Figure 11.47
A single large karri tr

sociation of Forest
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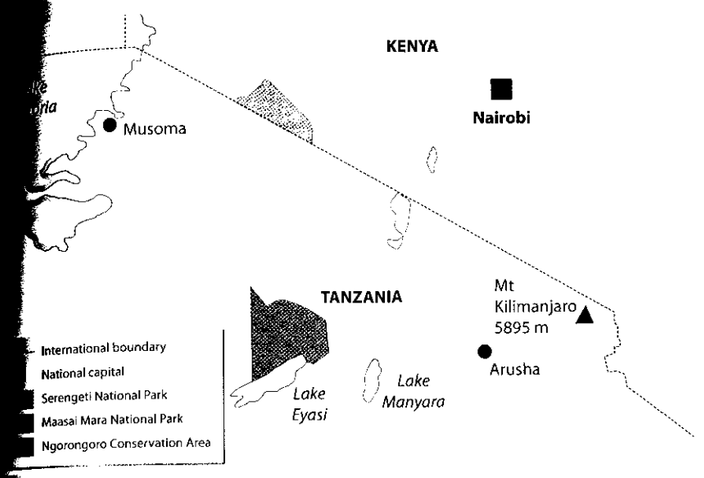


Figure 11.48
Location of the Serengeti

re starting this exercise, read pages
-321, Tropical grasslands, and pages
-338, Tropical grasslands in Kenya.
erengeti National Park's website is at:
w.serengeti.org
he Serengeti Shall Not Die area is useful
this exercise.

he Serengeti grasslands

he Serengeti grasslands lie just south of
e Tanzanian/Kenyan border, between
and 4° South (Figure 11.48). Mean
aximum temperatures are 24° to 27°C,
nd mean minimum temperatures 15°
6 21°C. Mean annual rainfall varies from
050 mm in the north-west to 550 mm
the south-east. Rainfall peaks in March
o May, and November to December
(compare Figure 12.49).

The soils are formed from volcanic
ash. The eco-region consists of slightly
undulating grassy plains, interrupted by
scattered rocky areas (kopjes) which are
parts of the Precambrian basement rocks
protruding through the ash layers.

Biodiversity features

The Serengeti grasslands are vital to the
cyclical movement of millions of large
mammals. Populations fluctuate, but about
1.3 million blue wildebeest, 200 000 plains
zebra, and 400 000 Thomson's gazelle
migrate between Serengeti and southern
Kenya each year. Many associated preda-
tors are also involved in these movements.
By the onset of the dry season (late May),
the grasses on the plains have either dried
out or been eaten down to stubble, and
water is scarce. This triggers the massive
migration from the plains northwards.
Then, at the start of the wet season, the
animals complete the cycle, and return to
the plains.

Fires, usually set by humans, are an
important disturbance in this eco-region.
The burning helps provide accessible
pasture for the herds of cattle that are kept
here but other species, including wilde-
beest, also favour grazing on the green
flush that emerges after burning.

Current status

Much of the eco-region occurs within
protected areas, most of which are joined
into a continuous block. The protected area
includes Serengeti National Park (SNP) and
Ngorongoro Conservation Area (NCA), both
of which are World Heritage Sites (page
596). This area is probably large enough to
ensure the survival of the habitat and its
biodiversity. There has been little loss of
habitat within the protected areas, except
for small areas used for tourist hotels.
Outside the protected areas, however, there
has been a rapid expansion of human set-
tlement and agriculture in recent years.

Types and severity of threats

While Maasai pastoralists occupy the
NCA, there are no people living within the
SNP. However, the western frontier of this
park has a dense population, growing at
4 per cent a year. Livestock numbers are
increasing, and much of the area is being
converted into cropland. Agriculture is the
main source of income, but many people
have been attracted to the area by the wild-
life resources and tourism opportunities
that the park presents.

Many animals within the SNP are killed
by poachers, who may be local people
hunting 'bush meat' for subsistence, organ-
ised commercial hunters taking meat
for sale in the cities, or Big Game hunters
taking part in organised illegal safaris.

However, it is hoped that schemes to
give local communities legal rights to
manage the wildlife around their villages
will reduce the worst excesses of the
hunting. There are also plans to channel
more money earned from tourist activities
within the park back into the community
as, so far, the contribution from tourism to
the local economy has been relatively low.

Are the Serengeti grasslands natural?

The Serengeti changed from a grassland
state to woodland twice in the last century.
The few old, large trees dotting the land-
scape started life about 1900, followed by a
slow decline in numbers due to elephants,
fire, disease, and natural thinning, leaving
the few that we see today. The second group
of smaller trees established themselves
between 1976 and 1983, and these trees
are still growing in abundance. Both groups
were able to grow because for two periods
there were neither elephants nor fires.

