Regional Land Suitability Frameworks for Queensland

Great state. Great opportunity.

Queensland Government

This publication has been compiled by officers of the Department of Natural Resources and Mines and the Department of Science, Information Technology, Innovation and the Arts.

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1 Introduction

Since 1990, the “Guidelines for agricultural land evaluation in Queensland” (Land Resources Branch Staff 1990) have provided the procedures for agricultural land evaluation in Queensland. Data collected through land resource survey and land evaluation is used for a variety of purposes, including regional planning, environmental assessments for mining, gas and industrial projects, agricultural expansion and compliance with government regulation.

Numerous land resource surveys and land evaluation projects have been undertaken across the State since 1990, and the Guidelines have been used to establish the suitability framework for each study area. The suitability framework provides the detail for assessing which crops are suitable for individual mapped areas of land or soil. The original version of the Guidelines, and the numerous land resource survey and land evaluation project reports remains accessible from the library catalogue at the web site http://www.qld.gov.au/environment/land/soil/soil-data/reports/.

There have been many changes in technology, evaluation methods and land regulation since the publication of the 1990 Guidelines. Therefore, it was determined that an updated version of the guidelines was required to meet new challenges and evolving methodologies/technologies associated with agricultural land evaluation in Queensland. To accompany the second edition of the guidelines[1], land suitability frameworks were prepared for various regional areas of Queensland, drawing on information contained in projects within each region. A land suitability framework for each regional cropping area in Queensland is included in this document.

The regional areas assessed in these land suitability frameworks are listed in Table 1.

Table 1. Regional areas assessed in land suitability frameworks

Region	Sub region
South East Queensland	Coastal SEQ Inland SEQ Coastal Burnett Inland Burnett
Southern Queensland	Eastern Downs Western Downs, Balonne and Maranoa Granite Belt (to be developed)
Central Queensland	Central Queensland Coast Mackay and Whitsunday Inland Fitzroy and southern Burdekin
North Queensland	Bowen and lower Burdekin Wet Tropics and Tablelands Einasleigh Uplands area Gulf Plains

1.1 Land suitability class definitions

Five land suitability classes are defined for use in Queensland, with land suitability decreasing progressively from Class 1 to Class 5. These classes are used to describe an area of land in terms of suitability for a particular land use which allows optimum, sustainable production with current technology while minimising degradation to the land resource in the short, medium or long-term.

Land is considered less suitable as the severity of limitations for a land use increases, reflecting either:

- reduced potential for production and/or ;
- increased inputs required to achieve an acceptable level of production and/or ;
- increased inputs required to prepare the land for successful production and/or ;

[1] Guidelines for Agricultural Land Evaluation in Queensland, Second edition (2013),Queensland Government, Brisbane.

- increased inputs required to prevent land degradation

The five land suitability classes are defined below:

Class 1 **Suitable land with negligible limitations.** This is highly productive land requiring only simple management practices to maintain economic production.

Class 2 **Suitable land with minor limitations** which either reduce production or require more than the simple management practices of class 1 land to maintain economic production.

Class 3 **Suitable land with moderate limitations** which either further lower production or require more than those management practices of class 2 land to maintain economic production.

Class 4 **Marginal land**, which is presently considered unsuitable due to severe limitations. The long term significance of these limitations on the proposed land use is unknown or not quantified. The use of this land is dependent upon undertaking additional studies to determine whether the effect of the limitation(s) can be reduced to achieve sustained economic production.

Class 5 **Unsuitable land** with extreme limitations that preclude its use.

The first three classes of land are considered *suitable* for the specified land use, as the benefits from using the land for that land use in the long term should outweigh the inputs required to initiate and maintain production. Decreasing land suitability within a region often reflects the need for increased inputs rather than decreased potential production. There are many occasions where there is no land assessed as Class 1 (or other suitable classes) in a study area for a particular land use.

Class 4 land is regarded as marginal land, *currently unsuitable* for a particular land use due to the severity of one or a number of limiting factors. It is doubtful that the inputs required to achieve and maintain production outweigh the benefits in the long-term. This land may possibly be upgraded to a suitable class if future agronomic, soil or engineering studies show it to be economically viable and environmentally sustainable. Changes in climate, economic conditions, or technology may alter the level of management inputs required to achieve satisfactory productivity.

Class 5 land is regarded as *unsuitable* for a particular land use because it has limitations that singularly or in aggregate are so severe that the benefits would not justify the inputs required to initiate and maintain sustainable production in the long term. It would require a major change in economics, technology or management expertise before the land could be considered suitable for that land use. However, some land assessed as class 5, such as escarpments, will always remain unsuitable for agriculture.

1.2 How Land Suitability Frameworks are developed and used

Appropriate ***land uses*** have been selected for each regional study area, by reviewing existing land evaluation studies and through consultation with appropriate professionals, landholders and organisations. A land use is the combination of a *crop* and its *management options* (e.g. rainfed sorghum, furrow irrigated cotton, drip irrigated grapes etc.). General ***land use requirements*** for plant growth, machinery use, land preparation, prevention of soil erosion, etc. have been defined in the guidelines (e.g. rockfree soil, adequate soil water, minimum soil loss due to erosion). ***Limitations*** are soil or land attributes that impede the productive growth of crops or pastures. Limitations may be expressed as land use requirements stated in a negative sense (e.g. rockiness, wetness) and are the main focus of the land suitability process.

The ***soil and land attributes*** that are selected to assess each limitation (e.g. abundance and size of coarse fragments for rockiness, site drainage class for wetness) are also termed diagnostic attributes. ***Limitation categories*** are then selected to cover the range of values for each diagnostic attribute for each limitation that will apply across all land uses. The limitation categories are ranked as ***suitability subclasses*** on a scale 1 to 5, from most suitable to unsuitable, *for each limitation for each land use*.

The land suitability framework is essentially a matrix for each limitation, showing the suitability subclass for each land use against each limitation category.

An ***overall suitability class*** for each land use is then determined for each mapping unit (unique map area, UMA) on a scale of 1 to 5. This is usually determined by the most severe suitability subclass that applies in that particular UMA (Table 2). If a particular land use has a suitability subclass of 4 (marginal) for several different limitations, it may be deemed appropriate to downgrade the suitability class in that particular UMA to 5 (unsuitable).

Table 2. Example of determining overall suitability class for four land uses in one particular UMA

UMA 121	**Limitation categories for three different limitations**	**Suitability subclasses for four land uses**			
100% Red Kandosol on 10% slope		Sugarcane	Peanuts	Banana (irrig)	Rambutan (irrig)
	Soil water availability-4	3	4	2	2
	Rockiness-3	3	5	2	1
	Wetness-3	3	3	3	2
	Overall suitability class for the UMA	**3**	**5**	**3**	**2**

2 Suitability framework for the Coastal South-East Queensland area

The following 17 limitations were used to assess land suitability in the Coastal South-East Queensland region.

Land use requirements	Limitations	Soil and land use attributes used to assess each limitation
Frost-free	**Frost (Cf)**	Frequency of damaging frosts, landform, landscape position.
Adequate rainfall (non-irrigated crops only)	**Precipitation (Cp)**	Amount and distribution of rainfall, evaporation, crop modelling.
Avoid environmental harm from acid drainage water from actual acidity	**Acid drainage water hazard actual (Da)**	Depth to actual existing acidity (pH<4.0), soil texture.
Avoid environmental harm from acid drainage water from potential acidity	**Acid drainage water hazard potential (Dp)**	Depth to potential acidity, depth to oxidisable sulfur above %S threshold, soil texture.
Minimise soil loss from erosion	**Water erosion (E)**	Soil susceptibility to erosion, slope, soil stability group, erodibility factor (K factor).
Absence of damaging floods	**Flooding (F)**	Frequency of flooding (recurrence interval – ARI).
Adequate water supply	**Soil water availability (M)**	PAWC
Adequate nutrients	**Nutrient deficiency (Nd)**	Level of Phosphorous (P) in top 0.3m of soils.
Low levels of toxic elements	**Element toxicity (Nt)**	pH at the soil surface (<0.3m) and pH at 0.6m depth.
Adequate soil depth for physical support	**Soil depth (Pd)**	Depth to C horizon, hard rock or other impermeable layer.
Ease of seedbed preparation and plant establishment	**Soil surface condition (Ps)**	Surface (<0.3m) physical condition, texture, structure.
Rock-free	**Rockiness (R)**	Size and content (%) of coarse fragments, % rock outcrop.
Favourable levels of soluble salts	**Soil salinity (Sa)**	Saturated extract conductivity (dS/m ECse) of the top 0-0.1m of soil.
Level land surface	**Microrelief (Tm)**	Height of microrelief vertical interval.
Land surface of acceptable slope	**Topography (Ts)**	Slope (%)
Adequate soil aeration	**Wetness (W)**	Soil drainage and permeability, height of underground water table.
Adequate land area available for efficient production	**Landscape complexity (X)**	Minimum area of contiguous suitable soil available for crop production.

The following 44 land management options were considered in the compilation of the Coastal South-East Queensland land suitability framework:

Avocado	Maize (summer forage) – dryland/rain fed
Bamboo – dryland/rain fed	Mango – irrigated
Banana – irrigated and dryland/rain fed	Millet (summer forage) – dryland/rain fed
Blackbutt (plantation forestry) – dryland/rain fed	Pawpaw – irrigated
Capsicum (summer and winter) - irrigated	Passionfruit – irrigated
Caribbean Pine (plantation forestry) - dryland/ rain fed	Persimmon – irrigated
Choko – irrigated	Pineapple – dryland/rain fed
Citrus – irrigated	Sorghum (summer forage) – dryland/rain fed
Cucurbits (summer and winter) - irrigated	Soya Bean – dryland/rain fed
Custard Apple – irrigated	Spotted Gum (plantation forestry) – dryland/ rain fed
Dunn’s White Gum (plantation forestry) - dryland/ rain fed	Stone Fruit – irrigated
Flooded Gum (plantation forestry) – dryland/rain fed	Strawberry – irrigated
Ginger – (summer and winter) - irrigated	Sugarcane – irrigated and dryland/rain fed
Gympie Messmate (plantation forestry) – dryland/rain fed	Sweet Corn (summer and winter) – irrigated
Hemp – dryland/rain fed	Sweet Potato (summer and winter) – irrigated
Improved Pasture – dryland/rain fed	Tomato (summer and winter) – irrigated
Lychee – irrigated	Turf – irrigated
Macadamias – irrigated and dryland/rain fed	

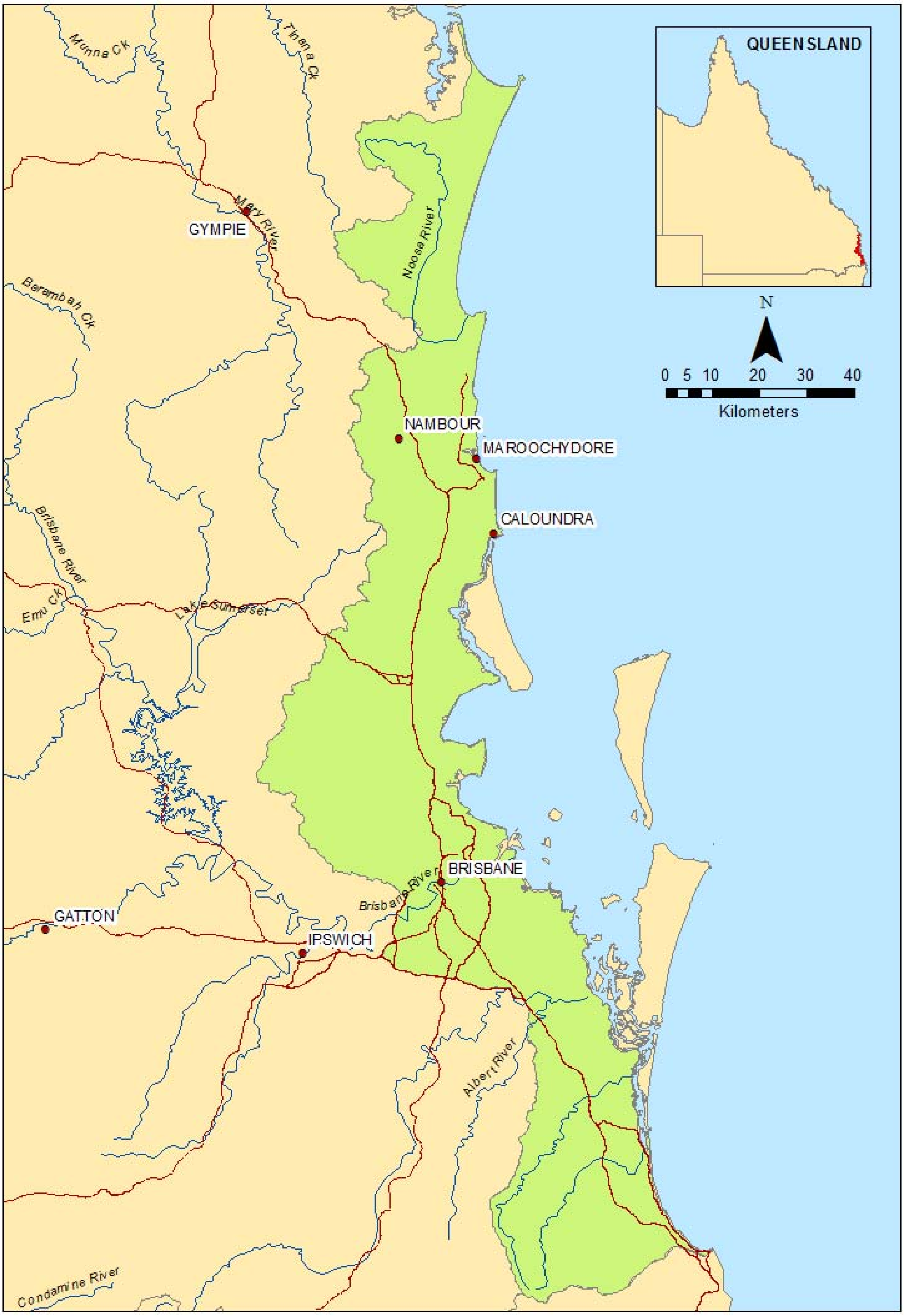

Figure 1. Area covered by the Coastal South East Queensland suitability framework

Frost (Cf)

Frosts may kill plants, suppress growth and reduce yield.

Limitation class determination
Crop tolerance and local experience were used to determine the impact of frosts.

Additional notes:

- Strawberries can tolerate regular moderate frosts but require night watering to avoid frost damage to flowers. This can lead to problems with excess wetness and a decline in fruit quality.
- Cucurbits, capsicums and tomatoes are highly susceptible to frost and careful management is required in frost prone areas to avoid all but occasional, very light frosts.

Cf – Climate - frost

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
		Suitability subclasses for various land management options							
1	Frost free or occasional light frost >-1°C (<3 events per year)	1	1	1	1	1	1	1	1
2	Regular light frosts >-1°C (= or > 3 events per year)	1	1	1	2	2	3	4	5
3	Regular moderate frosts -1 to -4°C (= or > 3 events per year)	1	2	2	3	4	4	5	5
4	Regular severe frosts < -4°C (= or > 3 events per year)	2	3	4	4	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
Dunn's white gum	Persimmon-irrigated-trickle	Turf-irrigated-spray	Sugarcane-dryland/rainfed	Citrus-irrigated-trickle	Caribbean pine	Avocado-irrigated-trickle	Banana-dryland/rainfed
Improved pasture-dryland/rainfed	Rose gum/flooded gum		Sugarcane-irrigated-spray		Choko-irrigated-spray	Blackbutt	Banana-irrigated-trickle
					Ginger-winter-spray	Capsicum-winter-spray	Cucurbit-winter-spray
					Gympie messmate	Custard apple-irrigated-trickle	Papaw-irrigated-trickle
					Strawberry-irrigated-spray	Lemon-scented gum/spotted gum	Tomato-winter-spray
					Sweet corn-winter-spray	Lychee-irrigated-trickle	
						Macadamia nuts-dryland/rainfed	
						Macadamia nuts-irrigated-trickle	
						Mango-irrigated-trickle	
						Passionfruit-irrigated-trickle	
						Pineapple-dryland/rainfed	
						Stone fruit-irrigated-trickle	
						Sweet potato-winter-spray	

Precipitation (Cp)

Rainfall amount and distribution largely control cropping and grazing productivity, and particularly cropping success in rain fed (dryland) situations.

Limitation class determination
Local experience and QDPI&F/Industry recommendations were used to determine crop yields and the success of achieving a harvestable product under rain fed conditions.

Additional notes:

- The Cp limitation only applies to crops that can be grown on a regular basis without supplementary irrigation. These include sugar cane, soybean, maize, sorghum and commercial plantation forestry (Blackbutt, Dunn’s white gum, Flooded gum, Gympie messmate and Spotted gum).
- Where annual rainfall has not been sufficient, sugar cane can be held-over for a second year if required (i.e. two year crop) to achieve a tonnage that is economic to harvest.
- Pineapple can be grown in low rainfall areas but the need for timely rainfall at crucial stages in the crop cycle means that low rainfall areas are high risk.
- Yield of Dunn’s white gum decreases in summer dominant high rainfall areas (particularly where high temperatures are associated with high rainfall) due to disease problems.
- Cp limitation does not apply to irrigated crops.

Cp - Rainfall

Limitation		Suitability subclasses for various land management options								
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I
1	Mean annual rainfall > 1500mm	1	1	1	1	1	1	1	3	3
2	Mean annual rainfall > 1200 to 1500mm	1	1	1	2	2	3	3	2	2
3	Mean annual rainfall > 1000 to 1200mm	1	1	1	3	4	4	5	2	2
4	Mean annual rainfall > 850 to 1000mm	2	2	3	4	5	5	5	2	3
5	Mean annual rainfall < 850mm	2	3	4	5	5	5	5	2	4

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I
Bamboo-dryland/rainfed	Lemon-scented gum/spotted gum	Soybean-dryland/rainfed	Caribbean pine	Banana-dryland/rainfed	Sugarcane-dryland/rainfed	Blackbutt	Hemp-dryland/rainfed	Dunn's white gum
			Gympie messmate	Macadamia-dryland/rainfed		Rose /flooded gum		
	Millet-summer		Pineapple-dryland/rainfed					
	Sorghum-summer							
	Improved pasture-dryland/rainfed							
Maize-summer								

Acid drainage water hazard (Da and Dp)

Toxic quantities of acid, aluminium, iron and heavy metals may contaminate land and adjacent waterways when acid sulphate soils (ASS) are disturbed or drained which can reduce crop yields.

Limitation class determination
The depth to:

- PASS (soil material with pH >4 and oxidisable sulfur levels above the action criteria); or
- AASS (soil material with pH <4 and/or jarosite present); and
- the depth to which drainage is required for a particular land use

determined the potential for acid drainage water hazard.

Crops requiring a soil depth of 1.5 m to AASS/PASS are restricted to:
Avocadoes.

