UNIT 20 ENVIRONMENTAL CONSERVATION-I

Structure

20.1 INTRODUCTION

In this course, so far, you have studied about the increase in population, poverty and pollution which are causing a rapid depletion of natural resources. In order to sustain the economic development of the nation, there is a strong need to preserve the natural resources, both biological and physical. In this unit, you will study about the conservation of biological resources (wildlife) and in the next unit, you will study about the conservation of physical resources.

We begin this unit by defining environmental conservation. Conservation is the planned management of man's surroundings to prevent its exploitation, destruction or neglect. Man's impact on nature started becoming evident when he perfected the art of hunting. With the development of farming and animal husbandry, man began to control his environment. He exploited the natural resources of the earth to keep pace with his physical and cultural needs. With increase in world population, there was further depletion of natural resources. However, it took time for people to realise that man's interference with nature had probably done more harm than good and that man had been careless of the future. Enthusiasm for nature and wildlife surged, laying the foundation of the conservation movement as we know it now.

In the present unit, the concept, principles and aims of conservation have been explained. The need for rational use, restoration, integration and allocation of resources has been stressed. The importance and advantages of conservation are also discussed. Wildlife conservation with reference to India is discussed in detail. The main factors which cause wildlife extinction are hunting, habitat destruction and predator control. Wildlife has economic, medicinal and recreational value. They also maintain the ecosystem stability. So there is a strong need for wildlife conservation. To conserve wildlife many acts have been passed and reserve areas created. In India, there are about 412 wildlife sanctuaries, 80 national parks and reserves to conserve wildlife. 'Project Tiger', an operation to conserve the Indian tiger is also discussed in this unit.

Objectives

After reading this unit, you will be able to:

- define, use and identify in proper context the terms: endangered species, conservation, national park and sanctuary,
- explain the aims and principles of conservation,
- list reasons and describe the need for wildlife conservation,
- explain the advantages of declaring some areas as wildlife parks and sanctuaries, and
- describe the state of wildlife conservation in India.

20.2 ENVIRONMENTAL CONSERVATION

The rapid decline in the quantity and quality of natural resources has led to a concern for their management and conservation. Natural resources are raw materials obtained or derived from nature. They are classified into renewable and non-renewable resources. Renewable resources are replaced from time to time by natural processes, like multiplication, recycling, etc. They are, in this sense, inexhaustible. Forests, pastures, wildlife and aquatic life come in this category. However, it is necessary to properly plan and manage their use. Non-renewable resources such as minerals, metals, soil, coal, oil deposits, etc., are available in limited amounts and in no manner can be rebuilt or increased.

If man expects to have a future on the earth, he must use the resources in the most prudent manner possible. Conservation does not mean hoarding. It means the wise management of resources to provide a continuous supply for a long time into the future. This implies continuous renewal of a resource and recovering, recycling or reusing the products. Conservation of a natural area means its maintenance in a natural state for the purpose of enjoyment or study in order to understand and appreciate the complexities of ecological laws.

20.2.1 Concept of Conservation

Conservation is a broad concept which involves not only the scientific but ethical, moral, economic and political aspects as well. Conservation has been variously defined. Conservation for a petroleum engineer is largely minimising of waste from incomplete extraction and for a forester it may be sustained yield of products. In all cases, conservation deals with judicious development and manner of use of natural resources of all kinds. A generalised definition of conservation is "the maximisation over time of the net social benefits in goods and services from resources". Although it is technologically based, conservation cannot escape socially determined values.

Conservation may also be defined as the achievement of the highest sustainable quality of living for mankind by the rational utilisation of the environment, protection of nature to enrich the life of man and the control or elimination of environmental pollution in its many manifestations. Conservation advocates practices that will perpetuate the resources of the earth on which man depends or in whose continued existence he takes an interest. Conservation derives its tenets from a knowledge of ecology, the science concerned with interrelationship between living things and their environment.

But the question arises, why there is a need for conservation? The reasons are:

a) world population is increasing at an alarming rate,

b) world resources are being used up at an increasing rate due to increase in population,

c) pollution is increasing with the passage of time, and

d) damage caused by human activities is sometimes irreversible.

Conservation involves perpetuation of the natural environment of man including the infinite resources of air, water, soil and life forms. Conservation involves the collective responsibility of governments, private organisations, industries and individuals and the setting aside of funds, finances for ecological research and execution of conservation projects.

20.2.2 Aims and Principles of Conservation

The aims of conservation are two-fold:

i) to ensure the preservation of a quality environment that considers aesthetics and recreational as well as product needs.

ii) to ensure a continuous yield of useful plants, animals and materials by establishing a balanced cycle of harvest and renewal.

Principles of Conservation

Conservation is achieved through measures adopted in favour of a natural resource in order to increase its longevity and improve usage patterns. Some such measures are as follows:

a) **Rational use of the resources** is one of the concepts in conservation of natural resources in an essentially undisturbed condition because they are of scientific interest, have aesthetic appeal or have recreational value. Preservation also serves an ecological purpose by maintaining the function of the total environment, for example, protection of forests assures a sustained yield of water into urban reservoirs, and protection of estuaries perpetuates ocean fishery.

But rational use is not just preservation. It also implies the direct use of resources for their commodity or recreational value. Thus, harvesting of forest crops, livestock grazing of grassland, catching fish and hunting wild animals can be considered a legitimate part of the rational use of natural resources, if they are carried out in such a way that the resource is perpetuated and not endangered.

b) Concept of **sustained yield** is involved in these activities. This means cropping the annual surplus of individuals so as not to endanger the breeding stock of game animals or fish. Similarly, tree cutting or grazing of grass should remove only the annual increment and no more.

c) **Restoration** is another important aspect of conservation. It is a widely familiar conservation measure which is essentially the correction of past careless activities that have impaired the productivity of the resource base. Deforested areas and mined and barren lands can be revegetated with some effort. Depleted animal and plant populations can recover if they are accorded protection. This measure is familiar in modern soil and water conservation practices applied to agricultural land.