Rinderpest, a cattle disease, came to East
Africa in about 1896. Most of the Serengeti
wildebeest died in a few years, as did the
cattle herds. There was famine, followed by

Issues Analysis Management of the Serengeti

Figure 11.49
Information from the Serengeti website

In recent years human population has increased, putting pressure on park resources. Conflicts arise as wild animals damage property and even threaten life. Illegal poaching activities create conflict. In some sections cultivation is right on the park border and this fuels conflict as animals destroy the crops on one side or are illegally hunted on the other.

The Serengeti is a prime example of how many natural ecosystems are being eroded by human population effects, irrespective of legal boundaries. The original Serengeti-Ngorongoro 'undisturbed' ecosystem (which included indigenous hunters with traditional weapons), set aside in the 1950s, has declined steadily. Some 40% of the natural ecosystem has been lost to farming and herding. Today, there are signs that this loss may be accelerating.

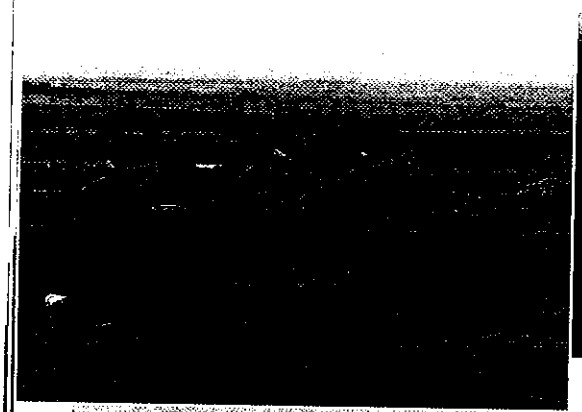
The Serengeti is also losing species. Thus, rhinoceros, once abundant, have been effectively exterminated from the ecosystem, and elephants were reduced by 80%, both by poaching. Wild dogs went extinct in the early 90s, due to contact with domestic dogs and infection with diseases like distemper and rabies. Unregulated hunting of large predators in areas around Serengeti has had dramatic impacts. Over-hunting of male lions alters the local adult sex ratio, draws males out from the park, and thus disrupts populations within in it.

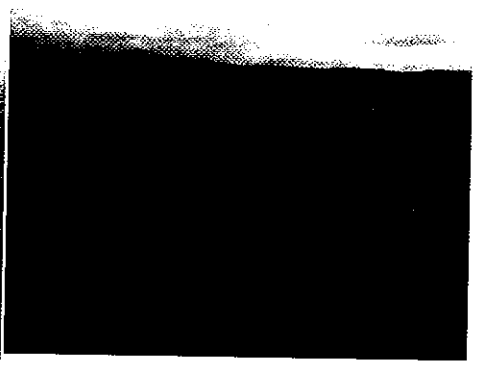
The 1989 worldwide ivory ban almost completely stopped the poaching of elephants and their numbers are recovering. However, meat poaching continues. In an average year, local people living around the park illegally kill about 40,000 animals, mainly wildebeest and zebra, but also giraffe, buffalo and impala. The populations of these animals seem to be able to survive this poaching without any long-term decline but the killing is a manifestation of growing antagonism between the impoverished villagers and the authorities of the SNP. This conflict did not exist two decades ago; there was land enough for everyone and every animal. What we must all face – poachers, tourists, farmers, conservationists and pastoralists – is the fact that the land does not go on forever.

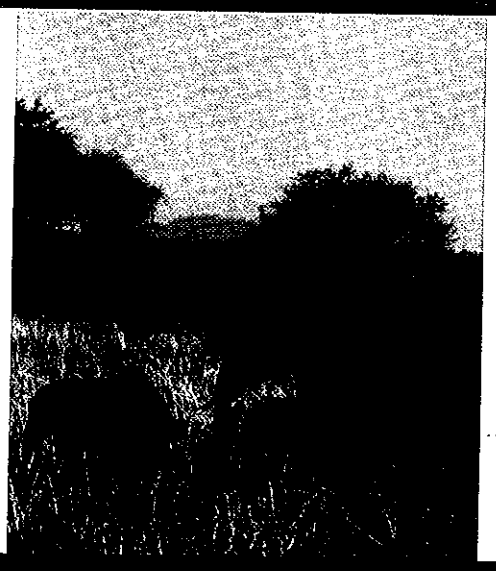
In an effort to harmonize the pastoralists with the wildlife in the Serengeti, locally administered reserves – Wildlife Management Areas – are now created on the borders of the park, where villagers are given a far greater degree of control over the land and its resources. In situations where protection of biodiversity is not seen to be of clear economic benefit to the community, outside assistance must attempt to bring change by:

- increasing community pride in their natural environment
- increasing the economic benefits of conservation, e.g. by fostering ecotourism, hiring community members as resource stewards, rangers, etc.
- rehabilitating depleted resource systems
- increasing the community's ability to control the use of the resource by outside interests.

