy as the foundation of periodisation shows the significance of mining and metal processing technologies in shaping societies and cultures. The disparity in access to metal was reflected in social terms by creating social differentiation. The mining activities led to the long-term transformation of land surfaces through soil erosion, deforestation, flooding, and chocking of rivers and inland waterbodies. Metallurgy also caused local and regional scales of air and water pollution. However, mining and metallurgy emerged as a major factor in the global environmental transformations after the expansion of fossil energy-based industrial revolution in the eighteenth century

This unit provides an overview of the long history of mining from the pre-historic stone tool to the present day. The history of mining and metallurgy shows us how human societies transformed their ways of organising

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livelihood patterns. The long history of mining shall help us to understand the dynamics of human social interactions with nature. Specifically, the history of mining mirrors the development of economies and state systems, including hunting and gathering, horticulture, nomadic pastoralism, commercial agriculture and industries. As we move through history, we shall specifically focus on certain mining enterprises that were crucial in the making of modern industrial societies. The large-scale extraction of mineral resources in the modern period led to environmental degradation and eliminated the multiplicity of livelihood resources. This Unit on the socio-environmental history of mining shall especially focus on the case studies from the Indian subcontinent.

23.2 MINING AND ENVIRONMENTAL TRANSFORMATIONS IN THE PREMODERN WORLD

The history of mining is as old as the formation of human society and cultures in the Palaeolithic Age. The early humans were attracted to rock as a resource for hunting, gathering and farming. One of the major developments in human pre-historic cultural formations was their ability to locate the stone suitable for making tools for hunting and food processing. The history of stone tool-making dates back over 2 million years. Humans made a variety of hunting tools, including scrapers, choppers, lances, spears, bow and arrows. Archeologists have discovered weapons made from stones by pre-historic humans and classified them to understand the nature of their economic activities. Archaeological evidence found in the Nile Valley in Egypt suggests that human groups engaged in quarrying activities as early as 55,000 years ago. The Palaeolithic hunters used these tools to dig roots, hunt large mammals such as rhinos and mammoths and engage in butchery activities. Indian subcontinent also provides extensive evidence for Palaeolithic stone working activities of the early humans. Archaeologists have recovered stone tools from several river valleys, hills, foothills, plains and river valleys in various regions of the subcontinent. For instance, archeological excavations conducted in Narmada Valley recovered several Paleolithic stone tools. The increasing population size and need for more food and habitat made the environmental impacts of human activities visible. Lower Palaeolthic stone tools found on the Aravalli hills shows the familiarity of the early humans with the rocks. Stone tools enabled early humans to exploit pre-Holocene mammals. There is an increasing interest among prehistorians to understand early anthropogenic environmental change (See Foley and Lahr 2015). Some prehistorians argue that efficient hunting with the help of sharp stone tools became a major factor in the extinction of large herbivorous mammals. The human predation-induced extinction of the Pleistocene megafauna contributed to long-term transformations of the ecosystem.

Later, the major climatic shift from the Pleistocene ice age to the interglacial Holocene epoch tremendously transformed landforms, plants and animals. The pre-historic humans experienced environmental change as a major food crisis. The subsequent beginning of agriculture involved major transformations in human interaction with their surrounding environment.

The advanced neolithic societies required the expansion of quarrying and stone tool preparation to clear vegetation, dig irrigation channels, and build dams. In some regions, the mining of coal emerged as systematic social activity around 7,000 years ago. The advanced Neolithic and early Bronze Age societies extracted copper minerals for making tools and weapons. A noticeable increase in the settlement density of villages accompanied by material changes, including the development of canals and dikes.

