

37. Edaphic grassland on drainage-impeded or seasonally flooded soils (edaphic vegetation type, g)

37.1. Description

White (1983) did not strictly apply a differentiation between edaphic wooded grassland (with cover percentages of 10 - 40% woody species) and edaphic grassland (with cover percentages of <10% woody species) since both types intergrade and edaphic wooded grasslands are often difficult to delimit from the more open grasslands with which they are associated (White 1983 pp. 50 - 52). **Within the VECEA map, we loosely⁽²⁰⁾ defined “edaphic wooded grassland” as “edaphic grassland with scattered woody species” and “edaphic grassland” as “edaphic grassland without scattered woody species”. This means that some vegetation types that would have been classified as “edaphic grasslands” in a strict physiognomic classification system (i.e. woody cover < 10%) may have been allocated to “edaphic wooded grasslands”.**

The most widespread edaphic grasslands are those associated with seasonally or permanently waterlogged soils. They are limited in areas with short or no dry seasons (such as the Guineo-Congolian floristic region), but are widespread in regions which experience strongly seasonal rainfall (such as the Indian Ocean coastal belt and the Somalia-Masai, Sudanian and Zambezan floristic regions). Waterlogged soils usually occur in depressions which receive more water than is supplied by incident rainfall, but sometimes parent material has an overriding effect such as on edaphic grasslands that occur on volcanic soils (mapped as a distinct VECEA subtype [gv]; White 1983 p. 51). Alkaline grasslands that occur in basins are considered to be halophytic vegetation (mapped separately in VECEA as Z; White 1983 p. 100).

Although White (1983) described edaphic grasslands and wooded grasslands separately for the various floristic regions, we did not apply a floristic classification system to edaphic grasslands and edaphic wooded grasslands in the VECEA map.

Zambezan edaphic grassland⁽²¹⁾ is widespread and occurs principally in four habitats: (i) seasonally waterlogged depressions on the Central African Plateau that are covered with edaphic grassland (“dambos”); (ii) flood plains of rivers and basins with internal drainage; (iii) Kalahari Sand of low relief; and (iv) sandy edges of dambos (White 1983 pp. 99 - 101):

Dambo grassland occurs above 1200 m and where there is seasonal flooding (some parts remain boggy throughout the year). The vegetation is usually a medium-dense grass mat of rather uniform appearance and height (50 to 100 cm with flowering culms of 1 to 2 m). ***Loudetia simplex*** is the most characteristic grass species and is dominant over large areas (White 1983 pp. 99 - 100).

20: among the exceptions that we made to the general rule, we did not include suffrutex grassland among wooded grassland types and neither did we include edaphic grassland on volcanic soils (gv) among wooded grassland types (although scattered *Acacia mellifera* may occur).

21: edaphic grasslands were studied in detail in several places because swarms of red locusts (*Nomadacris septemfasciata*) only originate from certain edaphic grassland areas. Four recognized major outbreak areas of the red locust are the Mweru-wa-Ntipa depression in Zambia and the Rukwa valley, the Malagarasi drainage basin and the Wembere depression in Tanzania (Vesey-Fitzgerald 1963).

Flood-plain grassland occurs in the valleys of larger rivers where erosion has covered the valley floors with alluvium (mostly heavy clay) and where seasonal rainfall results in seasonal waterlogging. These valleys are covered with a complex and constantly changing mosaic of edaphic grassland, permanent swamp vegetation (X) and termite-mound thickets (“bush groups”, see termitary vegetation [T]), which makes it very difficult to impossible to map these types separately. Floodplain grasslands can be subdivided into wetter types and better-drained types. The most extensive areas of flood-plain grasslands of the Zambezi region occur in the Lake Chilwa basin of Malawi, the Malagarasi and Rukwa valleys of Tanzania, the Bangweulu and Mweru Wantipa basins of Zambia and the Chambeshi, Kafue and Upper Zambezi valleys of Zambia (White 1983 p. 100).