Figure 11.50
Scenes in the Serengeti







emigration. With no people there was no one to light fires and the Serengeti went un-burnt. At the same time, the trade in ivory was at its peak. With no fires and no elephants, young trees were able to grow and flourish in the first big establishment of the century. Then, gradually, the wildebeest and cattle recovered and by the 1930s elephants started to return, and growth of new trees ceased.

Between 1976 and 1984 the weather patterns in and around Serengeti changed. The seasonal rains became more spread out, so the grasslands did not dry and burn during the 'dry season'. During this time there was an enormous upswing in the illegal ivory trade. With fire and elephants removed, the trees again established themselves in a burst. These trees are now about 30 years old and range from 2 to 5 m tall, often forming dense thickets.

There has been a large increase of impala inside the park. They seem to be much more successful in the woodlands than in the grasslands, and have increased as the woodlands have increased. In the past, elephants and fire have controlled the establishment of new trees. Today, both elephants and fire are monitored closely. The Park Ecology Department burns fire-breaks to stop the spread of large fires, and conducts 'cool' early burns in fire-prone areas. It is also monitoring the ecosystem carefully to see how all aspects interact.

The Serengeti National Park Authorities have two main aims:

1 to conserve the natural environment of the SNP
2 to support the traditional way of life of the people who live around the SNP.

Draw up a list of management objectives for the Park, justifying each of your objectives and explaining how individual objectives combine to form a coherent management plan for the area.

rowth of this biome only
nount of litter and, as there
the cold soil, organic matter
ery slowly to give a thin peaty
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drainage. Where this occurs,
olate downwards, usually as
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ic acid within it (the pH
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at a very variable depth but
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and causes extreme water-
(Figure 12.45). Few mixing
the cold, wet, tundra soils,
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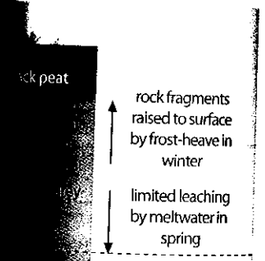