The production of surplus food based on irrigation and specialized craft production activities contributed to the development of urban settlements and long-distance trade. The emergence of urbanised state-level societies made metal an essential element in plough agriculture, craft production, trade and warfare. The development of urban centres in regions including Tigris and Euphrates Vally, Nile Valley, and Indus Valley required a considerable rearrangement of the existing mining practices. State systems evolved to control mining, irrigation and agricultural production activities. Artisans of Anatolia mined and smelted copper 9,000 years BP. Metal mining, mainly copper, developed as a systematic social activity during the advanced Neolithic and the early formation of the civilisations. However, copper as a fragile metal, was not suitable for making weapons to clear forests and to dig irrigation canals. Production of bronze, an alloy of copper and tin, offered farmers, woodcutters, soldiers and canal diggers a solid metal. Based on available evidence from Egypt, Minon-Crete and China, Archaeologists argue that bronze was developed around 5,500 BP.

In India, early metal artifacts associated with megalithic cultures included copper and iron. Copper mining and metallurgy in India date back to the Chalcolithic cultures. One of the first pieces of evidence of copper from India was a cylindrical bead recovered from Mehrgarh, which is dated to about 6000 BCE. Archeological evidence from Harappa suggests that the early Indian urban societies used copper and bronze to make daggers, axes, knives, chisels, bracelets, bangles and beads. There are evidence of gold mining in the subcontinent from 4000 BCE. For instance, carbon dating evidence from Hutti, in present-day Karnataka, provides evidence for gold mining that happened around this time. One of the important ancient gold mines was located in the Maski region in Karnataka. Gold was used for making utensils, ornaments and garments for the members of the Royal family and the aristocracy. However, the environmental impacts of gold mining received limited attention from historians. Fire-setting techniques used in mines to extract gold involved large-scale environmental destruction. It contaminates water with toxic wastes produced by mining. Gold mining requires large-scale modification of landforms such as deep trenches and large open-cast pits. Gold mining based on modern geological surveys led to the reopening of ancient gold mines, including Kolar, Hutti, Ramgiri and Godard.

The available evidence suggests that during the advanced stage of the Indus Valley Civilisation, the urban societies were familiar with metal and alloys, including copper, bronze, tin, gold, and lead. The early civilisations also extracted lead, mercury, silver and gold. The states began to coordinate mining activities and smelt metal in Asia, Mediterranean Europe and North Africa. Later the Hittites in West Asia began to process iron. The smelting of

bronze and iron required large-scale deforestation to make charcoal. Various sites on the Gangetic plains had evidence of the use of heavy metal tools and implements from 2000 BCE.

The early civilizations produced small objects, ornaments and ceremonial iron weapons. However, the large-scale production of iron became a part of the economic activities of civilised societies only around 2000 BCE. They used other metals along with iron. It was only after 1000 BCE state-societies began to use iron as the primary metal. Iron smelting requires large-scale production of charcoal since smelting requires 1535-degree Celsius heat. Human societies continued to use charcoal as the primary energy source for another 30 centuries. The early iron producers preferred hilltops to smelt iron to use the natural draft to force increase heat. The smelting activity emits a large amount of carbon dioxide and other greenhouse gases. The need for charcoal and repeated burning of the hilltops and riverbeds for smelting affected vegetation growth, air pollution, and water contamination. Mining of iron ore and smelting produced a large amount of iron ore tailings, slag, and acid drainage which are harmful for living species.

Metal mining and smelting had always been essential elements in the formation of the state systems and craft heritage in the Indian subcontinent. Archeological excavation in the Aravalli ranges, especially in Zawar, Agucha, and Dariba in Udaipur district in Rajasthan provides evidence of mines that are 100 meters in depth during the third century CE. Some of the heritage sites in India, especially Ashoka Pillar (Delhi), Qutab Minar (Delhi), Taj Mahal (Agra), Ajanta and Ellora Caves, and Konark Temple (Bhubaneswar), are examples for the art of metal works that existed in India.

Zinc metallurgy has been practiced in the Indian subcontinent since the fourth century BCE. Archeological excavation at Zawar mines in Rajasthan shows evidence of zinc in 400 BCE and later. Zinc is a difficult metal to smelt, which required sophisticated technologies to control heat to immediately cool down to solidify zinc. Therefore, zinc production required specifically designed retorts with furnaces. The *Rasaratnakara,* an ancient India text on alchemy, discussed the method of zinc production. Brass production also existed in Taxila in the third century BCE. Kautaliya's Arthashasthra, a fourth-century BCE text, described the production of Zinc, brass and silver production. The production of zinc required 500 degrees Celsius heat and large-scale cutting of trees to produce charcoal. Limited developments in smelting technology led to high level of emission of metal pollutants into the atmosphere. As J. R. McNeill observed, "total copper emission in the Roman and Song eras came to about a tenth of those of the 1990s, even though copper production was less than a hundredth of modern levels." (McNeill, 2001: 102).