Kalahari suffrutex grassland is a short wiry grassland that occurs on oligotrophic Kalahari Sand that is seasonally waterlogged. Trees are virtually absent and have been replaced by rhizomatous geoxylic suffrutices that are usually less than 0.6 m tall. At least under the present conditions, their stems are burnt back to ground level every year. The underground parts are usually of massive proportions and greatly exceed the phytomass of grasses, so these communities can be described as “underground forests” although above-ground they look like grasslands most of the year. Most of the suffrutex species are closely related to forest or woodland tree or liana species. The most abundant suffrutex is ***Parinari capensis*** and the most widespread dominant grasses are ***Loudetia simplex*** and ***Monocymbium cerasiiforme*** (White 1983 pp. 100 - 101). Widely distributed suffrutices described by Fanshawe (1971 p. 45) to occur in catenary regression stages of Kalahari woodlands include *Annona stenophylla*, *Chamaeclitandra henriquesiana*, *Diospyros chamaethamnus*, *Diospyros virgata*, *Gardenia brachythamnus*, *Lannea edulis*, *Leptactina benguelensis*, *Napoleonaea gossweileri*, ***Parinari capensis***, *Pygmaeothamnus zeyheri*, *Strobilanthopsis linifolia* and *Strychnos gossweileri*.

Most of the dambos are fringed by a narrow zone of sparse wiry grassland with abundant geoxylic suffrutices that are similar to Kalahari suffrutex grassland (White 1983 pp. 100 - 101). Fanshawe (1971 p. 52) describes suffrutex wooded grassland that occurs within a catenary sequence from Undifferentiated woodland (Wn) to grassland. Common suffrutices include *Annona stenophylla*, *Astripomoea malvacea*, *Brackenridgea arenaria*, *Combretum platypetalum*, *Cryptosepalum maraviense*, *Duosperma crenatum*, *Eriosema englerianum*, *Fadogia homblei*, *Gnidia kraussiana*, *Hibiscus rhodanthus*, *Ipomoea vernalis*, *Lannea edulis*, *Litogyne gariepina*, ***Parinari capensis*** and *Pygmaeothamnus zeyheri*.

Edaphic grassland in the Somalia-Masai floristic region was classified as edaphic wooded grassland, although treeless plains dominated by *Chrysopogon plumulosus* were described to occur in Somalia within deciduous bushland (Bd) and water-receiving depressions with black and cracking clays in Central Tanzania are treeless (but they are separated by an ecotone of wooded grassland, however; see edaphic wooded grassland [we]; White 1983 p. 116). Edaphic grassland that occurs on volcanic soils is mapped and described as a distinct subtype (mapping unit gv; see below).

Figure 37.1. Edaphic grassland in Amboseli National Park (Kenya). Photograph by F. Gachathi (2008).