Case Study 12

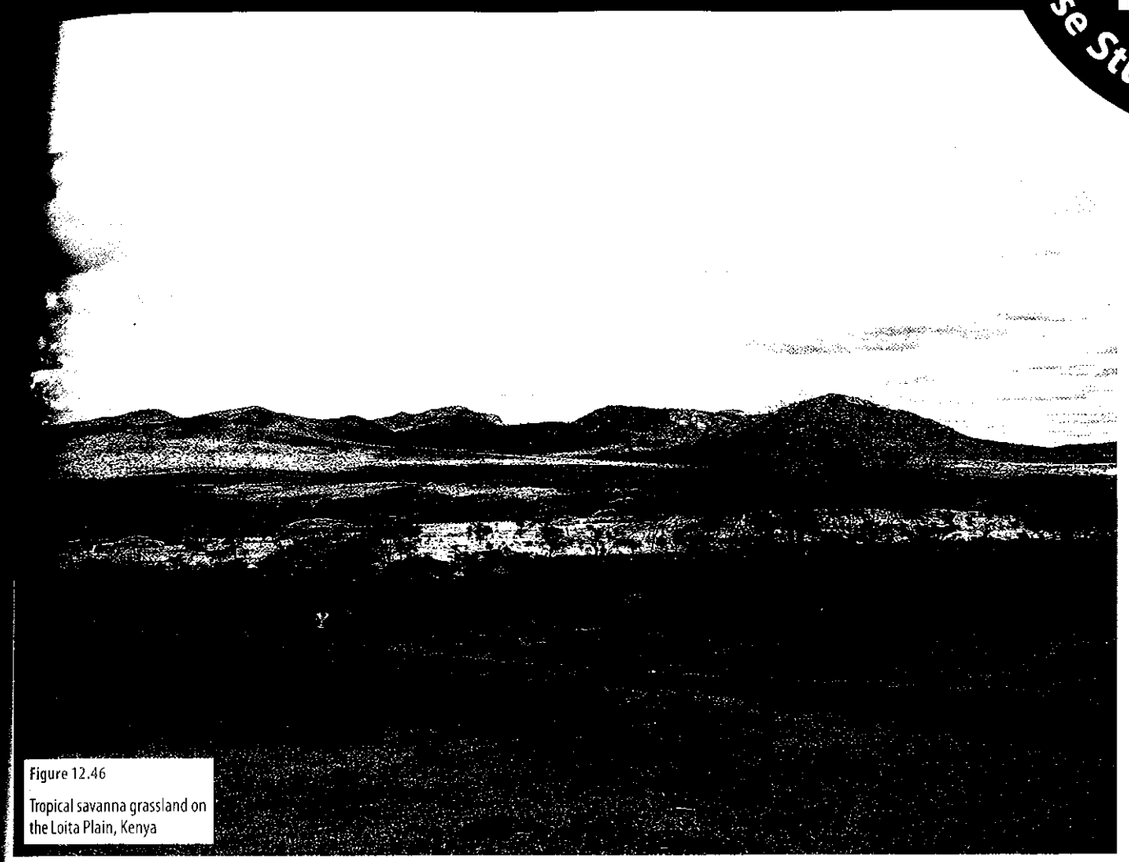

Figure 12.46
Tropical savanna grassland on the Loita Plain, Kenya

A Tropical grasslands in Kenya

The main expanses of tropical grassland in Kenya lie within the Rift Valley and on the adjacent plains of the Mara (an extension of the Serengeti) and Loita (Figure 12.48). Their appearance is one of open savanna (Figures 12.13 and 12.46) with small acacia and evergreen trees (Figure 12.15). There is evidence, however, that the original climax vegetation was forest, but that this has been altered by fires, started both naturally and by humans (page 293), by overgrazing (Figure 12.47) and by climatic change.

The climate is very warm and dry for most of the year with, usually, a short season (three months) of fairly reliable and abundant rainfall and an even shorter period known as the 'little rains' (Figure 12.49). Both periods of rainfall follow soon after the ITCZ and the associated overhead sun have passed over the

Figure 12.47
Scattered trees and over-grazed land in the central Rift Valley, Kenya