Crops requiring a soil depth of 1.0 m to AASS/PASS include:
Sweet corn, Maize, Sorghum, Choko, Citrus, Custard apple, Macadamia, Papaw, Stone-fruit, Mango, Lychee, Passionfruit, Persimmon, Gympie messmate, Blackbutt, Spotted gum, Flooded gum, Dunn's white gum and Caribbean pine.

Crops requiring a soil depth of 0.5 m to AASS/PASS include:
Capsicum, Cucurbits, Sweet potato, Tomato, Turf, Strawberry and improved pasture.

Da - Drainage water hazard, acid sulphate

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E
		Suitability subclasses for various land management options				
1	AASS (pH < or = 4) not present or present at depths > 3.0m	1	1	1	1	1
2	AASS present at depths between 2.0 and 3.0m	1	1	1	1	1
3	AASS present at depths between 1.0 and 2.0m	1	1	1	3	4
4	AASS present at depths between 0.5 and 1.0m	1	3	3	4	5
5	AASS present at depths < 0.5m	3	4	5	5	5

Group A	Group B	Group C	Group D	Group E
Bamboo-dryland/rainfed	Turf-irrigated-spray	Banana-irrigated-trickle	Citrus-irrigated-trickle	Avocado-irrigated-trickle
	Banana-dryland/rainfed		Stone fruit-irrigated-trickle	
	Capsicum-summer-spray		Blackbutt	
	Capsicum-winter-spray		Caribbean pine	
	Cucurbit-winter-spray		Choko-irrigated-spray	
	Cucurbit-summer-spray		Custard apple-irrigated-trickle	
	Ginger-summer-spray		Dunn's white gum	
	Ginger-winter-spray		Gympie messmate	
	Pineapple-dryland/rainfed		Hemp-dryland/rainfed	
	Soybean-dryland/rainfed		Lemon-scented gum/spotted gum	
	Strawberry-irrigated-spray		Lychee-irrigated-trickle	
	Sugarcane-dryland/rainfed		Macadamia nuts-dryland/rainfed	
	Sugarcane-irrigated-spray		Macadamia nuts-irrigated-trickle	
	Sweet potato-summer-spray		Maize-summer	
	Sweet potato-winter-spray		Mango-irrigated-trickle	
	Improved pasture-dryland/rainfed		Millet-summer	
	Tomato-summer-spray		Papaw-irrigated-trickle	
	Tomato-winter-spray		Passionfruit-irrigated-trickle	
			Persimmon-irrigated-trickle	
			Rose gum/flooded gum	
			Sorghum-summer	
			Sweet corn-summer-spray	
			Sweet corn-winter-spray	

Dp - Acid drainage hazard, potential

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
1	PASS (%S > action threshold) not present or present at depths > 3.0m	1	1	1	1
2	PASS present at depths between 2.0 and 30.m	1	1	1	1
3	PASS present at depths between 1.0 and 2.0m	1	1	3	4
4	PASS present at depths between 0.5 and 1.0m	1	3	4	5
5	PASS present at depths < 0.5m	3	5	5	5

Group A	Group B	Group C	Group D
Bamboo-dryland/rainfed	Turf-irrigated-spray	Citrus-irrigated-trickle	Avocado-irrigated-trickle
	Banana-dryland/rainfed	Stone fruit-irrigated-trickle	
	Banana-irrigated-trickle	Blackbutt	
	Capsicum-summer-spray	Caribbean pine	
	Capsicum-winter-spray	Choko-irrigated-spray	
	Cucurbit-winter-spray	Custard apple-irrigated-trickle	
	Cucurbit-summer-spray	Dunn's white gum	
	Ginger-summer-spray	Gympie messmate	
	Ginger-winter-spray	Hemp-dryland/rainfed	
	Pineapple-dryland/rainfed	Lemon-scented gum/spotted gum	
	Soybean-dryland/rainfed	Lychee-irrigated-trickle	
	Strawberry-irrigated-spray	Macadamia nuts-dryland/rainfed	
	Sugarcane-dryland/rainfed	Macadamia nuts-irrigated-trickle	
	Sugarcane-irrigated-spray	Maize-summer	
	Sweet potato-summer-spray	Mango-irrigated-trickle	
	Sweet potato-winter-spray	Millet-summer	
	Improved pasture-dryland/rainfed	Papaw-irrigated-trickle	
	Tomato-summer-spray	Passionfruit-irrigated-trickle	
	Tomato-winter-spray	Persimmon-irrigated-trickle	
		Rose gum/flooded gum	
		Sorghum-summer	
		Sweet corn-summer-spray	
		Sweet corn-winter-spray	

Water erosion (E)

Land degradation and long term productivity decline will occur on unprotected arable land due to excessive soil erosion.

Qualitative features have been linked to K factor ranges generated by USLE. Four (4) soil stability categories from very stable to very unstable were recognised.

Very stable soils: K factor
Strongly structured surface soils high in free iron (e.g. Ferrosols). Profiles are highly permeable throughout.

Stable soils: K factor <0.04
Friable surface soils with moderate to strong surface structure (granular or blocky); or surface soils with a soft, firm or weakly hard setting, medium to coarse sandy surface (sands, sandy loam, sandy clay loam); or surface soils very high in organic matter. Profiles are moderately to highly permeable throughout.

Unstable soils: K factor 0.04–0.06
Hard setting surface soils with weak (granular, blocky) to massive surface structure and fine sandy textures (fine sandy clay loam to fine sandy light clay). Surface horizons are moderately to slowly permeable. Slowly permeable, sodic subsoils are often developed within 1.0m of the surface in lower landscape positions.

Very unstable soils: K factor >0.06
Hard setting surface soils with weak (granular, blocky) to massive surface structure and silty textures (silty loam to silty light clay). Surface horizons are low in organic matter, slowly permeable and typically overlie slowly to very slowly permeable, sodic subsoils within 0.5 m of the surface.

Limitation class determination
Soil stability classes combined with appropriate slope classes were used to derive the limitation categories for water erosion.

Additional notes:

- Perennial tree and vine orchards typically practice grass/cover crop sward management and represent relatively stable land uses (i.e. suitable on slopes between >5–20 % depending on soil type).
- Papaws and bananas, which are replanted every 6–7 years, were not included with the perennial tree and vine crops. Typically, they require irregular cultivation, are planted in spring and are normally mounded on the contour. They were grouped with macadamia and choko because of the predominance of bare surface soil when compared with sward based systems, even in a mature orchard.
- Crops with extended crop cycles, such as sugar cane and pineapples are only cultivated every 2–4 years, and once established, have good levels of crop cover and produce significant crop residues. While the potential for erosion is greater with these land uses than for tree and vine crops, it was considered less critical than for annual field and horticultural small crops. Although pineapples are only planted every 3 years, soils may be prone to significant erosion due to strict weed control practises that expose bare surface soil. Where pineapples are mounded on the contour with run-off control structures in place, erosion risk is reduced.

- Turf is regularly stripped back to a completely bare surface but with a significant root mass and without regular tillage. Rilling and deposition following erosion events is a potential problem because uneven surface contours can present problems with harvesting. Standard management practices such as topdressing and levelling would largely overcome such erosion effects.
- Most field crops/horticultural crops require seedbed preparation on an annual basis. Tillage during late summer to prepare for the winter copping period leaves paddocks exposed and subject to potentially erosive rainfall events through the autumn months. Tillage is usually aggressive, surface soils very loose and paddocks laid out in straight rows. Land uses in this category were considered most at risk from erosion and slope limits are therefore more robust.
- Slope limits described for forestry situations assumed land is already cleared and pastured and broad-scale clearing is not required. These limits assumed minimal soil disturbance is practised during land preparation for planting. Lower limits would apply were significant soil disturbance involved.

E - Water erosion

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K
		Suitability subclasses for various land management options										
E0	Very stable soils with 0% slope.	1	1	1	1	1	1	1	1	1	1	1
E1	Very stable soils with 0-2% slope.	1	1	1	1	1	1	1	1	1	1	1
E2	Very stable soils with 2-5% slope.	1	1	1	1	1	1	2	2	2	2	2
E3	Very stable soils with 5-8% slope.	1	1	1	1	2	2	2	2	3	3	3
E4	Very stable soils with 8-12% slope.	1	1	1	2	3	3	3	4	4	4	4
E5	Very stable soils with 12-15% slope.	1	1	2	3	3	4	4	5	5	5	5
E6	Very stable soils with 15-20% slope.	2	2	3	3	4	4	5	5	5	5	5
E7	Very stable soils with 20-30% slope.	3	4	4	4	5	5	5	5	5	5	5
E8	Very stable soils with >30% slope.	5	5	5	5	5	5	5	5	5	5	5
A0	Stable soils (K < or = 0.04) with 0% slope.	1	1	1	1	1	1	1	1	1	1	1
A1	Stable soils (K < or = 0.04) with 0-2% slope.	1	1	1	1	1	1	1	2	2	2	2
A2	Stable soils (K < or = 0.04) with 2-5% slope.	1	1	1	1	2	2	2	3	2	3	3
A3	Stable soils (K < or = 0.04) with 5-8% slope.	1	1	1	2	3	3	3	4	3	3	4
A4	Stable soils (K < or = 0.04) with 8-12% slope.	1	1	2	3	4	4	4	5	4	4	5
A5	Stable soils (K < or = 0.04) with 12-15% slope.	2	2	3	3	5	5	5	5	5	5	5
A6	Stable soils (K < or = 0.04) with 15-20% slope.	3	3	3	4	5	5	5	5	5	5	5
A7	Stable soils (K < or = 0.04) with >20% slope.	4	4	4	5	5	5	5	5	5	5	5
B0	Unstable soils (K > 0.04 and K < or = 0.06) with 0% slope.	1	1	1	1	1	1	1	1	1	1	1
B1	Unstable soils (K > 0.04 and K < or = 0.06) with 0-1% slope.	1	1	1	1	1	1	1	2	2	2	2
B2	Unstable soils (K > 0.04 and K < or = 0.06) with 1-3% slope.	1	1	1	1	2	2	2	3	3	3	3
B3	Unstable soils (K > 0.04 and K < or = 0.06) with 3-5% slope.	1	1	1	2	3	3	3	4	4	4	4
B4	Unstable soils (K > 0.04 and K < or = 0.06) with 5-8% slope.	1	1	2	3	4	4	4	5	5	5	5
B5	Unstable soils (K > 0.04 and K < or = 0.06) with 8-12% slope.	2	2	3	3	5	5	5	5	5	5	5
B6	Unstable soils (K > 0.04 and K < or = 0.06) with >12% slope.	4	4	4	4	5	5	5	5	5	5	5
V0	Very unstable soils (K > 0.06) with 0% slope.	1	1	1	1	1	1	1	2	2	2	2
V1	Very unstable soils (K > 0.06) with 0-1% slope.	1	1	1	1	2	2	2	3	3	3	3
V2	Very unstable soils (K > 0.06) with 1-3% slope.	1	1	1	2	3	3	3	4	4	4	4
V3	Very unstable soils (K > 0.06) with 3-5% slope.	1	1	2	3	4	4	4	5	5	5	5

V4	Very unstable soils (K > 0.06) with 5-8% slope.	2	2	3	4	5	5	5	5	5	5	5
V5	Very unstable soils (K > 0.06) with 8-12% slope.	3	3	4	5	5	5	5	5	5	5	5
V6	Very unstable soils (K > 0.06) with >12% slope.	4	4	5	5	5	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K
Blackbutt	Bamboo-dryland/rainfed	Citrus-irrigated-trickle	Banana-dryland/rainfed	Sugarcane-dryland/rainfed	Ginger-summer-spray	Turf-irrigated-spray	Hemp-dryland/rainfed	Sweet potato-winter-spray	Sweet potato-summer-spray	Capsicum-winter-spray
Dunn's white gum		Stone fruit-irrigated-trickle	Banana-irrigated-trickle	Sugarcane-irrigated-spray	Ginger-winter-spray	Choko-irrigated-spray				Capsicum-summer-spray
Gympie messmate		Avocado-irrigated-trickle	Macadamia nuts-irrigated-trickle			Pineapple-dryland/rainfed				Cucurbit-winter-spray
Lemon-scented gum/spotted gum		Caribbean pine	Macadamia nuts-dryland/rainfed			Strawberry-irrigated-spray				Cucurbit-summer-spray
Rose gum/flooded gum		Custard apple-irrigated-trickle	Papaw-irrigated-trickle							Maize-summer
		Lychee-irrigated-trickle								Millet-summer
		Mango-irrigated-trickle								Sorghum-summer
		Passionfruit-irrigated-trickle								Soybean-dryland/rainfed
		Persimmon-irrigated-trickle								Sweet corn-summer-spray
		Improved pasture-dryland/rainfed								Sweet corn-winter-spray
										Tomato-summer-spray
										Tomato-winter-spray

Flooding (F)

Flood events typically involve inundation from overbank stream flows. Effects of flooding include yield reduction or plant death. Other effects include physical removal of or damage to the crop by flowing water, floodplain erosion and damage to infrastructure such as irrigation equipment.

Limitation class determination

- Consultation with local authorities, state agencies, community groups and local landholders.
- Published flood maps and flood modelling outputs.

Additional notes:

- Sugar cane and many other crops are commonly grown on low-lying areas, despite regular flooding. In such cases, some degree of crop tolerance means the effects of flooding do not detract from the intrinsic value of the land.
- Flooding was not considered a limitation for winter grown horticultural small crops because the growing season is relatively short and can be timed to avoid most seasonal flooding.
- Some tree crops (e.g. citrus, lychee, and mango) tolerate inundation for periods of about 1 day. This assumes low velocity floodwaters, relatively low silt loads, reasonable water temperatures and rapid internal soil drainage once floodwaters recede.
- While loss of trees due to flooding represents a severe financial loss, most orchard enterprises work towards a return on their investment after about 10 years. Floods less frequent than 1 in 10 years (i.e. 1:20 to 1:50 years or less frequent) are statistically beyond the productive life of the trees and areas subject to such floods were classed as marginal for production rather than unsuitable.
- Pineapples are very sensitive to flooding and suffer significant fruit damage resulting in financial loss following an event. However, losses in pineapples are less significant than those suffered through tree losses in orchards because planting occurs every few years and land can be brought back into production relatively quickly. As such, flood events less frequent than 1 in 10 years were considered borderline class 3/4 for pineapples.

F - Flooding

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
		Suitability subclasses for various land management options									
0	No flooding.	1	1	1	1	1	1	1	1	1	1
1	Flooding < 1 in 10 years (about 1 in 30 to 1 in 50 years).	1	1	1	1	1	1	2	3	4	5
2	Flooding occurs 1 in 2 to 1 in 10 years (about 1 in 5 years).	1	1	1	2	2	3	4	5	5	5
3	Annual flooding (about 1 in 1 to 1 in 2 years).	1	2	3	3	4	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
Bamboo-dryland/rainfed	Capsicum-winter-spray	Turf-irrigated-spray	Maize-summer	Banana-dryland/rainfed	Capsicum-summer-spray	Ginger-summer-spray	Citrus-irrigated-trickle	Stone fruit-irrigated-trickle	Avocado-irrigated-trickle
	Cucurbit-winter-spray		Millet-summer	Banana-irrigated-trickle	Caribbean pine	Ginger-winter-spray	Choko-irrigated-spray	Custard apple-irrigated-trickle	
	Sweet corn-winter-spray		Sorghum-summer	Blackbutt	Cucurbit-summer-spray	Hemp-dryland/rainfed	Lychee-irrigated-trickle	Macadamia nuts-dryland/rainfed	
	Sweet potato-winter-spray		Sugarcane-dryland/rainfed	Dunn's white gum	Strawberry-irrigated-spray		Mango-irrigated-trickle	Macadamia nuts-irrigated-trickle	
	Improved pasture-dryland/rainfed		Sugarcane-irrigated-spray	Gympie messmate	Sweet corn-summer-spray		Papaw-irrigated-trickle		
	Tomato-winter-spray			Lemon-scented gum/spotted gum	Sweet potato-summer-spray		Passionfruit-irrigated-trickle		
				Rose gum/flooded gum	Tomato-summer-spray		Persimmon-irrigated-trickle		
				Soybean-dryland/rainfed			Pineapple-dryland/rainfed		

Soil water availability (M)

Plant yield can be severely affected by periods of water stress, particularly during critical growth periods.

Limitation class determination
PAWC was used to determine soil water availability. PAWC is less critical for irrigated crops than for rain fed crops and in irrigated situations is used largely to estimate the required irrigation frequency.

Additional notes:
- All crops were considered irrigated except where indicated as rain fed. Forestry species and improved/sown pastures are rain fed.
- In areas receiving >1200 mm of annual rainfall, macadamias and bananas may be grown without supplementary irrigation but only on soils with a high PAWC (see Cp limitation).
- PAWC was predicted to the effective rooting depth (ERD). This is the depth to any impenetrable or impermeable layers (as defined for the Pd limitation). Native hardwood eucalypt species however have the ability to penetrate weathered/fractured rock and many impermeable layers and the PAWC boundary between suitable and marginal/unsuitable classes has been relaxed accordingly (when compared with cropping).

M – Soil water availability

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K
		Suitability subclasses for various land management options										
1	>150mm PAWC.	1	1	1	1	1	1	1	1	1	1	1
2	125-150mm PAWC.	1	1	1	1	1	1	1	1	1	2	2
3	100-125mm PAWC.	1	1	1	1	2	2	2	2	2	2	2
4	75-100mm PAWC.	1	1	2	2	2	2	3	3	3	2	2
5	50-75mm PAWC.	1	2	3	3	3	5	3	4	5	2	3
6	<50mm PAWC.	2	3	4	5	5	5	3	5	5	3	4

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K
Banana-irrigated-trickle	Caribbean pine	Blackbutt	Pineapple-dryland/rainfed	Bamboo-dryland/ rainfed	Hemp-dryland/ rainfed	Avocado-irrigated-trickle	Maize-summer	Banana-dryland/ rainfed	Choko-irrigated-spray	Turf-irrigated-spray
Capsicum-summer-spray	Lemon-scented gum/spotted gum	Dunn's white gum	Sugarcane-irrigated-spray				Millet-summer	Macadamia nuts-dryland/ rainfed	Ginger-summer-spray	
Capsicum-winter-spray		Gympie messmate	Improved pasture-dryland/rainfed					Soybean-dryland/ rainfed	Sweet corn-summer-spray	
Citrus-irrigated-trickle		gum/flooded gum						Sugarcane-dryland/ rainfed	Sweet potato-summer-spray	
Cucurbit-winter-spray		summer								
Cucurbit-summer-spray										
Custard apple-irrigated-trickle	Rose									
Ginger-winter-spray										
Lychee-irrigated-trickle										
Macadamia nuts-irrigated-trickle	Sorghum-									
Mango-irrigated-trickle										
Papaw-irrigated-trickle										
Passionfruit-irrigated-trickle										
Persimmon-irrigated-trickle										
Strawberry-irrigated-spray										
Stone fruit-irrigated-trickle										
Sweet corn-winter-spray										
Sweet potato-winter-spray										
Tomato-summer-spray										
Tomato-winter-spray										

Soil nutrient deficiency (Nd)

Reduced crop growth may be associated with nutrient deficiencies in many soils. Livestock production may also be affected as a result of reduced pasture yield and/or pasture quality and/or lowered nutrient intake in animals.