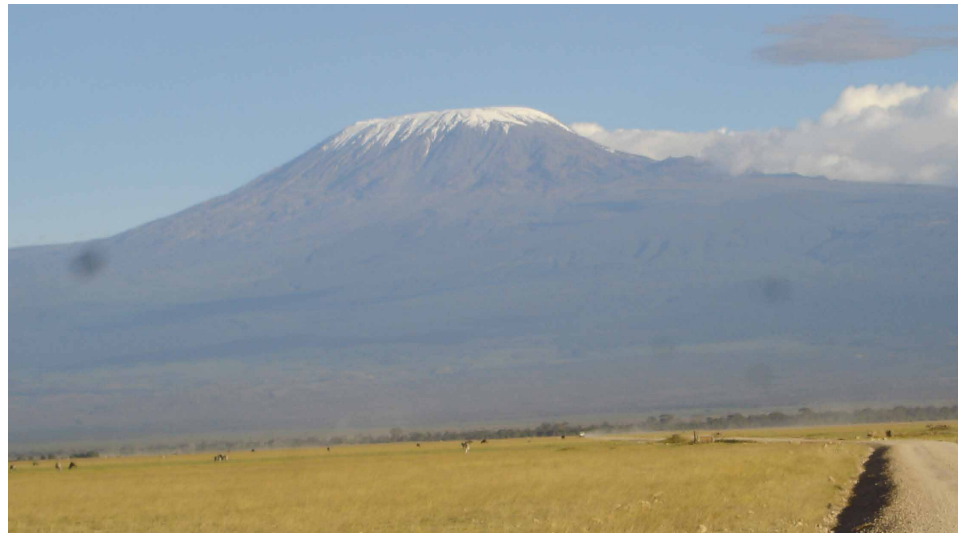


Figure 37.2. A typical dambo near Mbala (Zambia) with its centre of open grassland and fringe of small trees. In the background, Miombo woodland (Wm) with *Brachystegia microphylla* (a species virtually confined to rocky hills and escarpments, White 1983 p. 93). Burt et al. (1942 p. 79) comment that “a dambo often gives the impression of a wide road through the general monotony of the *Brachystegia* forest” (i.e. miombo woodland [Wm]). Burt et al. (1942, Photograph 7). Image obtained from URL: <http://www.jstor.org/stable/2256690>.



Figure 37.3. The “rain pond catena” in Tanzania was classified by the VE-CEA project as a catena of Somalia-Masai *Acacia-Commiphora* deciduous bushland and thicket (Bdd) / edaphic grassland on drainage-impeded or seasonally flooded soils (g). Although the water-receiving depressions are typically treeless grasslands, usually they are separated from deciduous bushland (Bd) by an ecotone of wooded grassland that is dominated by gall *Acacias* (especially *A. drepanolium*, *A. seyal*, *A. malacocephala* and *A. pseudofistula*; White 1983 p. 116; see also Gillman 1949 p. 29). Gillman (1949, Fig. 30; this is one of the photographs that was cited by White (1983 p. 116) for Somalia-Masai edaphic grassland).



Edaphic grassland of the Zanzibar-Inhambane region was described as a edaphic wooded grassland (we) since woody trees occur (although widely scattered; these areas also contain thicket-covered termite mounts [mapping unit T]; White 1983 p. 189).

In most Sudanian edaphic grasslands there is an admixture of woody plants (White 1983 p. 107). Edaphic grasslands were not described by White (1983) for the Afromontane floristic region, although he stated that “there are undoubtedly small areas of edaphic grassland” (White 1983 p. 168). No mention is made of edaphic grasslands for the Lake Victoria regional mosaic.

37.2. Species composition

(Please check the methodology and information from Volumes 2 - 5 for more details on how the information on species composition for the different manifestations of this potential natural vegetation type was compiled. In composition tables, "x" indicates that the species is expected to be present, "C" indicates that the species was identified as characteristic species and "f" indicates a species that was not listed in the documentation that we consulted although it is known to occur in the specific country).

Table 37. Edaphic grassland on drainage-impeded or seasonally flooded soils (edaphic vegetation type, g)

