UNIT 4 ENVIRONMENT ISSUES IN THE MEDIEVAL AGES IN INDIA

Structure

4.0 OBJECTIVES

After reading this Unit you will:

- understand medieval Indian history from a different perspective in which environment was one of key factors in shaping historical development;
- gain historical knowledge on impact of environment on human lives and impact of human actions on environment during this period; and
- look at ways through which medieval states mobilized and utilized natural resources and their attempts to control their use.

4.1 INTRODUCTION

History writing pre-1970s hardly deal directly with various issues concerning environment and its impact on human societies. Prime focus was on arable parts of the landscape. Accordingly, forests, pastures, mountains, marshes were ignored. Sir Jadunath Sarkar, who worked mainly on political history of Mughal empire, throws light on impact on environment due to Mughal military expeditions in south. However, not much information is available on environmental degradation. Major contribution towards understanding human-environment relationship in medieval India has been made by Annales historians. Harbans Mukhia, influenced by historical writings of Annales historians wrote "Was there Feudalism in Indian History?" and highlighted connection between environment and social formations as a sub-theme and contested the theory of Indian feudalism. He showed how ecology of medieval India differed from that of Europe. For instance, Indian ecology was characterized by almost 10 months of sunshine and soil needed no deep digging. Hump of Indian bull, unlike plain back of European bull, was utilized for ploughing the soil. Consequently, agricultural productivity was much higher here than in Europe. In Europe not until 19th century two crops per year could be grown which was not the case in medieval India.

Early writings on environmental history of India attribute interventionist attitude of state over natural resources to colonial and post-colonial periods. However, medieval states in order to ensure regular revenue were actively engaged in management and appropriation of natural resources. Tax on agricultural produce was main source of revenue. Thus, state took measures such as introduction of new technologies, provision of irrigation facilities etc. for expansion of cultivable lands. Tax collected from most fertile agricultural lands was reserved for ruler's personal treasury. Khalisa land was under direct control of central government in Delhi Sultanate and Mughal periods. Mughals had shikargah-i-muqarrar (reserved imperial hunting grounds). Non-agricultural taxes were imposed too, furthering state's control over non-agricultural lands. For instance, in arid regions of Marwar cattle owners paid ghasmari and pancharai for using grazing grounds. Tax was imposed on sale of grass. Unauthorized grass cutting was punishable offence. Peasant had to give a share of grass grown in his field since state needed to procure fodder for its war animals. Alauddin Khilji too had imposed grazing tax called charai.

It is certain that during medieval period empires and kingdoms were heavily dependent on animals in wars and battles and for means of transportation and one of their significant royal pastimes constituted hunt. States attempted to demonstrate their control over flora and fauna. Accordingly, rulers issued imperial orders, forbidding slaughtering of certain animals or cutting of green trees and punishing those who tried to destroy natural resources. In this Unit you will look at the ways humans interacted with environment, both natural which include biotic (flora and fauna) and abiotic (land, water and air) and man-made

(means of transportation, settlements, food etc.). First, let us understand how environment was impacted by natural calamities which, in turn, affected human population.

4.2 NATURAL CALAMITIES

Natural calamities like earthquakes, floods and droughts caused long-term environmental, economic and health impact on population. Along with that, severe weather conditions like heavy snowfall and rainfall, change in river courses etc. disrupted human lives and development and at times, they compelled people to realize the need to respect nature and utilize available natural resources judiciously, resulting into introduction of new belief systems and practices.

4.2.1 Droughts and Floods

Medieval India witnessed frequent famines due to its dependence on monsoons for annual rainfall and its uneven distribution in different regions. In situations when there was no or inadequate rainfall for over two seasons it could result in drought and heavy loss of lives. Lack of rain and continued drought became primary cause for famines. In early medieval period Pallava rulers were called kaduvettis (clearers of forests). They cleared large tracts of forestlands for expansion of agricultural lands and human habitation. During rule of Raja Simha there was no rainfall for some years, leading to a famine in Kanchipuram. Probably, it was caused due to deforestation. Similar was the situation in Pandya kingdom in 8th century where there was no rain for 12 years. To deal with it Pallava rulers as a relief measure built up a buffer-stock of harvest through panchavara variyam (a standing committee).

