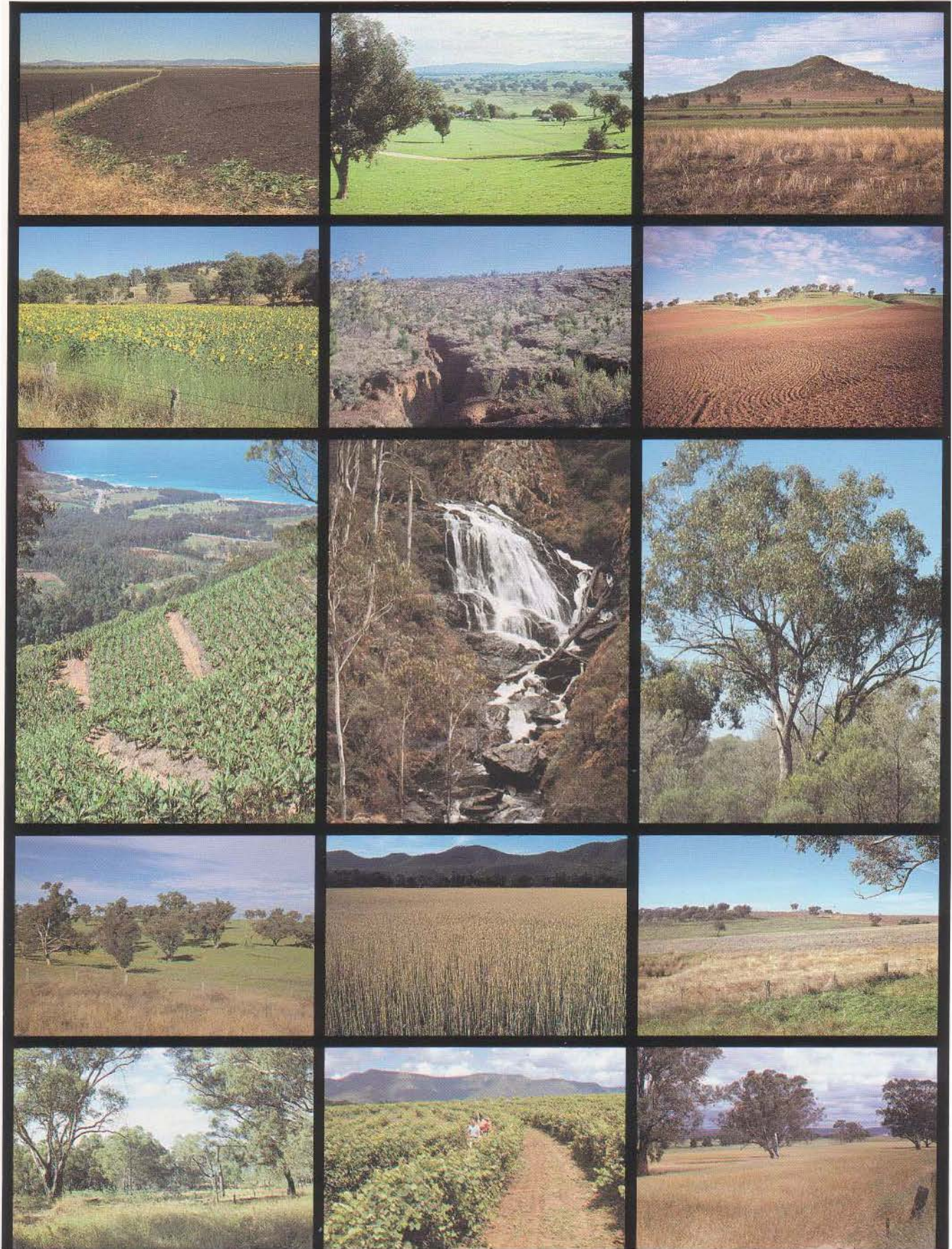


Systems used to classify rural lands in New South Wales



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Agricultural production is dependent on the use of land resources, and consequently, many systems for classifying land based on one or other of its attributes have been devised. Classifications may be based on a particular attribute, such as soil, terrain, vegetation, topography or climate. Other classifications attempt to assess the combined effects of these various attributes on a particular form of land use and produce a specialised classification for that use. The first type of classification is usually termed "an inventory of natural resources"; the second type a "land use classification".