Restoration is possible, however, only as long as species are protected and genetic diversity of life is maintained. When species become extinct, the restoration of past conditions become impossible.

d) **Protection** of natural resources from commercial exploitation to prolong their use for recreation, watershed protection, and scientific study. This is the concept underlying the establishment and protection of parks and reserves of many kinds.

e) **Reutilisation** is the reuse of waste materials, as in the use of industrial water after it has been purified and cooled. The same process becomes recycling if the waste material requires minor treatment before it can be reused, as in the use of scrap iron in steel manufacture.

f) **Substitution,** an important conservation measure, has two aspects: (i) the use of a common resource instead of a rare one when it is for the same purpose, (ii) the use of a renewable rather than a non-renewable resource when conditions permit.

g) **Allocation** concerns the strategy of use—the best use of a resource. For many resources and their products, the market price decides as to the use a resource is put, but under certain instances, general welfare may dictate otherwise. The allocation of resources may be controlled by government through the use of quotas, rationing and outright permits.

h) **Integration** in resource management is a conservation measure because it maximises over a period of time, the sum of goods and services that can be had from a resource, or a resource complex such as a river valley. This is preferable to maximise certain benefits from a single resource at the expense of other benefits or other resources. Integration is a central objective of planning.

Try to answer the following SAQ to see if you have understood the concept and principles of conservation.

SAQ 1

a) Why is there a strong need for environmental conservation? Give two reasons.

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b) Give three important principles of environmental conservation.

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20.3 WILDLIFE CONSERVATION

You have become familiar with the term 'wildlife' in Unit 7 of this course. The term wildlife is commonly referred to represent the non-domesticated animals living in a natural habitat. Our country was endowed with a particularly rich biological heritage. But due to extinction of many species, the number of wildlife (flora and fauna) has come down. In addition to many species having become extinct, some are endangered and a few are threatened. Before discussing the reasons for extinction and the need for wildlife conservation, let us define the terms **endangered, threatened** and **extinct.** **Endangered species** are those that were once abundant but have since dropped drastically in number due to human activities, and now their very existence is in danger. **Threatened species** are those that are likely to become endangered species within the foreseeable future, throughout or in a significant portion of its range. The threatened or endangered species for which no conservation measures are taken become **extinct.** You can have a look at Table 20.1 for further clarification.

Endangered species are in danger of being eliminated, extinct species no longer exist.

The world is losing one speices every day and within next 20 years at least 25% of all forms of wildlife could be extinct.

Table 20.1
Categories of Animals at risk

Classification	Meaning & Examples
Critically endangered	Will not survive without human assistance, examples: California condor, Florida panther, Great Indian Bustard
Endangered	In immediate danger ot extinction, examples : whooping crane, red wolf, key deer, blue whale, gharial
Threatened	Abundant in parts of its range, but severely depleted in others, examples : grizzly bear, horned rhino
Rare	Not endangered at present, but at risk because of low numbers, includes many island species

To conserve the endangered and threatened species, and thereby prevent extinction of species is a major goal of wildlife conservation. You will study the reasons for extinction of species, the need for conservation of species and the task of conservation in the following subsections.

20.3.1 Reasons for Extinction of Wildlife

Wildlife extinction results from many forces operating in the society, such as economics, politics and psychology. Fig. 20.1, shows the specific activities that cause extinction of species and the relative importance of each. Some factors affect wildlife directly and others affect it indirectly. Let us examine each of these factors in a little more detail.

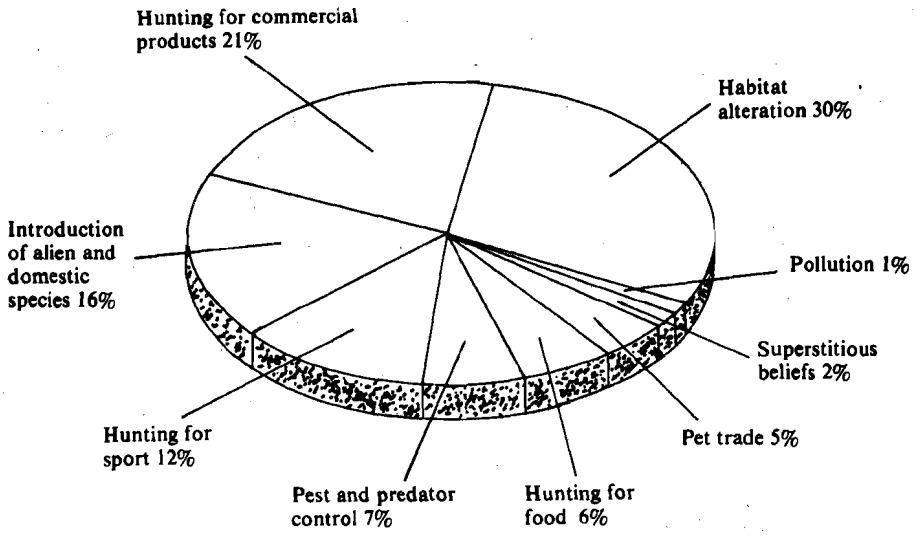

Fig. 20.1 : An approximate breakdown of the human activities that lead to extinction of species. More than one activity is often involved, however.

a) **Alteration of habitat:** Destruction of the habitat of a particular wildlife species intentionally or unintentionally leads to extinction of species. The habitat may be destroyed by deforestation, drainage, overgrazing, expanding agriculture, urban and suburban development, highway construction, dam building, etc. As a result of destruction of its habitat, the species must either adapt to the changes, move elsewhere or may succumb to predation, starvation or disease and die.

b) **Commercial sport and subsistence, hunting:** Nature has great diversity. It has created, over many millions of years, a large number of species of plants and animals. But it is man who is responsible for the extinction of plant and animal species either directly or indirectly.