SPECIES	Regional status	Kenya	Malawi	Tanzania (Tanzania subtype)	Tanzania (Tanzania subtype)	Uganda (Uganda subtype)	Uganda (Uganda subtype)	Zambia	
				gft	gft	gbu	geU		
<i>Acroceras macrum</i>	Zambezian edaphic grassland (wetter types of floodplain grasslands)	f		f	C	f	f	f	x
<i>Andropogon brazzae</i>	Zambezian edaphic grassland (better-drained types of floodplain grasslands)			f	C				
<i>Andropogon schirensis</i>	Zambezian edaphic grassland (dambo grasslands, suffrutex grasslands)	f		C	f	f	f	f	x
<i>Aristida adscensionis</i>	Somalia-Masai edaphic grassland (clays plains in Somalia)	x							
<i>Aristida stipitata</i>	Zambezian edaphic grassland (suffrutex grasslands)								x
<i>Bothriochloa bladhii</i>	(grass)	f	x	f	f	f	f	f	x
<i>Brachiaria brizantha</i>	(grass)	f	x	f	f	f	f	f	x
<i>Brachiaria humidicola</i>	(grass)	f	x	f	f				x
<i>Brachiaria jubata</i>	(grass)					C	f	f	
<i>Chloris gayana</i>	edaphic grasslands of the Serengeti plains	f	x	f	f	f	f	f	x
<i>Cynodon dactylon</i>	Somalia-Masai edaphic grasslands; edaphic grasslands of the Serengeti plains	x	x	f	f	f	f	f	x
<i>Cyperus dives</i>	(sedge)	f		f	f	f	C	f	
<i>Cyperus latifolius</i>	(sedge)					f	C	f	
<i>Cyperus longus</i>	(sedge)	f	C	f	f	f	f	f	
<i>Dichanthium annulatum</i>	(grass)	f	x	f	f				x
<i>Echinochloa haploclada</i>	(grass)	x	f	f	f	f	f	f	x
<i>Echinochloa pyramidalis</i>	Zambezian edaphic grassland (wetter types of floodplain grasslands)	f	x	f	C	f	C	f	x
<i>Echinochloa stagnina</i>	Zambezian edaphic grassland (wetter types of floodplain grasslands)	f		f	C	f	f	f	x
<i>Entolasia imbricata</i>	Zambezian edaphic grassland (better-drained types of floodplain grasslands)	f	x	f	C	f	f	f	x
<i>Eragrostis atrovirens</i>	(grass)	f	x	f	f				x
<i>Erianthus teretifolius</i>	Zambezian edaphic grassland (dambo grasslands)			C	f				
<i>Eustachys paspaloides</i>	edaphic grasslands of the Serengeti plains	f		f	f	f	f	f	x
<i>Fimbristylis dichotoma</i>	(sedge)					f	f	C	
<i>Hyparrhenia bracteata</i>	Zambezian edaphic grassland (dambo grasslands)	f	x	C	f	f	f	f	x
<i>Hyparrhenia diplandra</i>	Zambezian edaphic grassland (dambo grasslands)	f		C	f	f	f	f	x
<i>Hyparrhenia filipendula</i>	(grass)	f	x	f	f	C	f	f	x
<i>Hyparrhenia newtonii</i>	Zambezian edaphic grassland (dambo grasslands)			C	f	f	f	f	x
<i>Hyparrhenia nyassae</i>	(grass)	f	x	f	f	f	f	f	x
<i>Hyparrhenia rufa</i>	(grass)	f	x	f	f	f	f	C	x
<i>Imperata cylindrica</i>	(grass)	f	x	f	f	f	f	f	x
<i>Leersia hexandra</i>	Zambezian edaphic grassland (wetter types of floodplain grasslands)	f	x	f	C	f	C	f	x
<i>Loudetia kagerensis</i>	(grass)	f		f	f	f	f	C	
<i>Loudetia simplex</i>	Zambezian edaphic grassland (dambo grasslands, better-drained types of floodplain grasslands, suffrutex grassland)	f	x	C	C	f	f	f	x
<i>Microchloa kunthii</i>	edaphic grasslands of the Serengeti plains	f		f	f	f	f	f	
<i>Monocymbium cerasiiforme</i>	Zambezian edaphic grassland (dambo grasslands, better-drained types of floodplain grasslands, suffrutex grassland)		x	C	C				x

38. Edaphic grassland on volcanic soils (edaphic subtype, gv)

38.1. Description

The grasslands of the Serengeti Plains grow on soils that are derived from volcanic ash. Outside the greater Serengeti region, grasslands occurring on volcanic ash are very restricted in Africa (White 1983 pp. 125 and 126). Huge quantities of fine whitish-grey ash were produced by eruptions around 150,000 years ago by the now extinct Kerimasi volcano (2 52' S, 35 56' E). The ashes fell over a wide area where it resulted in a relatively flat surface over a formerly undulating peneplain. The ash hardened to form grey and light-brown calcareous tuffs and almost continuous layers of calcitic hard-pan layers at successive layers (with the accumulation of lime through downward leaching; White 1983 p. 126).