Mining and metallurgy were important aspect of shaping human interactions with nature. The production of stone tools, pots, and metal tools required a large-scale modification of nature. Compared to the modern world, the environmental impacts of early human activities were local and regional. However, it is important to notice that human-induced environmental degradation led to socio-economic and political transformations. Environmental damages caused by economic activities have been considered

a factor that led to the decline of the several ancient civilisations. Historians consider environmental degradation, especially deforestation, topsoil erosion silting of water bodies, and overgrazing, a crucial factor that led to the decline of the early civilisations. The environmental factors also included mining and exhaustion of metallic resources which led pollution. The environmental damages created by ancient mining and quarrying stayed for a very long time. The issues included wastes and pollutants produced by mining and smelting activities, especially the fuel needed to smelt iron.

Population growth and settlement expansion in the preindustrial world required the expansion of economic activities to new frontiers. The ancient and medieval societies developed new tools and techniques to produce surplus and to engage in long-distance trade. The need for metal, coal, and salt has been at the centre of developing geological and chemical knowledge. They extracted gold and silver for ornaments, vessels and coins. Salt was also extracted in large quantity to preserve food for the winter season. Mining activities evolved as a part of state and social formations involved large-scale human modification of the environment. There were innumerable small quarries with limited environmental impacts. However, the cities and empires required large quarries for a steady supply of stones. Deep mining left open pits in many places. Deep mining also required large-scale use of timber to construct tunnels and drainages. Therefore, quarrying and metal mining involved large-scale deforestation.

Almost no place on earth existed without a mining site. The mined materials, including copper, iron, silver, gold, and salt, represented the main form of wealth. Societies and state systems fought over, controlled, taxed and relentlessly searched for mineral resources. For instance, the Ancient Greek city-states, grew wealthier due to the development of large-scale mining of silver, especially at Laurion Mines. Athens and Sparta, two prominent Greek city-states struggled to control the mines. In the pre-modern world, metallurgy played a crucial role in economic development based on intensified agricultural production. The advances in mining technologies supported the expansion of agriculture and urban growth in the pre-industrial world.

23.3 COLONIALISM, INDUSTRIALISATION AND THE MODERN HISTORIES OF MINING

The economic integration of the world from the 1500s was a process that involved the expansion of mineral extraction. The need to have a steady source of metal and energy sources for surplus production and to develop transportation infrastructures radically redefined human relationship with nature. The emergence of capitalistic production patterns led to a global-scale expansion of mining for iron ore, coal, gold and later petroleum. The emergence of capitalism fundamentally altered the mining industry. Along with the expansion of metal mining, the expanded use of fossil remains as an important source of energy initiated a planetary-scale environmental transformation. In India, the extraction of mineral resources emerged as a major industrial activity under British colonialism. Coal and gold mining became the most important mineral products where the British, as well as the

Indian entrepreneurs, invested their capital. Coal mining increased tenfold between 1800 and the early twentieth century. The expansion of railways and steam shipping required the development of iron ore and coal mining. The states and capitalists searched for coal and iron ore deposit in all possible corners of the planet. The process of converting landscapes into mines, railways, roads and ports can be called the commodification of nature. Because mining was a process that involved the large-scale extraction of minerals and its global-scale marketing as metal, non-metal minerals and energy sources. The process of extracting and transporting metal and fossil energy sources required the large-scale extraction of building materials, including gravel, sand, granite, clay and other construction materials.