It may be a coincidence that all the motives for killing animals begin with the letter 'F': food, fats, finery (fur and feathers), fun, financial gain and fear. From time immemorial, man has hunted for food. It is only in relatively recent times that man is killing animals on a large scale for economic gains or even for sport.

Commercially, animals are hunted for their fur, hides, tusks, antlers and various other body parts. Rhinoceros is hunted for its horns. Gharial and crocodile are hunted for their skin, which is used for various purposes. One of the most publicised commercial hunts is that of a whale. The "whalebone" or "baleen" was used to make combs and other products.

Hunting for sport is also a factor in wildlife extinction. Poaching of wildlife for sport and profit is widespread.

c) **Introduction of foreign species:** The introduction of foreign or alien species into new territories can often lead to ecological and economic disaster. An introduced species' niche may overlap that of a native species, the newcomer may out-compete the native species, resulting in its extinction. Though, species are often intentionally introduced to improve fishing and hunting, it can lead to problems also.

d) **Control of pests and predators:** Natural predators remove the aged, sick and injured members of the prey population. In contrast, human beings generally remove the strongest specimens. Such predation will diminish the genetic vigour of a population. Thus human being and natural predators have opposing effects on population of prey. Natural predators make the prey population stronger, human beings make it weaker. Predators or pests are also important biotic components of the ecosystem and so great care should be taken while dealing with these components. Human beings hunt, trap and poison predators and pests such as bears, wolves, lions, etc. In general, predator and pest control measures have two major impacts: (i) they kill natural predators that are a part of the balanced ecosystem, (ii) they can indiscriminately poison non-target species, having a ripple effect on organisms higher in the food chain.

Rabits became pests in Australia because of no predator control over them.

e) **Collection for zoos, private collections and research:** Animals and plants are gathered throughout the world for zoos, private collectors and researchers in biology and medicine. Amongst the legally exported animals there are many endangered, threatened and rare species. Researchers throughout the world use a variety of animals for their studies, many of which come from the wild. Particularly primates such as monkeys and chimpanzees are sacrificed for research. Primates are desired because of their anatomical, genetic and physiological similarity to human beings. The chimpanzee, for example, is being used in work on human reproduction and cancer detection. Research animals often do not breed in captivity. They also have a high mortality, resulting in continual loss of wildlife.

Moreover, the regulations for the supply of animals are poorly enforced. The hunters also know very little about effective live capture; therefore, deaths and injuries during capture are not uncommon. It is not only animals but plants like cacti and orchids are also being uprooted for sale elsewhere.

f) **Pollution:** Pollution alters the habitat of plants and animals and play a significant role in extinction. Water pollution is especially harmful to the organisms living in estuaries and coastal zones. Toxic wastes entering the food chain can have devastating effect on their population. Insecticides and pesticides can also affect the plants and animals.

Other Ecological factors: There are other ecological factors that contribute to species extinction. Some of these are as follows:

i) Degree of specialisation is an important factor. The more specialised an animal or plant is, the more vulnerable it is to extinction.

ii) Location of the organism in the food chain is also important. The higher the animal is in food chain, the more susceptible it becomes. Larger animals are more profitable to hunt and they are easy targets because they are less fearful of human beings.

iii) The distribution range also affects extinction. The smaller the range, the greater the threat of extinction. Population on islands are particularly susceptible.

iv) Reproductive rate is also an important factor. Large organisms tend to produce fewer offspring at widely spaced intervals. Their offspring also tend to reach reproductive age late.

v) Animal's tolerance of human presence or specific behavioural patterns also play an important role.

SAQ 2

a) In the following Table, put the appropriate term filling the descriptions of species given on left-hand column:

Description	Term
Species in danger of being eliminated	
Species no longer exist	
Species likely to become endangered species.	

b) Wildlife extinction is caused due to a number of reasons. Give four important reasons.

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20.3.2 Need for Wildlife Conservation

You will be curious to know why we should save endangered species. Why is it that all policy makers, scientists and interested citizens argue that species extinction is one of the most serious environmental problems? The importance of the need for protecting endangered species is discussed in detail in this section.

i) **Value as a genetic reservoir:** Plants and animals possess undiscovered or undeveloped traits which are very important for the survival of a particular species. When all the genes of all the individual members in a given population are added together, a **gene pool** is created which is representative of that species. It is important to preserve all gene pools as they might prove useful to us in future. In any case, we do not know enough about interspecies relationships and ecosystem balance and its stability to allow any gene pool to get eroded or obliterated.

Large gene pools are also important to agriculturists. All domestic crops and livestock have originated from native plants and animals. All those native species are still needed to provide the new genetic characteristics that we need to help solve our present and future food production problems. If steps are not taken to preserve endangered species then these gene pools will be swept away.

ii) **Value in maintaining ecosystem stability:** As you know, ecosystem includes abiotic factors like temperature, humidity etc. and biotic factors like plants and animals. The ecosystems maintain a delicate balance of nature. Each species interacts with other species and plays a role in the transfer of energy and materials within and between ecosystems, hence each one, in its own way, contributes to the stability of ecosystems. The function of a species whether plant

or animal is very critical to ecosystem stability. As you know, the plants occupy the base of food webs, so extinction of a single plant species may lead to the extinction of animal species dependent on that particular plant species. A species lost here and there may be of little consequence for overall ecosystem stability, but in the long run, the cumulative effect of such losses may some day threaten our existence. If we think that each species by itself is dispensable, then bit by bit we will destroy the rich biological world in which we live.

iii) **Economic value:** In our daily life, we use many things which are products of wildlife. Many plants have medicinal value, for example, we get, penicillin from Pencillium, quinine from Cinchona, morphine from opium poppy. A chemical derived from the skeletons of shrimps, crabs and lobsters may serve as a preventive medicine against fungal infection.

Important plant and animal genes are needed to improve domestic crops and livestock. Many genetic reservoirs located in the tropics and subtropics are the source of virtually all the common valuable plants and animals. They provide genetic material needed in the continual battle to improve plant and animal resistance. Loss of these centres would have a global impact on food supplies.

