

SAVANNAH

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SAVANNAH

Introduction

The savannah environment is in the tropical and in the equatorial zones, which have seasonal rain that characterize two different seasons: the rainy season and the dry season.

This climate determines the ideal conditions for widespread grasslands that are typical of the savannah. The temperature is high all year round. The grass is more resistant than the trees and notwithstanding the dry winds, it loses less water than the taller plants and is the principal source of food for many animals of the savannah. In the grasslands of East Africa, the elephants, antelopes and giraffes eat only the leaves; gnus eat the higher grasses, zebras graze the low grass and the gazelles eat plants and grass that grow near the soil. Every year, at the end of the rainy season, many grazing animals start to migrate in search of water and food and are followed by predators and "scavengers". Lions, leopards, cheetahs, wild dogs and hyena attack the herds, vultures and jackals clean up the carcasses, crocodiles and catfish await near the fords where the herds gather in large numbers to cross the swollen rivers.

Savannah biome

All tropical or rain forests were originally woods located between the Tropic of the Cancer (23° and 27' N) and the Tropic of the Capricorn (23° e 27' S). This area typically has a mean temperature of approximately 25°C with oscillations of no more than 2-3 degrees and plenty of rainfalls (over 1,500 mm a year). In some forests, the annual rainfall may reach 11,000 mm, even if in most areas it is around 2,500 mm. The best word to describe this forest actually is "rainforest". In some forests it rains little but every day (rainforests or equatorial forests), while in others (in the south-east of Asia) dry and rainy periods alternate (tropical or monsoon forests). Nevertheless, for the sake of clarity, the terms "rainforest" and "tropical forest" will be considered as equivalent.

The savannah in the world

Tropical forests, or rainforests, occupy the so-called inter-tropical area of the planet, that is the area between the Tropic of the Cancer and that of the Tropic of the Capricorn. Large rainforests are mainly in Latin America (Amazonia) where they are called selva, in Africa (Congo, Cameroon, Madagascar, etc.), in the Indo-Malay area (Philippines, Indonesia, etc.) where they are called "jungle" (from the Sanskrit *jāngala*) and in the Australian area (Australia, New Guinea); altogether, they cover 10% of the lands above sea level. Among these, the Amazonian Forest makes up approximately one third of all the tropical forests and is the greatest freshwater reserve on earth.

Plants of savannah

The plants of the savannahs are mainly xeromorphic, i.e. adapted to the lack of water, including graminaceous plants, bushes and different species of trees. These adaptations are generally



aimed at preventing water evaporating: falling of leaves during the dry season (such as the acacia) or reduction of foliar surface or development of leathery shells to protect leaves (sclerophyllia), such as the euphorbia. Another form of adaptation to the lack of water is the development of very deep roots to go searching for moisture (such as the Cactaceae) or fleshy stalks or roots to trap water inside (such as the Cactaceae, Euphorbiaceae, Liliaceae or Leguminosae). The typical trees of this biome are acacias with their typical umbrella-shaped foliage, but there are also plenty of other leguminous plants bristling with thorns whose purpose is to defend them from herbivores and prevent water from evaporating.

Animals of the savannah

A large amount of large-sized herbivores live in the savannah (gnus, zebras, antelopes, giraffes, rhinoceroses and elephants in Africa; deer, elephants and gaurs in India) and in the dry season migrate to more humid areas hundreds of kilometres away. Sometimes herds of different species form. Most of the offspring of the herbivores of the savannah are very precocious: a gnu, for instance, can walk a few minutes after birth. This is because they must not be left behind by their herd, which protects them from predators. The carnivores of the savannah are also social: lions, hyena-dogs, hyenas and jackals hunt in groups according to specific strategies. The savannah is also inhabited by large birds, the Ratitae (ostrich, rhea) and other terricolous birds (great bustard, guinea-fowl, marabou). Nevertheless, the savannah is mostly inhabited by insects, including ants, termites and grasshoppers, which migrate far away during the dry season. These animals feed on local vegetation to which these huge swarms of insects cause extensive damage.