The worldwide economic integration made even the remotest hills supply source of minerals. The conversion of hills, grassland, and the plains as iron ore mines, oilfields, coal fields and gold and other rare earth mines led to the rapid exhaustion of resources that resulted in an accelerated phase of ecological degradation. This had a direct impact on livelihood patterns based on forests, pastures, and aquatic resources. The rapid growth of population from the eighteenth century and the industrialisation of production and distribution from the latter decades of the nineteenth century led to a new phase of socio-environmental transformations. This included the making of metropolitan cities, the development of mega transport infrastructures, including railways, ports, and road networks and the shifting of production from household units to city-based factories. All these developments steadily increased the demand for metal and fossil energy. The interconnected processes of industrialisation and urbanisation made mining a major economic activity in the modern world.

23.3.1 Fossil Energy and Planetary Environmental Transformations

The development of the steam engine in the eighteenth century made the ancient sunlight stored in fossil remains an important source to harness energy. The steam engines allowed the conversion of chemicals into energy. Later the invention of internal combustion engines at the turn of the nineteenth century allowed the use of petroleum as an energy source. By the early decades of the twentieth century, coal, oil, biomass, and human and animal labour power provided energy for production and transportation. However, the production and distribution of petroleum thrived in the second half of the twentieth century. Therefore, it would be apt to call the period starting from the 1930s the age of oil. The exploitation of natural resources and the exponential growth of pollution resulted in an increasing scarcity of natural resources. The poorer social sections and peripheral regions of the world experience severe inequalities of wealth and access to nature as a freely available source of livelihood. The effect of the massive emission of fossilised carbon was negative, which led to the contemporary issue of the climate crisis. This history of the climate crisis can be traced back to the large-scale use of fossil fuel for industrial production that shaped the modern world from the latter half of the eighteenth century.

Industrial developments in the eighteenth and nineteenth century were primarily based on technological developments to use coal as the prime source of energy. Initially, the coal-operated steam engine was used to

operate machinery for factory production. The portability of the steam engines allowed it to be put on ships and railway locomotives to facilitate long-distance transportation. In the nineteenth century, the development of railways and steamships made coal a major source of energy for transportation. From the 1850s, scientists engaged in developing technologies for the drilling and refining crude oil. The invention of the internal combustion engine in the early decades of the twentieth century was the beginning of the oil-based energy revolution. The development of crude oil extraction and refining technologies started providing large quantities of energy for production and transportation. The use of fossil fuel and the development of electric motors initiated a global-scale electrification process in the last decade of the nineteenth century.

Table 23.1: World Fuel Production, 1800-1990 in Millions of metric tons

Type of Fuel	1800	1900	1990
Biomass	1,000	1,400	1,800
Coal	10	1,000	5,000
Oil	0	20	3,000

Source: J. R. McNeill (2001), *Something New Under the Sun,* P. 53.

Table 23.1 shows that world energy production underwent a revolutionary transformation in the past 200 years with the introduction of coal, crude oil and natural gases. However, the emergence of oil as the prime source of energy was accompanied massive environmental transformation. The production of large quantities of coal and petroleum, as well as the production of metal, transformed the earth's surface and created open pits, and erased hills and mountains. At the same time, mining activities produced mountains of waste of rock and slag and choked rivers with silt and sediments. It made the traditional economic activities of fishing and navigation impossible in mining regions around the world.

The extraction of petroleum emerged as an industrialised economic activity in the early decades of the twentieth century. Oil began to replace coal as the prime source of energy for industrial production. The expansion of the great oil fields in the Middle East and the Americas made petroleum a cheap but the most efficient source of energy. The shift to oil initially reduced the amount of carbon smoke and lead emitted into the atmosphere. However, the consumption of fossil fuels has long-term environmental consequences. The massive combustion of fossil fuel resulted in an increasing accumulation of greenhouse gases, a major factor in atmospheric temperature rise. The impetus for large-scale increase in the fossil fuel came from development of combustion engines and allied infrastructures.