Human trafficking was another unfortunate outcome of such natural calamities. William Methwold, the English factor, recorded that many impoverished parents at Masulipatnam in 1630s owing to famine were forced to sell their children not chiefly for money but because they hoped that their children would have greater chances of survival away from affected region, since the children bought were transported to different regions of India.

However, such natural disasters sometimes also compelled humans to protect environment. In c. 1485 Jambheshwaraji founded Bishnoi sect after Marwar witnessed a severe drought. He meditated and realized the significance of protecting environment. Accordingly, Bishnois started to worship nature. He prescribed 29 rules for his adherents, most of which speak of maintaining harmony with environment by banning cutting of green trees and animal slaughter. His contemporary – Jasnathji – too emphasized on conserving environment. Later, in 1730 at Khejarli, Amrita Devi along with other Bishnois sacrificed their lives in their attempt to stop felling of Khejri trees which were sacred to them by hugging them. About 363 Bishnois were decapitated.

Such events also brought changes in ecology. Devastating flood in 1341 in Periyar river created Cochin harbor and importance of Cranganur port was declined. The flood also spread Pokkali rice to Ezhikkara and tidal wetlands of present Ernakulam, Alappuzha and Thrissur districts from Idduki district of

Kerala. With passage of time this rice variant adapted to saline backwater region by growing taller to around 1.5 meters to survive high tides. Thus, this variety of rice became resistant to saline water, sea erosion and weathering floods.

Mahabalipuram – a seaport during Pallava period – faced coastal flooding in 320-560 CE and 950 CE due to soil erosion. Literary texts of Chola dynasty (9th-11th century) and archaeological excavations show connection between destruction of Kavaripattinam (Poompuhar) and sea flood. It was a port from where Cholas traded with Southeast Asia. When Marco Polo – a Venetian merchant – arrived on this coast in 1292 he anchored his ship at a port called Cail which is about 180 km south of Kaveripattinam, since latter was submerged into sea. Temple inscriptions are a useful source in extracting information regarding coastal inundations. Nilakanta Shastri who studied these temple inscriptions mentions in his work The Cholas (2000) that in 1112 CE some of the salt pans at Bapatla (in modern Andhra Pradesh) were destroyed. Irfan Habib in Man and Environment: The Ecological History of India shows influence of seashore changes on ports in Gujarat and how in 17th century Surat emerged as its major port. Thus, such hydroclimatic extremes and inherent aspects of monsoonal landscape altered human lives.

4.2.2 Earthquakes

Medieval writers recorded occurrences of earthquakes in different parts of India such as Gujarat, Assam, Kashmir, Delhi region etc. Devastating earthquakes would result in depopulation, destruction of human settlements and cities, alteration of river flow regimes etc. Babur (1526-1530 CE) in his memoir Baburnama mentions of an earthquake that hit Kabul in 1505 and its tremors were felt for a month in the region and not just epicenter of the region was devastated but its tremors were also felt in northern India in places like Agra, Gwalior, Mandu etc. Severity of this earthquake was such that it found place in most of medieval sources and even in a Hindi novel Mrignayani set in 15th century and written by Vrindavan Lal Verma. Due to a high intensity earthquake in Gujarat in 1699 Niccolao Manucci – the Italian traveler during Mughal period – informs us that canals there which supplied water became nearly dry and sulphur content in water had increased. The region was again hit by a severe earthquake in 1702. Rivers again witnessed a rise in sulphur content. Fish died in large numbers. High sulphur content in water is also not fit for human consumption as it leads to diarrhea and dehydration.

4.2.3 Heavy Rain and Snowfall

Rainfall was most important environmental factor for peasants. Its timely arrival was crucial for good production. Kathleen Morrison highlights agricultural expansion in marginal areas in Vijayanagar empire during 16th and 17th centuries through channelization of monsoon rains. However, heavy downpour not only halted day-to-day activities but caused some serious issues. Jahangir (1605-1627 CE), the Mughal emperor in his memoir Tuzuk-i-Jahangiri mentions

that while he visited Mandu during rainy season his imperial march faced series of problems and he could not go for hunting in such harsh weather. It was reported that 20 inhabitants died owing to excessive rain, thunder and lightning and many houses collapsed. Mughals who relied on cavalry had to shift to elephants while moving towards wetlands of Bengal and Assam. After conquest of Bengal its integration into Mughal territory was not smooth. Bengal's capital was shifted back to Gaur – ancient city where Ganges river changed its course – turning river's formerly rapid channels into stagnant backwaters. It became cause of devastating plague of 1575 when several Mughal officers, soldiers and civilians died. Many left the region. Besides this, continuous heavy rainfall sometimes increased level of a river, resulting into flood which altered human lives. Likewise, heavy snowfall caused many difficulties too. Mughal military expeditions to Balkh and Qandahar were obstructed number of times by harsh winter and heavy snowfalls and hailstorms. Hence, natural disasters were recurring features of medieval period and directly determined human society. But, human actions can also not be ignored while examining connections between humans and environment. In following section, you will look at how human efforts affected natural world.