Fish is a source of income to fishing lodges and sporting goods stores. Wildlife is a source of income to recreation and tourism industry. The most popular tourist attractions are national and state parks and forests.

Although the economic value of a given species may not be apparent, we cannot assert that a species has no economic value.

iv) **Aesthetic value:** Aesthetic value of a species also promotes its preservation. For example, the taste of wild berries, the refreshing fragrance of wild flowers and the softness of a bed of moss have no monetary value, but still their aesthetic value compels us to preserve them.

v) **Inherent value:** Each species has a right to exist. So, if a species exists, then it has a fundamental right to continue to exist without being driven to extinction by human activities. The inherent value of a species cannot be measured merely by the extent to which human beings can get along without it.

Before taking up various measures to save the endangered species, try the following SAQ.

SAQ 3

a) Why are more mammal species, specially primates, becoming extinct as compared to other animals?

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b) State four important reasons for saving endangered species.

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20.3.3 How to Save Endangered Species?

Preserving species is not a simple matter. The problems of wildlife management are very complex and there is much work on three overlapping levels, i.e., technical, legal and personal.

To achieve a desired abundance of a particular species of wildlife, it is imperative to save their habitat because wildlife populations respond very sensitively to their habitats. Thus, habitat management is an efficient technique. So, we can say that wildlife management includes habitat management.

Integrated species management programme is the best way for protecting wildlife. This approach is a diversified attack on the cause of extinction. Some of the tasks of integrated species management are given in the following Table. (Table 20.2).

Table 20.2 : Integrated Species Management: Some Measures

1. Reduce habitat destruction by careful selection of urban and other development.
2. Establish preserves to protect nesting grounds and other critical habitats.
3. Reduce commercial and trophy hunting when evidence shows that the hunted species is rare, threatened, or endangered and when synthetic products can replace those acquired from these animals and plants.
4. Improve wildlife management, including programmes to protect and manage non-game species.
5. Control the introduction of alien species, especially on islands.
6. Design careful predator and pest control management programme so as not to indiscriminately eliminate non-target species.
7. Reduce pollution
8. Increase public awareness of the value of wildlife and what factors cause extinction.
9. Fund captive breeding programmes to raise endangered species for release.
10. Establish breeding programmes to generate research animals.
11. Impose tough penalties, and increase the policing of animal and plant trade and poaching.
12. Promote international cooperation to curb the trade of endangered species.
13. Increase expenditures for all protective measures, possibly through new taxes; and
14. Intensify research efforts to learn more about ecosystem stability and to identify critical plants and animal habitats.

A group of techniques specifically designed for benefiting one target species for each area and for achieving the specific objectives is called **systems approach.** The systems approach involves:

a) intensive study and research by experts to isolate the problem,

b) definition of goals,

c) education of the public by all the media,

d) programmes to retain and improve the habitat,

In Kaziranga, where one horned rhino breed successfully, are recently migrated to Tarahi, where probability of increase in rhino population are more.

e) goal-oriented game harvest regulations or population control programmes,

f) manipulation of sex and age ratios as well as density of animals, to achieve desired population change,

g) action by agents to deter or apprehend poachers or game law violation,

h) control of disease and parasites and to select individual predators, and

i) well-researched transplanting of wildlife from areas where it has bred successfully to areas with high potential for population building.

20.4 CONSERVATION IN OUR COUNTRY

Indian wildlife is rich and diverse and hence deserves protection. There are 45,000 species of plants in this country, of which 7000 are endemic to India. Animal species number at around 75,000 of which 850 are mammals which include the mighty elephant, the gigantic Himalayan sheep, the Indian bison or gaur, the spotted deer or cheetah, the black-buck, the four-horned antelope, the one-horned rhinoceros and the prestigious lion and the tiger. But with the passage of time, the number of wildlife came down due to man's interference with nature. Some species have become extinct and some are endangered or threatened. Though the list of endangered species in India cannot be exactly determined, it is estimated that the existence of 150 mammals and 150 birds is threatened. An unknown number of insects and flora too are in danger of becoming extinct. A list of endangered species of amphibians, reptiles, birds and mammals is given below (Table 20.3). The figures of some of the

Table 20.3
A Few Endangered Species of Reptiles, Birds and Mammals

Reptiles	Mammals	Birds
Gharial	Black Buck	Great Indian Bustard (Fig. given in Unit 7)
Green Sea Turtle	Lion-tailed Macaque	Great Indian Hornbill
Pythons	Wild Ass	Brown Headed Gull
Tortoise	Hyaena	Mountain Quail
	Sloth Bear	Peacock
	Tiger	Peafowl
	Cheetal	Pelican
	Sambar	Siberian White Crane