In the 1970s, the Organization of Petroleum Exporting Countries (OPEC) established their collective monopoly of oil production and increased crude oil price. The soaring price of petroleum forced non-OPEC countries to explore and expand oil fields elsewhere. This led to the massive environmental destruction of ecologically sensitive regions, including the

Gulf of Mexico, Alaska, Ecuador, and western Siberia. The oil extraction and distribution, such as oilfields, pipelines, refineries, and leaks and spills, involved massive landscape modification. The global peripheries became dump yards to deposit mining and chemical wastes produced by industrial countries. For instance, Mexico and Southeast Asian countries buried toxic industrial wastes produced by the United States and Japan, respectively. Plastic, a major byproduct of petroleum, leaves a major scar on the environment and create a major health hazard for living species.

23.3.2 Iron Ore Mining and Steel Production

Iron and steel production is central to world economic integration. Mechanisation of factory production in Europe in the eighteenth century increased the demand for iron production. Moreover, improvements in rock blasting techniques by using gunpowder also allowed a rapid and large-scale expansion of the iron ore mining industry. The metal requirement of world demands the mining of more than 2,000 million tons of iron ore every year. After the Industrial Revolution, the European capitalists turned to other continents to meet the industrial demand for iron and steel. The English East India Company and later the colonial Government of India promoted iron ore mining activities in India in the eighteenth and nineteenth centuries. The Bengal Iron Working Company was formed in 1874 with modern technologies to produce iron to meet European market demand for iron and to support railway and port construction requirements in the subcontinent. They used coal which was procured from charcoal as the primary energy source for iron ore mining. This adversely affected Indian forest wealth.

Iron ore mining and processing became a major industry in India in the early decades of the twentieth century. The expansion of mining required the modification of an extended landscape to supply coal, develop railway networks and channeling of fresh water for iron ore processing. J. N. Tata's interest in developing a *swadeshi* iron and steel production company led to the setting up of the first major Indian iron ore mining enterprise in India. Tata's initial challenge, after getting a concession from the colonial Indian government to establish mining enterprise in the iron-ore-rich Chanda, district was to get a reliable source to access cheaper and good quality coal, limestone and fresh water. Jharia coal field of Bengal was identified as a suitable site due to geographical proximity. Simultaneously, the iron ore deposit in Mayurbhanj in Orissa was also located. These two suitable sites led to the establishment of the largest steel-producing city of Jamshedpur.

The thinly populated tribal regions in eastern India experienced a major environmental transformation with the large-scale inflow of energy resources and mine workers from all over India. With the large-scale development of mining facilities, Tata Steel Ltd. (TISCO) could produce 188,000 tons of iron and 181,000 tons of raw steel in 1917-18, the years of World War I (Morris D Morris 1984: 591). After World War I, the demand for steel exponentially increased due to a large-scale mecahnisation of production and transportation. Steel was required for machinery, automobiles, trucks, ships, railways, and for the construction of bridges, buildings and ports. During the interwar years (1920-1939) TISCO was the prime supplier of steel in India.

During World War II (1939-45) TISCO's plants could produce 800,000 tons of finished steel. The company increased the blast capacity of the mining sector from 250 tons a day in 1920 to 780 tons in 1940. This led to the unprecedented environmental transformation of the region, including deforestation, soil erosion, and the accumulation of debris. Moreover, the increased production capacity required a massive increase in the production of coal and freshwater supply. In addition, the expansion of Katni limestone fields gave TISCO a large amount of limestone. Along with TISCO, the emergence of other steel production companies in various regions made Iron and Steel production a big business in India.

Mining operations in these regions were dominated by the Tata Iron and Steel Company and the Indian Iron and Steel company. The mining regions, or the so-called iron ore hills, were rocky terrain and forest-clad hills rising upto 3000 feet above sea level. The large-scale mining activities in the northeastern regions of the sub-continent started marginalising the livelihood patterns based on agriculture and forest gathering. A major portion of the iron ore mined from the region was processed in the blast furnaces in Jamshedpur in Jharkhand and Asansol in West Bengal. The region consists of many small rivers and hills. The iron ore deposit and other natural resources were crucial in the emergence of the Bihar-Bengal Heavy Industrial Area. The large-scale mining made the forest hills and agricultural villages into mining settlements with large scale mine waste deposits and pit heaps. The mines also became a destination for migrant workers from the north-western Indian regions. The mining development led to the rapid urbanisation of the region. The towns of Chaibasa, Noamunid, and Manoharpur develop in the early decades of the twentieth century. The combination of mining centres and the construction of railway networks majorly transformed the ecology of the regions that extended from Bihar to Orissa. The mining-related environmental degradation reduced agricultural yield, making the villages in the iron ore mining region dependent on imported food crops.