4.3 FLORA AND FAUNA

In ancient times humans primarily struggled against flora and fauna. Once these were domesticated and brought under control, human efforts were directed towards multiplying them. During medieval period one can collect information regarding indigenous plants from texts on Tibb-i-Unani (Greek medicine) which was introduced in 12th century. These works gave information on medicinal plants and herbs like those on Ayurveda. Some of important medical texts include:

- Majma-i-Siya'i (written in period of Muhammad bin Tughlaq),
- Rahat-al-Insan and Tibb-i-Firuz-Shahi (composed during time of Firoz Shah Tughlaq),
- Tibb-i-Sikandari of Mian Bhuwa (dedicated to Sikandar Lodi),
- Shifa-i-Mahmudi: a translated work of Ashtanga Hridaya by Vaghbhata, commissioned by Mahmud Shah: sultan of Gujarat and grandson of Ahmad Shah I.

Another significant contemporary source on plants and animals is a unique work – Mriga-pakshi-shastra – by Hamsadeva, a Jain poet during reign of king Shaudadeva of Jinapura in 13th century. The king commissioned the work because once after returning from one of his hunting expeditions he was greatly

affected by thought of gradual extinction of animals and birds through hunting and felt the need to have information on animals and birds in forests and mountains. Memoirs of Mughal emperors Babur and Jahangir give very useful descriptions of flora and fauna of the empire. In next section you will learn how humans exercised control over wide range of animals and plants: wild, exotic and domesticated.

4.3.1 Exchange of Exotic Animals

Exotic animals and plants aroused great curiosity and were sought after by kings and aristocrats. They were described in royal chronicles or travelogues, illustrated by skilled painters, sent as diplomatic gifts etc. Such diplomatic gifts were a means of fostering ties and demonstrating ruler's power and control over vast natural resources. On wall of Konark Sun Temple built in 13th century there is depiction of a giraffe from Africa. Jahangir would commission paintings of exotic flora and fauna he came across. He maintained vast collection of animals which included 100 lions, 400 cheetahs, 6000 Turkish horses, 1200 elephants and 2000 camels along with rare animals such as zebras, dodos and giraffes. He acquired such unusual animals through exchange of diplomatic missions and also by instructing his nobles and officers such as Muqarrab Khan in Goa to bring him any rarities they would find. One of his nobles – Mir Jafar – gifted him a zebra which the former had procured from some Turks traveling from Ethiopia to India. Jahangir later gifted the animal to Shah Abbas, the Safavid king, in 1621. Earlier in 1619 Shah Abbas had sent a gyrfalcon to court of Jahangir.

Animals found in India such as elephants, rhinoceros etc. were sent as diplomatic gifts to Europe as well. In 1577 Abada, a female rhinoceros, was sent as a gift to Sebastian I (1557-1578), king of Portugal, probably from viceroy of Portuguese India. Another female rhino named Clara sent from India toured Europe in 1740s and 1750s. She became one of the subjects painted by Rococo painters. She was also received by king of France – Louis XV (1715-1774) – in Versailles where she stayed for some duration. The Bourbon ruler had her portrait made.