Rural lands in N.S.W. are currently being mapped according to two different land classification systems. The first of these, used by the Soil Conservation Service of N.S.W., classifies land into eight classes known as LAND CAPABILITY CLASSES. The second system, which is outlined in the Rural Land Evaluation Manual and used by the N.S.W. Department of Agriculture, classifies land into five classes known as AGRICULTURAL SUITABILITY CLASSES.

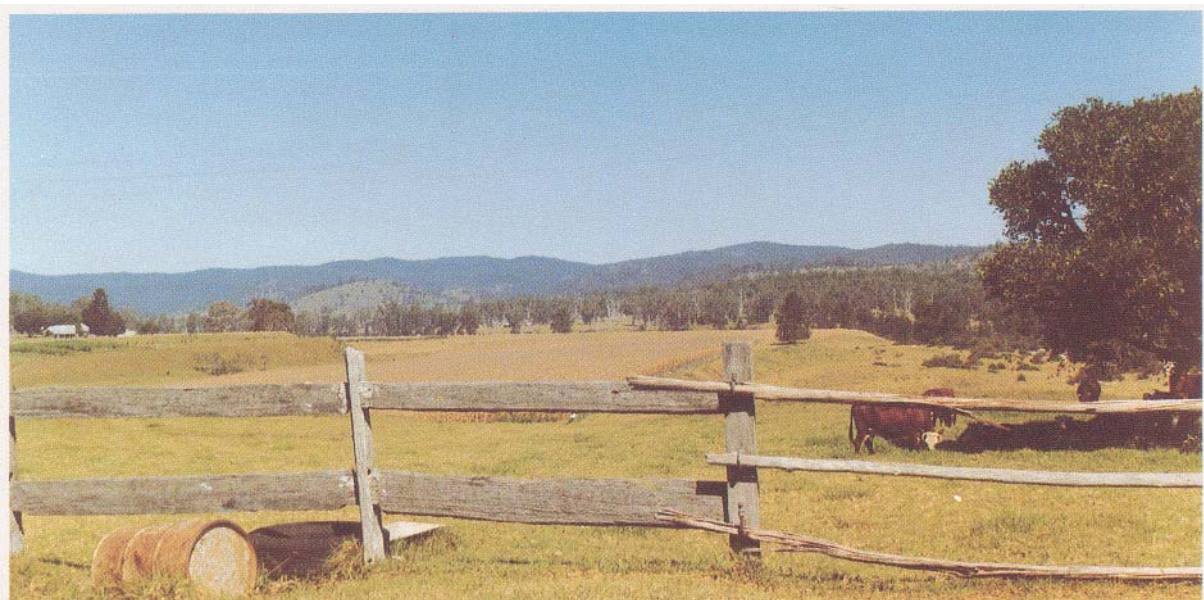
The aim of the Soil Conservation Service's LAND CAPABILITY classification is to delineate the various classes of rural land on the basis of the capability of the land to remain stable under particular land uses. The classification does not imply any aspects of agricultural suitability which can involve connotation of closeness to markets, availability of water or processing facilities. The Department of Agriculture's AGRICULTURAL SUITABILITY classification uses land capability as a basis and then

incorporates other factors such as those mentioned, to determine an appropriate Suitability Class. For example, land classed as Class IV grazing land under the Soil Conservation Service's land capability classification may well be Class 1 agricultural suitability because of its use for specialised or unique horticultural crops.