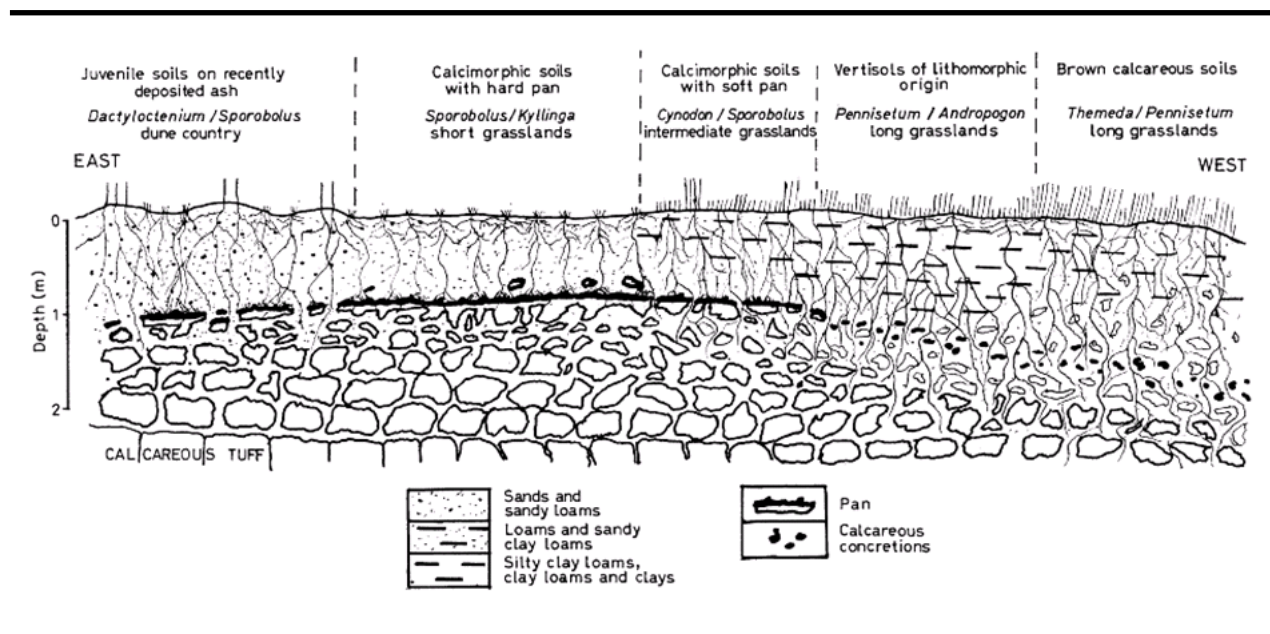


Figure 38.1. Profile diagram of the soil – edaphic grassland associations running east to west across the Serengeti Plains. Surface topography is not drawn to scale. White (1983 p. 126) describes that the gradient from the juvenile ash soils in the east to the more mature brown calcareous soils in the west are paralleled by a climatic gradient as annual rainfall gradually increases from the 380 mm in the east to 780 mm in the west. Anderson and Talbot (1965, Figure 2). Image obtained from URL: <http://www.jstor.org/stable/2257564>



Figure 38.2. Edaphic grassland on volcanic soils along the Namanga – Arusha road (Tanzania). Altitude approximately 1700 m. Photograph by H. N. Moshi (2009).

38.2. Species composition

(Please check the methodology and information from Volumes 2 - 5 for more details on how the information on species composition for the different manifestations of this potential natural vegetation type was compiled. In composition tables, "x" indicates that the species is expected to be present, "C" indicates that the species was identified as characteristic species and "f" indicates a species that was not listed in the documentation that we consulted although it is known to occur in the specific country).

Table 38. Species composition for Edaphic grassland on volcanic soils (edaphic subtype, gv)

SPECIES	Regional status	gvK (Kenya)	gvT (Tanzania)
<i>Acacia mellifera</i>	scattered bushes that sometimes occur on more stable areas between the dunes on juvenile soils on volcanic ash in the Serengeti plains		x
<i>Andropogon greenwayi</i>	edaphic grasslands of the Serengeti plains		C
<i>Aristida adscensionis</i>	Somalia-Masai edaphic grassland	x	
<i>Aristida mutabilis</i>		x	
<i>Chloris gayana</i>	edaphic grasslands of the Serengeti plains		C
<i>Cynodon dactylon</i>	edaphic grasslands of the Serengeti plains		C
<i>Digitaria macroblephara</i>	edaphic grasslands of the Serengeti plains		C
<i>Enteropogon macrostachyus</i>	(grass)	x	
<i>Eragrostis superba</i>	(grass)	x	
<i>Eragrostis tenuifolia</i>	edaphic grasslands of the Serengeti plains		C
<i>Eustachys paspaloides</i>	edaphic grasslands of the Serengeti plains		C
<i>Heteropogon contortus</i>	(grass)	x	
<i>Indigofera spinosa</i>		x	
<i>Microchloa kunthii</i>	edaphic grasslands of the Serengeti plains		C
<i>Panicum coloratum</i>	edaphic grasslands of the Serengeti plains		C
<i>Pennisetum mezianum</i>	edaphic grasslands of the Serengeti plains		C
<i>Pennisetum stramineum</i>	edaphic grasslands of the Serengeti plains		C
<i>Sporobolus ioclados</i>	edaphic grasslands of the Serengeti plains		C
<i>Sporobolus spicatus</i>		x	
<i>Themeda triandra</i>	edaphic grasslands of the Serengeti plains		C