Jahangir's court painter Ustad Mansur, a specialist in nature studies, was commissioned on several occasions to paint on such subject-matters. Accordingly, he painted a turkey (the bird was unknown to Mughals), zebra, dodo, Eurasian red squirrels etc. Painting of dodo by him is considered most accurate representation of this extinct bird till date. He would paint flora and fauna in landscape in which they were found. In painting titled 'Eurasian Red Squirrels on a Chinar Tree' in 1610 the landscape is illustrated with a number of Indian birds and animals viz.:

- Eurasian collared dove
- Red-wattled lapwing

- Demoiselle crane: It is a migratory bird which visits north India till today in winter. Babur had also mentioned migratory patterns of birds.
- Kalij pheasant
- Ladakhi urial
- Chukar patridge

Trade and diplomatic exchanges enabled Mughals to introduce plants from Middle East and Persia and encourage cultivation of fruits and vegetables from New World. Jesuits of Goa introduced systematic technique of mango-grafting in middle of 16th century. Mughals, using grafting method, propagated varieties of mango. Akbar (1556-1605) near Darbhanga had built Lakh Bagh which was a big orchard of 1,00,000 mango trees. Ali Quil Afshar, a governor during reign of Akbar, introduced sweet cherry in Kashmir by grafting. Jahangir started cultivating pineapple which was procured from Goa. It came there from the Americas. Tobacco, chillies, potato, custard apple, pineapple, cashew nut and guava were brought from the Americas by European traders. It is to be noted that the kind of uniformity we saw as result of 'Ecological Imperialism' after Industrial Revolution (that first took place in Europe) and colonial expansion was not evident prior to these events. Ecology during this time was comparatively very diverse and such diversity was seen with lot of curiosity and received much attention by ruling class.

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Ladakhi Mountain Goat. Mughal. The Art Institute of Chicago. Source: Dr. Richa Singh.

4.3.2 Hunts and Captive Animals

A study of hunting expeditions of Mughal emperors is useful in obtaining information regarding distribution of animals they hunted. There were different techniques and methods of hunting. Through qamargah hunts herbivores (gazelles, antelopes, nilgais, deer, patridges etc.) and omnivore birds were surrounded and then released in a large qamargah to be hunted. From 1585-1617 Jahangir had killed 28,532 animals, out of which 17,167 were killed with gun. Rulers used wild animals such as caracals and cheetahs as coursing animals. Firoz Shah Tughlaq had large number of coursing caracals (now included in a critically endangered species' list in India) which in medieval Indian Persian texts viz. the Tutinama, Anwar-i-Suhayli, khamsa-e-Nizami and Shahnameh are called siyah-gosh (black ears) since they have black tufted ears. The Sultan had siyah-goshdar-khana (stables for caracals). They were used during time of Akbar as well for hunting. Akbar had a collection of 1000 cheetahs. Cheetahs hardly breed in captivity. However, in 1613 Jahangir records an instance of cheetahs breeding in captivity when a female cheetah named Cheeti gave birth to three

cubs. It is the only recorded example of captive breeding of cheetahs until 1956 when Philadelphia zoo successfully bred them. Since then they have been bred in zoological facilities. Jahangir also records of an albino cheetah which was gifted to him by ruler of Orchha – Raja Bir Singh Deo. Royal hunting had impacted distribution of wildlife species, especially of cheetahs. Their demand and captivity by Mughal emperors took a heavy toll on their population. Large number of them were taken out of their natural habitats for hunting purposes: a practice which continued till 20th century until they became almost extinct in India.

During Delhi Sultanate period Sultan and his nobles enjoyed hunting lions. But, hunting a lion was a royal prerogative under Mughals. This stalled the process of elimination. Jahangir banned hunt of deer in Jahangirpur. He also encouraged experiments on breeding of animals and hybridization. He once had two male Markhors crossed with seven female Barbary goats. His father Akbar took keen interest in producing good breeds of domesticated animals including elephants and horses.

Besides royal hunts in forests and on their reserved hunting grounds there are examples which show that sometimes when wild animals happened to enter cultivated lands they were killed by inhabitants. Abul Fazl writes that in Tirhut which was the Mughal suba of Bihar, during rainy season cultivated lands were frequented by deer, gazelle and tiger and they were hunted by locals, highlighting human-wildlife conflict.

Thus, rulers exhibited their power by capturing and taming wild beasts or by hunting them. There were efforts made by them to encourage their reproduction. However, those who could not breed in captivity eventually their number declined drastically since they could not multiply at reasonable pace. Besides, hunt was also seen as a means for developing military skills and exercises for kings and officers and soldiers.