Fig. 20.2 : Pelican

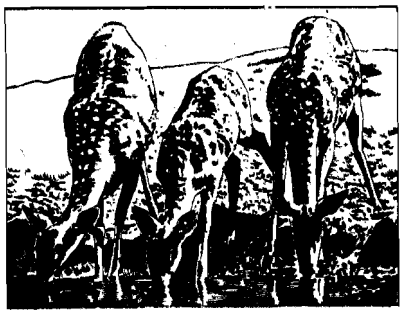

Fig. 20.3 : Cheetal

Fig. 20.4 : Tiger

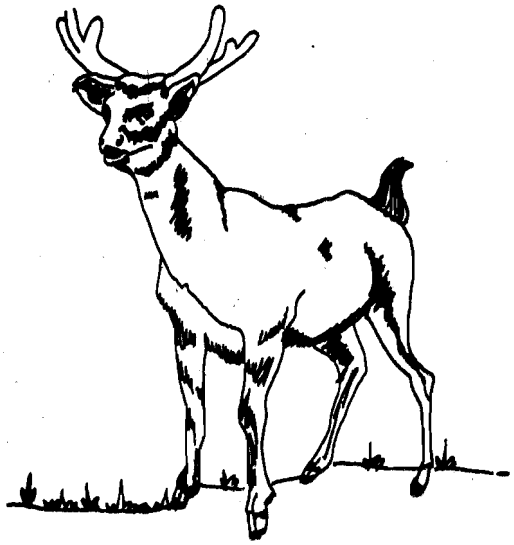

Fig. 20.5 : Sambar

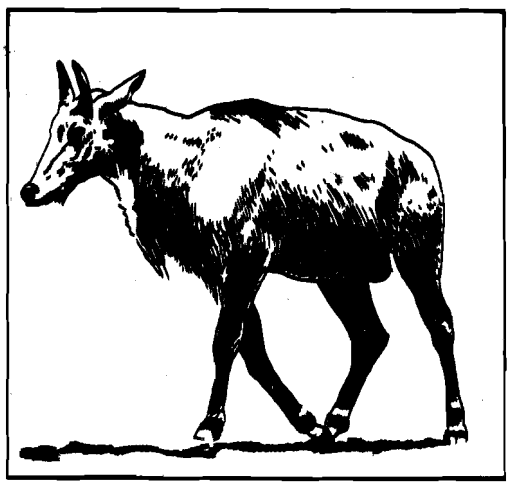

Fig. 20.6 : Black Buck

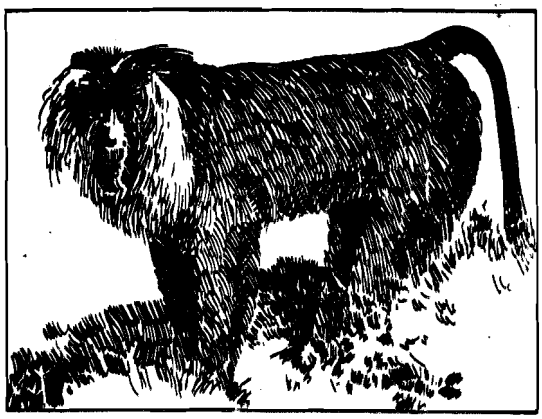

Fig. 20.7 : Lion-tailed Macaque

With time, the concept of wildlife has been changed. Now wildlife is considered as a 'thing of beauty' and a 'gift of nature' which needs to be preserved rather than a 'game' to be hunted as considered before. This new concept of wildlife has resulted in its protection in the protected areas, i.e. national parks, sanctuaries and reserves. You will study about these in the following sub-sections.

20.4.1 Protected Areas: National Parks and Sanctuaries

Natural communities, little affected by man's activities, are thought to be worth preserving for a variety of reasons. By declaring some areas as national parks or wildlife sanctuaries, the natural community along with its ecosystem is preserved. Let us first define national parks, sanctuaries and reserves. A **national park** is an area dedicated to conserve the environment, natural and historical objects and to conserve the wildlife therein, and at the same time, to provide for enjoyment from them, in such a manner and by such means, as will leave them unimpaired for the enjoyment of future generations. In national parks, all private rights are non-existent and all forestry operations and other usages such as grazing of domestic animals are prohibited.

In a **wildlife sanctuary,** killing, hunting, shooting or capturing of any species of birds and mammals is prohibited except by or under the control of the highest authority in the department responsible for management of the sanctuary. Private ownership rights may be allowed to continue in a sanctuary and forestry and other usages permitted to the extent that they do not adversely affect wildlife.

Any area where special protection is offered to wildlife is declared a **protected area.** Such as:

a) River valley projects and other irrigational works that attract water birds and other wildlife.

b) An area where protection is offered to wildlife in or around large towns of sacred places.

Reserves are areas demarcated especially for the protection of wildlife.

Advantages of Protected Areas

There is much scientific benefit to be derived by studying the ecosystem in a protected area particularly the functioning of the biosphere. From studies of undisturbed ecosystems, much can be learnt about the behaviour of these systems. Only with such a control can man gauge how much damage he has caused to his environment. Furthermore, more or less undisturbed communities are important to the continued operation of the systems that man has created. Thus, watershed forests are protected to maintain stream flow and avoid siltation of reservoirs. Similarly, protected estuaries guarantee continued production of marine life important to man for food and other purpose. Outdoor activities in a natural setting or contact with plants and animals in a wild state appears to be important to man's psychological well being. So, protected areas are of aesthetic and recreational values too.

By declaring certain areas as protected, the laws to regulate that protection should apply automatically. It becomes easier to monitor the population of the species living in the area, prevent poaching and also avoid exploitation of the area into consideration by excessive tree felling or overgrazing.

WWF operates on a global scale and is represented in 25 countries. The WWF raises money for conservation projects in all parts of the world, with particular emphasis on endangered species and habitats. WWF calls for advice from IUCN, a representative group of experts from government and execution agencies in over 100 countries.

Acts to Protect Wildlife: Realising the importance of the wildlife resources and to prevent gene erosion, our country has from time to time taken steps by way of enactment of various wildlife Acts. As a result of worldwide concern, the International Union for Conservation of Natural Resources (IUCN) was formed, as also its appendage, the Survival Service Commission, which sought to supply up-to-date information about every species of animal in danger of extinction. The World Wildlife Fund now called World Wide Fund for Nature (WWF), affiliated to IUCN, is also closely concerned with conservation problems.

You will study about environmental legislation in detail in Unit 23 of Block 6. Here, we will give you the titles of some Acts related to wildlife.

Indian Board of Wildlife was set up in 1952. There was enactment of an All India Wildlife Protection Act in 1972, becoming a party to the "*Convention on International Trade in Endangered Species of Fauna and Flora*" (CITES, 1976), launching a

national component of the UNESCO's "*Man and the Biosphere Programme*" (MAB, 1971). Conservation projects for individual endangered species like Hangul (1970), Lion (1972), Tiger (1973), Crocodiles (1974) and Brown-antlered Deer (1981) were initiated.

Through the efforts of the Central and the State Governments and by cooperation of the voluntary agencies, wildlife is sought to be carefully protected and planned in the protected areas. Although, the establishment and proper management of parks and reserves permits the survival of certain species in certain areas, general programme of rational management covering the use of all lands and species is essential to the survival of wildlife throughout the world.