39. Vegetation of sands (edaphic type, s)

39.1. Description

This vegetation type was not described in “the vegetation of Africa”.

39.2. Species composition

(Please check the methodology and information from Volumes 2 - 5 for more details on how the information on species composition for the different manifestations of this potential natural vegetation type was compiled. In composition tables, "x" indicates that the species is expected to be present, "C" indicates that the species was identified as characteristic species and "f" indicates a species that was not listed in the documentation that we consulted although it is known to occur in the specific country).

Table 39. Species composition for Vegetation of sands (edaphic type, s)

SPECIES	Regional status	sM (Malawi)	sC (Coast)
<i>Cadaba farinosa</i>			x
<i>Flacourtia indica</i>		f	x
<i>Garcinia livingstonei</i>		f	x
<i>Pandanus kirkii</i>			f
<i>Parinari curatellifolia</i>		C	f
<i>Salvadora persica</i>		f	x
<i>Sterculia africana</i>		f	x
<i>Terminalia sericea</i>		C	

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






























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Legend

Potential Natural Vegetation of Kenya

-  Afroalpine vegetation (A)
 -  Afromontane desert (Ad)
 -  Afromontane bamboo (B)
 -  Somalia-Masai Acacia-Commiphora deciduous bushland and thicket (Bd)
 -  Somalia-Masai Acacia-Commiphora deciduous bushland and thicket and Acacia-Commiphora stunted bushland (Bd/Bds)
 -  Acacia-Commiphora stunted bushland (Bds)
 -  Somalia-Masai Acacia-Commiphora shrubland and Somalia-Masai semi-desert grassland and shrubland (Bds/S)
 -  Acacia-Commiphora deciduous wooded grassland + Combretum wooded grassland (Bdw/Wc)
 -  Evergreen and semi-evergreen bushland and thicket (Be)
 -  Desert (D)
 -  Montane Ericaceous belt (E)
 -  Afromontane rain forest (Fa)
 -  Afromontane undifferentiated forest (Fb)
 -  Single-dominant Hagenia abyssinica forest (Fd)
 -  Afromontane moist transitional forest (Fe)
 -  Lake Victoria transitional rain forest (Ff)
 -  Afromontane dry transitional forest (Fh)
 -  Lake Victoria drier peripheral semi-evergreen Guineo-Congolian rain forest (Fi)
 -  Zanzibar-Inhambane lowland rain forest (Fo)
 -  Edaphic grassland on drainage-impeded or seasonally flooded soils (g)
 -  Climatic grasslands (G)
 -  Edaphic grassland on drainage-impeded or seasonally flooded soils or freshwater swamp (g/X)
 -  Edaphic grassland on volcanic soils (gv)
 -  Mangrove (M)
 -  Riverine wooded vegetation (R)
 -  Sand (s)
 -  Somalia-Masai semi-desert grassland and shrubland (S)
 -  Dry Combretum wooded grassland (Wcd)
 -  Moist Combretum wooded grassland (Wcm)
 -  Edaphic wooded grassland on drainage-impeded or seasonally flooded soils (wd)
 -  Tortilis wooded grassland and woodland (WdK)
 -  Biotic wooded grassland (We)
 -  Freshwater swamp (X)
 -  Halophytic vegetation (Z)
 -  Coastal Mosaic (CM)
 -  Water bodies (w)
-
-  Seasonal rivers
 -  Perennial rivers
 -  Cities
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 -  Roads & tracks

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