4.3.3 Animals and Mobility

Medieval Indian states were heavily dependent on war animals, coursing animals, pack animals (camels, mules, bullocks, etc) for carrying heavy loads and swift animals to carry messengers. Cavalry was backbone of Sultanate and Mughal armies. During time of Akbar Mughal royal cavalry comprised of about 12,000 horses but their maintenance was a challenge due to scarcity of grazing lands and poor quality of many grasses found here. Most of their horses were brought from Central Asia and Persia and some from Arabia. Some were bred in India too. Mansabdars too had to maintain a reserve force of some 26,000 horses. Like Mughals best horses found in Vijayanagar empire were mainly imported from Persia. Duarte Barbosa, a Portuguese traveler who visited the empire during reign of Krishnadeva Raya, remarks that since these horses were not bred in the empire and were not used to its climate, therefore, they could not survive for long. So, they were very well taken care of.

Mughal mobile camps consisted of enormous number of animals. Francis Bernier, a 17th century French physician, estimated that mobile camp of Aurangzeb marching to Kashmir had about 150,000 animals (warhorses and beasts of burden). Out of these 50,000 of them were camels. Such huge dependence on animals for mobility also meant that they required judicious care and maintenance. Some Persian texts delineating on their diet and upkeep are:

- Rahat-al-faras by Ananda Ram Mulkhis (on horses and their treatment),
- Kabutarnama by Valih Musavi (on pigeons and their care and breeding),
- Ain-i-Akbari by Abul Fazl too gives information on diet and care provided to imperial animals.

Delhi Sultanate located between Ganga and Indus valleys enjoyed a strategic location. Its strength lay on ability of its Sultans to control eastward flow of horses and westward flow of elephants. Mughal chronicles and European travelogues provide significant information about elephants. Arthashastra mentions eight elephant forests. By Mughal period elephants could no longer be found in Indus valley and Upper Deccan as they used to be during Mauryan period. However, there was not much drastic change in distribution of wild elephants despite which they were being captured for warfare. Their number fell considerably due to severe shrinkage of their habitats from colonial period (since about 1800 CE). According to Duarte Barbosa and Abdur Razak (a Persian ambassador) Vijayanagar rulers imported elephants from Ceylon. This is interesting because elephants form an indigenous member of fauna of India. Ain-i-Akbari mentions places from where Mughals procured their elephants but nowhere does it refer to Ceylon. Perhaps it was because Bahmanis and later its five independent kingdoms which had its control over central regions of India where elephants were found. It seems that camels were too used in the empire but they must have been used by powerful and rich men. Hence, medieval states were often preoccupied with procurement and upkeep of animals which they utilized for several purposes.

4.3.4 Animals and Food

A wide range of animal flesh was available for consumption. Manasollasa, an encyclopedic account on conduct of kingly affairs, written by 11th century king Someshvara III of Western Chalukyan dynasty, records some meat-based aphrodisiacs and concoctions for building virility which are often mentioned in Ayurvedic medical treatises. He relished eating fried tortoise, roasted black rat (maiga). Domingo Paes says that in Vijaynagar empire a variety of wild fowl and other birds and game animals were sold alive in markets at very cheap price. People were free to eat flesh of any animal and bird except cows and oxen. Mutton, venison, pork, sparrows, rats, cats and lizards were too found in markets.

While on the other hand, Akbar renounced beef and prohibited cow slaughter. He abstained from eating meat twice a week (on Fridays and Sundays). Members of Din-i-illahi were prescribed to abstain from meat. He forbade meat consumption for 100 days a year and prohibited sale of all meats on certain holy days. Abul Fazl says that he developed distaste for meat and almost became vegetarian. Jahangir did not eat meat on Thursdays and Sundays. However, on days when he went for hunting expeditions he would sometimes kill game animals and distribute their flesh among the poor. This way, kings tried to establish a connection with their subjects either by providing them access or restricting access to resources.

Check Your Progress Exercise 1

1. How natural calamities affected human-environment interaction during medieval period?

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2. Explain in what ways medieval Indian states relied on animal resource and how were they procured?

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3. State true or false:

a) Tibb-i-Sikandari is a translated work of Ashtanga Hridaya written by Vaghbhata.

b) Ustaad Mansur, who was granted the title of Nadir ul-Asr (Miracle of the Age) by Jahangir, painted a number of plants and animals which provide us valuable information about flora and fauna during Mughal period.

c) Cheetahs captured by Mughals frequently bred in captivity. As a result of this their number increased significantly.

d) Rahat-al-Faras by Ananda Ram Mukhlis is a Persian account which deals with horses and their upkeep.