The government policy to promote iron production allowed the big corporate companies to access natural resources, including land and water rights, as cheap resources with limited state interventions. The mining companies had little environmental protection responsibilities during the colonial period. Therefore, the regeneration of mining sites was a major environmental challenge in India. In the Jharia and Raniganj coal fields in Bihar, there are more than 500 abandoned mines covering about 18000 hectares. The sites include subsided areas, excavated pits, spoil dumps, and areas affected by the fire.

World War I related demand for natural resources further intensified the process of the industrial extraction of natural resource in India. The war-related demand for material supply led to the emergence of some of the major industrial sectors. Portland cement production emerged as a major industry during and after the World War. The technology of rotary kilns to make cement was introduced in the late nineteenth century. However, large-scale cement production started in Katni in Central Province, Bundi in Rajputana, and Porbunder in Kathiawar during World War I.

The mining of manganese ore became an important mining activity in Viziangram State in present-day Andhra Pradesh. Subsequently, the need for manganese for steel production expanded the mining sector to various mineral deposit sites in central India, including Chhindwara, Jhabua, Balaghat districts in the Indian state of Madhya Pradesh, Nagpur and Bhandara districts in Maharashtra and Sundargarh, Koraput, Ganjam districts in Odisha and Srikakulam and Visakhapatanam districts in Andhra Pradesh. The use of manganese for steel production, rifle barrels, railway tracks and dry-cell batteries increased in the twentieth century.

23.3.3 Gold Mining

Gold mining is a sector that contributed to massive environmental destruction. Extensive mining activity for gold production destroys vast amount of land and vegetation and contaminate water sources. It also produces large amount of highly toxic chemicals including cyanide, mercury and other toxic chemicals. For instance, mining in Kolar Gold Field produced more than 800 tons of gold between 1880s and 1950s, however region underwent a major environmental transformation. The region became a modern urban space and was called mini-England. One of the first general hydroelectric scheme was set up to power Kolar Gold Field in 1903. Before the expansion of mining activities these regions were majorly forest hills. The hard nature of rocks in Kolar required large-scale use of chemicals for mining activities. The century-long mining and ore processing produced more than 35 million tonnes of residue. The mining residue contains sodium cyanide, a highly lethal chemical that contaminates groundwater in the area. Moreover, occasional flood carries chemical from the mining pits and contaminates surrounding agricultural fields.

The issue of soil contamination affected villagers who cultivate vegetables, paddy, ragi and groundnut. It also created multiple health hazards. Miners of the Kolar Gold Fields suffer from multiple health issues, including silicosis and lung cancer due to the blast, dust and smoke. Dumping of sodium cyanide, silica, copper sulphate and sodium silicate causes air and water pollution in an extended area that has health issues for all living species. Massive moving of soil and rocks for gold mining wiped out forests, vegetation, and waterbodies that were essential for lifeforms to survive. The long-term and adverse effects of mining are evident in Kolar Gold Fields after its closure in the early 2000s. The area remained polluted and has become a degraded ecological condition burdened with extracted ores as mountains of waste.

Mining of iron, coal, gold, silver and manganese became major industries in colonial India. However, there were no systematic rules or regulations to protect the environment or to ensure the safety of miners. In 1890 the Secretary of State for India initiated mining regulation by suggesting the Government of India intervene in issues related to labour and safety. As a response to this, the Government of India created the post of the Inspector of Mines to study the issues of mines in India. Based on the report of the Inspector of Mines, the Government of India initiated the framing of mining rules and regulations. Subsequently, the Indian Mines Acts of 1901 (replaced by the Indian Mines Act of 1923) and the Indian Coal Mines Regulation of 1926 were passed.

