TEN Tenafeate Land System

Strongly dissected slopes of the South Para catchment immediately south east of Gawler

Area: 30.1 km^2

Annual rainfall: 475 – 625 mm average

Geology: The land is underlain by siltstones, slates and fine sandstones, and minor quartzites and dolomites. The rocks are variably capped by fine carbonates of aeolian origin, which occur as a veneer of soft segregations in rock fissures and in the lower soil profile. Locally derived alluvium, usually fine grained, occurs in minor drainage depressions. There are minor remnant laterites and Tertiary gravel deposits. These materials, which presumably covered most of the area at some time, have been all but completely eroded away by the down cutting of the streams.

Topography: The landscape is dominated by steep to moderately steep slopes created by the downcutting of the South Para River just prior to its exit from the ranges on to the plains. The main river channel runs more or less through the centre of the System. It is deeply incised between its point of entry on the eastern side of the System, to its exit in the north west corner. Short closely spaced tributaries draining from the edges of the System to the river in the centre have also cut valleys up to 100 m deep. Drainage depressions are narrow, and where mappable (ie more than 100 m wide) are very well defined. There is typically an abrupt boundary between the creek flat and the adjacent slope.

Elevation: 50 m in the north west where the South Para River flows out, to 290 m in the south west.

Relief: Up to 100 m

Soils: Most soils are shallow to moderately deep over basement rock. Loamy surfaces are usual, but subsoils vary. Well structured red clays are common, particularly on lower slopes. These may or may not be calcareous with depth. However soils with weakly developed or no subsoil are more extensive. They are usually very stony. There is a range of deep soils over alluvium on creek flats. Black clay loams are most characteristic.

Main soils:

Acidic soils formed in weathering basement rock

K2a Acidic loam over red clay
K2b Acidic loam over brown and red clay
L1a Shallow stony loam

Soils formed on calcified basement rock

C2 Shallow gradational red loam
D1 Shallow loam over red clay
L1b Shallow stony loam

Minor soils:

Soils formed in alluvium

F1 Sandy loam over brown sandy clay to clay
M1 Deep sandy loam
M2 Deep black clay loam

Main features: The Tenafeate Land System is dominated by steep slopes. Almost 70% of the area is steeper than 30% and as such is inaccessible to conventional agricultural machinery. The majority of the rest of the land is moderately steep and non arable, although accessible. The soils throughout are loamy with subsoils ranging from thick well structured red clays to nothing (ie soils are shallow over parent rock). They are inherently fertile and well drained, although

of highly variable depth. This affects waterholding capacity and therefore pasture productivity. Perennial horticulture and viticulture are options on the accessible slopes where water is available.

Soil Landscape Unit summary: 6 Soil Landscape Units (SLUs) mapped in the Tenafeate Land System

SLU	% of area	Main features #
AJC AJD	25.8 68.4	Moderately steep to steep strongly dissected low hills and hills, formed on weakly calcified siltstones, slates and fine sandstones, and minor quartzites and dolomites. Gully slopes are up to 50% (100% in extreme cases), grading to more gently inclined upper slopes and crests (10% to 30% slopes, down to 4% on narrow crests). Maximum relief is 100 metres. Water courses are well defined in narrow drainage depressions. Rock outcrop is sporadic, but extensive in places. There is variable surface stone. **AJC** Moderate slopes and rolling low hills with relief to 80 m and slopes of 20-30%. **AJD** Steep hillslopes with relief to 100 m and slopes of 30-100%. Most soils are shallow to moderately deep over siltstone which may be non-calcified or contain soft carbonate in rock fissures. Common profiles include loams over red brown clays, shallow non-calcareous stony loams, and shallow loams over calcified rock. Main soils: Acidic loam over red or brown clay - **K2a** / **K2b** (E) Shallow stony loam - **L1a** / **L1b** (C) Shallow loam over red clay - **D1** (L) Shallow gradational red loam - **C2** (L) Variation in soil depth is considerable, but otherwise the soils are inherently fertile and well drained. The slopes preclude any cultivated agriculture, but gentler slopes where water is available are suitable for perennial horticulture or viticulture.
DGD	1.8	Moderate slopes of 10-20% and up to 80 m high formed on weakly calcified siltstones, slates and fine sandstones, and minor quartzites and dolomites. There is no rock outcrop and up to 10% surface stone. Most soils are shallow to moderately deep over siltstone which may be non-calcified or contain soft carbonate in rock fissures. Surfaces are mostly loamy. Main soils: Acidic loam over red or brown clay - **K2a** / **K2b** (E) Shallow stony loam - **L1a** / **L1b** (L) Shallow loam over red clay - **D1** (L) Shallow gradational red loam - **C2** (L) These soils are moderately deep to shallow, fertile and well drained. The slopes are semi arable, and cropping is not a viable option in the long term. However the land is suitable for perennial horticulture or viticulture where water is available.
FiZ	0.8	Upper slopes and summit surfaces (flat topped crests) underlain by deeply weathered and lateritized schists. Slopes are variable, up to 15%, with some surface ironstone. Soils are characterized by ironstone gravel. Main soils: Ironstone soil - **J2b** (E) Acidic sandy loam over brown clay on kaolinized rock - **K4b** (E) These soils are deep, but imperfectly drained, infertile and acidic. Productive potential is low.
GBD	0.9	Undulating upper slopes of 2-10% formed on Tertiary sandstones, with reworked sandy sediments in hollows and depositional areas. There is negligible surface stone and there are no defined water courses. Soils are invariably sandy surfaced, usually with more clayey subsoils, but some deep gritty sands occur on reworked sediments. Main soils: Bleached sand over sandy clay loam - **G2** (E) Sandy loam over poorly structured brown clay - **F2** (C) Thick sand over clay - **G3** (L) Deep loamy sand - **M1** (L) These soils are moderately deep, but highly infertile and prone to acidification and water repellence. Drainage is variable, usually moderately well to well, but some hollows are imperfectly drained with seepage areas. The sands are highly erodible, to both wind and water, so cropping is not generally sustainable. Most of the land is suitable for perennial horticulture and viticulture, although drainage management is required in some parts.