4.4 USE OF NATURAL RESOURCES

Tapping and utilization of natural resources transformed landscapes and impacted historical processes. Artificial irrigation promoted agricultural expansion. Irrigation projects enabled Firoz Shah Tughlaq (1351-1388 CE) to tackle issue of famine which was one of major concerns during reign of Muhammad bin Tughlaq (1325-1351 CE). It aided in cultivation of rabi crops besides kharif crops in some regions. As production increased prices of commodities decreased. Now you will read about human endeavours to tap natural resources such as water and soil.

4.4.1 Water Management

Tughlags were first to introduce canal irrigation in India. Barani in Tarikh-i-Firozshahi tells us that Ghiasuddin Tughlaq was first ruler to undertake construction of canals. Firoz Shah Tughlaq built canals on a large scale. He built Rajabwah and Ulug Khani canals, drawing water from Yamuna River to Hissar region. Other canal that he built carried water from Satluj river while other one supplied water from Ghaggar. Another canal joined Kali river with Yamuna near Delhi, connecting Delhi with rest of north India. Before construction of canals places like Hissar-e-Firoza was an arid-zone and had acute water scarcity problem. Siraj-us-Afif records that due to introduction of canals Hissar had sufficient water to grow both rabi and kharif crops. Shah Jahan (1628-1658 CE) is also known to have laid out canals. He built Nahr-i-Bihisht and further improved West Yamuna canal to irrigate the doab. He also constructed dighis which were square or circular reservoirs with steps to enter.

Mughals were known to build complex and intricate system of water management. They built qanats in various parts of their empire. However, they have fallen into disuse in today's time due to uncleared sedimentation, cutting of trees, contamination of groundwater by industrial wastes etc. Qanat is an Arabic word meaning channel. It was invented in Persia (modern Iran) where it is called kariz. Series of well-like vertical channels were made on hillsides, connected by a sloping horizontal tunnel. Water flowed from tunnel to an open tank. Apart from qanat other water-lifting devices used were:

a) Noria, and

b) Saqiya.

Baolis (step-wells) were designed for conservation of water in arid or semi-arid areas. They also provided inhabitants to escape heat in such climate since air remained cooler at bottom of these baolis than at surface. Chand Baoli (near Jaipur) is a remarkable example of a step-well from Rajasthan. Rani Ki Vav at Anhilwada (Patan) was built by queen of Solanki or Chalukya dynasty of Gujarat. In Delhi Raja Ki Baoli, Gandhak Ki Baoli, Hazrat Nizamuddin Baoli, Agrasen Ki Baoli, Red Fort Baoli etc. were built. Artificial lakes such as Anasagar lake (Ajmer), Pichola and Katehsagar lakes (Udaipur) were constructed in Rajasthan to deal with recurring issues of droughts and famines. Likewise, in Delhi Iltutmish excavated Hauz-i-Shamsi and Alauddin Khilji built Hauz-i-Alai. Anangpur dam in Haryana – a stone-built dam – was constructed by king Anangpal in 8th century.

In south early dynasties were mainly concentrated in riverine deltas such as Cholas were located in Kaveri delta, Pandyas in Vaigai delta and Chalukyas of Vengi in Krishna delta. By 12th-13th centuries riverine deltas shifted to inland zones. Tanks were constructed on large scale. Rajendra Chola (c. 1014-1044 CE) built huge tank called Cholagangam in his capital Gangaikonda Cholapuram. Parantaka Chola (c. 907-955 CE) constructed Viranameri lake (in modern south Arcot). Domingo Paes, a Portuguese traveler, noticed a large tank at Vijayanagar built by Krishnadeva Raya after sacrificing many prisoners to appease gods. Therefore, with aid of different water management and conservation technologies water (source of all life) was channelized even in arid regions, hilly areas etc. and population and cultivation flourished.