Under British colonial rule, the primary consideration of the ruling elites was to expand and intensify mining activities to generate maximum profit. However, the growth of labour movement in the 1920s started demanding accident compensation, adequate wages and regulation of working hours. Child labour in mine was banned, and minimum age of miners was decided as 15 years old. In 1937, the Government of India banned the employment of women miners. The ban excluded about 40,000 women from mining work. Later in 1943 the ban was lifted due to the Allied coal crisis during World War II. The lifting of the ban made around 70,000 tribal women in the Eastern Indian region a part of the British Empire's intensified appropriation of natural resources, especially coal, for war efforts and reimposed again after the War in 1946. The ban affected the livelihood of women miners who lived in remote Eastern Indian mining regions. The issue related to labour, tribals, women in the mining and other industrial sectors has been discussed in **MHI-107: Indian Economy-2 C.1700 to 2000**.

23.4 MINING AND ENVIRONMENTAL CONCERNS IN POST-COLONIAL SOCIETIES

After the end of colonial rule, the independent Indian government considered the conservation and development of mineral resources as crucial. One of the major concerns for the state and policymakers has been to balance mining-related economic development and environmental degradation. The Mineral Policy Conference of 1947 initiated the evolution of India's mining policy. The Conference led to the enactment of the Mines and Minerals (Regulation and Development) Act of 1948. Article 48 (A) of the Indian constitution makes it obligatory for the state to protect and improve the environment and to safeguard the forests and wildlife of the country. In addition to this, according to an interpretation provided by the Rajasthan High Court made the Right to a clean environment is based on the right to life guaranteed by the Article 21 of the constitution. In addition to these, Articles 39 (c), 39 (e), 42, and 43 guarantee citizens' rights to have humane conditions of work, living wage, and facilities to improve public health. The legislation on mines interconnected the issues related to the environment and public health.

In the initial decades of the Independence in India, mining-related regulations emphasised on labour welfare schemes. In 1956, the Government of India categorised the mines into three sectors: (i) strategic minerals under direct state control, (ii) minor minerals to be developed by private investors, and (iii) all other mines to be managed by the state. By doing this, the Government made mining majorly a state-controlled sector. The Government also developed institutions to promote mining activities, including the Geological Survey of India, the Indian Bureau of Mines, and the Office of the Coal Controller. The history of Independent Indian Mine laws from the first Mines Act of 1952 to 1986 Mines Regulations gave limited attention to environmental regulations. It amended the Mines and Minerals (Regulation and Development) Act 1957 to include specific provisions related to mines and environmental protection. The Act included provisions to control mining-related environmental issues, including floods, pollution, toxic chemicals, safety of buildings and monuments, and the conservation of mineral resources. At the same time, the mining regulations included provisions

related to the disposal of mine wastes, contamination of water bodies and the health and safety of miners. Especially, the Oil Mines Regulations of 1984 made it mandatory to reduce noise pollution in mines and ban contaminating fresh water. However, these regulations were insufficient to control ecological damages related to mining.

The Mines and Minerals (Regulation and Development Amendment) Act of 1986 was the first systematic legal intervention to address environmental issues related to mining. It included provisions to make the rehabilitation of flora destroyed as a part of mining. However, the loss of tribal habitats and the impacts on fauna were not addressed. The Mines Concession Rules of 1987 included provisions to make the state assess environmental damages associated with mining and held the owners of mines responsible for deforestation and compensation by planting trees. The Mineral (Conservation and Development) Rules of 1988 included provisions to minimize environmental damages, including deforestation, land degradation, air pollution, freshwater contamination, and noise pollution. Subsequent Government notifications and judicial innervations made environmental clearance a mandatory condition for mining industries. The Government of India in the 1970s nationalised coal and petroleum mines. In 1994, the National Mineral Policy was revised to permit private domestic and foreign investors to explore and exploit the following minerals: iron ore, copper, manganese, lead, chrome ore, zinc, sulphur, molybdenum, gold, tungsten ore, diamond and platinum group of metals. The National Mineral policy was also aimed to encourage large-scale private investment and to increase the export of mineral resources.