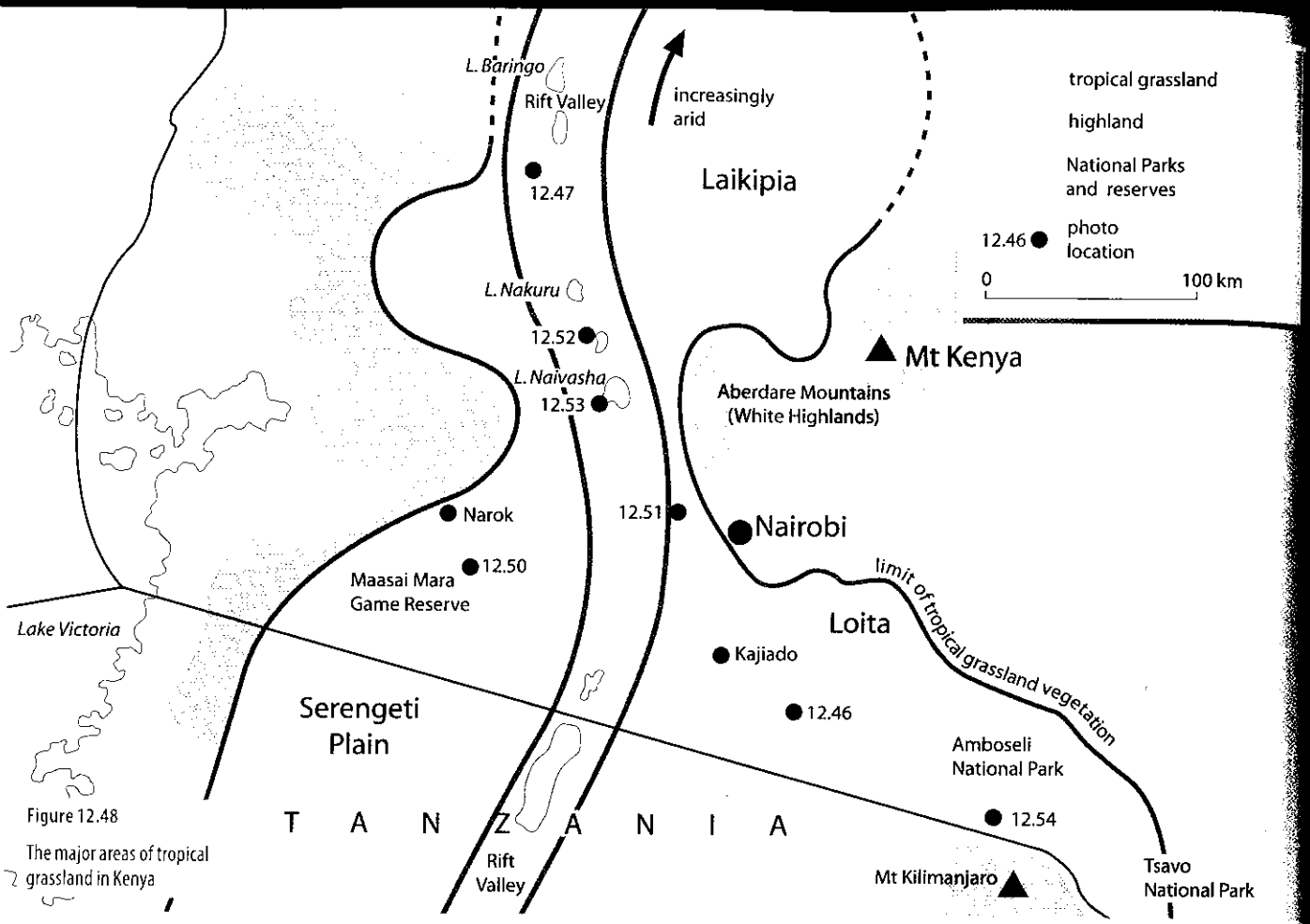

Figure 12.48
The major areas of tropical grassland in Kenya

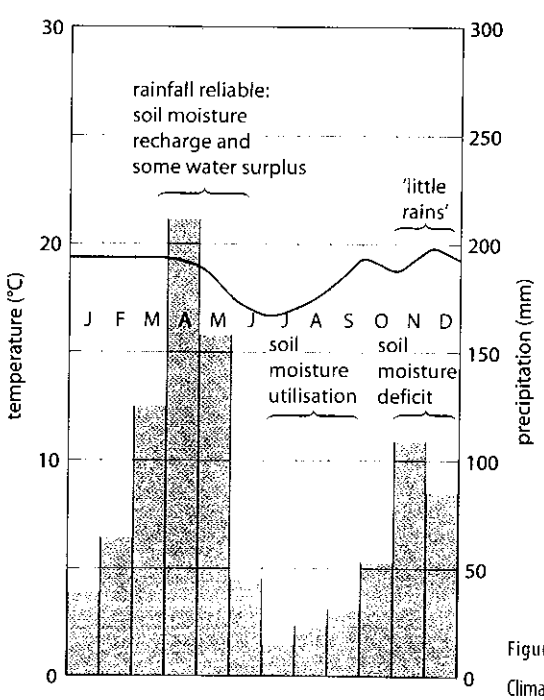

Figure 12.49
Climate graph and water balance for Nairobi (note that, due to its higher altitude, Nairobi is cooler and wetter than the surrounding grasslands)

Equator (Figure 12.12). The annual water balance shows a deficit (Figure 3.3) so that, although there is some leaching during the rainy season, for most of the year capillary action occurs. This has resulted in the development of ferruginous soils with, in places, a lateritic crust (page 321). Water supply is therefore a major management problem in this part of Kenya.

Water is obtained from springs at the foot of Mount Kilimanjaro – the mountain itself is in Tanzania – which are fed by melting snow; from several of the Rift Valley lakes (not all, as some are highly saline); from rivers (many of which are seasonal); and from waterholes. Even so, there have been, in the last 100 years alone, several major droughts when the carrying capacity of the region was exceeded. The **carrying capacity** (page 378) is the maximum number of a population (people, animals, plants, etc.) that can be supported by the resources of the environment in which they live, e.g. the greatest number of cattle that can be fed adequately on the available amount of grassland.

Human pressure on the natural resources

Maasai pastoralists

Maasai are defined as 'people who speak the Maa language'. Their ancestors were Nilotic, coming from southern Sudan during the first millennium AD. They kept cattle and grew sorghum and millet. The present Maasai may be descendants of the last of several migration waves. Latest evidence suggests that they may have only been in Kenya for 300 years. Over time, they specialised more in cattle and came to see themselves, and to be seen by others, historically and ethnically, as 'people of cattle'. Figure 12.50 is a stereotype photo of the Maasai, dressed in their red cloaks and with their humped zebu cattle. While all Maasai are Maa speakers, not all Maa speakers are Maasai – nor, today, are all Maasai pastoralists! The Maasai became semi-nomadic, moving seasonally with their cattle in search of water and pasture (two wet seasons and two dry seasons meant four moves a year; Figure 12.49). Herds had to be large enough to provide sufficient milk and meat for their owners and to reproduce themselves over time, including the ability to recover from drought and disease.