Each classification has a different aim and sometimes utilises a different interpretation of those resources and properties of the environment that influence land use. Some users have confused both systems, and comparisons have been attempted between one system and the other. A specific comparison between the systems was never intended and should not be attempted, as such a course of action fails to recognise the original purpose for which the two classifications were established.

The eight class system used by the Soil Conservation Service classifies land in terms of its inherent physical characteristics or physical constraints, and denotes measures needed to protect the land from soil erosion and other forms of land degradation. It therefore considers the optimum use of land rather than the maximum use.

Alluvial resources, Nymboida River. The three terrace levels have different soil types. Agricultural Suitability: Class 1 high terrace, Class 3 mid terrace, Class 2 lower terrace. Land Capability: Class I high terrace, Class II mid and lower terraces.





The five class system used by the Department of Agriculture classifies land in terms of its suitability for general agricultural use, including both cropping and pastoral purposes. This system also takes into account the inherent physical characteristics of land but, because other factors are also brought into consideration, it need not necessarily lead to a classification comparable to the first system. For example, land that has a high inherent capability for agriculture based on physical characteristics and constraints may not necessarily have a high suitability for agriculture because of adverse demand, cultural factors or location, which may make full agricultural use of the land uneconomic or undesirable.

The CAPABILITY of a particular parcel of land will, in general, not change over time while the AGRICULTURAL SUITABILITY may

Strip Cropping at Mullaley. Land Capability: Class II-Agricultural Suitability: Class 2.

well change if product demand or factors relating to its location change.

In both classifications, lands are assigned to their respective classes after considering some or all of the following factors:

- the climate and any adverse features of that climate;
- the physical nature of the soils, and any limiting soil physical characteristics, particularly for cultivation;
- the chemical fertility of the soils, and any deficiencies in nutrients or toxicities of elements which may limit plant growth;
- drainage, including frequency of inundation;
- stoniness and/or the presence of rock outcrops;

- shallow soils or occurrence of hard pans;
- the topography and any adverse topographic features; and
- the accumulated experience of cropping and livestock husbandry in the area concerned.

Both systems have a use in the context of land use planning to identify the better agricultural lands so that they can be retained for agriculture and not lost to other forms of land use. Neither classification provides an absolute ranking for land valuations.

It should be pointed out, however, that the Soil Conservation Service LAND CAPABILITY classification also has a role in delineating rural lands which are not suitable for either agricultural or pastoral use because of severe physical limitations.

Each classification system is defined below in more detail:

1. The eight class system of the

Soil Conservation Service:

This system classifies land into LAND CAPABILITY CLASSES. The basic principle of assessing the class into which any type of land should be placed is that of "using land according to its inherent capability and protecting it from soil erosion and other forms of land degradation according to its needs".

In the first place, the inherent capability of the land determines how it may be used but, if productivity is to be maintained, it needs also to be protected from the various forms of soil degradation.

The capability class into which any type of land is placed depends on the physical characteristics of the site, the soils and specific limitations to their use, land management constraints and the local climate. The protection land requires depends upon the proposed use, and topographic features such as slope length and gradient, the erodibility of the soil, the frequency of high intensity rain storms or strong winds, and the types of land degradation likely to occur at the site.

The inherent capability and the need for protection constitute the basis for classification of land into its various categories. The first step in classification is to decide whether the land is capable of being cultivated. If it can be

cultivated, the topographic location of the site, the degree and length of slope, the erodibility of the soils and the other factors just mentioned, will govern the amount of protection it may need against soil erosion.

If the land is not capable of cultivation, the presence of various physical constraints, such as degree of slope, erosion hazard, depth of soils, soil structure, impeded drainage, salinity level, or occurrence of rock outcrops, will decide whether it can be used for grazing (and also the amount of protection necessary), or whether it should be retained under green timber or not used for any agricultural or pastoral purpose.

On this basis, the following system of classification has been devised;

Land capable of being regularly cultivated

- Class I.** No special soil conservation works or practices necessary.
- Class II.** Soil conservation practices such as strip cropping, conservation tillage and adequate crop rotations.
- Class III.** Structural soil conservation works such as diversion banks, graded banks and waterways, together with soil conservation practices as in Class II.