For coastal south-east Queensland it was determined that Phosphorus (P) is the only limiting nutrient that cannot easily be added in sufficient quantities to meet crop demands, therefore, Nd assessment was based on the level of P within the surface soil (0 to 0.3 m).

Limitation class determination
Nutrient deficient soils require additional P applications over and above standard management practices.

Additional notes:

- Because fertiliser use is considered a standard management practice associated with intensive cropping systems, nutrient deficiency is only recognised as a minor limitation.

Nd - Nutrient deficiency

Limitation		Suitability subclasses for various land management options		
Value	**Description**	**Group A**	**Group B**	**Group C**
1	Phosphorus (P) > 20ppm.	1	1	1
2	Phosphorus (P) 10-20ppm	2	2	2
3	Phosphorus (P) 5-10ppm.	2	2	3
4	Phosphorus (P) <5ppm.	2	3	4

Group A	Group A cont.	Group B	Group C
Citrus-irrigated-trickle	Maize-summer	Blackbutt	Bamboo-dryland/rainfed
Stone fruit-irrigated-trickle	Mango-irrigated-trickle	Caribbean pine	Improved pasture-dryland/rainfed
Turf-irrigated-spray	Millet-summer	Dunn's white gum	
Avocado-irrigated-trickle	Papaw-irrigated-trickle	Ginger-summer-spray	
Banana-dryland/rainfed	Passionfruit-irrigated-trickle	Gympie messmate	
Banana-irrigated-trickle	Persimmon-irrigated-trickle	Lemon-scented gum/spotted gum	
Capsicum-summer-spray	Pineapple-dryland/rainfed	Rose gum/flooded gum	
Capsicum-winter-spray	Sorghum-summer	Sugarcane-dryland/rainfed	
Choko-irrigated-spray	Soybean-dryland/rainfed	Sugarcane-irrigated-spray	
Cucurbit-winter-spray	Strawberry-irrigated-spray		
Cucurbit-summer-spray	Sweet corn-summer-spray		
Custard apple-irrigated-trickle	Sweet corn-winter-spray		
Ginger-winter-spray	Sweet potato-summer-spray		
Hemp-dryland/rainfed	Sweet potato-winter-spray		
Lychee-irrigated-trickle	Tomato-summer-spray		
Macadamia nuts-dryland/rainfed	Tomato-winter-spray		
Macadamia nuts-irrigated-trickle			

Element toxicity (Nt)

Reduced crop growth may be associated with the oversupply or toxicity (i.e. excessive levels) of some mineral nutrients, particularly where soil pH is very low. Livestock production may be also be affected under such conditions as a result of reduced pasture yield and/or pasture quality.

Limitation class determination
Field or laboratory pH data were assessed against published research relating low pH to crop tolerance and element toxicity.

Additional Notes:

- While high pH values (greater than 8.5) are not common in inland SEQ, where they exist, nutrient availability may be reduced.
- Forestry crops are commonly grown in soils with a surface pH of 5.5, with subsoil pH values of 4.5 to 5.

Nt - Nutrient toxicity

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
1	Surface soil (0-0.3m) pH >5.0.	1
2	Soil pH at 0.6m >5.0.	1
3	Surface soil (0-0.3m) pH <5.0.	3
4	Soil pH at 0.6m <5.0.	3

Group A		
Citrus-irrigated-trickle	Dunn's white gum	Pineapple-dryland/rainfed
Stone fruit-irrigated-trickle	Ginger-summer-spray	Rose gum/flooded gum
Turf-irrigated-spray	Ginger-winter-spray	Sorghum-summer
Avocado-irrigated-trickle	Gympie messmate	Soybean-dryland/rainfed
Bamboo-dryland/rainfed	Hemp-dryland/rainfed	Strawberry-irrigated-spray
Banana-dryland/rainfed	Lemon-scented gum/spotted gum	Sugarcane-dryland/rainfed
Banana-irrigated-trickle	Lychee-irrigated-trickle	Sugarcane-irrigated-spray
Blackbutt	Macadamia nuts-dryland/rainfed	Sweet corn-summer-spray
Capsicum-summer-spray	Macadamia nuts-irrigated-trickle	Sweet corn-winter-spray
Capsicum-winter-spray	Maize-summer	Sweet potato-summer-spray
Caribbean pine	Mango-irrigated-trickle	Sweet potato-winter-spray
Choko-irrigated-spray	Millet-summer	Improved pasture-dryland/rainfed
Cucurbit-winter-spray	Papaw-irrigated-trickle	Tomato-summer-spray
Cucurbit-summer-spray	Passionfruit-irrigated-trickle	Tomato-winter-spray
Custard apple-irrigated-trickle	Persimmon-irrigated-trickle	

Soil depth (Pd)

Shallow soils limit root proliferation and anchorage. Plants in shallow soils may lodge or become uprooted during strong winds.

Limitation class determination
Consultation with agronomic extension staff and local landholder experience.

Additional notes:
- Native hardwood eucalypt species have a rooting depth requirement >0.6m, but have the ability to penetrate weathered/fractured rock and many impermeable layers. Therefore, the 'suitable' soil depth limit to impermeable layers was decreased from 0.6m to 0.4m.
- Vine crops (e.g. choko, passionfruit) and some horticultural crops (e.g. tomatoes) are normally trellised and lodging due to shallow soil depth is not considered an issue. As such, these crops have been treated in the same way as shallow rooted crops of low height.
- Depth to acidic subsoil material, as a result of acid sulfate soil, is dealt with in other limitations (i.e. Da, Dp).

Pd - Soil depth

Limitation		Suitability subclasses for various land management options					
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
1	Effective soil depth >1.0m.	1	1	1	1	1	1
2	Effective soil depth 0.5-1.0m.	1	1	1	2	2	2
3	Effective soil depth 0.3-0.5m.	1	1	2	3	4	5
4	Effective soil depth <0.3m.	3	4	5	4	5	5

Group A	Group B	Group C	Group D	Group E	Group F
Improved pasture-dryland/rainfed	Turf-irrigated-spray	Hemp-dryland/rainfed	Blackbutt	Banana-dryland/rainfed	Avocado-irrigated-trickle
	Capsicum-summer-spray	Maize-summer	Caribbean pine	Banana-irrigated-trickle	Custard apple-irrigated-trickle
	Capsicum-winter-spray	Millet-summer	Gympie messmate	Citrus-irrigated-trickle	Lychee-irrigated-trickle
	Choko-irrigated-spray	Sorghum-summer	Lemon-scented gum/spotted gum	Dunn's white gum	Macadamia nuts-dryland/rainfed
	Cucurbit-winter-spray	Sugarcane-dryland/rainfed	Rose gum/flooded gum	Papaw-irrigated-trickle	Macadamia nuts-irrigated-trickle
	Cucurbit-summer-spray	Sugarcane-irrigated-spray		Persimmon-irrigated-trickle	Mango-irrigated-trickle
	Ginger-summer-spray	Sweet corn-summer-spray		Stone fruit-irrigated-trickle	
	Ginger-winter-spray	Sweet corn-winter-spray			
	Passionfruit-irrigated-trickle				
	Pineapple-dryland/rainfed				
	Soybean-dryland/rainfed				
	Strawberry-irrigated-spray				
	Sweet potato-summer-spray				
	Sweet potato-winter-spray				
	Tomato-summer-spray				
	Tomato-winter-spray				

Soil surface condition (Ps)

Problems with germination and seedling development during crop establishment are typically associated with adverse physical conditions in the surface soil, such as hard setting behaviour, coarse aggregates and crusting.

Limitation class determination
Plant tolerance limits and requirements in relation to germination were matched with soil properties and supported by agronomic experience.

Additional notes:

- Crops planted from seed (particularly small seeded grasses or pasture species) are most affected by this limitation.
- Horticultural crops such as tomatoes, capsicum and cucurbits, which are planted as seedlings, are less affected.
- Tree and vine crops, which are planted as large tree seedlings, and also crops planted using vegetative material (e.g. ginger, pineapple, sugar cane) are least affected.

Ps - Surface condition

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
		Suitability subclasses for various land management options					
0	No restrictions.	1	1	1	1	1	1
1	Hard setting soils with SL to CL surface textures and dry firm consistency.	1	1	1	2	2	2
2	Hard setting massive soils with FSL to CLFS surface textures and dry firm consistency.	1	2	2	3	3	3
3	Surface crusts present.	1	2	3	3	3	4
4	Large soil aggregate size on surface (>20mm)	4	2	3	4	5	4

Group A	Group B	Group C	Group D	Group E	Group F
Stone fruit-irrigated-trickle	Ginger-summer-spray	Turf-irrigated-spray	Soybean-dryland/rainfed	Millet-summer	Hemp-dryland/rainfed
	Ginger-winter-spray	Capsicum-summer-spray		Sorghum-summer	
	Pineapple-dryland/rainfed	Capsicum-winter-spray		Improved pasture-dryland/rainfed	
	Sugarcane-dryland/rainfed	Cucurbit-winter-spray			
	Sugarcane-irrigated-spray	Cucurbit-summer-spray			
	Sweet potato-summer-Spray	Maize-summer			
	Sweet potato-winter-spray	Strawberry-irrigated-spray			
		Sweet corn-summer-spray			
		Sweet corn-winter-spray			
		Tomato-summer-spray			
		Tomato-winter-spray			

Rockiness (R)

Coarse fragments (e.g. pebbles, gravel, cobbles, stones and boulders) and rock in the plough zone can damage and/or interfere with the efficient use of agricultural machinery. Surface gravel, stone and rock are particularly important and can interfere significantly with planting, cultivation and harvesting machinery used for root crops, macadamias, small crops, annual forage crops and sugar cane.

Limitation class determination
Consultation with landholders and machinery operators were used to establish accepted tolerances to rockiness.

Additional notes:

- Coarse fragments are particles greater than 2 mm that are not continuous with the underlying bedrock. Rock is defined as being continuous with the bedrock.
- Gravel and rock create serious problems for subsurface crops (ginger, sweet potato). These crops are subject to significant soil disturbance during harvest and face serious post-harvest issues if gravel and rock need to be separated from the crop. Severe problems also apply to turf; particularly the effect gravel or rock may have on subsurface cutting equipment. Gravel sized coarse fragments <60mm also create significant issues for macadamia crops during harvest. Problems arise because of the similarity in size between surface gravels and nuts on the ground following shaking. Larger stones and rock also make the ground surface uneven for harvesting equipment and for routine activities such as slashing. As such, the presence of significant surface coarse fragments in macadamias represents a similar limitation to that experienced by most root crops.
- Strawberries and other horticultural small crops have low harvest heights and require numerous machinery passes (e.g. Green manure, seedbed prep, fumigation, bedding up, plastic application, picking etc.). While they are severely affected by significant stone or rock, it is less critical than for root crops or macadamias.
- Pineapples require intensive but infrequent (only every 3 years) bed preparation prior to planting. Significant stone or rock can severely restrict this and cause excessive damage to machinery. However, fruit is handpicked.
- Ground preparation for sugar cane is less intensive than for pineapples and crop cycles are normally 4 years. Significant stone or rock can severely impede low harvest height however.
- Bananas require extensive land preparation for a medium term crop (every 6 – 7 years) and stone or rock can represent a significant limitation during cultivation and planting. As such, bananas are more sensitive to the presence of stone or rock than most tree crops, but less sensitive than sugarcane or pineapples.

R - Rockiness

Limitation		Suitability subclasses for various land management options								
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I
R0	No rock.	1	1	1	1	1	1	1	1	1
RF2	2-6mm (fine gravel) 2-10%.	1	1	1	1	1	1	1	1	3
RF3	2-6mm (fine gravel) 10-20%.	1	1	1	1	1	2	2	2	4
RF4	2-6mm (fine gravel) 20-50%.	1	1	1	2	2	3	3	3	5
RF5	2-6mm (fine gravel) >50%.	1	2	2	3	3	3	4	4	5
RM2	6-20mm (medium gravel) 2-10%.	1	1	1	1	1	1	1	3	3
RM3	6-20mm (medium gravel) 10-20%.	1	1	1	1	1	1	2	3	4
RM4	6-20mm (medium gravel) 20-50%.	1	1	1	2	2	2	3	4	5
RM5	6-20mm (medium gravel) >50%.	1	1	2	3	3	3	4	5	5
RG1	20-60mm (coarse gravel) <2%.	1	1	1	1	1	2	1	2	4
RG2	20-60mm (coarse gravel) 2-10%.	1	1	1	1	1	3	2	3	5
RG3	20-60mm (coarse gravel) 10-20%.	1	1	1	2	2	4	3	4	5
RG4	20-60mm (coarse gravel) 20-50%.	1	2	2	3	3	5	4	5	5
RG5	20-60mm (coarse gravel) >50%.	2	3	3	4	4	5	5	5	5
RC1	60-200mm (cobbles) <2%.	1	1	1	2	2	2	3	4	5
RC2	60-200mm (cobbles) 2-10%.	1	2	2	3	3	2	4	5	5
RC3	60-200mm (cobbles) 10-20%.	1	3	3	4	4	3	5	5	5
RC4	60-200mm (cobbles) 20-50%.	2	4	4	5	5	4	5	5	5
RC5	60-200mm (cobbles) >50%.	3	5	5	5	5	5	5	5	5
RS1	200-600mm (stones) <2%.	1	2	2	3	3	2	4	5	5
RS2	200-600mm (stones) 2-10%.	2	3	3	4	4	3	5	5	5
RS3	200-600mm (stones) 10-20%.	3	4	4	5	5	4	5	5	5
RS4	200-600mm (stones) 20-50%.	4	5	5	5	5	5	5	5	5
RS5	200-600mm (stones) >50%.	5	5	5	5	5	5	5	5	5
RO1	>600mm or rock outcrop (boulders) <2%.	2	3	3	1	4	3	5	5	5
RO2	>600mm or rock outcrop (boulders) 2-10%.	3	4	4	5	5	4	5	5	5
RO3	>600mm or rock outcrop (boulders) 10-20%.	4	5	5	5	5	5	5	5	5
RO4	>600mm or rock outcrop (boulders) 20-50%.	5	5	5	5	5	5	5	5	5
RO5	>600mm or rock outcrop (boulders) >50%.	5	5	5	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I
Bamboo-dryland/rainfed	Caribbean pine	Banana-dryland/rainfed	Sugarcane-dryland/rainfed	Maize-summer	Macadamia-dryland/rainfed	Cucurbit-winter-spray	Capsicum-summer-spray	Turf-irrigated-spray
Citrus-irrigated-trickle		Banana-irrigated-trickle		Millet-summer	Macadamia-irrigated-trickle	Cucurbit-summer-spray	Capsicum-winter-spray	
Stone fruit-irrigated-trickle		Choko-irrigated-spray		Sorghum-summer		Ginger-summer-spray	Strawberry-irrigated-spray	
Avocado-irrigated-trickle		Papaw-irrigated-trickle		Sugarcane-irrigated-spray		Ginger-winter-spray	Sweet potato-summer-spray	
Blackbutt		Pineapple-dryland/rainfed		Sweet corn-summer-spray		Hemp-dryland/rainfed	Sweet potato-winter-spray	
Custard apple-irrigated-trickle				Sweet corn-winter-spray		Soybean-dryland/rainfed	Tomato-summer-spray	
Dunn's white gum							Tomato-winter-spray	
Gympie messmate								
Lemon-scented gum/spotted gum								
Lychee-irrigated-trickle								
Mango-irrigated-trickle								
Passionfruit-irrigated-trickle								
Persimmon-irrigated-trickle								
Rose gum/flooded gum								
Improved pasture-dryland/rainfed								

Salinity (Sa)

High soluble salts within the root zone can limit water uptake, result in toxicity effects and restrict root development.

Limitation class determination
Subclass determination was based on surface (0-0.1m) salinity (ECse dS/m) combined with the productivity decrease guides in Table 46 of the Salinity Management Handbook (Salcon 1997). This assumes that surface salinity indicates root zone salinity. Sub-classes were assigned based on:

Limitation sub-class	**Predicted yield reduction as a result of root zone salinity**
Class 1	0 to 10% yield reduction
Class 2	10 to 20% yield reduction
Class 3	20 to 35% yield reduction
Class 4	35 to 50% yield reduction
Class 5	>50% yield reduction

Spatial representation of surface salinity data for south-east Queensland is available from the Queensland Department of Natural Resources and Mines or from http://www.qld.gov.au/environment/land/soil/salinity/

Sa - Salinity

Limitation		Suitability subclasses for various land management options											
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K	Group L
1	No salinity or salinity <2dS/m ECse.	1	1	1	1	1	1	1	1	1	1	2	2
2	Dominantly slightly saline (2-4 dS/m ECse).	1	1	2	2	2	2	3	3	3	4	3	4
3	Dominantly moderately saline (4-8 dS/m ECse).	2	3	3	3	4	5	4	4	5	5	5	5
4	Dominantly severely saline (>8 dS/m ECse).	4	4	4	5	5	5	4	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K	Group L
Sorghum-summer	Soybean-dryland/rainfed	Custard apple-irrigated-trickle	Sugarcane-dryland/rainfed	Stone fruit-irrigated-trickle	Sweet corn-summer-spray	Bamboo-dryland/rainfed	Caribbean pine	Choko-irrigated-spray	Banana-dryland/rainfed	Citrus-irrigated-trickle	Avocado-irrigated-trickle
		Macadamia nuts-dryland/rainfed	Sugarcane-irrigated-spray	Turf-irrigated-spray	Sweet corn-winter-spray		Dunn's white gum	Ginger-summer-spray	Banana-irrigated-trickle	Capsicum-summer-spray	Blackbutt
		Macadamia nuts-irrigated-trickle		Cucurbit-winter-spray	Tomato-summer-spray		Maize-summer	Ginger-winter-spray	Lychee-irrigated-trickle	Capsicum-winter-spray	Gympie messmate
		Millet-summer		Cucurbit-summer-spray	Tomato-winter-spray		Sweet potato-summer-spray		Papaw-irrigated-trickle		Hemp-dryland/rainfed
		Rose gum/flooded gum		Mango-irrigated-trickle			Sweet potato-winter-spray		Passionfruit-irrigated-trickle		Lemon-scented gum/spotted gum
		Improved pasture-dryland/rainfed		Persimmon-irrigated-trickle					Pineapple-dryland/rainfed		
									Strawberry-irrigated-spray		

Microrelief (Tm)

Microrelief such as melon holes, swamp hummock, rills and small gullies cause irregular and reduced crop productivity. This is mainly as a result of uneven water distribution (e.g. water ponding in depressions), irregular cultivation and impeded trafficability. Effects associated with the presence of microrelief such as temporary waterlogging and poor surface condition are covered in the wetness (W) and soil physical (Ps) limitations respectively.

The vertical interval (VI) of the microrelief typically dictates the amount of levelling required and/or the potential for reduced productivity. Therefore VI was used to determine the severity of the limitation.

Limitation class determination
Land resource surveys, consultation with agronomic extension staff and local landholder experience.