African savannah

In Africa, the savannahs are classed according to the arboreal and shrubby species that live there. Generally, the trees are 6 to 12 metres tall, apart from the peculiar African baobab. This tree can be up to 30 metres tall and have a circumference of over 40 metres and a diameter of 10 metres at the base of its trunk. The prevailing baobab in Africa is the *Adansonia digitata*, which lives to an impressively old age: between 1,000 and perhaps 6,000 years. It is shaped like a bottle and its trunk traps over 120,000 litres of water within its tissues. Acacias (*Acacia* spp.) are the most numerous trees in this biome, with approximately 40 species, i.e. one half of the trees that live there. One of the most typical acacias is the *Acacia tortilis* with its typical flattened, umbrella-shaped foliage. There are also other trees, such as the *Brachystegia*, which produces the so-called “miombo” woods or savannahs, where there are as many trees as in a wood, even if sparse and full of clearings.

Animals of the African savannah. In Africa, there are approximately 100 species of wild bovids, 72 of which are endemic; antelopes alone make up 55 species. The African savannah is inhabited by approximately one third of the world's felines, such as lions, leopards, cheetahs, servals, three different species of hyenas, three of jackals and hyena-dogs. The savannah is also home to some terricolous birds (great bustards, galliformes, etc.), such as the ostrich which is the biggest and can reach 2.5 m tall, but cannot fly. A peculiarity is that the male lives in harems of three or four females,

but mates first and most often with a favourite female (dominant or alpha female). Then all females lay their eggs together in a hole in the ground and the eggs of the favourite female are laid in the middle; the favourite female and the male will look after the eggs until hatched. The eggs in the middle of the nest will be best protected from predators, which are quicker to reach the outer ones. Other birds living here are some weaver passerines (Ploceidae), which built nests hanging from acacia and baobab branches, and different species of vultures which are the main class of flying necrophagous animals (that feed on dead animals) specialised in finding carcasses of dead animals. The savannahs play a key role in ornithology (the science that deals with birds). During the boreal and austral winter, many species of birds, especially insectivores (feeding on insects), fly away from the cold and migrate sometimes hundreds of kilometres away. Billions of birds move from Europe and western Asia to Africa, where they can benefit from the mild climate and availability of insects. Swallows and European swifts are a typical example of such migrations.

Bushveld. The African savannahs south of the Equator, i.e. in such countries as South-Africa, Namibia, Tanzania, Kenya, etc., are known as bushveld and are home to the Acacia, *Combretum*, *Mopane* (*Colophospermum mopane*) and baobab trees. In the south, it is the *Acacia erioloba* or Giraffe Acacia that dominates the landscape. In the driest areas, the bushveld becomes the thornveld, which has fewer trees but plenty of spiny shrubs. In this area, the fauna is the same as in the African savannah.

Savannahs of Madagascar

Madagascar is an island inhabited by many endemic plants and animals (i.e. existing only in specific areas) because of hundreds of millions of years of seclusion. The northern mountain ridge and the central plateaux act as barriers against the wet winds, thus determining areas with different plants: in the north there is a tropical forest, in the north-west a thick but low and deciduous forest. Finally in the south we found a baobab savannah (seven different species of baobab) that turns into a spiny forest of strange trees with the most bizarre shapes, such as bottle-shaped trees, dwarf baobabs and thick thorny bushes. The climate caused leaves to turn into thorns to avoid transpiration and keep the herbivores at bay, especially the endemic Didiereaceae family, which look like the succulent plants of the deserts (cactuses or euphorbias). These plants make the spiny forest one of the most bizarre and fascinating habitats in the world. Madagascar is home to many particular animals, including: lemurs, chameleons, geckos, lizards and endemic snakes.