Land not capable of being regularly cultivated but suitable for grazing with occasional cultivation

- Class IV.** Soil conservation practices such as pasture improvement, stock control, application of fertiliser and minimal cultivation for the establishment or re-establishment of permanent pasture.
- Class V.** Structural soil conservation works such as absorption banks, diversion banks and contour ripping, together with the practices as in Class IV.

Land not capable of being cultivated but suitable for grazing

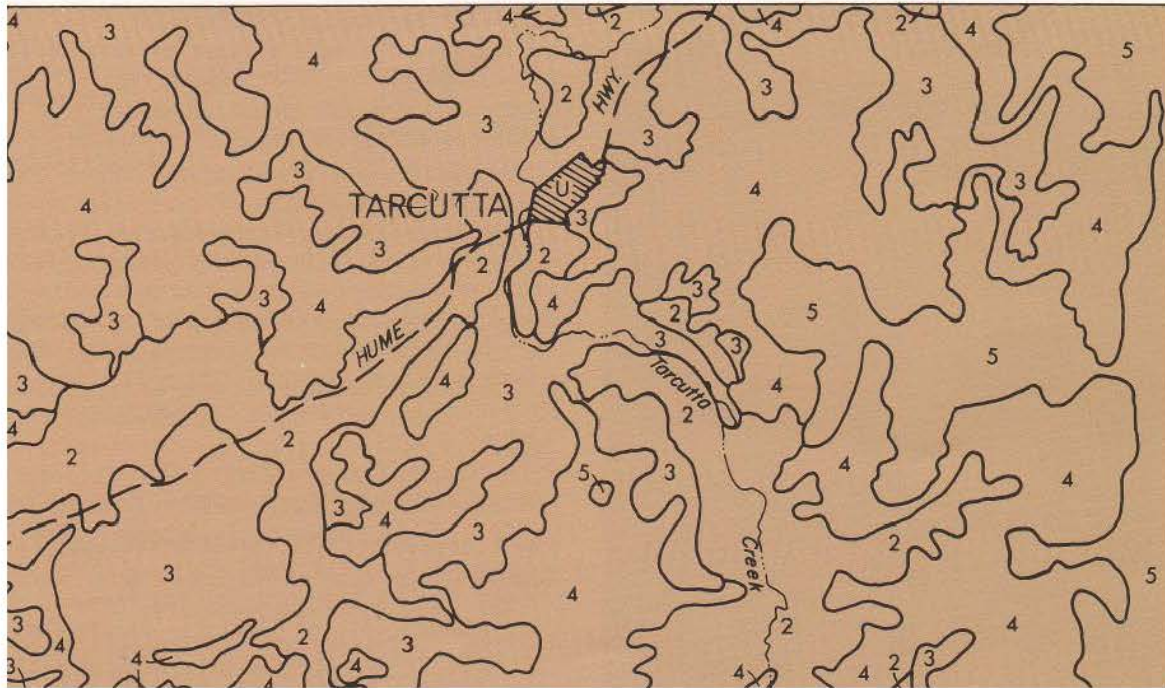
- Class VI.** Soil conservation practices including limitation of stock, broadcasting of seed and fertiliser, prevention of fire and destruction of vermin. This class may require some structural works.