LdE	2.3	Creek flats formed on clayey alluvium. Main soils: Deep black clay loam - **M2** (E) Sandy loam over brown sandy clay to clay - **F1** (E) Deep sandy loam - **M1** (L) These soils are deep and fertile, but imperfectly drained. Productive potential is high although useable areas are very limited. Irrigation must be carefully managed to avoid waterlogging. Sporadic salinity should be monitored and measures to control water course erosion are required.

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

(D) Dominant in extent (>90% of SLU)
(V) Very extensive in extent (60–90% of SLU)
(E) Extensive in extent (30–60% of SLU)
(C) Common in extent (20–30% of SLU)
(L) Limited in extent (10–20% of SLU)
(M) Minor in extent (<10% of SLU)

Detailed soil profile descriptions:

Acidic soils formed on weathering basement rock

K2a Acidic loam over red clay (Eutrophic, Red Kurosol)
Medium thickness reddish loam to clay loam with a gravelly and paler coloured A2 horizon, overlying a red very well structured clay grading to weathering siltstone from about 100 cm, but deeper on lower slopes.

K2b Acidic loam over brown and red clay (Eutrophic, Brown Kurosol)
Thick sandy loam to loam surface soil with a paler coloured and gravelly A2 horizon, overlying a yellowish brown, brown and red well structured clay subsoil grading to weathering siltstone or fine sandstone by 100 cm.

L1a Shallow stony loam (Basic, Paralithic, Leptic Tenosol)
Thick stony loam, forming in weathering siltstone at 50 cm or less.

Soils formed on calcified basement rock

C2 Shallow gradational red loam on rock (Hypercalcic, Red Dermosol)
Medium thickness red brown loam to clay loam, grading a red well structured clay loam, grading to massive semi hard carbonate, over weathering siltstone below 50 cm.

D1 Shallow loam over red clay on rock (Hypercalcic, Red Chromosol)
Medium thickness hard setting loam with a paler and stony A2 horizon, overlying a dark reddish brown well structured clay which is highly calcareous from about 50 cm. Weathering calcified siltstone or slate occurs within 100 cm.

L1b Shallow stony loam (Calcareous, Paralithic, Leptic Tenosol)
Thick stony reddish brown loam, grading to highly calcified weathering siltstone or fine sandstone within 50 cm.

Soils formed in alluvium

F1 Sandy loam over brown sandy clay to clay (Hypocalcic, Brown Chromosol)
Thick loamy sand to sandy clay loam with a strongly bleached A2 horizon, sharply overlying a yellowish brown, grey and red mottled sandy clay to clay grading to medium or fine grained alluvium.

M1 Deep sandy loam (Regolithic, Red-Orthic Tenosol)
Thick brown sandy loam to loamy sand, overlying a reddish brown clayey coarse sand to silty sand, grading to variable sandy and gritty alluvial sediments.

M2 Deep black clay loam (Melanic, Eutrophic, Black Dermosol)
Thick black silt loam to clay loam with strong granular structure, overlying a black to dark brown clay with strong blocky structure, becoming yellow and grey mottled with depth.

Further information: DEWNR Soil and Land Program