Tm - Microrelief

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
0	No microrelief.	1	1	1
1	Microrelief with a vertical interval <0.3m.	1	2	3
2	Microrelief with a vertical interval 0.3-0.5m.	2	3	4
3	Microrelief with a vertical interval >0.5m.	3	4	5

Group A	Group B	Group C	Group C cont.
Blackbutt	Turf-irrigated-spray	Citrus-irrigated-trickle	Macadamia nuts-dryland/rainfed
Caribbean pine	Maize-summer	Stone fruit-irrigated-trickle	Macadamia nuts-irrigated-trickle
Dunn's white gum	Millet-summer	Avocado-irrigated-trickle	Mango-irrigated-trickle
Gympie messmate	Sorghum-summer	Bamboo-dryland/rainfed	Papaw-irrigated-trickle
Lemon-scented gum/spotted gum	Sugarcane-dryland/rainfed	Banana-dryland/rainfed	Passionfruit-irrigated-trickle
Rose gum/flooded gum	Sugarcane-irrigated-spray	Banana-irrigated-trickle	Persimmon-irrigated-trickle
Improved pasture-dryland/rainfed		Capsicum-summer-spray	Pineapple-dryland/rainfed
		Capsicum-winter-spray	Soybean-dryland/rainfed
		Choko-irrigated-spray	Strawberry-irrigated-spray
		Cucurbit-winter-spray	Sweet corn-summer-spray
		Cucurbit-summer-spray	Sweet corn-winter-spray
		Custard apple-irrigated-trickle	Sweet potato-summer-spray
		Ginger-summer-spray	Sweet potato-winter-spray
		Ginger-winter-spray	Tomato-summer-spray
		Hemp-dryland/rainfed	Tomato-winter-spray
		Lychee-irrigated-trickle	

Topography (Ts)

The safety and/or efficiency of farm vehicle/machinery operation are affected by:

- steep gradients, specifically rolling and side-slip hazards; and
- erosion control layouts on land with significant variability in the degree and direction of slopes (e.g. complex slopes). It is particularly important with row crops where final layouts on such lands would necessitate impractical short rows and sharp curves.

Limitation class determination
Consultation with Workplace, Health and Safety guidelines and landholder experience were used to determine the upper slope limit for safe machinery operation over a range of land uses. Farmer tolerance to short row length and the inability of trailing implements to effectively negotiate curves with less than 30m radius were also considered.

Additional notes:

- Where tillage forms part of normal management within the crop cycle, a slope limit of 15% was recognised as the upper limit for general machinery use.
- However, where contour based or cross slope sward management is practised in horticultural situations (e.g. tree and vine orchards) slopes of 20% were considered manageable.
- In commercial hardwood timber production, where specialised techniques (e.g. hand planting and cable logging) are used in planting and harvesting operations, steeper slope limits up to 35–40% are considered workable.
- Where spraying and harvesting operations in horticultural tree and vine crops can be carried out directly up and down slopes, a maximum slope limit of 25% was considered manageable for safe machinery operation.
- The exception to this limit was macadamias, where mechanised ground harvesting equipment needs to be able to turn safely on side slopes. This reduces the safe working slope limit to 20% for these crops.

Ts - Slope

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G
		Suitability subclasses for various land management options						
1	Slope <8%.	1	1	1	1	1	1	1
2	Slope 8-12%.	1	1	1	1	1	2	3
3	Slope 12-15%.	1	1	1	1	2	3	4
4	Slope 15-20%.	1	1	1	2	3	4	5
5	Slope 20-30%.	1	2	2	3	4	5	5
6	Slope >30%.	4	3	4	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G
Bamboo-dryland/rainfed	Blackbutt	Improved pasture-dryland/rainfed	Citrus-irrigated-trickle	Banana-dryland/rainfed	Turf-irrigated-spray	Soybean-dryland/rainfed
	Dunn's white gum		Stone fruit-irrigated-trickle	Banana-irrigated-trickle	Capsicum-summer-spray	
	Gympie messmate		Avocado-irrigated-trickle	Choko-irrigated-spray	Capsicum-winter-spray	
	Lemon-scented gum/spotted gum		Caribbean pine	Lychee-irrigated-trickle	Cucurbit-summer-spray	
	Rose gum/flooded gum		Custard apple-irrigated-trickle	Macadamia nuts-dryland/rainfed	Cucurbit-winter-spray	
			Mango-irrigated-trickle	Macadamia nuts-irrigated-trickle	Ginger-summer-spray	
			Passionfruit-irrigated-trickle	Papaw-irrigated-trickle	Ginger-winter-spray	
			Persimmon-irrigated-trickle		Hemp-dryland/rainfed	
					Maize-summer	
					Millet-summer	
					Pineapple-dryland/rainfed	
					Sorghum-summer	
					Strawberry-irrigated-spray	
					Sugarcane-dryland/rainfed	
					Sugarcane-irrigated-spray	
					Sweet corn-summer-spray	
					Sweet corn-winter-spray	
					Sweet potato-summer-spray	
					Sweet potato-winter-spray	
					Tomato-summer-spray	
					Tomato-winter-spray	

Wetness (W1, W2 and W3)

Waterlogged soils reduce plant growth and delay effective machinery operations.

Crops requiring a minimum drained soil depth of 1.5 m are restricted to:
Avocadoes.

Crops requiring a minimum drained soil depth of 1.0 m include:
Sweet corn (summer & winter), Maize, Sorghum, Choko, Citrus, Custard apple, Macadamia, Papaw, Stone-fruit, Mango, Lychee, Passionfruit, Persimmon, Gympie messmate, Blackbutt, Spotted gum, Flooded gum, Dunn’s white gum and Caribbean pine.

Crops requiring a minimum drained soil depth of 0.5 m include:
Ginger, Capsicum (summer & winter), Cucurbits (summer & winter), Pineapple, Sweet potato (summer & winter), Tomato (summer & winter), Turf, Strawberry, Sugar cane, Sown pasture and Banana.

Limitation class determination
Crop tolerance information, consultation with agronomic extension staff and local landholder experience was used in determining the severity of this limitation. The effects of delayed machinery operations were also considered.

Additional notes:

- Wetness subclasses for bananas are similar to sugar cane except soil wetness has a greater effect on machinery usage.
- For sown pastures, a wide range of species is available to cater for pasture production across a range of soil wetness conditions (with the exception of very poorly drained sites where there is no recognised non-invasive species).
- Imperfectly drained soils significantly affect plant growth for many crops and are usually the soils where mounding is important. Mounding is a common management practice for tree crops.
- Wetness subclasses for winter horticultural crops (capsicum, cucurbits, sweet potato, tomato) are less stringent than for equivalent summer crops because winter period conditions are drier and temporary watertables may disappear or drop significantly allowing the allocation of a higher (better) drainage class.

W1 - Wetness to 1m

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
W60	Rapidly drained.	1	1	1	1
W54	Well drained (5) & highly permeable (4).	1	1	1	1
W53	Well drained (5) & moderately permeable (3).	1	1	1	2
W44	Moderately well drained (4) & highly permeable (4).	1	1	1	2
W43	Moderately well drained (4) & moderately permeable (3).	1	2	2	3
W42	Moderately well drained (4) & slowly permeable (2).	2	3	3	4
W41	Moderately well drained (4) & very slowly permeable (1).	2	3	3	4
W34	Imperfectly drained (3) & highly permeable (3).	2	1	3	4
W33	Imperfectly drained (3) & moderately permeable (3).	3	4	4	4
W32	Imperfectly drained (3) & slowly permeable (2).	3	4	4	5
W31	Imperfectly drained (3) & very slowly permeable.	4	4	4	5
W24	Poorly drained (2) & highly permeable (4).	4	5	5	5
W23	Poorly drained (2) & moderately permeable (3).	4	5	5	5
W22	Poorly drained (2) & slowly permeable (2).	5	5	5	5
W21	Poorly drained (2) & very slowly permeable (1).	5	5	5	5
W10	Very poorly drained (1).	5	5	5	5

Group A	Group B	Group C	Group D
Caribbean pine	Maize-summer	Citrus-irrigated-trickle	Stone fruit-irrigated-trickle
Mango-irrigated-trickle		Lychee-irrigated-trickle	Choko-irrigated-spray
Sorghum-summer		Millet-summer	Custard apple-irrigated-trickle
Sweet corn-winter-spray		Persimmon-irrigated-trickle	Hemp-dryland/rainfed
		Sweet corn-summer-spray	Macadamia nuts-dryland/rainfed
			Macadamia nuts-irrigated-trickle
			Papaw-irrigated-trickle
			Passionfruit-irrigated-trickle

W2 - Wetness to 0.5m

Limitation		Suitability subclasses for various land management options								
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I
W60	Rapidly drained (6).	1	1	1	1	1	1	1	1	1
W54	Well drained (5) & highly permeable (4).	1	1	1	1	1	1	1	1	2
W53	Well drained (5) & moderately permeable (3)	1	1	1	1	1	1	1	1	2
W44	Moderately well drained (4) & highly permeable (4).	1	1	1	1	1	1	1	1	2
W43	Moderately well drained (4) & moderately permeable (3).	1	1	1	1	1	2	2	2	3
W42	Moderately well drained (4) & slowly permeable (2).	1	1	2	2	2	3	3	3	4
W41	Moderately well drained (4) & very slowly permeable (1).	1	1	2	2	2	3	3	3	4
W34	Imperfectly drained (3) & highly permeable (4).	1	2	2	2	2	2	2	3	4
W33	Imperfectly drained (3) & moderately permeable (3).	1	2	2	2	2	3	4	4	4
W32	Imperfectly drained (3) & slowly permeable (2).	2	2	3	3	3	4	4	4	5
W31	Imperfectly drained (3) & very slowly permeable (1).	2	2	3	3	3	4	4	4	5
W24	Poorly drained (2) & highly permeable (4).	3	4	3	3	4	5	5	5	5
W23	Poorly drained (2) & moderately permeable (3).	3	4	3	3	4	5	5	5	5
W22	Poorly drained (2) & slowly permeable (2).	4	4	4	4	5	5	5	5	5
W21	Poorly drained (2) & very slowly permeable (1).	4	4	4	4	5	5	5	5	5
W10	Very poorly drained (1).	5	4	4	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I
Improved pasture-dryland/rainfed	Bamboo-dryland/rainfed	Sugarcane-dryland/rainfed	Turf-irrigated-spray	Banana-dryland/rainfed	Soybean-dryland/rainfed	Strawberry-irrigated-spray	Capsicum-summer-spray	Ginger-summer-spray
		Sugarcane-irrigated-spray		Banana-irrigated-trickle	Blackbutt		Cucurbit-summer-spray	Ginger-winter-spray
				Capsicum-winter-spray	Gympie messmate		Pineapple-dryland/rainfed	
				Cucurbit-winter-spray	Lemon-scented gum/spotted gum		Sweet potato-summer-spray	
				Dunn's white gum	Rose gum/flooded gum		Tomato-summer-spray	
				Sweet potato-winter-spray				
				Tomato-winter-spray				

W3 - Wetness to 1.5m

Limitation		Suitability subclasses for various land management options
Value	**Description**	**Group A**
W64	Rapidly drained (6) & highly permeable (4).	1
W63	Rapidly drained (6) & moderately permeable (3).	2
W54	Well drained (5) & highly permeable (4).	2
W53	Well drained (5) & moderately permeable (3).	3
W44	Moderately well drained (4) & highly permeable (4).	3
W43	Moderately well drained (4) & moderately permeable (3).	4
W42	Moderately well drained (4) & slowly permeable (2).	5
W41	Moderately well drained (4) & very slowly permeable (1).	5
W34	Imperfectly drained (3) & highly permeable (4).	4
W33	Imperfectly drained (3) & moderately permeable (3).	5
W32	Imperfectly drained (3) & slowly permeable (2).	5
W31	Imperfectly drained (3) & very slowly permeable (1).	5
W24	Poorly drained (2) & highly permeable (4).	5
W23	Poorly drained (2) & moderately permeable (3).	5
W22	Poorly drained (2) & slowly permeable (2).	5
W21	Poorly drained (2) & very slowly permeable (1).	5
W10	Very poorly drained (1).	5

Group A
Avocado-irrigated-trickle

Landscape complexity (X)

This limitation assessed the effect soil complexity and/or topographic dissection may have on the size or shape of an area of suitable land. A ‘minimum production area’ is defined as the minimum area of land that is practicable to utilise for a particular land use.

Limitation class determination
The minimum production area for each land use was determined by consultation with agronomic extension staff and landholders. The suitability may be modified according to the proximity and extent of surrounding non-contiguous suitable land.

Additional notes:
- Landscape complexity has most effect on broad-acre crops that require large paddock sizes for efficiency (e.g. sugar cane, forage crops, commercial timber). Surveyed lot size is not considered.

X - Landscape complexity

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C	Group D	Group E	Group F	Group G
1	Minimum practical production area >10ha.	1	1	1	1	1	1	1
2	Minimum practical production area 5-10ha.	1	1	1	1	1	3	3
3	Minimum practical production area 2.5-5ha.	1	1	1	1	3	4	5
4	Minimum practical production area 1.5-2.5ha.	1	1	2	3	4	4	5
5	Minimum practical production area <1.5ha.	2	4	3	4	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G
Turf-irrigated-spray	Capsicum-summer-spray	Citrus-irrigated-trickle	Stone fruit-irrigated-trickle	Maize-summer	Blackbutt	Hemp-dryland/rainfed
Choko-irrigated-spray	Capsicum-winter-spray	Avocado-irrigated-trickle	Lychee-irrigated-trickle	Millet-summer	Caribbean pine	Soybean-dryland/rainfed
	Cucurbit-winter-spray	Banana-dryland/rainfed	Macadamia nuts-dryland/rainfed	Sorghum-summer	Dunn's white gum	
	Cucurbit-summer-spray	Banana-irrigated-trickle	Macadamia nuts-irrigated-trickle		Gympie messmate	
	Pineapple-dryland/rainfed	Custard apple-irrigated-trickle	Persimmon-irrigated-trickle		Lemon-scented gum/spotted gum	
	Sweet corn-summer-spray	Ginger-summer-spray			Rose gum/flooded gum	
	Sweet corn-winter-spray	Ginger-winter-spray				
	Sweet potato-summer-spray	Mango-irrigated-trickle				
	Sweet potato-winter-spray	Papaw-irrigated-trickle				
	Tomato-summer-spray	Passionfruit-irrigated-trickle				
	Tomato-winter-spray	Strawberry-irrigated-spray				
		Sugarcane-dryland/rainfed				
		Sugarcane-irrigated-spray				

3 Suitability framework for the Inland South-East Queensland area

The following 16 limitations were used to assess land suitability in the Coastal South-East Queensland region.

Land use requirements	Limitations	Soil and land attributes used to assess each limitation
Frost-free	**Frost (Cf)**	Frequency and severity of damaging frosts, landform and landscape position.
Minimise soil loss from erosion	**Water erosion (E)**	Slope/soil erodibility (USLE K factor), soil stability groups
Minimise soil loss from subsoil (from water erosion)	**Subsoil erosion (Es)**	Soil classification, depth to B horizon, B horizon dispersion, Exchangeable sodium percentage of B horizon, electrical conductivity, CEC and Ca/Mg ratio of B horizon.
Absence of damaging floods	**Flooding (F)**	Frequency of flooding (recurrence interval – ARI).
Adequate water supply	**Soil water availability (M)**	PAWC
Adequate nutrients	**Nutrient deficiency (Nd)**	Levels of Phosphorus (P) in top 0.3m.
Low levels of toxic elements	**Element toxicity (Nt)**	Soil pH in the surface soil (<0.3 m) and at 0.6 m depth.
Ability to harvest underground crops	**Soil adhesiveness (Pa)**	Texture, structure, consistence and clay mineralogy of the surface soil (<0.3m).
Adequate soil depth for physical support	**Soil depth (Pd)**	ESP, salinity, pH of soil profile, depth to water table, impermeable horizon, and/or hardpan or rock, presence of roots, soil texture, structure and consistence.
Ease of seedbed preparation and plant establishment	**Soil surface condition (Ps)**	Surface condition, surface soil texture and structure (<0.3m), susceptibility to compaction.
Rock-free	**Rockiness (R)**	Size and content (%) of coarse fragments, % rock outcrop.
Favourable levels of soluble salts	**Soil salinity (Sa)**	Saturated extract conductivity (dS/m ECse) of the top 0 -0.1m of soil.
Level land surface	**Microrelief (Tm)**	Vertical interval of microrelief.
Land surface of acceptable slope for safe machinery use	**Topography (Ts)**	Slope (%) variation in slope length and direction.
Adequate soil aeration	**Wetness (W)**	Soil drainage and permeability, depth to and degree of mottling, soil colour, ESP, native vegetation, redox, time period of water saturation, soil structure and texture.
Adequate production area, uniform production areas	**Landscape complexity (X)**	Minimum area of contiguous suitable soil available for crop production.

The following land management options were considered in the compilation of the Inland South-East Queensland land suitability framework:

Asian Vegetables (a, w, sp)	Green Panic	Potato (a, w, sp)
Avocado	Green bean (s)	Onion (w, sp, s)
Barley	Gympie messmate (*E. cloeziana*)	Rhodes Grass
Beetroot (a, w, sp)	Hoop Pine	Rye Grass
Blackbutt (*E. pilularis*)	Improved pasture legumes	Sorghum (forage)
Brassica (cabbage, Cauliflowers, etc.) (a, w, sp)	Kikuyu	Soybean
Broccoli	Lettuce (a, w, sp)	Soybean (irrigated)
Carrot (a, w, sp)	Leucaena	Spotted gum *(C. citriodora*)
Capsicum (s)	Lucerne (irrigated)	Sweet corn (s)
Chickpea	Mungbean	Tomato (s)
Citrus (lime, lemon)	Native pastures	Turf
Cucurbits (melons, pumpkins, Zucchini) (s)	Navy Bean	Wheat
Dunn's white gum (*E. dunnii*)	Oats	

Note: Summer (s), spring (sp), autumn (a) and winter (w) land uses have been identified to allow assessment for seasonal adaptation and variation in soil/land attributes such as frosts, temperature, flooding, wetness and soil water availability.