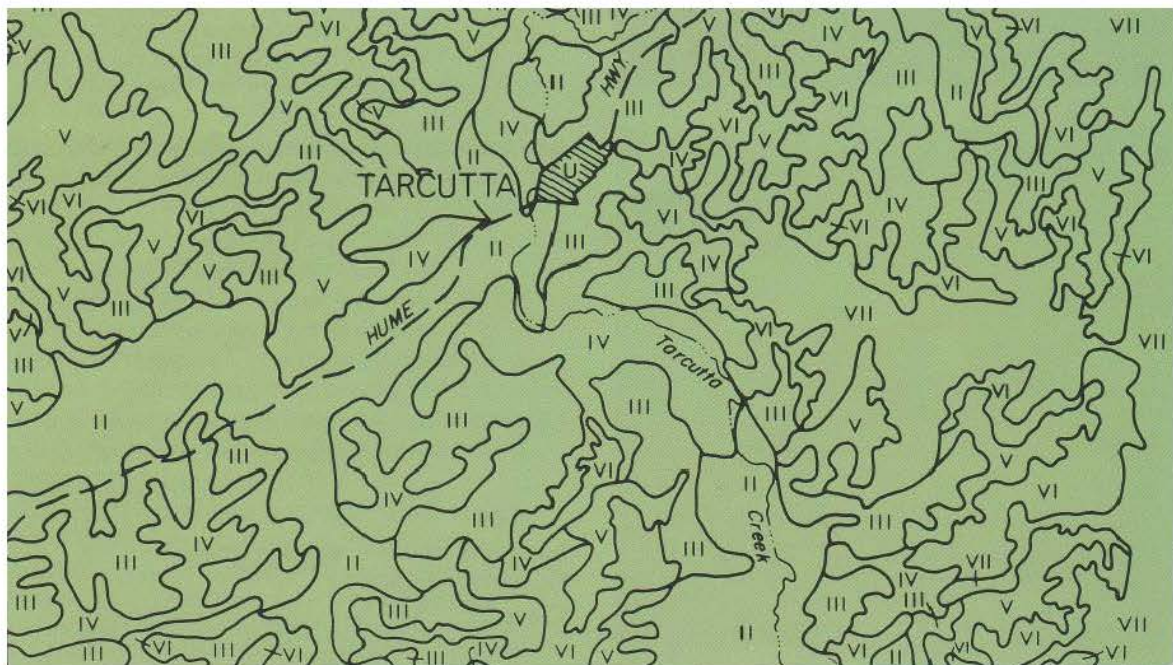
Potatoes growing on Krasnozem soils, Comboyne Plateau. Land Capability: Class III in foreground, Class VI in background. Agricultural Suitability: Class 2 in foreground, Class 4 in background.



Cultivation for pasture renovation, Orange District. Land Capability: Class IV foreground, V mid-ground and Class VI background. Agricultural Suitability: Class 3 foreground, Class 4 background.



Land suitability map (above) and land capability map (below) for part of the Tarcutta district.



Other lands

Class VII. Land best protected by green timber.

Class VIII. Cliffs, lakes or swamps and other lands incapable of sustaining agricultural or pastoral production.

The broad principle applied here is to grade the classes from the best to the worst. While

some exceptions may occur where grazing or forestry production are more profitable than cultivation, it is generally the case that the productivity of land follows the order used.

The land is not classified on its present use but on its potential for use when fully developed.

For rural planning purposes, the land capability classes can be combined into three



*Deep gulying in dispersible soils, Goulburn.
Agricultural Suitability: Class 4 (foreground) and Class 3
(background). Land Capability: Class V (foreground)
and Class IV (background).*

categories of potential land use:

- land suitable for cultivation (Classes I, II and III)
- land suitable for grazing (Classes IV, V and VI)
- land not suitable for agricultural or pastoral uses (Classes VII and VIII).

This system is used by the Soil Conservation Service in the preparation of its 1: 100 000 land capability maps of the Eastern and Central Divisions of N.S.W. These maps show the maximum inherent capability of land for agricultural purposes and the level of protection necessary to prevent or control soil erosion and other types of land degradation. In addition, the maps identify those land uses where the capability is altered by existing infrastructure developments or land use zonings. Urban areas, state forests, national parks, recreational reserves and lands affected by surface mining or quarrying activities are shown as separate features. Land uses which are unique to particular classes of land, but are not compatible with the land capability classification are identified by subscripts to the land capability class. Specific examples are lands used for banana and tobacco production.