American savannahs

In Latin America, the savannahs are called *vàrzeas*; in areas with rocky basements and little soil, the savannahs are called *campo rupestre*; in Brazil they are very woody, look like dry forests and are called *cerrado*. The *tierra firme* are like the African savannahs even if they are rainier and wetter during the dry season and there are also fewer fires. In the Amazonian region, there are small savannahs, which become larger north of the Amazon. The *vàrzeas* are, instead, open savannahs which are situated between the Rio Negro and the Xingu and around the Orinoco and which are flooded during the rainy season. Later on, as the dry season arrives, the land dries up and herbs and



shrubs (i.e. *Artemisia artemisifolia*) quickly spring up; there are also palms (i.e. *Mauritia flexuosa*) or trees that resist floods and long dry spells. This mass of trees and shrubs (*matas*) may look like islands in a sea of dry or half-buried grass. Between Argentina, Bolivia and Paraguay, below the Mato Grosso, there is the Chacò region with abundant but irregular rains. Here grow the *Copernicia* palms that can resist long dry spells. In this area the fauna consists of many birds (e.g. cockerel, rhea), pumas, jaguars, hares, bats and many insects (crickets, ants, flies, etc.).

Asian savannahs

In tropical Asia there are monsoons, bringing rain and humidity, so as well as savannahs, there are also "clear" woods and forests, i.e. having deciduous and less luxuriant trees than in rain jungles. In India and Indochina, these areas are inhabited by large herbivores, such as deer, elephants, gaurs and bantengs and large-size predators, such as tigers, leopards, cuons and wolves. In India there are also drier areas: one in the north-west, including part of the Indo basin, the other being the Deccan Plateau. These areas are called sub-desert and include sandy areas where acacias and *Zizyphus* bushes grow. They look less desolate than the near-by Sahara Desert but are not so full of plants as an African or South American savannah.

Man and savannah

The habitat of the savannah favours farming and breeding and this is why it has been remarkably altered. The people living in this biome are mainly farmers who grow cereals and other plants that can resist long dry spells, such as millet, sorghum, barley and wheat, as well as peanuts, cotton, rice and sugarcane, while breeding prevails in drier savannah areas. Farm animals are generally cattle (zebus), sheep, goats and donkeys. Many peoples live in the savannahs: the Nubians in the upper Sudanese Nubia, the Kwalngo and the Akan in the Ivory Coast, the Bushmen and the Hottentots in Namibia.

The Masai. The best known people of this habitat are the Masai. The Masai are a number of groups who share the same language and cultural and social similarities and who live scattered between Kenya and Tanzania. They mainly live on sheep-breeding, but also on farming and trade. Breeding provides the staples of the warriors' diet: they only eat cow milk, meat and blood, while the old and the women also eat butter, legumes and flour. All of them eat a lot of honey while only the old and the women are allowed tobacco. These people have plenty of traditional customs dating back to ancient times: from religious ceremonies to the initiation of young warriors. Men wear their hair long, arranged in thick locks mixed with red ochre and animal fat, while the women, the old and the children must be thoroughly shaved. Another particular customs of the Masai is they change their names at each life stage, from childhood to old age. Among all the inhabitants of the village, one in particular has a superior authority: the oi-boni, a sort of chieftain, who is also a healer and has the power to make prophecies and predictions by throwing stones, inspecting animal entrails, interpreting dreams and consulting oracles. The Masai believe in the existence of two superhuman gods: the red god, who is evil and the bearer of drought, and the black god, who is kind and brings

rain. The two gods receive sacrificial offerings and propitiatory rites, especially with grass, that for the Masai has a religious and strongly symbolic value, so much so that if they are fighting against an enemy and want to make peace they offer them grass as a token of peace.