SAQ 4

a) Give one word for the following:
   i) An area where special protection is given to wildlife .....
   ii) An area where killing, hunting or shooting of animals is prohibited but private ownership rights may be allowed ..... .
   iii) An area dedicated to conserve the environment, natural and historical objects and where all private rights are non-existent ..... .

b) Expand the following abbreviations:

   WWF .....

   IUCN .....

20.4.2 Wildlife Sanctuaries and National Parks in India

It is gratifying to note that the number of national parks and sanctuaries has risen from a mere 33 in 1952 to a total of 221 by the end of December 1980, covering 2-3% of the total geographical area and 10% of the total forest area of the country.

Today, India has 80 national parks and 412 wildlife sanctuaries. In addition, there are 17 tiger reserves. The protected area is, thus, altogether over 4% of the geographical area of the country.

In recent years, there has been an increasing realisation that wildlife conservation is a total concept involving animals, plants, micro-organisms and soil as also other physical elements of environment, in which they live and on which they depend.

But even then the conservation is concentrated mainly on animals and that too on mammals; plants have been taken for granted and have been left out of consideration in any meaningful programme of wildlife conservation. There is one gene sanctuary each for citrus and pitcher plants, both located in northeast India. The reason for emphasis on conservation of animals is apparent. It is assumed that "if all is well with the apex, the base of the ecosystem will also be alright". In other words, if the tiger is flourishing, then it is reasonable to assume that Chital and other herbivorous prey are also flourishing and all plant life as also lesser forms of life are also flourishing. Plants are critical to the very existence of all life on the surface of earth.

Some of the important wildlife sanctuaries and national parks are listed in the following table (Table 20.4).

Table 20.4 : Important national parks and wildlife sanctuaries in India with indications of some of the more important animals

State	Name of national parks/ sanctuaries	Fauna
1	2	3
Andhra Pradesh	Pakhal Wildlife Sanctuary	Tiger, panther, hyaena, fox, jungle cat, chawsingha, etc. Horned games, aquatic birds, including spot bill.
Assam	Kaziranga National Park	Great Indian one-horned rhinoceros, wild buffalo, gaur, swamp deer, hog deer, sambar, elephant, tiger, leopard cat, wild boar, langur, pelican, florican, patridge, python, etc.

State	Name of national parks/ sanctuaries	Fauna
1	2	3
	Manas Wildlife Sanctuary	Same as in Kaziranga, Tiger, golden langur, pigmy hog, water monitor; rich and interesting bird life
Bihar	Hazaribagh National Sanctuary	Tiger, leopard, sloth bear, wild dog, hyaena, sambar, barking deer, chital, chawsingha, neelgai, civet cat, wild boar, etc.
Gujarat	Gir National Park	Indian lion, panther, hyaena, sambar, chital, neelgai, chawsingha, chinkara, wild boar, langur, crocodile.
	Nal Sarovar Bird Sanctuary	Water birds
Haryana	Sultanpur Lake Bird Sanctuary	Most of the birds are migratory.
Jammu & Kashmir	Dachigam Wildlife Sanctuary	Hangul, musk deer, Himalayan black bear, brown bear, pine martin, other avian fauna.
Karnataka	Bandipur National Park	Elephant, gaur, sambar, chital, barking deer, chawsingha, wild boar, tiger, leopard, sloth bear, jungle cat, langur, wild dog, bird life quite rich.
	Ranganthitto Bird Sanctuary	Openbill, stork, white ibis, little egret, cattle egret, darter, cormorants, river tern, spoon bill, crocodile.
Kerala	Periyar Wildlife Sanctuary	Elephant, tiger, leopard, sloth bear, wild dog, gaur, neelgai, sambar, barking deer, wild boar.
Madhya Pradesh	Kanha National Park	Tiger, leopard, gaur, swamp, deer of hard ground sambar, chital, black buck etc.
	Shivpuri National Park	Tiger, leopard, neelgai, chawsingha, sambar, chital etc.
Maharashtra	Dhakna-Kolkaz Wildlife Sanctuary (now under Project Tiger)	Tiger, panther, gaur, sambar, barking deer, chawsingha, sloth bear, wild boar and chital confined to flat tracts, rich bird life.
Orissa	Simlipal National Park (proposed)	Elephant, sambar, barking deer, leopard, tiger, etc.
Punjab	Abohar Wildlife Sanctuary	Black buck and several species of birds.
Rajasthan	Ranthambore (Tiger project)	Tiger, leopard, jungle cat, sloth bear, neelgai, sambar, chital, wild boar, etc.
	Sariska	Tiger, leopard, hyaena, jungle cat, sambar, neelgai, chawsingha, etc.
	Ghana Bird Sanctuary	About 300 species of migratory and resident birds. Also black buck, wild boar, sambar, chital, etc.
Tamil Nadu	Mudumalai Wildlife Sanctuary	Tiger, leopard, elephant, gaur, sambar, chital, sloth bear, wild dog.
	Vedanthangal Water Bird Sanctuary	Several species of Water birds.
Uttar Pradesh	Corbett National Park	Tiger, leopard, sloth bear, elephant, sambar, chital, hog deer, barking deer, chawsingha, wild boar, crocodile, rich bird life.
	Dudwa National Park	Tiger, leopard, sloth bear, swamp deer, sambar, chital, hog deer, barking deer, neelgai.
West Bengal	Sunderbans Tiger Reserve	Tiger, sambar, chital, wild boar, several species of birds and crocodiles.
	Jaldapara Wildlife Sanctuary	Rhinoceros, elephant, tiger, leopard, wild boar, gaur, sambar, barking deer, hog deer.

*The species *underlined* are important protected species in the sanctuary/national park.

Location of wildlife sanctuaries in India is shown in the following figure (**Fig. 20.8**).