2. The five class system of the Department of Agriculture: This system classifies land into AGRICULTURAL SUITABILITY CLASSES. It was developed jointly by the Department of Agriculture and the Soil Conservation Service for the Rural Land Evaluation Manual (Department of Environment and Planning, 1981). It provides a ranking of lands according to their productivity for a wide range of agricultural activities. It also aims to determine the potential for crop growth within certain limits.

The classification is based upon the effects of climate, topography and soil characteristics, the cultural and physical requirements for various crops and pastures, and existing socioeconomic factors including local infrastructure and geographic location, which combine to determine the productive potential of the land and determine its capacity to produce crops, pastures and livestock.

The agricultural suitability classification is as follows:

Class 1 Arable land suitable for intensive cultivation where constraints to sustained high levels of agricultural production are minor or absent.

Class 2 Arable land suitable for regular cultivation for crops but not suited to continuous cultivation. It has a moderate to high suitability for agriculture but edaphic (soil factors) or

environmental constraints reduce the overall level of production and may limit the cropping phase to a rotation with sown pastures.

Class 3

Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with pasture. The overall level of production is moderate as a result of edaphic or environmental constraints. Erosion hazard or soil structural breakdown limit the frequency of ground disturbance, and conservation or drainage works may be required.

Class 4

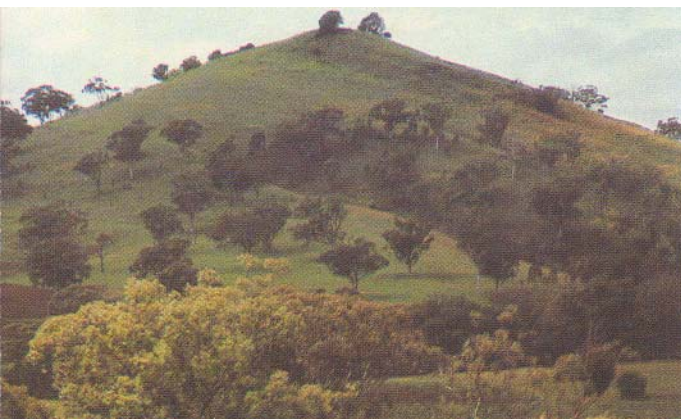
Land suitable for grazing but not for cultivation. Agriculture is based on native pastures or improved pastures established using minimum tillage techniques. Production may be high seasonally but the overall level of production is low as a result of a number of major constraints, both environmental and edaphic.

Class 5

Land unsuitable for agriculture or at best suited only to light grazing. Agricultural production is very low or zero as a result of severe constraints, including economic factors, which preclude improvement.

This classification is suited to general application in the Eastern Division and that part of the Central Division where the mean annual rainfall exceeds about 450 mm.

Grazing land near Dungowan, Peel River catchment. Land Capability: Class IV foreground and lower slopes, Class VI upper slopes. Agricultural Suitability: Class 3 foreground and lower slopes, Class 4 upper slopes.



Steep, rocky slopes with shallow soils have minimal grazing potential. Agricultural Suitability: Class 5. Land Capability: Class VIII.

The result is to produce three broad categories of land use potential:

- Highly productive lands suited to both row and field crops (Classes 1 and 2).
- Moderately productive lands suited to improved pasture and to cropping within a pasture rotation (Class 3).
- Marginal lands not suitable for cultivation and with low to very low productivity for grazing (Classes 4 and 5). In addition, a "speciality crop" class is recognised where an area is particularly suited to a single crop or very narrow range of crops, but not to other crops.

Summary

The broad groupings of land use potential derived from both classifications show certain similarities. However, any specific comparison between the two systems was never intended and should not be attempted since such an exercise fails to recognise the original purpose for establishing both classification systems. The Department of Agriculture's system places additional emphasis on socio-economic and productivity factors, whilst the system used by the Soil Conservation Service emphasises the need for the protection of land from land degradation.