The Bushmen. Another people who used to be numerous and is now reduced to few hundreds of individuals is the Bushmen who live in the Kalahari desert. Their economy is exclusively based on hunting, which is practised by men, and supplemented by roots and seeds, which are collected instead by women and children. The Bushmen's life style and social organisation are considered as very similar to those of the late Palaeolithic people and this is why they are submitted to in-depth anthropological studies. The Bushmen still use the hunting techniques described in the ancient rock graffiti: the ambush is laid by lying flat on the ground, then poisoned arrows are thrown at the prey. As well as bows, they also use stone-topped clubs, digging canes, stone scraping blades and sometimes spears. Only un-tanned hides are used to make their primitive clothes; the scanty water available is kept in ostrich eggshells. Their homes, which are just windcreens, are erected when they stop, when the hunter has killed his prey. This is eaten at once, just slightly browned on fire, since the Bushmen are not used to preserving their food. Their social structure is quite simple, based on monogamous families. Every family have their hunting territory within the larger but strictly outlined territory of the tribe. The harsh environmental conditions and their nomadic lives impose strict living rules that must have been easier and less strict in the past, as is shown by their rich and lively wealth of myths and legends and by the nature of the Supreme Being, who once used to be good and is now evil "because of the cruel fights he had to endure". The Bantus first, then the Europeans systematically exterminated the Bushmen. Many of the original groups have disappeared or are reduced to few dozens of individuals so that now the Bushmen are only 10 – 15,000. Today their territory has become a place to look for natural resources, regardless of the impact this may have on the Bushmen. After years of indifference by the African Governments, they are now awakening to the problem of the indigenous minorities who risk disappearing. The community has now become aware of the importance of the Bushmen's great cultural and artistic heritage, which is regarded as one of the most significant in the history of mankind.

Tourists in the savannah

An important human activity related to the savannah certainly is tourism: the savannah and in particular the wildlife sanctuaries offer the opportunity to observe, film and take pictures of an exotic and particularly fascinating nature, thus becoming an important attraction for tourists and enthusiasts. The safaris, tours within nature reserves, offer the opportunity to capture with one's camera or just with one's eyes wonderful animals in the wild state. Tourism thus becomes an extremely important economical resource for these regions, which are often poor.

A precious biome

Mainly cereals (such as oat and maize), dates, olives and vegetables are grown in the savannah. Breeding includes goats, sheep, horses and cattle. The savannah can be economically useful not only



for farming and breeding but also for the natural resources it offers. The baobab for instance is used for different purposes: as a drug to treat a number of diseases, for the light wood used to make music instruments and pirogues. Its fruits can be eaten raw or used to make drinks; its roots are eaten like asparagus. The savannah is also very important for birds, whose survival depends on migrations to avoid the harsh winters of temperate areas. The wildlife sanctuaries of the savannah are indispensable for the protection of dying species and for scientific and ethological research in a wild environment.

The origins of the savannah

Before the last glaciations, the Earth certainly looked very different from the way it looks today. In the past, the areas where there are deserts and savannahs now were covered with forests, while an expanse of ice covered the medium and high altitudes. As the climate got drier, the forests slowly disappeared and the savannahs got in. In particular, geological events occurred in the African forests, approximately 7 or 8 million years ago, which can now be explained by plate tectonics and which caused savannahs and man to appear on Earth. The **rift valley**, that later on would cause the Horn of Africa (Eritrea, Ethiopia, Uganda, etc.) to come off the continent, began to form. This area, that extends north to south along the Great Lake line, was tormented for a long time by an intense volcanic activity, which brought along significant climatic changes. The west winds, loaded with rain, no longer reached the inland, which as a consequence dried up. The forest thus disappeared and was replaced by the savannah, a new environment, unsuitable for the tree monkeys and favourable therefore to those species that began to use their back limbs, thus getting on their way to walk on two legs. Conversely, the bigger monkeys kept evolving as the forests retreated. In the grassy areas, to walk upright was useful to explore the environment and quickly locate dangers. New forms of life, better suited to living outdoors, began to appear, goaded by the new lifestyle, and originated the evolutionary line of the hominids. In addition to these geological events, the savannah has been developed in more recent times by man, who cut trees for timber, put lands to pasture and burnt down the forests. Man's action has actually extended what was the natural area of this biome and still keeps it like it.