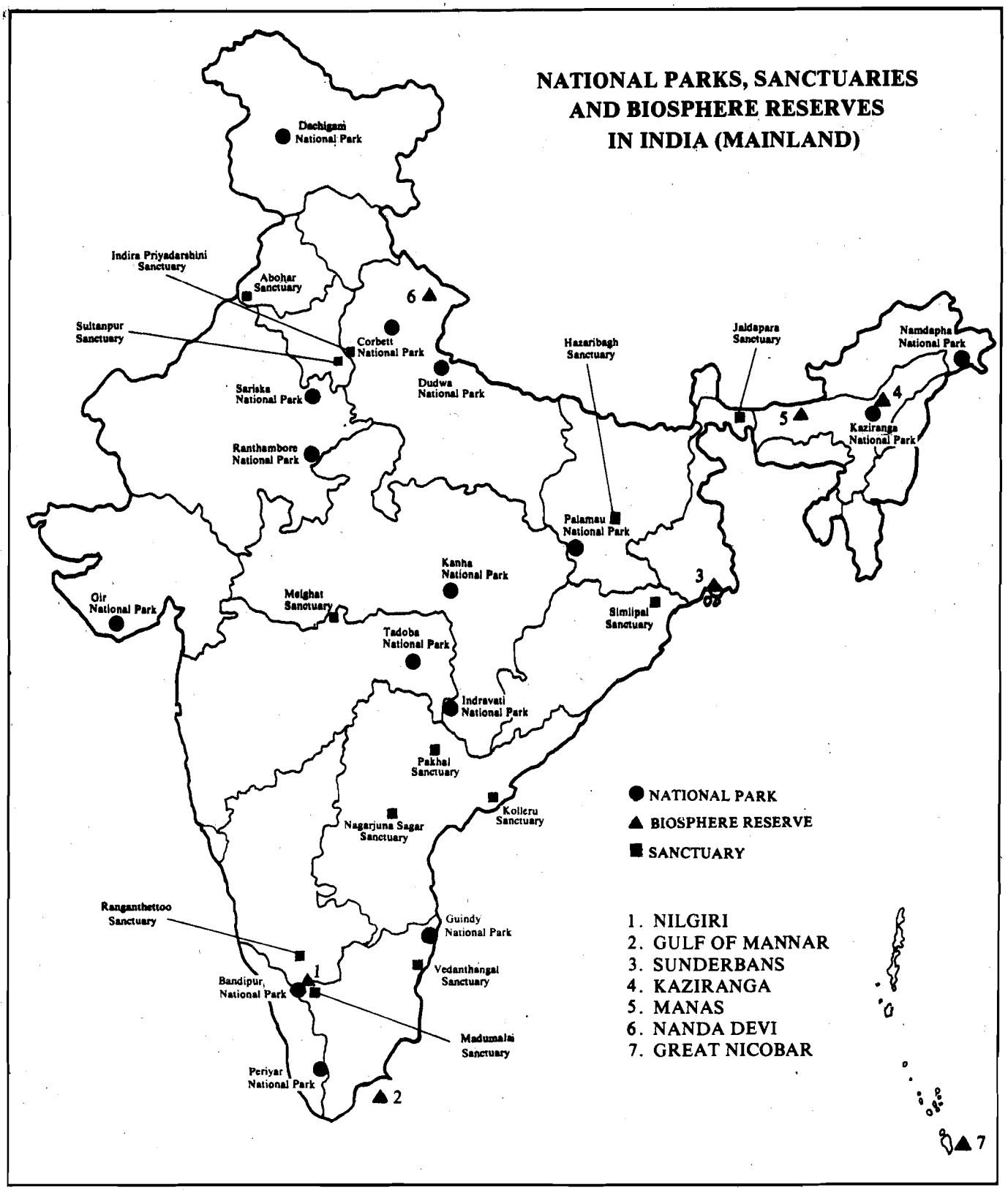

Fig. 20.8 : National Parks Sanctuaries and Biosphere Reserves in India (Mainland)

After going through the above table and figure carefully, answer the following SAQ.

SAQ 5

a) Give two examples of endangered species of each of the following:

i) Mammals

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ii) Birds

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iii) Reptiles

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b) Complete the following table:

Sanctuary/National Park	Place	Animal Conserved
Dachigam		
Gir		
Dudwa		
Simlipal		
Mudumalai		
Kaziranga		

c) Fill in the blanks in the following:

i) Total number of wildlife sanctuaries in India is ..... .

ii) Total number of national parks in India is ..... .

iii) India Wildlife Protection Act was passed in year ..... .

20.4.3 Project Tiger

'Project Tiger' is one of the successful operations which indicates what one can attain once all resources are pooled together in a coordinated manner. It is a known fact that nature is both ruthless and opportunistic due to which no species can be guaranteed indefinite persistence.

There was a decline in the population of world tigers, from 40,000 at the turn of the century down to 1827 in 1972. The main reasons for extinction of tigers are hunting, habitat destruction by deforestation and taming the rivers for human needs. So a strong need was felt to keep the tigers with us in perpetuity. Hence, a long-term strategy based on principles of genetics and evolution was proposed which was named "Project Tiger". This project was aimed not only at increasing the number of tigers but also giving the tiger the requisite inherent genetic evolutionary resistance to successfully face future environmental onslaughts.

This centrally-sponsored multimillion dollar project was initiated on April 1, 1973. It was funded by the Worldwide Fund for Nature.

The objectives of this project are:

a) ensuring the maintenance of a viable population of tigers in India for scientific, economic, aesthetic, cultural and ecological values, and

b) preserving for all times, areas of such biological importance as a national heritage for the benefit, education and enjoyment of people.

This project concentrated on protecting good tiger habitats by creating sanctuaries and extending the existing ones.

Under this project, 18 tiger reserves have been set up in India (Table 20.5); 4334 tigers (recorded in 1990) living in these reserves, testify to the success of the project.