4.4.2 Land

Rich fertile lands had been coveted by kingdoms and battles were fought to control them. Just as in British colonial era in pre-British era too forests were seen as an obstacle. Thick forests were seen as refuge of robbers, rebels and wild animals. Though clearing them was a strenuous task, Balban cut forests and built forts in doab in order to check Mewati Rajput brigandage in the region. Forests were used for extraction of herbs, timbers, tubers, guns, dyes, firewood, etc. for trade but this extraction of forest produce was small, as large part of forests was not accessible. They were also a means of subsistence for people who depended on food-gathering economy. Forests of Malabar were rich source for obtaining spices and spice trade was crucial source of state revenue for kingdoms situated on Malabar coast and these kingdoms were engaged in flourishing trade with Arabs. Arabian fleet was made of teak timber from Malabar. When Vasco da Gama, the Portuguese sailor, landed in Calicut (modern Kozhikode) in 1498 Portuguese faced their commercial competitor – Arab traders – in Malabar coast. One of the ways through which Portuguese tried to control Indian Ocean trade was by acquiring control over ship-building centres in Malabar. Lack of wood in Arabian desert regions prevented Arabs from competing with the Portuguese in rapid shipbuilding. Later, British too recognized the importance of teak for ship

building and commercial exploitation of forests was further intensified. Indian teak trees were more suitable for ship building than Oak trees of England. A British merchant on his visit to Surat met a Parsi shipwright named Lovji Nusserwanjee Wadia and invited him to come to Bombay presidency to assist the British in shipbuilding. In 1821 at Bombay dockyard 159 ships weighing over 100 tons were built by the British.

Early medieval period witnessed growth of the practice of land-grants by which more and more uncultivated lands were brought under cultivation. In south India temples emerged as an institution which carried out multiple activities and mobilized resources of land and money, promoting agricultural development. During Delhi Sultanate north India had dense forests. When Muhammad bin Tughlaq increased tax in doab it caused famine in Delhi and entire doab region in 1334-35 CE. According to Barani the famine continued for seven years. Badauni informs that during this time of hardship peasants rebelled and fled to forests. It is believed that during 12th-13th centuries Ganga-Yamuna doab was still not cleared. Fawad-al-Fuad mentions that between Badaun and Delhi tigers attacked common man 12th century. This was altered by 16th century when all these areas were brought under cultivation as per W. H. Moreland. Before Mughals precise extent of forests was not known. Agricultural diffusion impacted forest ecosystems. Extensive clearing of forests for more cultivable lands led to shrinking of forestlands and expansion of agricultural lands. New crops were introduced. Improvement in artificial irrigation methods and techniques, as we read about them earlier, contributed to agricultural expansion and surplus produce. Urbanization and growth of human settlements too required clearing of forests.

It is to be noted that though there was agricultural expansion, large tracts of land were still not brought under settled agriculture and were inhabited by pastoralists and tribal societies. However, increasing cultivable lands, especially in fertile regions, encouraged tribes to adopt sedentary lifestyle. Between 11th and 16th century Jats in Punjab area converted from pastoralism to agriculture and had become settled peasants while in areas with harsh climate e.g. Sindh they continued to be pastoralists. So, climatic conditions were a crucial factor in determining human activities but landscapes were undergoing transformations too with human efforts.

4.5 TRADE AND INDUSTRY

Mughal emperors had their own kaarkhaanaas (factories) for manufacturing cotton and silk cloths. Indigo constituted one of chief export items during this period. Before forceful cultivation of indigo done by British planters in India indigo plantation rivalry among European companies was evident from reign of Akbar to seize the trade. Thus, during this time too many landless labourers worked on indigo farms. Jean-Baptiste Tavernier, a 17th century French gem merchant, informs that workers engaged in sifting indigo had to be cautious while doing so and cover their nose and mouth with piece of cloth so as to prevent dust

to be absorbed into their body via nostrils because dust of indigo was highly penetrative and hazardous to health when inhaled.

Another very important export item during Mughal period was opium. Cultivation of poppies (from which opium is obtained) was lucrative and comprised important source of revenue for government. As per statistical data provided by Abul Fazl on rates of various commodities for about the period of 19 years starting from 1590 indigo, poppies and sugar are mentioned as three most valuable commodities. Mughal emperors like Humayun and Jahangir were known to be opium addicts. Akbar lost his sons Daniyal and Murad owing to their excessive addiction to opium. Akbarnama by Abul Fazl refers to use of opium among Mughal elites. But due to its economic value the practice of smoking or eating opium could not be checked. Tobacco smoking was another addiction to become rapidly popular among Mughal elite class. It reached court of Mughals through diplomatic missions to Adil Shahis of Bijapur. Tobacco reached India via the Portuguese and was introduced in Bijapur. Soon it became a popular product in deccan. Andhra region became a chief centre of tobacco production from where tobacco was exported to Southeast Asia and far east.