The evolution of hominids

There is plenty of evidence of this evolutionary process. A nearly full skeleton of a female hominid who lived approximately 3.5 million years ago was found in Ethiopia in 1974; scientists called it Lucy. The shape of its spine, leg bones, pelvis and limbs show that Lucy used to walk like we do now. The fossilised footprints of three human beings who had walked through the ash deposits of a recent volcanic eruption were discovered at Laetoli (Tanzania) in 1978. These footprints date back to between 3.6 and 3.8 million years ago and are the most ancient evidence ever found of the existence of two-legged primates.

Protected savannah areas

Today protected areas are formally indicated as “land and/or sea areas specifically dedicated to the protection and preservation of biological diversity and related natural and cultural resources.” According to the classification by the International Union for Conservation of Nature (IUCN), the greatest world organization for the preservation of natural areas, six different general types of protected areas have been devised which reflect different degrees of exposure to human disturbance.

The latter are defined as follows:

- integral nature reserves and uncontaminated areas;
- national parks;
- natural monuments;
- reserves for active management of species, habitats and natural resources;
- protected landscapes and seascapes;
- areas for sustainable management of resources.

Protected areas according to IUCN

Let's have a closer look at what these definitions mean.

Integral nature reserves and uncontaminated areas. In these areas all species and resources are meticulously protected. The goal is to prevent any possible human interference, banning activities of all sorts. The purpose of these areas, in fact, is to preserve completely biodiversity living within them, guaranteeing total isolation from industrial and anthropized areas. These areas constitute open air ecological laboratories, where the only activity allowed, when holding specific authorization, is indeed scientific study of natural processes.

National parks. National parks are the most famous protected areas. Generally, in these parks all activities related to resource extraction aren't allowed as well as every initiative potentially harmful for the environment which must be carefully authorized, planned and controlled. National parks cover wide areas and often comprise very different and interesting habitats. For this reason, among their peculiarity, is to be the favoured destination of natural excursions of many schoolpupils and university students. On the other hand, their heritage plays such an important scientific role that besides aesthetics these places always deserve a visit.

Natural monuments. In this case we are dealing with relatively small-sized areas where, although, it's necessary to establish a protection scheme due to the presence of biological and/or geological formations of particular interest or historical and artistic relics of high cultural value.

Reserves for active management of species, habitats and natural resources. These areas have a similar purpose to integral nature reserves. The difference lies in the fact that initiatives regarding maintenance of natural environment are tolerated, as some silvicultural practices, management of problematic species, and a few others. In this type of reserves, moreover, some low-impact activities for the environment can also be authorized.

Protected landscapes and seascapes. These are land and sea areas where limits to human activities are more flexible. De facto, in this typology of protected areas, all activities related to local traditions are allowed as long as use of natural resources is modulated. Often these resorts offer good opportunities to create a non-aggressive form of tourism and recreational activities compatible with the environment. In this category are typically numbered areas inhabited by small communities which live off fishing, local agriculture and ecological tourism.

Areas for sustainable management of resources. This definition indicates very wide areas where the balance between the use and the lack of use of resources is in favour of the first. In other words, the principle of controlled use of nature is favoured rather than strict protection. In these areas, therefore, there is important biodiversity but at the same time, where possible, sustainable extraction of raw materials is allowed, both of biological and a biological origin, under the condition that these activities are undertaken respecting the process of the time and manner of their natural renewal.