Table 20.5 : Tiger Reserves in India

Name of the Reserve	State	Tiger Population		
		1973	1979	1984
Simlipal	Orissa	17	65	71
Palamau	Bihar	22	37	62
Bandipur	Karnataka	10	39	53
Kanha	Madhya Pradesh	43	71	109
Melghat	Maharashtra	27	63	80
Ranthambhore	Rajasthan	14	25	38
Corbett	Uttar Pradesh	44	84	90
Sunderbans	West Bengal	60	205	264
Manas	Assam	31	69	123
Periyar	Kerala	—	34	44
Sariska	Rajasthan	—	19	26
Buxa	West Bengal	—	—	15
Indravati	Madhya Pradesh	—	—	38
Nagarjunasagar	Andhra Pradesh	—	—	65
Namdapha	Arunachal Pradesh	—	—	43
	Total (Number is increasing)	268	711	1121

SAQ 6

a) In column I names of Tiger reserves are given and in II the States in which these tiger reserves are situated. Match column I with II.

Column I	Column II
A) Periyar	i) Assam
B) Manas	ii) Bihar
C) Bandipur	iii) U.P.
D) Palamau	iv) Kerala
E) Corbett	v) West Bengal
F) Sunderbans	vi) Karnataka

b) Fill in the blanks.

i) ..... is an endangered mammal in our country.

ii) The Project Tiger was launched in the year ..... and financed by ..... .

iii) There are ..... tiger reserves in India.

20.5 SUMMARY

What we have learnt in this unit can be summarised as follows:

- Environmental conservation is the planned management of man's surroundings to prevent its exploitation, destruction or neglect.
- Conservation involves a planned, rational use of the environment, ensuring a sustained yield from it in a manner maintaining its ecological balance. It involves recognition and usage of multiple values of a natural resource and the restoration of depleted lands or living species.
- Conservation aims to preserve the environment for aesthetic and recreational needs and to ensure a continuous yield of useful materials from the environment.
- A delicate ecological balance is maintained between the ecosystem and its living community. Any interference with or disruption of this balance can have far-reaching effects.
- Threatened species are likely to become endangered species. Endangered species are those that were once abundant but have since dropped drastically in number. They are in danger of being eliminated.

- The main reasons for extinction of wildlife are habitat destruction, hunting, predator and pest control, introduction of foreign species and other ecological factors. But wildlife has economic, medicinal, aesthetic, and inherent value. They make a 'gene pool'. They are of great value for man's welfare or survival in the future so there is an urgent need for wildlife conservation.
- For wildlife conservation in India, there are 67 national parks and 397 wildlife sanctuaries covering 4% of the country's total land area. "Project Tiger" was launched in the year 1973 to protect tigers. Under this project 17 tiger reserves have been set up to provide a safe and suitable habitat for tigers to increase in numbers.

20.6 TERMINAL QUESTIONS

1. Define "Conservation".

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2. What are the two important aims of conservation?

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3. How does habitat destruction cause extinction of wildlife?

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4. Wildlife includes both plants and animals. But why is emphasis given on conservation of wild animals and not on wild plants ?

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20.7 ANSWERS

Self Assessment Questions

SAQ 1

a) There is a strong need for conservation because
   i) pollution is increasing at alarming rate

ii) population is increasing due to which world resources are being used up.

b) i) The rational use of the resource
ii) Restoration
iii) Integration

SAQ 2

a)

Description	Term
Species in danger of being eliminated	Endangered species
Species no longer exists	Extinct
Species likely to become an endangered species	Threatened species

b) i) Alteration of habitat
ii) Hunting
iii) Introduction of alien species
iv) Control of pests and predators

SAQ 3

a) Mammals, especially primates, are desired by researchers because of their anatomical, genetic and physiological similarity to humans.

b) Endangered species should be saved because of their value:
a) as genetic reservoir
b) in maintaining ecosystem stability
c) for economic value
d) for promoting aesthetic sense

SAQ 4

a) i) Protected area
ii) Wildlife sanctuary
iii) National Park

b) i) World Wide Fund for Nature
ii) International Union for Conservation of Natural Resources.

SAQ 5

a) i) Tiger, Black buck
ii) Great Indian bustard, Siberian crane
iii) Gharial, Tortoise

b)

Sanctuary/National Park	Place	Animal Conserved
Dachigam	Jammu & Kashmir	Hangul, Musk deer, Brown bear
Gir	Gujarat	Indian Lion, Chital, Wild boar
Dudhwa	U.P.	Tiger, Leopard
Simlipal	Orissa	Elephant, Tiger
Mudumalai	Tamil Nadu	Tiger, Leopard, Elephant
Kaziranga	Assam	One-horned Rhinoceros, Elephant

c) i) 412, ii) 80, iii) 1972.

SAQ 6

a) A — iv
B — i
C — vi
D — ii
E — iii
F — v

b) i) Tiger
ii) 1972, WWF
iii) 18

Terminal Questions

1. Conservation may be defined as the achievement of the highest sustainable quality of living for mankind by the rational utilisation of the environment, protection of nature to enrich the life of man and the control or elimination of environmental pollution in its many manifestations. A generalised definition of conservation is "the maximisation over time of the net social benefits in goods and services from resources"

2. The two important aim of conservation are:
   i) to ensure the preservation of a quality environment that considers aesthetics and recreational as well as product needs.
   ii) To ensure a continuous yield of useful plants, animals and materials by establishing a balanced cycle of harvest and renewal.

3. Habitat destruction intentionally or unintentionally leads to species extinction. Because when the habitat of a particular species is destroyed, then to survive in that area, it is a must that a species should adapt to the changes. But, if it cannot adapt then it should move elsewhere or may succumb to predation, starvation or disease and die. Thus, it leads to species extinction.

4. The conservation of animals is emphasised as compared to plants because in the food chain, the order is plants → herbivores → carnivores. In other words, plants occupy the base of the food chain. It is assumed that if all is well with the apex, the base of the ecosystem is alright. For example, if tiger is flourishing then it can be assumed that herbivores and plant life are also flourishing.