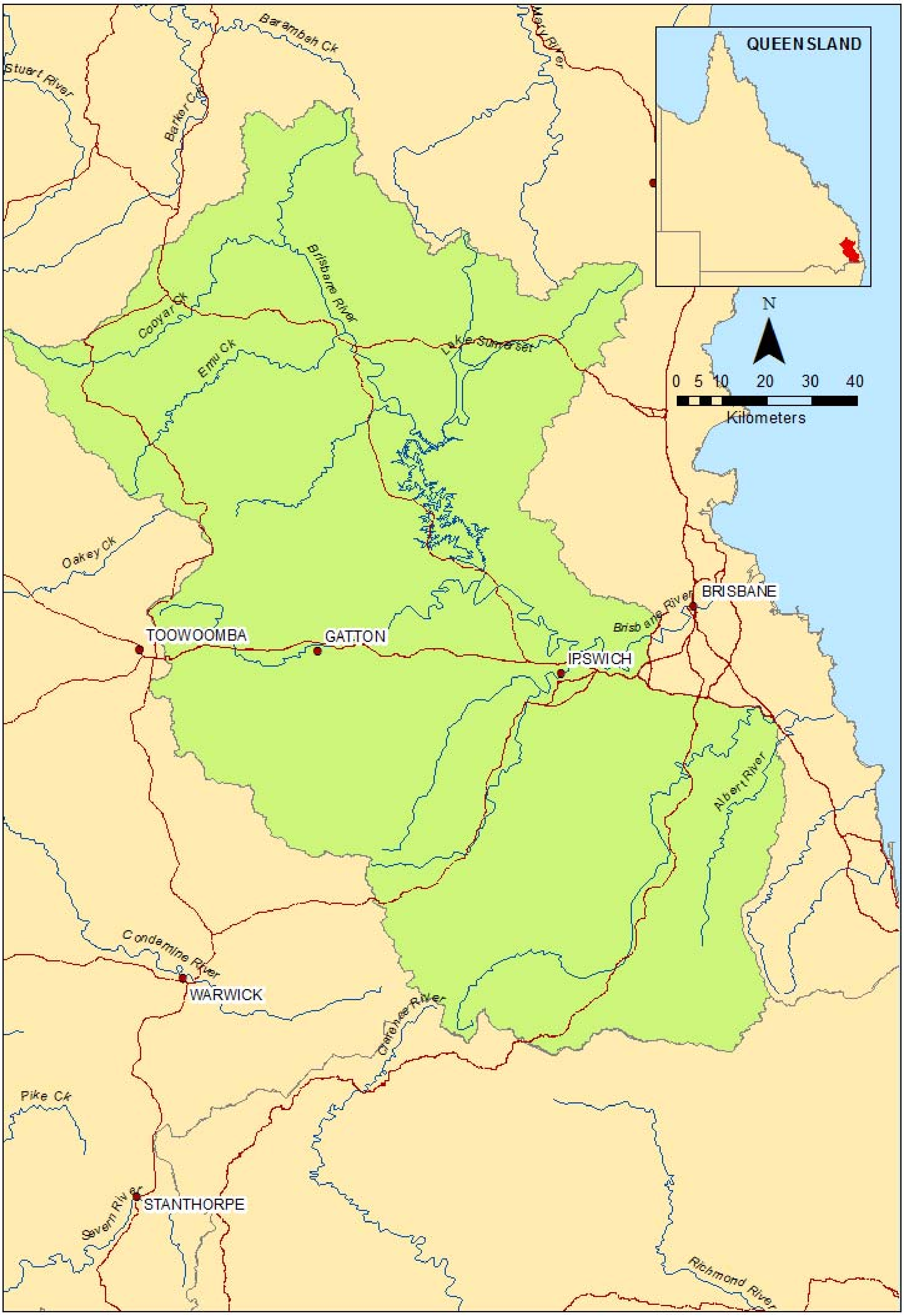

Figure 2. Area covered by the Inland South east Queensland suitability framework

Frost (Cf)

Frosts may kill plants, suppress growth and reduce yield, particularly if their occurrence coincides with frost sensitive periods in plant growth cycles.

Limitation category determination
Crop tolerance and local experience have been used to determine the incidence and severity of frosts.

Additional Notes:

- All frost sensitive crops (including green beans, cucurbits, capsicums, tomatoes and Spotted Gum) are highly susceptible to frost and careful management is required in frost prone areas to avoid the effects of all but occasional, very light frosts.
- Horticultural cropping is carried out at times of the year which substantially avoids the effects of frosts. Irrigation strategies are used to mitigate frost risk (e.g. Potato).
- "Summer" vegetables (which area frost sensitive), are planted after the risks of frost are over in the late spring – consecutive plantings are made over the summer, and the final harvests are made in the autumn before the risk of frosts affects quality. Consequently, frost is not considered a limitation for the summer vegetable crops.

Cf - Frost

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K	Group L
		Suitability subclasses for various land management options											
1	Frost free or occasional light frost >-1°C (<3 events per year)	1	1	1	1	1	1	1	1	1	1	1	1
2	Regular light frosts (>/= 3 events per year) over winter months only (>-1°C)	1	1	1	1	1	1	1	1	2	2	3	4
3	Regular light frosts over late autumn and early spring (>-1°C)	1	1	1	1	1	2	2	2	2	2	3	4
4	Regular moderate frosts (>/= 3 events per year) over winter months only (-1°C to -4°C)	1	1	2	2	3	2	3	5	2	3	4	5
5	Regular severe frosts (>/= 3 events per year) over winter months only (<-4°C)	1	2	2	3	4	3	4	5	4	4	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K	Group L
Native Pasture	Dunn's White Gum-Dryland	Green Panic-Dryland	Forage Sorghum-Dryland	Turf-Irrigated	Brassicas-Irrigated	Broccoli-Irrigated	Potatoes - Irrigated	Beetroot-Irrigated	Barley-Dryland	Avocados-Irrigated	Asian Vegetables-Irrigated
	Hoop Pine-Dryland	Kikuyu-Dryland	Leucaena-Dryland		Carrots-Irrigated				Chickpeas-Dryland	Gympie Messmate-Dryland	Blackbutt-Dryland
	Improved Pasture Legumes-Dryland	Lucerne-Irrigated	Maize-Dryland						Citrus-Irrigated		Spotted Gum-Dryland
		Rhodes Grass-Dryland	Onions-Irrigated						Oats-Dryland		
		Rye Grass-Dryland	Sorghum-Dryland						Wheat-Dryland		
			Soybeans-Irrigated								
			Summer Pulses-Dryland								

Water erosion (E)

Land degradation and long term productivity decline will occur on unprotected arable land due to excessive soil erosion.
Qualitative features have been linked to K factor ranges generated by USLE. Four (4) soil stability categories from very stable to very unstable were recognised.

Very stable soils: K factor <0.05
Strongly structured surface soils high in free iron (Ferrosols). Profiles are highly permeable throughout.

Stable soils: K factor <0.05
Friable surface soils with moderate to strong surface structure (granular or blocky); or surface soils with a soft, firm or weakly hard setting, medium to coarse sandy surface (sands, sandy loam, sandy clay loam); or surface soils very high in organic matter. Profiles are moderately to highly permeable throughout.

Unstable soils: K factor 0.05 – 0.07
Hard setting surface soils with weak (granular, blocky) to massive surface structure and fine sandy textures (fine sandy clay loam to fine sandy light clay). Surface horizons are moderately to slowly permeable. Slowly permeable, sodic subsoils are often developed within 1.0m of the surface in lower landscape positions.

Very Unstable soils: K factor >0.07
Hard setting surface soils with weak (granular, blocky) to massive surface structure and silty textures (silty loam to silty light clay). Surface horizons are low in organic matter, slowly permeable and typically overlie slowly to very slowly permeable, sodic subsoils within 0.5m of the surface.

Limitation category determination
Slope limits are determined in consultation with soil conservation extension and research personnel, and extension and research agronomists.

Additional Notes:

- Perennial tree and vine orchards typically practice grass/cover crop sward management and represent relatively stable land uses (i.e. suitable on slopes between >5 – 20 % depending on soil type).
- Turf is regularly stripped back to a completely bare surface but with a significant root mass and without regular tillage. Rilling and deposition following erosion events is a potential problem because uneven surface contours can present problems with harvesting. Standard management practices such as topdressing and levelling would largely overcome such erosion effects.
- Most field crops/vegetable crops require seedbed preparation on an annual basis. Tillage during summer to prepare for the winter copping period leaves paddocks exposed and subject to potentially erosive rainfall events through the summer and autumn months. Tillage is usually aggressive, surface soils very loose and paddocks laid out in straight rows. Land uses in this category are considered most at risk from erosion and slope limits are therefore more robust.
- Soil loss on alluvial soils is exacerbated by channel deviation across cultivation resulting in loss and deposition processes.
- Slope limits described for forestry situations assume land is already cleared and pastured and broadscale clearing is not required. These limits assume minimal soil disturbance is practised during land preparation for planting. Lower limits would apply were significant soil disturbance involved.

E - Water erosion

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
		Suitability subclasses for various land management options									
1A	Very stable soils; K factor <0.05 & slope range <2%	1	1	1	1	1	1	1	1	1	1
2A	Very stable soils; K factor <0.05 & slope range >2-5%	1	1	1	1	1	1	1	2	2	2
3A	Very stable soils; K factor <0.05 & slope range 5–8%	1	1	1	2	2	2	2	2	3	3
4A	Very stable soils; K factor <0.05 & slope range 8-12%	1	1	2	2	3	3	3	3	4	4
5A	Very stable soils; K factor <0.05 & slope range 12-15%	1	2	3	3	3	4	4	4	4	4
6A	Very stable soils; K factor <0.05 & slope range 15-20%	2	3	3	3	4	5	5	5	5	5
7A	Very stable soils; K factor <0.05 & slope range >20-25%	3	4	4	5	5	5	5	5	5	5
8A	Very stable soils; K factor <0.05 & slope range >25%	4	4	5	5	5	5	5	5	5	5
1B	Stable soils; K factor <0.05 & slope range <2%	1	1	1	1	1	1	1	1	1	2
2B	Stable soils; K factor <0.05 & slope range >2-5 %	1	1	1	1	1	2	2	2	2	2
3B	Stable soils; K factor <0.05 & slope range 5–8%	1	1	1	2	2	3	3	3	3	3
4B	Stable soils; K factor <0.05 & slope range 8-12%	1	2	2	3	3	3	3	4	4	4
5B	Stable soils; K factor <0.05 & slope range 12-15%slope	2	2	3	3	3	4	4	5	5	5
6B	Stable soils; K factor <0.05 & slope range 15-20%	3	3	3	4	4	5	5	5	5	5
7B	Stable soils; K factor <0.05 & slope range >20-25%	4	4	4	5	5	5	5	5	5	5
8B	Stable soils; K factor <0.05 & slope range >25%	4	4	5	5	5	5	5	5	5	5
1C	Unstable soils; K factor 0.05 – 0.07 & slope range <2%	1	1	1	1	1	2	2	1	1	1
2C	Unstable soils; K factor 0.05 – 0.07 & slope range >2-5%	1	1	1	2	1	3	3	3	3	3
3C	Unstable soils; K factor 0.05 – 0.07 & slope range 5–8%	1	2	2	2	2	3	3	4	4	4
4C	Unstable soils; K factor 0.05 – 0.07 & slope range 8-12%	2	3	3	3	3	4	4	5	5	5
5C	Unstable soils; K factor 0.05 – 0.07 & slope range 12-15%	3	3	3	4	3	5	5	5	5	5
6C	Unstable soils; K factor 0.05 – 0.07 & slope range 15-20%	4	4	4	4	4	5	5	5	5	5
7C	Unstable soils; K factor 0.05 – 0.07 & slope range 20-25%	5	5	5	5	5	5	5	5	5	5
8C	Unstable soils; K factor 0.05 – 0.07 & slope range >25%	5	5	5	5	5	5	5	5	5	5
1D	Very unstable soils; K factor > 0.07 & slope range <2%	1	1	1	1	1	2	2	2	2	2

2D	Very unstable soils; K factor > 0.07 & slope range >2-5%	2	2	2	2	2	3	3	3	3	3
3D	Very unstable soils; K factor > 0.07 & slope range 5-8%	2	3	3	3	3	3	4	4	4	4
4D	Very unstable soils; K factor > 0.07 & slope range 8-12%	3	4	4	3	4	4	4	5	5	5
5D	Very unstable soils; K factor > 0.07 & slope range 12-15%	4	4	4	4	4	5	5	5	5	5
6D	Very unstable soils; K factor > 0.07 & slope range 15-20%	5	5	5	5	5	5	5	5	5	5
7D	Very unstable soils; K factor > 0.07 & slope range 20-25%	5	5	5	5	5	5	5	5	5	5
8D	Very unstable soils; K factor > 0.07 & slope range >25%	5	5	5	5	5	5	5	5	5	5

Group A	**Group B**	**Group C**	**Group D**	**Group E**	**Group F**	**Group G**	**Group H**	**Group I**	**Group J**
Blackbutt-Dryland	Native Pasture	Kikuyu-Dryland	Avocados-Irrigated	Green Panic-Dryland	Summer Pulses-Dryland	Barley-Dryland	Turf-Irrigated	Asian Vegetables-Irrigated	Broccoli-Irrigated
			Citrus-Irrigated	Improved Pasture Legumes-Dryland		Chickpeas-Dryland		Beetroot-Irrigated	
			Dunn's White Gum-Dryland	Leucaena-Dryland		Forage Sorghum-Dryland		Brassicas-Irrigated	
			Gympie Messmate-Dryland	Rhodes Grass-Dryland		Lucerne-Irrigated		Capsicum-Irrigated	
			Hoop Pine-Dryland	Rye Grass-Dryland		Maize-Dryland		Carrots-Irrigated	
			Spotted Gum-Dryland			Oats-Dryland		Cucurbits-Irrigated	
						Sorghum-Dryland		Green Beans-Irrigated	
						Soybeans-Irrigated		Lettuce-Irrigated	
								Onions-Irrigated	
						Wheat-Dryland		Potatoes-Irrigated	
								Sweet Corn-Irrigated	
								Tomato-Irrigated	

Subsoil erosion (Es)

Subsoil instability caused by high sodicity and/or a very low calcium/magnesium ratio can lead to reduced infiltration and drainage, increased erosion and loss of structural integrity. The proportion of sodium in relation to other cations is expressed as exchangeable sodium percentage (ESP).

Limitation category determination
Laboratory measured cations.

Es - Subsoil erosion

Limitation		Suitability subclasses for various land management options				
Value	Description	Group A	Group B	Group C	Group D	Group E
0	No subsoil sodicity (ESP <6)	1	1	1	1	1
1	Subsoil sodic (ESP 6-15) and clay content >15%	1	1	2	2	3
2	Subsoil strongly sodic (ESP >15%) and clay content >15% and/or Ca/Mg <0.1	1	2	2	4	4

Group A	Group B	Group B cont.	Group C	Group D	Group E
Native Pasture	Avocados-Irrigated	Lucerne-Irrigated	Asian Vegetables-Irrigated	Turf-Irrigated	Potatoes-Irrigated
	Barley-Dryland	Maize-Dryland	Beetroot-Irrigated		
	Blackbutt-Dryland	Oats-Dryland	Brassicas-Irrigated		
	Chickpeas-Dryland	Rhodes Grass-Dryland	Broccoli-Irrigated		
	Citrus-Irrigated	Rye Grass-Dryland	Capsicum-Irrigated		
	Dunn's White Gum-Dryland	Sorghum-Dryland	Carrots-Irrigated		
	Forage Sorghum-Dryland	Soybeans-Irrigated	Cucurbits-Irrigated		
	Gympie Messmate-Dryland	Spotted Gum-Dryland	Green Beans-Irrigated		
	Hoop Pine-Dryland	Summer Pulses-Dryland	Green Panic-Dryland		
	Improved Pasture Legumes-Dryland	Sweet Corn-Irrigated	Lettuce-Irrigated		
	Kikuyu-Dryland	Wheat-Dryland	Onions-Irrigated		
	Leucaena-Dryland		Tomato-Irrigated		

Flooding (F)

Flood events typically involve inundation from overbank stream flows. Effects of flooding include yield reduction or plant death. Other effects include physical removal of or damage to the crop by flowing water, floodplain erosion and damage to infrastructure such as irrigation equipment.

Limitation class determination

- Consultation with local authorities, state agencies, community groups and local landholders.
- Published flood maps and flood modelling outputs.

Additional Notes:

- Flooding is generally not considered a limitation for winter grown vegetable crops because the main growing season coincides with the dry season, allowing the majority of plantings to be timed to avoid most seasonal flooding. Notwithstanding flooding does irregularly occur in the months of April and May causing substantial damage.
- Some tree crops (e.g. citrus,) tolerate inundation for periods of about 1 day or so. This assumes low velocity floodwaters, relatively low silt loads, reasonable water temperatures and rapid internal soil drainage once floodwaters recede.
- While loss of trees due to flooding represents a severe financial loss, most orchard enterprises work towards a return on their investment after about 10 years. Floods less frequent than 1 in 10 years (i.e. 1:20 to 1:50 years or less frequent) are statistically beyond the productive life of the trees and areas subject to such floods are classed as marginal for production rather than unsuitable.
- Avocados are highly sensitive to flooding and suffer significant fruit damage, root rot and financial loss following an event. Losses in avocados are more significant than other orchards.

F- Flooding

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G
		Suitability subclasses for various land management options						
0	No flooding.	1	1	1	1	1	1	1
1	Flooding less frequent than 1 in 10 years	1	1	1	1	2	3	5
2	Flooding frequency between 1 in 2 and 1 in 10 years	2	2	3	3	3	5	5
3	Flooding frequency approaches annual occurrence	3	4	4	5	4	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G
Green Panic-Dryland	Blackbutt-Dryland	Improved Pasture Legumes-Dryland	Asian Vegetables-Irrigated	Barley-Dryland	Citrus-Irrigated	Avocados-Irrigated
Kikuyu-Dryland	Dunn's White Gum-Dryland		Beetroot-Irrigated	Chickpeas-Dryland		
Leucaena-Dryland	Gympie Messmate-Dryland		Brassicas-Irrigated	Forage Sorghum-Dryland		
Native Pasture	Hoop Pine-Dryland		Broccoli-Irrigated	Lucerne-Irrigated		
Rhodes Grass-Dryland	Spotted Gum-Dryland		Capsicum-Irrigated	Maize-Dryland		
Rye Grass-Dryland			Carrots-Irrigated	Oats-Dryland		
Turf-Irrigated			Cucurbits-Irrigated	Sorghum-Dryland		
			Green Beans-Irrigated	Soybeans-Irrigated		
			Lettuce-Irrigated	Summer Pulses-Dryland		
			Onions-Irrigated	Wheat-Dryland		
			Potatoes-Irrigated			
			Sweet Corn-Irrigated			
			Tomato-Irrigated			

Soil water availability (M)

Plant yield can be severely affected by periods of water stress, particularly during critical growth periods.

Limitation class determination
PAWC was used to determine soil water availability. PAWC is less critical for irrigated crops than for rain fed crops and in irrigated situations is used largely to estimate the required irrigation frequency.

Additional Notes

- All crops were considered irrigated except where indicated as rain fed/dryland. Forestry species and sown pastures are rain fed.
- Soil drainage may modify PAWC for a particular soil. For example, a shallow watertable within the effective rooting depth for 2–3 months or longer (see W limitation) can provide water to plants for extended periods.
- All horticultural crops are irrigated, so soil water availability is not a significant limitation to production.
- PAWC has been predicted to the effective rooting depth (ERD). This is the depth to any impenetrable or impermeable layers (as defined for the Pd limitation). Native hardwood eucalypt species however have the ability to penetrate weathered/fractured rock and many impermeable layers and the PAWC boundary between suitable and marginal/unsuitable classes has been relaxed accordingly (when compared with cropping).