23.5 SUMMARY

The universal expansion of fossil energy regimes and related technological advancement shaped the modern history of mining and related environmental transformations. The intensity of environmental change is very intense. The contemporary world encounters mining and earth-moving as a major threat to the planet and its ecology. The hazardous health effects of mining activities included lung fibrosis, blood hemolysis, pheumoconiosis, persistent cough, aveolarlipoproteinosis, tuberculosis, respiratory, and ear drum related problems and infertility.

The increasing intensity of mining prompted the emergence of powerful social movements worldwide. The movements raise various environmental issues related to mining, including air and water pollution, soil erosion and degradation, loss of biodiversity, food crisis, hazardous health effects, and the reduction of freshwater availability. The movements against uncontrolled mining activities made the ruling elites devise mining regulations and environmental protection laws.

23.6 EXERCISES

1) Write a note on the significance of mineral resources.
2) Paleolithic societies had the knowledge about the nature and character of rock to be used for tool making. Discuss.
3) Discuss the importance of minerals in the emergence and consolidation of state formation during premodern era.

4) Examine the role of fossil fuel in the exponential expansion of mineral extraction.

5) Discuss the social and ecological consequences of industrial extraction of mineral since the introduction of internal combustion engines.

23.7 RECOMMENDED READINGS AND REFERNCES

Agarwal, D. P. and Ghosh, A (eds), (1971) *The Copper-bronze Age in India.* Munshiram Manoharlal, Delhi.

Bharadwaj, H. C., (1979) *Aspects of Ancient Indian Technology,* Munshiram Manoharlal, New Delhi.

Biswar, A. K. and Biswas, S, (1996) *Minerals and Metals in Ancient India,* 2 vols. D. K. Printworld, New Delhi.

Coulson, Michael, (2012) *The History of Mining: The Events, Technology and People Involved in the Industry that Forged the Modern World.* Harriman House Ltd., Hampshire.

Dane, Richard M, (1924) 'The Manufacture of Salt in India,' *Journal of the Royal Society of Arts,* Vol. 72, No. 3729, pp. 402-418.

Diamond, Jared, (2005) *Collapse: How Societies Choose to Fail or Succeed,* Viking, New York.

Dorian, James P, (1989) 'The Development of India's Mining Industry,' *GeoJournal,* Vol. 19, No. 2, pp. 145-160.

Foley, Robert A and Marta Mirazon Lahr, (2015) 'Lithic Landscapes: Early Human Impact from Stone Tool Production the Central Saharan Environment,' PLos One, Vol. 10, No. 3. (Online accessed on 30 Dec. 2022: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4356577/)

Gullapalli, Praveena, (2009) 'Early Metal in South India: Copper and Iron in Megalithic Contexts.' *Journal of World Prehistory,* Vol. 22, No. 4, pp. 439-459.

Habib, Irfan, (2008) *Technology in Medieval India, c. 650-1750.* Tulika, New Delhi.

Jariwala, C M, (1995) 'Mining and Environment: Indian Law Scenario,' *Journal of the Indian Law Institute,* Vol. 37, No. 4, pp. 431-441.

Karan, Pradyumna P, (1957) 'Iron Mining Industry in Singhbhum-Mayurbhanj Region of India,' *Economic Geography,* Vol. 33, No. 4, pp. 349-361.

Kurlansky, Mark, (2003) *Salt: A World History.* Vintage, London.

Morris D. Morris, (1984) 'The Growth of Large-Scale Industry to 1947,' in *The Cambridge Economic History of India,* Dharma Kumar and Meghnad Desai, Vol. 2: c. 1757-1970, Orient Longman, Hyderabad.

Simmons, I. G., (2008) *Global Environmental History: 10,000 BC to AD 2000.* Edinburgh University Press, Edinburgh.

The Royal Society for arts, manufactures and commerce (1910), 'The Mining Industries of British India,' *Journal of the Royal Society of Arts,* Vol. 58, No. 3005, pp. 737-738.