Mughal architectural structures are renowned for their exquisite parchin kari (pietra dura) work on them and this art form is still alive in Agra. However, working with gemstones and carving them into small sizes to form beautiful geometric patterns or imageries of flora too required caution against inhaling its dust. Dust from agate is highly toxic as it is made of silica. Turquoise and garnet can be contaminated with free silica. Silica exposure is known to cause cancers, renal disease and other ailments. Likewise, workers employed to build magnificent buildings made of sandstones, marbles, etc. were exposed to health hazards as well. Thus, there were instances of use and abuse of resources.

Amir Himmat Yar Khan Smoking a Huqqa. Hyderabad. Late 18th Century. “Nauras: The Many Arts of the Deccan” Exhibition. National Museum, New Delhi. Source: Dr. Richa Singh.

Check Your Progress Exercise 2

1. Describe some of the water management techniques and their significance during medieval period.

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2. Fill in the blanks:

a) Arabian ships were made of _____ wood from Malabar.

b) During medieval period Jats in Punjab region ceased to be _____ and adopted _____ and sedentary lifestyle. However, people in Sindh with extreme climate continued to practice _____.

c) Smoking of _____ was introduced to court of Mughals through diplomatic missions to Adil Shahis of Bijapur.

3. Match the following:

(i) Pietra Dura (a) Its addiction caused death of two Mughal princes Daniyal and Murad.

(ii) Indigo (b) It is present in some gemstones such as agate, turquoise etc. and its dust is highly toxic and health hazardous.

(iii) Opium (c) One of main exports from Mughal empire.

(iv) Silica (d) Inlay work of cut and polished gemstones to create geometric or floral designs

4.6 SUMMARY

To sum up, in this Unit you learned about continuous interface between environment and humans during medieval period of India. It is comprehensible that states during this period were heavily dependent on use of natural resources. They were preoccupied with procurement of swift and fine breed of war animals, fertile lands, water bodies etc. causing enmity between them or there were instances when enemy states attempted to prevent their adjoining kingdoms from procuring them to enhance their respective power. Control over resources defined king's relationship with other rulers as well as with his subjects and local chieftains. Therefore, proposition of historians like Ramachandra Guha and Madhav Gadgil i.e. there was prudent use of natural resources by traditional societies before colonial era has been contested. Against this generalized notion recent works show that ruling elites put claims on natural resources and actively

safeguarded their claims and were eager to expand scopes for state intervention. The magnitude of exploitation of natural resources intensified with advent of Industrial Revolution and colonial expansion about which you will read in next Unit.

4.7 KEY WORDS

Doab: A fertile tract of land (owing to the presence of alluvial soil) between two converging rivers

Ecological Imperialism: Theory propounded by Alfred Crosby as per which Europeans, through means of accidental or intentional introduction of flora and fauna and disease, caused decline in local population (of both humans and animals and plants) and a shift in their ecology. This enabled them to successfully build colonial empires.

Saqiya: Device to lift water mechanically from a well with aid of drought animals (ox, mule or camel). The animal turns horizontal wheel which is engaged to a vertical wheel. It is also called Persian wheel or rahat. It is different from noria though both are water-lifting devices and they consist of a large vertical wheel with water pots attached to it, but noria is always used on a river since it does not work on standing body of water. Sanskrit term araghatta is used in ancient texts to describe saqiya.

Qamargah: Large tract of land (often around hundreds of square miles) circled by soldiers who slowly closed in and collected thousands of animals into the center. Mughal emperor would enter into the circle and hunt the game. Nobody else could step inside the circle till he was done hunting. Since this mode of hunting covered huge portion of land therefore it usually took months to surround and gather animals and hunt them. Qamargah was considered to be an effective way of keeping soldiers active and practice their military skills in times of peace.

4.8 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

1. See Section 4.2, Subsections 4.2.1, 4.2.2 and 4.2.3
2. See Section 4.3, Subsections 4.3.1, 4.3.2, 4.3.3 and 4.3.4
3. a) False, b) True, c) False, d) True

Check Your Progress Exercise 2

1. See Sections 4.4 and 4.4.1
2. a) teak; b) pastoralists, agriculture, pastoralism; c) tobacco
3. (i) (d), (ii) (c), (iii) (a), (iv) (b)

4.9 SUGGESTED READINGS

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