M – Soil water availability

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
1	>150mm PAWC	1	1	1	1	1	1	1	1
2	125-150mm PAWC	1	1	1	1	1	2	2	2
3	100-125mm PAWC	1	1	1	2	2	2	2	3
4	75-100mm PAWC	1	1	2	2	3	3	3	3
5	50-75mm PAWC	1	2	3	4	3	3	4	4
6	<50mm PAWC	2	3	4	4	4	4	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
Asian Vegetables-Irrigated	Hoop Pine-Dryland	Blackbutt-Dryland	Lucerne-Irrigated	Avocados-Irrigated	Native Pasture	Green Panic-Dryland	Barley-Dryland
Beetroot-Irrigated	Spotted Gum-Dryland	Dunn's White Gum-Dryland	Soybeans-Irrigated	Citrus-Irrigated		Improved Pasture Legumes-Dryland	Chickpeas-Dryland
Brassicas-Irrigated		Gympie Messmate-Dryland				Kikuyu-Dryland	Forage Sorghum-Dryland
Broccoli-Irrigated						Leucaena-Dryland	Maize-Dryland
Capsicum-Irrigated						Rhodes Grass-Dryland	Oats-Dryland
Carrots-Irrigated						Rye Grass-Dryland	Sorghum-Dryland
Cucurbits-Irrigated							Summer Pulses-Dryland
Green Beans-Irrigated							Wheat-Dryland
Lettuce-Irrigated							
Onions-Irrigated							
Potatoes-Irrigated							
Tomato-Irrigated							
Turf-Irrigated							
Sweet Corn-Irrigated							

Nutrient deficiency (Nd)

Reduced crop growth may be associated with nutrient deficiencies in many soils. Livestock production may also be affected as a result of reduced pasture yield and/or pasture quality and/or lowered nutrient intake in animals.

For coastal south-east Queensland it was determined that Phosphorus (P) is the only limiting nutrient that cannot easily be added in sufficient quantities to meet crop demands, therefore, Nd assessment was based on the level of P within the surface soil (0 to 0.3 m).

Limitation class determination
Nutrient deficient soils require additional P applications over and above standard management practices.

Additional Notes:

- Because fertiliser use is considered a standard management practice associated with intensive cropping systems, nutrient deficiency is only recognised as a minor limitation. This limitation is of more relevance to the pasture lands.

Nd – Nutrient deficiency

Limitation		Suitability subclasses for various land management options					
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
1	Phosphorus (P) >20ppm	1	1	1	1	1	1
2	Phosphorus (P) 10-20ppm	1	1	2	2	2	2
3	Phosphorus (P) 5-10ppm	1	2	2	2	3	3
4	Phosphorus (P) <5ppm	2	3	2	3	3	4

Group A	Group B	Group C	Group D	Group E	Group F
Asian Vegetables-Irrigated	Barley-Dryland	Avocados-Irrigated	Blackbutt-Dryland	Improved Pasture Legumes-Dryland	Green Panic-Dryland
Beetroot-Irrigated	Leucaena-Dryland	Citrus-Irrigated	Dunn's White Gum-Dryland	Rhodes Grass-Dryland	Kikuyu-Dryland
Brassicas-Irrigated	Native Pasture		Forage Sorghum-Dryland	Rye Grass-Dryland	Oats-Dryland
Broccoli-Irrigated			Gympie Messmate-Dryland		Wheat-Dryland
Capsicum-Irrigated			Hoop Pine-Dryland		
Carrots-Irrigated			Lucerne-Irrigated		
Chickpeas-Dryland			Maize-Dryland		
Cucurbits-Irrigated			Sorghum-Dryland		
Green Beans-Irrigated			Soybeans-Irrigated		
Lettuce-Irrigated			Spotted Gum-Dryland		
Onions-Irrigated			Summer Pulses-Dryland		
Potatoes-Irrigated					
Sweet Corn-Irrigated					
Tomato-Irrigated					
Turf-Irrigated					

Nutrient toxicity (Nt)

Reduced crop growth may be associated with the oversupply or toxicity (i.e. excessive levels) of some mineral nutrients, particularly where soil pH is very low. Livestock production may be also be affected under such conditions as a result of reduced pasture yield and/or pasture quality.

Limitation class determination
Field or laboratory pH data were assessed against published research relating low pH to crop tolerance and element toxicity.

Additional Notes:

- While high pH values (greater than 8.5) are not common in inland SEQ, where they exist, nutrient availability may be reduced.
- Forestry crops are commonly grown in soils with a surface pH of 5.5, with subsoil pH values of 4.5 to 5.

Nt – Nutrient Toxicity

Limitation		Suitability subclasses for various land management options		
Value	Description	Group A	Group B	Group C
1	Surface soil (0-0.3m) pH >5.0.	1	1	1
2	Soil pH at 0.6m >5.0.	1	1	1
3	Surface soil (0-0.3m) pH <5.0.	2	2	3
4	Soil pH at 0.6m <5.0.	n/a	3	3

Group A	Group B	Group C
Asian Vegetables-Irrigated	Avocados-Irrigated	Barley-Dryland
Beetroot-Irrigated	Citrus-Irrigated	Chickpeas-Dryland
Brassicas-Irrigated		Forage Sorghum-Dryland
Broccoli-Irrigated		Green Panic-Dryland
Capsicum-Irrigated		Improved Pasture Legumes-Dryland
Carrots-Irrigated		Kikuyu-Dryland
Cucurbits-Irrigated		Leucaena-Dryland
Green Beans-Irrigated		Lucerne-Irrigated
Lettuce-Irrigated		Maize-Dryland
Onions-Irrigated		Native Pasture
Potatoes-Irrigated		Oats-Dryland
Sweet Corn-Irrigated		Rhodes Grass-Dryland
Tomato-Irrigated		Rye Grass-Dryland
Turf-Irrigated		Sorghum-Dryland
		Soybeans-Irrigated
		Summer Pulses-Dryland
		Wheat-Dryland
		Blackbutt-Dryland
		Dunn's White Gum-Dryland
		Gympie Messmate-Dryland
		Hoop Pine-Dryland
		Spotted Gum-Dryland

Soil adhesiveness (Pa)

Harvesting root crops can be difficult in soils that adhere to the harvested product or machinery, and can affect the quality and post-harvest treatment of harvest material. Adhesive soils are prone to significant levels of soil disturbance during harvest and may be subject to increased compaction and declining structural stability.

Soil adhesiveness categories		Inherent soil morphological properties affecting adhesiveness	
		structure and texture characteristics	**surface condition**
Pa0	No restrictions	Strongly structured (granular, polyhedral) surface soils high in free iron (Ferrosols) Sandy textured surface soils (<SL) low in organic matter Humic surface soils very high in organic matter	soft or firm loose, soft or firm soft or firm
Pa1	Slightly adhesive soils	Moderately to strongly structured (granular, blocky) surface soils (>SL) (friable Dermosols).	weakly hardsetting
Pa2	Moderately adhesive soils	Massive to weakly structured (granular, blocky), silty or fine sandy textured surface soils	moderately to strongly hard setting
Pa4	Strongly adhesive soils	Sticky and/or sodic clay within 0.3m of the surface (within the plough zone) (Dermosols, Vertosols, thin surfaced Sodosols)	firm to hard setting or self-mulching

Additional Notes:

- This limitation only applied to carrots, potatoes, onions and beetroot. This issue is generally overcome by post-harvest washing.

Pa – Soil adhesiveness

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
0	No restrictions	1	1
1	Slightly adhesive	1	1
2	Moderately adhesive	2	2
3	Strongly adhesive	2	3

Group A	Group B
Beetroot - Irrigated	Onions
Carrots-Irrigated	
Potatoes-Irrigated	

Soil depth (Pd)

Shallow soils limit root proliferation and anchorage. Plants in shallow soils may lodge or become uprooted during strong winds.

Limitation class determination
Consultation with agronomic extension staff and local landholder experience.

Additional Notes:

- Native hardwood eucalypt species have a rooting depth requirement >0.6 m, but have the ability to penetrate weathered/fractured rock and many impermeable layers. Therefore, the ‘suitable’ soil depth limit to impermeable layers has been decreased from 0.6 m to 0.4 m.
- Some vegetable crops (e.g. tomatoes) are normally trellised and lodging due to shallow soil depth is not considered an issue. As such, these crops have been treated in the same way as shallow rooted, vegetable crops of low height.

Pd – Soil depth

Limitation		Suitability subclasses for various land management options				
Value	Description	Group A	Group B	Group C	Group D	Group E
1	>1.0m	1	1	1	1	1
2	0.5-1.0m (minimum for tree crops)	1	1	2	2	3
3	0.3-0.5m	1	1	3	4	5
4	<0.3m	3	5	4	5	5

Group A	Group B	Group C	Group D	Group E
Green Panic-Dryland	Asian Vegetables-Irrigated	Blackbutt-Dryland	Barley-Dryland	Avocados-Irrigated
Improved Pasture Legumes-Dryland	Beetroot-Irrigated	Gympie Messmate-Dryland	Chickpeas-Dryland	
Kikuyu-Dryland	Brassicas-Irrigated	Hoop Pine-Dryland	Citrus-Irrigated	
Native Pasture	Broccoli-Irrigated	Leucaena-Dryland	Dunn's White Gum-Dryland	
Rhodes Grass-Dryland	Capsicum-Irrigated	Spotted Gum-Dryland	Forage Sorghum-Dryland	
Rye Grass-Dryland	Carrots-Irrigated		Lucerne-Irrigated	
	Cucurbits-Irrigated		Maize-Dryland	
	Green Beans-Irrigated		Oats-Dryland	
	Lettuce-Irrigated		Sorghum-Dryland	
	Onions-Irrigated		Wheat-Dryland	
	Potatoes-Irrigated			
	Soybeans-Irrigated			
	Summer Pulses-Dryland			
	Sweet Corn-Irrigated			
	Tomato-Irrigated			
	Turf-Irrigated			

Soil surface condition (Ps)

Problems with germination and seedling development during crop establishment are typically associated with adverse physical conditions in the surface soil, such as hard setting behaviour, coarse aggregates and crusting.

Limitation class determination
Plant tolerance limits and requirements in relation to germination were matched with soil properties and supported by agronomic experience.

Additional Notes:

- Crops planted from seed (particularly small seeded vegetables, grasses or pasture species) are most affected by this limitation. Vegetable crops such as lettuce, brassicas, tomatoes, capsicum and cucurbits, which are in the main planted as seedlings, are less affected. Tree and vine crops, which are planted as large tree seedlings, and also crops planted using vegetative material are least affected.
- Irrigated crops are able to overcome limitations associated with crusting and hardsetting soils.

Ps – Soil surface condition

Limitation Value	Description	Suitability subclasses for various land management options Group A	Group B	Group C	Group D	Group E	Group F
0	No restrictions.	1	1	1	1	1	1
1	Hard setting soils with SL to CL surface textures and dry firm consistency.	1	2	2	3	3	3
2	Hard setting massive soils with FSL to CLFS surface textures and dry firm consistency.	2	2	2	3	3	3
3	Surface crusts present.	2	2	2	3	3	3
4	Large soil aggregate size on surface (>20mm)	2	2	3	3	4	5

Group A	Group B	Group C	Group D	Group E	Group F
Asian Vegetables-Irrigated	Beetroot-Irrigated	Soybeans-Irrigated	Chickpeas-Dryland	Barley-Dryland	Sorghum-Dryland
Brassicas-Irrigated	Carrots-Irrigated		Forage Sorghum-Dryland	Maize-Dryland	
Broccoli-Irrigated	Green Beans-Irrigated		Green Panic-Dryland	Oats-Dryland	
Capsicum-Irrigated	Lucerne-Irrigated		Improved Pasture Legumes-Dryland	Wheat-Dryland	
Cucurbits-Irrigated	Sweet Corn-Irrigated		Kikuyu-Dryland		
Lettuce-Irrigated			Leucaena-Dryland		
Onions-Irrigated			Native Pasture		
Potatoes-Irrigated			Rhodes Grass-Dryland		
Tomato-Irrigated			Rye Grass-Dryland		
Turf-Irrigated			Summer Pulses-Dryland		

Rockiness (R)

Coarse fragments (e.g. pebbles, gravel, cobbles, stones and boulders) and rock in the plough zone can damage and/or interfere with the efficient use of agricultural machinery. Surface gravel, stone and rock are particularly important and can interfere significantly with planting, cultivation and harvesting machinery used for root crops, macadamias, small crops, annual forage crops and sugar cane.

Limitation class determination
Consultation with landholders and machinery operators were used to establish accepted tolerances to rockiness.

Additional Notes:

- Surface gravel, stone and rock are particularly important and can interfere significantly with planting, cultivation and harvesting machinery used for root crops, other vegetable crops, annual forage crops.
- Surface rock in particular interferes with harvester machinery for sub-surface and ground crops such as carrots and potatoes. The presence of rocks also affects plant available moisture (considered under the **M** limitation).

R - Rockiness

Limitation		Suitability subclasses for various land management options													
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K	Group L	Group M	Group N
R0	No rock.	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RF2	2-6mm (fine gravel) 2-10%.	1	1	1	1	1	1	1	1	1	1	1	2	2	1
RF3	2-6mm (fine gravel) 10-20%.	1	1	1	2	2	2	2	2	2	2	3	2	4	2
RF4	2-6mm (fine gravel) 20-50%.	1	1	1	3	3	3	3	3	3	3	3	3	5	3
RF5	2-6mm (fine gravel) >50%.	1	2	2	3	4	4	4	3	3	4	4	4	5	3
RM2	6-20mm (medium gravel) 2-10%.	1	1	1	2	1	2	2	2	2	3	3	1	5	3
RM3	6-20mm (medium gravel) 10-20%.	1	1	1	2	2	2	3	3	4	4	4	2	5	4
RM4	6-20mm (medium gravel) 20-50%.	1	1	2	3	3	3	4	4	5	5	5	3	5	5
RM5	6-20mm (medium gravel) >50%.	2	2	3	4	4	4	5	5	5	5	5	4	5	5
RG1	20-60mm (coarse gravel) <2%.	1	1	1	2	1	1	1	2	3	3	3	1	4	2
RG2	20-60mm (coarse gravel) 2-10%.	1	1	1	2	2	2	3	3	4	4	4	2	5	3
RG3	20-60mm (coarse gravel) 10-20%.	1	1	2	3	3	3	4	4	5	5	5	3	5	4
RG4	20-60mm (coarse gravel) 20-50%.	2	2	3	4	4	4	5	5	5	5	5	4	5	5
RG5	20-60mm (coarse gravel) >50%.	2	3	4	5	5	5	5	5	5	5	5	5	5	5
RC1	60-200mm (cobbles) <2%.	1	1	1	1	2	2	2	2	3	3	3	1	5	2
RC2	60-200mm (cobbles) 2-10%.	1	1	2	2	3	3	3	3	4	4	4	2	5	3
RC3	60-200mm (cobbles) 10-20%.	2	2	3	2	4	4	4	4	5	5	5	3	5	4
RC4	60-200mm (cobbles) 20-50%.	2	2	4	3	4	5	5	5	5	5	5	4	5	5
RC5	60-200mm (cobbles) >50%.	3	3	5	4	5	5	5	5	5	5	5	5	5	5
RS1	200-600mm (stones) <2%.	1	1	2	2	3	3	2	2	4	4	4	3	5	2
RS2	200-600mm (stones) 2-10%.	2	2	3	3	4	4	4	4	5	5	5	4	5	4
RS3	200-600mm (stones) 10-20%.	2	3	4	4	5	5	5	5	5	5	5	5	5	5
RS4	200-600mm (stones) 20-50%.	3	4	5	5	5	5	5	5	5	5	5	5	5	5
RS5	200-600mm (stones) >50%.	4	4	5	5	5	5	5	5	5	5	5	5	5	5
RO1	>600mm or rock outcrop (boulders) <2%.	1	2	2	2	3	3	2	2	3	3	3	3	5	2
RO2	>600mm or rock outcrop (boulders) 2-10%.	2	3	4	3	4	4	4	4	4	4	4	4	5	4
RO3	>600mm or rock outcrop (boulders) 10-20%.	3	4	4	4	5	5	5	5	5	5	5	5	5	5
RO4	>600mm or rock outcrop (boulders) 20-50%.	3	5	5	5	5	5	5	5	5	5	5	5	5	5
RO5	>600mm or rock outcrop (boulders) >50%.	4	5	5	5	5	5	5	5	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K	Group L	Group M	Group N
Native Pasture	Blackbutt-Dryland	Green Panic-Dryland	Avocados-Irrigated	Barley-Dryland	Lucerne-Irrigated	Lettuce-Irrigated	Asian Vegetables-Irrigated	Beetroot-Irrigated	Carrots-Irrigated	Potatoes-Irrigated	Summer Pulses-Dryland	Turf-Irrigated	Onions-Irrigated
	Dunn's White Gum-Dryland	Improved Pasture Legumes-Dryland	Citrus-Irrigated	Chickpeas-Dryland			Brassicas-Irrigated						
	Gympie Messmate-Dryland	Kikuyu-Dryland		Forage Sorghum-Dryland			Broccoli-Irrigated						
	Hoop Pine-Dryland	Leucaena-Dryland		Maize-Dryland			Capsicum-Irrigated						
	Spotted Gum-Dryland	Rhodes Grass-Dryland		Oats-Dryland			Cucurbits-Irrigated						
		Rye Grass-Dryland		Sorghum-Dryland			Green Beans-Irrigated						
				Soybeans-Irrigated			Sweet Corn-Irrigated						
				Wheat-Dryland			Tomato-Irrigated						

Soil salinity (Sa)

High soluble salts within the root zone can limit water uptake, result in toxicity effects and restrict root development.

Limitation class determination
Subclass determination was based on surface (0-0.1m) salinity (ECse dS/m) combined with the productivity decrease guides in Table 46 of the Salinity Management Handbook (Salcon 1997). This assumes that surface salinity indicates root zone salinity. Sub-classes were assigned based on:

Limitation sub-class	Predicted yield reduction as a result of root zone salinity
Class 1	0 to 10% yield reduction
Class 2	10 to 20% yield reduction
Class 3	20 to 35% yield reduction
Class 4	35 to 50% yield reduction
Class 5	>50% yield reduction

Spatial representation of surface salinity data for south-east Queensland is available from the Queensland Department of Natural Resources and Mines and http://www.qld.gov.au/environment/land/soil/salinity/ .

Additional Notes:

- Salinity is a significant limitation for plantation timber species, particularly Blackbutt, Spotted Gum and Gympie Messmate.