Natural reserves and sustainability

Modern natural reserves mediate between two different requirements: the protection of the natural heritage and the economic development of local communities. Control over man's actions in protected areas does no longer serve purely conservative functions; the new-concept reserves aim at promoting those activities that may generate development in marginal areas. Reserves are therefore a new instrument to achieve sustainable development by fulfilling all sustainability requirements:

- to preserve and protect the natural heritage;
- to involve the marginal local communities in the development process (for instance the Cambodian Government permanently employs poachers under arrest to protect the fauna because they know the area quite well);
- to oppose to the neglect of people living in marginal areas;
- to raise environmental awareness through educational and informative activities established by the Reserve Authorities.

Rhinoceros hunting

However, in many countries even the establishment of reserves no longer offers good protection to many animals species, because of population increases political and ethnic conflicts (for instance in Mozambique), increasing poverty; there are many people who kill protected animals to sell parts of them to survive. Poachers have caused some species, such as black rhinoceroses, white rhinoceroses and elephants, to disappear. In particular, rhinoceroses are at risk because of their horns, which are much sought-after for medical purposes and to make daggers which in Yemen are symbols of manhood and strength. In the Seventies, this was all the rage and so this fashion played its part in the killing of 90% of the rhinoceroses of Kenya, Tanzania and Zambia, and in their disappearance in another 7 countries. In 1977, the CITES listed all the species whose trade is forbidden, including both whole animals and animal parts and by-products. These bans and stricter and stricter inspections



caused the value of horns to increase, making smuggling more and more remunerative and, in poor countries which are endlessly threatened by famines and wars, this often pushes people to infringe the ban. Poachers have therefore got on with their jobs undisturbed and the populations have dropped to critical levels. Since the late Eighties, Namibia first, then Zimbabwe have begun to cut the horns off rhinoceroses under anaesthetic. This has proven to be a deterrent against poaching, but unfortunately the horns re-grow by a few cm a year (they are made of keratin just like nails and hairs) and the operation has to be repeated every 2-3 years at the cost of approximately 1,000 dollars per animal and funds are not always available. At the latest CITES Conference at Fort Lauderdale, Florida, in November 1994, the countries in which rhinoceroses and product consumers live decided to strengthen the laws on protection and the inspections on their enforcement as well as to promote alternatives to horn-based drugs. At the same Conference, South-Africa was granted authorisation to export live white rhinoceroses (the only increasing species) to other protected areas and the trophies made by selective killing to fund protection projects. After these last changes, it seems the importation of rhinoceros horns has decreased over the last few years.

Elephants without teeth

Equally important is the problem of elephants, hunted for their ivory tusks. The tusks are the upper incisors, which in old males can reach 2-3 metres long and are used by the pachyderms to strip the bark off trees or dig up roots and in social gatherings are exhibited as a sign of power and used as weapons. Ivory is also used to make jewels and other items, which are much sought-after and sold all over the world. Since the Seventies, the CITES has been successfully protecting Asian elephants and since 1990 African elephants as well. The situation has improved so much that sometimes it causes overpopulation, so that entire families of elephants have to be moved to less crowded areas instead of killing them. Many elephants are moved, for instance, to Angola, whose Government after decades of wars and poaching is trying to reintroduce the Big Five, the five big African mammals: elephants, leopards, buffaloes, lions and rhinoceroses.

Vegetal ivory

Vegetal ivory (*Phytelphas* sp.) is a substance that can be used to replace animal ivory that for years has seriously endangered elephants and threatened them with extinction. Vegetal ivory nuts are extremely hard and can be carved to produce a number of items as well as powerful abrasives and phytochemicals. In addition, this substance, before being hardened, has a creamy texture and is quite tasty. The leaves of this plant are also used to make packaging straw. This substance was most commonly used in 1929 and Ecuador was the greatest exporter. In 1941 the trade of this substance slumped and exports dropped to one quarter. Today, however, the trade of vegetal ivory has recovered thanks to the increased "ecological awareness", even if it is very expensive: a button of vegetal ivory costs 25% more than a plastic one. Today, Ecuador produces approximately 2,300 kg which are mostly exported to Italy, Japan and Germany.

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