Sa - Salinity

Limitation Value	Description	Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L	Grp M	Grp N	Grp O	Grp P
		Suitability subclasses for various land management options															
1	No salinity or salinity <2dS/m ECse	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
2	Dominantly slightly saline (2-4 dS/m ECse)	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	4
3	Dominantly moderately saline (4-8 dS/m ECse)	1	1	2	2	3	4	2	3	3	4	5	4	5	4	5	5
4	Dominantly severely saline (>8 dS/m ECse)	2	3	3	4	4	4	3	4	5	5	5	5	5	5	5	5

Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L	Grp M	Grp N	Grp O	Grp P
Barley-Dryland	Rhodes Grass-Dryland	Leucaena-Dryland	Forage Sorghum-Dryland	Beetroot-Irrigated	Oats-Dryland	Kikuyu-Dryland	Green Panic-Dryland	Asian Vegetables-Irrigated	Turf-Irrigated	Carrots-Irrigated	Dunn's White Gum-Dryland	Capsicum-Irrigated	Improved Pasture Legumes-Dryland	Citrus-Irrigated	Avocados-Irrigated
		Native Pasture	Sorghum-Dryland	Chickpeas-Dryland			Rye Grass-Dryland	Brassicas-Irrigated		Cucurbits-Irrigated	Hoop Pine-Dryland	Green Beans-Irrigated			Blackbutt-Dryland
			Wheat-Dryland	Lucerne-Irrigated				Broccoli-Irrigated		Lettuce-Irrigated	Maize-Dryland				Gympie Messmate-Dryland
				Soybeans-Irrigated						Onions-Irrigated					Spotted Gum-Dryland
				Summer Pulses-Dryland						Potatoes-Irrigated					
										Sweet Corn-Irrigated					
										Tomato-Irrigated					

Microrelief (Tm)

Microrelief such as melon holes, swamp hummock, rills and small gullies cause irregular and reduced crop productivity. This is mainly as a result of uneven water distribution (e.g. water ponding in depressions), irregular cultivation and impeded trafficability. Effects associated with the presence of microrelief such as temporary waterlogging and poor surface condition are covered in the wetness (W) and soil physical (Ps) limitations respectively.

The vertical interval (VI) of the microrelief typically dictates the amount of levelling required and/or the potential for reduced productivity. Therefore VI was used to determine the severity of the limitation.

Limitation class determination
Land resource surveys, consultation with agronomic extension staff and local landholder experience.

Tm – Microrelief

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
0	No microrelief.	1	1	1	1
1	Microrelief with a vertical interval <0.3m.	2	1	1	3
2	Microrelief with a vertical interval 0.3-0.5m.	3	2	2	4
3	Microrelief with a vertical interval >0.5m.	4	2	3	5

Group A	Group B	Group C	Group D
Lettuce-Irrigated	Green Panic-Dryland	Blackbutt-Dryland	Asian Vegetables-Irrigated
Avocados-Irrigated	Improved Pasture Legumes-Dryland	Dunn's White Gum-Dryland	Beetroot-Irrigated
Chickpeas-Dryland	Kikuyu-Dryland	Gympie Messmate-Dryland	Brassicas-Irrigated
Citrus-Irrigated	Leucaena-Dryland	Hoop Pine-Dryland	Broccoli-Irrigated
Forage Sorghum-Dryland	Native Pasture	Spotted Gum-Dryland	Capsicum-Irrigated
Lucerne-Irrigated	Rhodes Grass-Dryland		Carrots-Irrigated
Maize-Dryland	Rye Grass-Dryland		Cucurbits-Irrigated
Oats-Dryland			Green Beans-Irrigated
Sorghum-Dryland			Onions-Irrigated
Soybeans-Irrigated			Potatoes-Irrigated
Summer Pulses-Dryland			Sweet Corn-Irrigated
Wheat-Dryland			Tomato-Irrigated
			Turf-Irrigated

Topography (Ts)

The safety and/or efficiency of farm vehicle/machinery operation are affected by:

- steep gradients, specifically rolling and side-slip hazards; and
- erosion control layouts on land with significant variability in the degree and direction of slopes (e.g. complex slopes). It is particularly important with row crops where final layouts on such lands would necessitate impractical short rows and sharp curves.

Limitation class determination
Consultation with Workplace, Health and Safety guidelines and landholder experience were used to determine the upper slope limit for safe machinery operation over a range of land uses. Farmer tolerance to short row length and the inability of trailing implements to effectively negotiate curves with less than 30m radius were also considered.

Additional Notes:

- Where tillage forms part of normal management within the crop cycle, a slope limit of 15% was recognised as the upper limit for acceptable machinery use.
- However, where contour based or cross slope sward management is practised in horticultural situations (e.g. tree and vine orchards) slopes of 20% were considered manageable.
- In commercial hardwood timber production, most plantations are on slopes <25%. However, steeper slopes can be utilised with hand planting and specialised machinery for harvesting operations (e.g. cable logging) allowing steeper slope limits up to 35%.
- Where spraying and harvesting operations in horticultural tree and vine crops can be carried out directly up and down slopes, a maximum slope limit of 25% is considered manageable for safe machinery operation.

Ts – Topography

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I
		Suitability subclasses for various land management options								
1	Slope <5%	1	1	1	1	1	1	1	1	1
2	Slope 5-8%	1	1	1	1	1	1	2	3	3
3	Slope 8-12%	1	1	1	1	2	2	2	4	4
4	Slope 12-15%	1	2	2	2	3	4	4	4	5
5	Slope 15-20%	2	2	3	3	4	5	5	5	5
6	Slope 20-30%	3	3	4	5	5	5	5	5	5
7	Slope >30%	4	3	5	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I
Native Pasture	Blackbutt-Dryland	Kikuyu-Dryland	Green Panic-Dryland	Avocados-Irrigated	Chickpeas-Dryland	Turf-Irrigated	Asian Vegetables-Irrigated	Sweet Corn-Irrigated
	Dunn's White Gum-Dryland		Improved Pasture Legumes-Dryland	Citrus-Irrigated	Forage Sorghum-Dryland		Beetroot-Irrigated	
	Gympie Messmate-Dryland		Leucaena-Dryland		Lucerne-Irrigated		Brassicas-Irrigated	
	Hoop Pine-Dryland		Rhodes Grass-Dryland		Maize-Dryland		Broccoli-Irrigated	
	Spotted Gum-Dryland		Rye Grass-Dryland		Oats-Dryland		Capsicum-Irrigated	
					Sorghum-Dryland		Carrots-Irrigated	
					Soybeans-Irrigated		Cucurbits-Irrigated	
					Summer Pulses-Dryland		Green Beans-Irrigated	
					Wheat-Dryland		Lettuce-Irrigated	
							Onions-Irrigated	
							Potatoes-Irrigated	
							Tomato-Irrigated	

Wetness (W)

Waterlogged soils reduce plant growth and delay effective machinery operations.

Limitation category determination
Crop tolerance information, consultation with agronomic extension staff and local landholder experience were used in determining the severity of this limitation. The effects of delayed machinery operations have also been considered.

Additional Notes:

- Imperfectly drained soils (3H, 3M, 3S, 3V) significantly affect plant growth for many crops and are usually the soils where mounding is important. Mounding is a common management practice for tree crops.
- Crops requiring a minimum drained soil depth of **1.5m** are restricted to: Avocados.
- Crops requiring a minimum drained soil depth of **1.0m** are restricted to: Citrus.
- All remaining crops require a minimum drained soil depth of **0.5m**.

W1 wetness to 1.0m

Limitation		Suitability subclasses for various land management options
Value	**Description**	**Group A**
6	Rapidly drained	1
5	Well drained	1
4H	Moderately well drained and highly permeable	1
4M	Moderately well drained and moderately permeable	2
4S	Moderately well drained and slowly permeable	3
4V	Moderately well drained and very slowly permeable	3
3H	Imperfectly drained and highly permeable	3
3M	Imperfectly drained and moderately permeable	4
3S	Imperfectly drained and slowly permeable	4
3V	Imperfectly drained and very slowly permeable	4
0	Poorly to very poorly drained	5

Group A
Citrus-Irrigated

W2 wetness to 0.5m

Limitation Value	Description	Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L	Grp M	Grp N
		Suitability subclasses for various land management options													
6	Rapidly drained	1	1	1	1	1	1	1	1	1	1	1	2	2	1
5	Well drained	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4H	Moderately well drained and highly permeable	1	1	1	1	1	2	2	2	2	2	2	1	2	3
4M	Moderately well drained and moderately permeable	1	1	1	2	2	2	2	2	2	2	3	2	3	3
4S	Moderately well drained and slowly permeable	1	1	2	2	3	2	2	2	2	3	3	2	3	3
4V	Moderately well drained and very slowly permeable	1	1	2	3	3	2	2	2	2	3	3	3	3	3
3H	Imperfectly drained and highly permeable	2	2	2	3	3	2	2	2	3	3	3	3	3	4
3M	Imperfectly drained and moderately permeable	2	2	3	3	3	3	3	3	3	3	4	3	4	4
3S	Imperfectly drained and slowly permeable	2	2	3	3	4	3	3	3	3	4	4	3	4	4
3V	Imperfectly drained and very slowly permeable	2	2	4	4	4	3	4	4	4	4	5	4	5	4
2H	Poorly drained and highly permeable	3	3	3	4	5	3	3	4	4	4	4	4	4	4
2M	Poorly drained and moderately permeable	3	3	3	4	5	3	4	4	4	5	5	4	5	4
2S	Poorly drained and slowly permeable	3	3	4	5	5	4	5	4	5	5	5	5	5	5
2V	Poorly drained and very slowly permeable	3	4	5	5	5	5	5	5	5	5	5	5	5	5
1H	Very poorly drained and highly permeable	4	3	4	5	5	4	5	4	5	5	5	5	5	5
1M	Very poorly drained and moderately permeable	4	3	4	5	5	5	5	5	5	5	5	5	5	5
1S	Very poorly drained and slowly permeable	4	4	5	5	5	5	5	5	5	5	5	5	5	5
1V	Very poorly drained and very slowly permeable	4	5	5	5	5	5	5	5	5	5	5	5	5	5

Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L	Grp M	Grp O	Grp N
Leucaena-Dryland	Native Pasture	Rye Grass-Dryland	Forage Sorghum-Dryland		Asian Vegetables-Irrigated	Kikuyu-Dryland	Improved Pasture Legumes-Dryland	Green Panic-Dryland	Barley-Dryland	Chickpeas-Dryland	Summer Pulses-Dryland	Lucerne-Irrigated	Soybeans-Irrigated	Blackbutt-Dryland
		Dunn's White Gum-Dryland	Maize-Dryland		Beetroot-Irrigated	Rhodes Grass-Dryland			Oats-Dryland					Gympie Messmate-Dryland
			Sorghum-Dryland		Brassicas-Irrigated				Wheat-Dryland					Hoop Pine-Dryland
					Broccoli-Irrigated									Spotted Gum-Dryland
					Capsicum-Irrigated									
					Carrots-Irrigated									
					Cucurbits-Irrigated									
					Green Beans-Irrigated									
					Lettuce-Irrigated									
					Onions-Irrigated									
					Potatoes-Irrigated									
					Sweet Corn-Irrigated									
					Tomato-Irrigated									
					Turf-Irrigated									

W3 wetness to 1.5m

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
6	Rapidly drained	1
5	Well drained	1
4H	Moderately well drained and highly permeable	2
4M	Moderately well drained and moderately permeable	2
4S	Moderately well drained and slowly permeable	3
4V	Moderately well drained and very slowly permeable	4
3H	Imperfectly drained and highly permeable	4
3M	Imperfectly drained and moderately permeable	4
3S	Imperfectly drained and slowly permeable	5
3V	Imperfectly drained and very slowly permeable	5
0	Poorly to very poorly drained	5

Group A
Avocados-Irrigated

Landscape complexity (X)

This limitation assessed the effect soil complexity and/or topographic dissection may have on the size or shape of an area of suitable land. A 'minimum production area' is defined as the minimum area of land that is practicable to utilise for a particular land use.

Limitation class determination
The minimum production area for each land use was determined by consultation with agronomic extension staff and landholders. The suitability may be modified according to the proximity and extent of surrounding non-contiguous suitable land.

Additional Notes:

- The minimum practical area for forestry has been assessed for economic purposes, and not for amenity or environmental values (e.g. salinity, wind breaks, noise barriers).
- Landscape complexity has most effect on broad acre crops that require large paddock sizes for efficiency (e.g. forage crops, commercial timber). Lot size is not considered.

X – Landscape complexity

Limitation		Suitability subclasses for various land management options										
Value	**Description**	**Group A**	**Group B**	**Group C**	**Group D**	**Group E**	**Group F**	**Group G**	**Group H**	**Group I**	**Group J**	**Group K**
1	Minimal practical production area >10ha	1	1	1	1	1	1	1	1	1	1	1
2	Minimal practical production area 5-10ha	1	1	1	1	1	1	1	1	4	3	1
3	Minimal practical production area 2.5-5ha	1	1	1	1	2	2	4	1	5	4	1
4	Minimal practical production area 1.5-2.5ha	1	2	2	3	3	4	5	3	5	4	4
5	Minimal practical production area <1.5ha	1	4	3	4	4	5	5	5	5	5	4

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K
Asian Vegetables-Irrigated	Green Panic-Dryland	Beetroot-Irrigated	Onions-Irrigated	Avocados-Irrigated	Green Beans-Irrigated	Lucerne-Irrigated	Potatoes-Irrigated	Barley-Dryland	Blackbutt-Dryland	Carrots-Irrigated
	Pasture Legumes-Dryland	Brassicas-Irrigated		Citrus-Irrigated	Sweet Corn-Irrigated			Chickpeas-Dryland	Dunn's White Gum-Dryland	
	Kikuyu-Dryland	Broccoli-Irrigated						Forage Sorghum-Dryland	Gympie Messmate-Dryland	
Improved	Dryland	Capsicum-Irrigated						Maize-Dryland	Hoop Pine-Dryland	
	Native Pasture	Cucurbits-Irrigated						Oats-Dryland	Spotted Gum-Dryland	
	Rhodes Grass-Dryland	Lettuce-Irrigated						Sorghum-Dryland		
Leucaena-	Rye Grass-Dryland	Tomato-Irrigated						Soybeans-Irrigated		
	Turf-Irrigated							Summer Pulses-Dryland		
								Wheat-Dryland		

4 Suitability framework for the Coastal Burnett area

The following 17 limitations were used to assess land suitability in the Coastal Burnett area.

Land use requirements	Limitations	Soil and land use attributes used to assess each limitation
Frost-free	**Frost (Cf)**	Frequency and severity of frosts (based on position in landscape); crop tolerance.
Avoid environmental harm from acid drainage water from potential acidity	**Acid drainage water hazard potential (Dp)**	Depth to potential acidity, depth to oxidisable sulfur above %S threshold, soil texture.
Minimise soil loss from erosion	**Water erosion (E)**	Erodibility and slope.
Absence of damaging floods	**Flooding (F)**	Frequency of flooding based on position in landscape and historic flood levels.
Minimal deep drainage	**Furrow Irrigation (If)**	Subsoil permeability to 1m and position in landscape.
Adequate water supply	**Soil water availability (M)**	PAWC.
Ease of harvesting and minimal impact on quality of subsurface harvest materials	**Soil adhesiveness (Pa)**	Surface physical condition, texture, structure. Degree of adhesiveness increases as clay content and/or consistency increase and the degree of pedality decreases
Adequate soil depth for physical support	**Soil depth (Pd)**	Depth to hard rock or other impermeable layer, or high salt.
Soils that allow cultivation and tillage at a range of moisture levels	**Narrow Moisture (Pm)**	Surface (<0.3m) physical condition, texture, structure
Ease of seedbed preparation and plant establishment	**Soil surface condition (Ps)**	Surface physical condition, texture, structure.
Rock-free	**Rockiness (R)**	Size (mm) and abundance (%) of coarse fragments, machinery and farmer tolerance of increase size and abundance.
Favourable levels of soluble salts	**Soil salinity (Sa)**	Evidence of surface salinity as indicated by high EC (dS/m) reading, salt crystals or salinity scalds.
Areas free of significant water discharge	**Secondary salinity (Ss)**	Soil permeability, drainage and position in the landscape
Level land surface	**Microrelief (Tm)**	Height of microrelief (gilgai, channel, other) vertical interval.
Land surface of acceptable slope	**Topography (Ts)**	Slope (%) in relation to machinery safety and efficiency.
Adequate soil aeration	**Wetness (W)**	Internal drainage class and soil permeability are assessed in relation to plant rooting depth. Slope and topographic position determine external drainage.
Suitable land is of sufficient size and is not isolated	**Topographic complexity**	The size of the productive area and the level of topographic dissection

Figure 3. Area covered by the Coastal Burnett Suitability framework

Frost (Cf)

Frosts can kill plants, suppress growth and reduce yield.

Limitation class determination
Crop tolerance and local experience has been used to determine the incidence and severity of frosts. Seasonal adaptation of crops is not considered (such as frost tolerance of summer crops).

Additional Information

- Generally incidence and severity of frost is determined by position in the landscape. Hill slopes and rises experience fewer and less severe frosts and are suitable for sensitive crops such as avocados and mangoes. Lower lying areas along creeks and drainage lines may experience regular frosts, limiting suitable crops to deciduous plants such as pecans, low-chill stone fruits, grapes, adaptable small crops and field crops.
- Cucurbits, capsicums and tomatoes are highly susceptible to frost and careful management is required in frost-prone areas to avoid all but occasional, very light frosts.

Cf - Climate, frost

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I
		Suitability subclasses for various land management options								
1	Frost free or occasional light frost (<3 events/yr-hilltops or near coastal areas)	1	1	1	1	1	1	2	3	3
2	Regular light to moderate frosts (= 3 events/yr)	1	2	2	3	3	5	5	3	5
3	Regular severe frosts (= 3 events/yr ? channel benches, depressions in lower terraces)	1	3	4	4	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I
Asparagus-Spray Irrigated	Sugarcane-Dryland	Turf-Spray Irrigated	Beans-Spray Irrigated	Strawberry-Trickle Irrigated	Banana-Trickle Irrigated	Avocado-Microsprinkler Irrigated	Spotted gum-dryland	Gympie messmate-Dryland
Cruciferae-Trickle Irrigated	Sugarcane-Furrow Irrigated		Capsicum-Trickle Irrigated			Macadamia-Dryland		
Grapes-Trickle Irrigated	Sugarcane-Spray Irrigated		Citrus-Microsprinkler Irrigated			Macadamia-Microsprinkler Irrigated		
Improved Pasture-Dryland			Cucurbit-Furrow/row Irrigated			Mango-Microsprinkler Irrigated		
Improved Pastures-Spray Irrigated			Cucurbit-Spray Irrigated					
Lucerne-Spray Irrigated			Lychee-Microsprinkler Irrigated					
Maize-Furrow/row Irrigated			Pineapple-Dryland					
Maize-Spray Irrigated			Pineapple-Spray Irrigated					
Navy Bean-Furrow/row Irrigated			Radiata Pine-Dryland					
Navy Bean-Spray Irrigated			Sweet corn-Furrow/row Irrigated					
Peanut-Furrow/row Irrigated			Sweet corn-Spray Irrigated					
Peanut-Spray Irrigated			Sweet Potato-Spray Irrigated					
Potato-Spray Irrigated			Tomato-Trickle Irrigated					
Sorghum (forage)-Furrow/row Irrigated			Zucchini-Trickle Irrigated					
Sorghum (forage)-Spray Irrigated								
Soybean-Dryland								

Soybean-Furrow/row Irrigated
Soybean-Spray Irrigated
Stone Fruit-Microsprinkler Irrigated

Drainage water hazard from Acid Sulfate Soils (Dp)

Drainage water from acid sulfate soils creates an environmental and soil degradation hazard. When acid sulfate soils (including potential acid sulfate soils) are disturbed or drained, existing acidity and potential acidity from the oxidation of pyrite (FeS_2) allows toxic quantities of acid, aluminium, iron and heavy metals to leach from soils to contaminate waterways. Such contamination can injure and destroy aquatic flora and fauna, affect or kill vegetation and crops, and accelerate structural failure of pipes, foundations, bridges and road surfaces.

Limitation class determination
The depth to:

- PASS (soil material with pH > 4 and oxidisable sulfur levels above the action criteria); or
- AASS (soil material with pH <4 and/or jarosite present); and
- The depth to which drainage is required for a particular land use

Determine the potential for acid drainage water hazard.

Additional Information
- The drained soil depth requirement before intersecting AASS or PASS layers varies between crops. The wetness limitation lists the different requirements for the range of crops.

Dp - Drainage water hazard potential, acid sulfate

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
C1	Light medium to heavy clay soils with depth to oxidisable sulfur layer <0.5m	4	5	5
C2	Light medium to heavy clay soils with depth to oxidisable sulfur layer 0.5-1m	3	4	4
C3	Light medium to heavy clay soils with depth to oxidisable sulfur layer 1- 2m	1	3	3
C4	Light medium to heavy clay soils with depth to oxidisable sulfur layer 2-4m	1	1	2
C5	Light medium to heavy clay soils with depth to oxidisable sulfur layer >4m	1	1	1
L1	Sandy loam to light clay soils with depth to oxidisable sulfur layer <0.5m	4	5	5
L2	Sandy loam to light clay soils with depth to oxidisable sulfur layer 0.5-1m	3	4	4
L3	Sandy loam to light clay soils with depth to oxidisable sulfur layer 1-2m	1	3	3
L4	Sandy loam to light clay soils with depth to oxidisable sulfur layer 2-4m	1	1	2
L5	Sandy loam to light clay soils with depth to oxidisable sulfur layer >4m	1	1	1
N	Not an acid sulfate soil	1	1	1
S1	Sands to loamy sandy soils with depth to oxidisable sulfur layer <0.5m	4	5	5
S2	Sands to loamy sandy soils with depth to oxidisable sulfur layer 0.5-1m	3	4	4
S3	Sands to loamy sandy soils with depth to oxidisable sulfur layer 1-2m	1	3	3
S4	Sands to loamy sandy soils with depth to oxidisable sulfur layer 2-4m	1	1	2
S5	Sands to loamy sandy soils with depth to oxidisable sulfur layer >4m	1	1	1

Group A	Group B	Group C	Group C cont.	Group C cont.
Turf-Spray Irrigated	Gympie messmate-Dryland	Asparagus-Spray Irrigated	Macadamia-Microsprinkler Irrigated	Soybean-Furrow/row Irrigated
	Spotted gum-dryland	Avocado-Microsprinkler Irrigated	Maize-Furrow/row Irrigated	Soybean-Spray Irrigated
		Banana-Trickle Irrigated	Maize-Spray Irrigated	Stone Fruit-Microsprinkler Irrigated
		Beans-Spray Irrigated	Mango-Microsprinkler Irrigated	Strawberry-Trickle Irrigated
		Capsicum-Trickle Irrigated	Navy Bean-Furrow/row Irrigated	Sugarcane-Dryland
		Citrus-Microsprinkler Irrigated	Navy Bean-Spray Irrigated	Sugarcane-Furrow Irrigated
		Cruciferae-Trickle Irrigated	Peanut-Furrow/row Irrigated	Sugarcane-Spray Irrigated
		Cucurbit-Furrow/row Irrigated	Peanut-Spray Irrigated	Sweet corn-Furrow/row Irrigated
		Cucurbit-Spray Irrigated	Pineapple-Dryland	Sweet corn-Spray Irrigated
		Grapes-Trickle Irrigated	Pineapple-Spray Irrigated	Sweet Potato-Spray Irrigated
		Improved Pasture-Dryland	Potato-Spray Irrigated	Tomato-Trickle Irrigated
		Improved Pastures-Spray Irrigated	Radiata Pine-Dryland	Zucchini-Trickle Irrigated
		Lucerne-Spray Irrigated	Sorghum (forage)-Furrow/row Irrigated	
		Lychee-Microsprinkler Irrigated	Sorghum (forage)-Spray Irrigated	
		Macadamia-Dryland	Soybean-Dryland	

Water erosion (E)

Land degradation and long term productivity decline will occur on any unprotected land due to excessive soil erosion.

Limitation class determination
Slope limits were determined in consultation with soil conservation extension and research personnel, and extension and research agronomists.

Additional Information

- Soil loss will depend on soil erodibility and land slope for a particular crop and surface management system. For each soil type there is a maximum slope above which soil loss cannot be reduced to acceptable levels by erosion control measures or surface management practices.
- Tree crops and vine orchards have higher slope limits than other broadacre crops because of the reduced cultivation and increased surface cover.
- Crops with extended crop cycles (such as sugarcane or pineapples) have a higher erosion potential compared to tree and vine crops, but are considered less critical than annual field and horticultural small crops.

Most field crops and horticultural small crops are considered most at risk from erosion due to surface exposure frequency, timing and duration, and tillage; therefore making slope limits more stringent.

E - Water erosion

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K
		Suitability subclasses for various land management options										
A0	Stable soils which are non-sloping	1	1	1	1	1	1	1	1	1	2	3
A1	Stable soils with 0-2% slope	1	1	1	1	2	2	2	2	2	3	3
A2	Stable soils with 2-5% slope	1	2	2	2	3	3	3	3	3	4	3
A3	Stable soils with 5-8% slope	2	3	3	3	4	4	4	4	5	5	3
A4	Stable soils with 8-12% slope	3	4	4	4	4	5	5	5	5	5	3
A5	Stable soils with 12-15% slope	3	4	5	5	5	5	5	5	5	5	3
A6	Stable soils with 15-20% slope	4	5	5	5	5	5	5	5	5	5	3
A7	Stable soils with >20% slope	5	5	5	5	5	5	5	5	5	5	4
B0	Unstable soils which are non-sloping	1	1	1	5	1	1	1	1	2	3	3
B1	Unstable soils with 0-1% slope	1	1	1	1	3	2	2	3	2	3	3
B2	Unstable soils with 1-3% slope	1	2	2	2	4	3	3	4	3	4	3
B3	Unstable soils with 3-5% slope	2	3	3	3	5	4	4	5	4	5	3
B4	Unstable soils with 5-8% slope	3	4	4	4	5	5	5	5	5	5	3
B5	Unstable soils with 8-12% slope	4	5	5	5	5	5	5	5	5	5	3
B6	Unstable soils with 12-15% slope	5	5	5	5	5	4	5	5	5	5	4
E0	Very stable soils which are non-sloping	1	1	1	1	1	1	1	1	1	2	3
E1	Very stable soils with 0-2% slope	1	1	1	1	1	1	1	1	2	3	3
E2	Very stable soils with 2-5% slope	1	2	2	2	2	2	2	3	3	4	3
E3	Very stable soils with 5-8% slope	1	2	2	3	4	3	3	4	4	5	3
E4	Very stable soils with 8-12% slope	2	3	3	4	5	4	4	5	5	5	3
E5	Very stable soils with 12-15% slope	2	4	4	5	5	5	5	5	5	5	3
E6	Very stable soils with 15-20% slope	3	5	5	5	5	5	5	5	4	5	3
E7	Very stable soils with 20-30% slope	4	5	5	5	5	5	5	5	5	5	4
E8	Very stable soils with >30% slope	5	5	5	5	5	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K
Avocado-Microsprinkler Irrigated	Sugarcane-Dryland	Lucerne-Spray Irrigated	Turf-Spray Irrigated	Beans-Spray Irrigated	Strawberry-Trickle Irrigated	Asparagus-Spray Irrigated	Navy Bean-Spray Irrigated	Sugarcane-Furrow Irrigated	Cucurbit-Furrow/ row Irrigated	Gympie messmate-Dryland
Banana-Trickle Irrigated		Sugarcane-Spray Irrigated			Sweet Potato-Spray Irrigated	Capsicum-Trickle Irrigated	Peanut-Spray Irrigated		Maize-Furrow/ row Irrigated	Spotted gum-dryland
Citrus-Microsprinkler Irrigated						Cruciferae-Trickle Irrigated	Potato-Spray Irrigated		Navy Bean-Furrow/ row Irrigated	
Grapes-Trickle Irrigated						Cucurbit-Spray Irrigated	Soybean-Dryland		Peanut-Furrow/ row Irrigated	
Improved Pasture-Dryland						Maize-Spray Irrigated	Soybean-Spray Irrigated		Sorghum (forage)-Furrow/ row Irrigated	
Improved Pastures-Spray Irrigated						Pineapple-Dryland			Soybean-Furrow/ row Irrigated	
Lychee-Microsprinkler Irrigated						Pineapple-Spray Irrigated			Sweet corn-Furrow/ row Irrigated	
Macadamia-Dryland						Sorghum (forage)-Spray Irrigated				
Macadamia-Microsprinkler Irrigated						Sweet corn-Spray Irrigated				
Mango-Microsprinkler Irrigated						Tomato-Trickle Irrigated				
Radiata Pine-Dryland						Zucchini-Trickle Irrigated				
Stone Fruit-Microsprinkler Irrigated										

Flooding (F)

Flood events typically involve inundation from overbank stream flows. Effects of flooding include yield reduction or plant death caused by anaerobic conditions and/or high water temperature and/or silt deposition during inundation. Other effects include physical removal or damage to the crop by flowing water, floodplain erosion and damage to infrastructure such as irrigation equipment.

Limitation class determination
Due to the difficulty of assessing the effects of flooding on individual mapping units, landform position in relation to historical flood flows (i.e. flooding frequency) was used to distinguish between suitable and unsuitable land only in extreme frequency situations or for intolerant crops.

Additional Information

- A suitability subclass of three (3) has been applied in areas where flood frequency is significant, but not extreme and where there is insufficient knowledge. Note: Historical land suitability classification schemes for local projects may have used a suitability subclass of zero (0) instead.
- Sugarcane and many other crops are commonly grown on low-lying areas, despite regular flooding. In such cases, some degree of crop tolerance means the effects of flooding does not detract from the intrinsic value of the land.
- Some tree crops (e.g. citrus, lychees, mangoes) tolerate inundation for periods of about 1 day. This assumes low velocity floodwaters, relatively low silt loads, reasonable water temperatures and rapid internal soil drainage once floodwaters recede.

F - Flooding

Limitation		Suitability subclasses for various land management options						
Value	**Description**	**Group A**	**Group B**	**Group C**	**Group D**	**Group E**	**Group F**	**Group G**
0	No flooding	1	1	1	1	1	1	1
1	Flooding <1 in 10 years (about 1 in 30 to 1 in 50 years)	1	1	1	1	1	1	1
2	Flooding occurs 1 in 2 to 1 in 10 years (about 1 in 5 years)	1	1	1	2	3	3	5
3	Annual flooding (about 1 in 1 to 1 in 2 years)	1	2	3	4	4	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G
Capsicum-Trickle Irrigated	Improved Pasture-Dryland	Turf-Spray Irrigated	Banana-Trickle Irrigated	Asparagus-Spray Irrigated	Beans-Spray Irrigated	Avocado-Microsprinkler Irrigated
Cruciferae-Trickle Irrigated	Improved Pastures-Spray Irrigated		Gympie messmate-Dryland	Maize-Furrow/row Irrigated	Lucerne-Spray Irrigated	Citrus-Microsprinkler Irrigated
Cucurbit-Furrow/row Irrigated			Spotted gum-dryland	Maize-Spray Irrigated	Navy Bean-Furrow/row Irrigated	Grapes-Trickle Irrigated
Cucurbit-Spray Irrigated			Sugarcane-Dryland	Sorghum (forage)-Furrow/row Irrigated	Navy Bean-Spray Irrigated	Lychee-Microsprinkler Irrigated
Potato-Spray Irrigated				Sorghum (forage)-Spray Irrigated	Peanut-Furrow/row Irrigated	Macadamia-Dryland
Sweet Potato-Spray Irrigated				Soybean-Dryland	Peanut-Spray Irrigated	Macadamia-Microsprinkler Irrigated
Tomato-Trickle Irrigated				Soybean-Furrow/row Irrigated	Radiata Pine-Dryland	Mango-Microsprinkler Irrigated
Zucchini-Trickle Irrigated				Soybean-Spray Irrigated	Strawberry-Trickle Irrigated	Pineapple-Dryland
				Sugarcane-Furrow Irrigated		Pineapple-Spray Irrigated
				Sugarcane-Spray Irrigated		Stone Fruit-Microsprinkler Irrigated
				Sweet corn-Furrow/row Irrigated		
				Sweet corn-Spray Irrigated		

Furrow Infiltration (If)

The effects of furrow infiltration relate to the amount of water applied and the rate of application, as furrow irrigation must match the permeability of the soil to minimise deep drainage and to determine suitable furrow length.

Limitation class determination
Limitation classes are related directly to soil permeability, landscape position and whether the site is located within a groundwater area. Hydraulic conductivity (permeability) measurements are required. Indicator attributes for soil permeability include texture, grade and type of structure, sodicity, pH and salt bulge. Furrow irrigation is only suitable on land with gentle slopes and slowly permeable soils, such as cracking clay soils and texture contrast soils. Furrow infiltration was not applied for spray / drip / trickle or micro-sprinkler irrigated crops.

Additional Information

- Where insufficient information was available for class separation, subclass three (3) was applied. Note: Historical land suitability classification schemes for local projects may have used a suitability subclass of zero (0) instead.
- Additional management requirements are associated with short furrows. Long furrow lengths and application times are inappropriate for soils where a significant deep drainage component is likely to occur. This causes excess infiltration, leaching, seepage, wastage of water, and problems with aeration at the head ditch end of the furrows. The most suitable furrow length and field layout for flood irrigation needs to be tailored to the permeability of each soil.
- Deep drainage in recharge areas or undulating landscapes can contribute significantly to watertables in lower landscape positions. The effect of deep drainage on groundwater levels can be managed on very slowly to moderately permeable soils within areas where groundwater is used for irrigation and on level plains with very slowly permeable soils where there is minimal contribution to groundwater levels from the surrounding landscape.
- Where utilising this scheme within a groundwater area (e.g. Monto groundwater area), subclasses have been improved (e.g. by a value of one) to allow for the recycling/reuse of water lost through deep drainage. If not within a groundwater area use the limitation classes for undulating landscapes and level plains.

If - Furrow infiltration, deep drainage

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
HG	Highly permeable subsoils within a groundwater area	4
HP	Highly permeable subsoils on level plains	5
HU	Highly permeable subsoils on undulating ground	5
MG	Moderately permeable subsoils within a groundwater area	3
MP	Moderately permeable subsoils on level plain	4
MU	Moderately permeable subsoils on undulating ground	5
SG	Slowly permeable subsoils within a groundwater area	3
SP	Slowly permeable subsoils on level plains	3
SU	Slowly permeable subsoils on undulating ground	4
VG	Very slowly permeable subsoils within a groundwater area	3
VP	Very slowly permeable subsoils on level plains	3
VU	Very slowly permeable subsoils on undulating ground	3

Group A
Cucurbit-Furrow/row Irrigated
Maize-Furrow/row Irrigated
Navy Bean-Furrow/row Irrigated
Peanut-Furrow/row Irrigated
Sorghum (forage)-Furrow/row Irrigated
Soybean-Furrow/row Irrigated
Sugarcane-Furrow Irrigated
Sweet corn-Furrow/row Irrigated

Soil water availability (M)

Plant yield can be severely affected by periods of water stress, particularly during critical growth periods.

Limitation class determination
Plant available water capacity (PAWC) is used as a measure of the amount of water in a soil available to plants over the rooting depth. PAWC is based on predicted values relating to the frequency of irrigation for spray/furrow irrigation only, as negligible limitations apply to micro-sprinkler or drip irrigation systems where small amounts of water are added frequently. Generally soil texture, structure and clay mineralogy over the effective rooting depth are important attributes affecting PAWC.

Additional Information

- Irrigation frequency considers crop rooting depth, seasonal evapotranspiration rates and the amount of labour and equipment required. For example, irrigated shallow-rooted crops (e.g. cucurbits, sweet corn, sweet potato) are usually irrigated using overhead methods and therefore require more frequent irrigation than deep-rooted crops and greater management inputs than micro-sprinkler or drip systems.
- PAWC has been predicted to the effective rooting depth – i.e. soil depth to decomposing rock, pan, high salt or any impermeable layer. For example: tree crops 1-1.5m; small crops 0.5m; field crops, sugarcane and grapes 1.0m.

M – Soil water availability

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K
		Suitability subclasses for various land management options										
1	>150mm PAWC	1	1	1	1	1	1	1	1	2	3	3
2	125-150mm PAWC	1	1	1	1	1	1	2	2	2	3	3
3	100-125mm PAWC	1	1	1	1	1	2	2	5	2	3	3
4	75-100mm PAWC	1	1	1	1	2	3	2	4	2	3	3
5	50-75mm PAWC	1	2	2	2	3	4	3	5	2	3	4
6	<50mm PAWC	1	3	4	5	4	5	4	5	3	4	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K
Avocado-Microsprinkler Irrigated	Improved Pasture-Dryland	Improved Pastures-Spray Irrigated	Soybean-Dryland	Sugarcane-Furrow Irrigated	Sugarcane-Dryland	Turf-Spray Irrigated	Macadamia-Dryland	Asparagus-Spray Irrigated	Spotted gum-dryland	Gympie messmate-Dryland
Banana-Trickle Irrigated	Radiata Pine-Dryland	Lucerne-Spray Irrigated		Sugarcane-Spray Irrigated				Beans-Spray Irrigated		
Capsicum-Trickle Irrigated		Maize-Furrow/row Irrigated						Cucurbit-Furrow/row Irrigated		
Citrus-Microsprinkler Irrigated		Maize-Spray Irrigated						Cucurbit-Spray Irrigated		
Cruciferae-Trickle Irrigated		Peanut-Furrow/row Irrigated						Navy Bean-Furrow/row Irrigated		
Grapes-Trickle Irrigated		Peanut-Spray Irrigated						Navy Bean-Spray Irrigated		
Lychee-Microsprinkler Irrigated		Pineapple-Dryland						Potato-Spray Irrigated		
Macadamia-Microsprinkler Irrigated		Pineapple-Spray Irrigated						Sweet corn-Furrow/row Irrigated		
Mango-Microsprinkler Irrigated		Sorghum (forage)-Furrow/row Irrigated						Sweet corn-Spray Irrigated		
Stone Fruit-Microsprinkler Irrigated		Sorghum (forage)-Spray Irrigated						Sweet Potato-Spray Irrigated		
Strawberry-Trickle Irrigated		Soybean-Furrow/row Irrigated						Zucchini-Trickle Irrigated		
Tomato-Trickle Irrigated		Soybean-Spray Irrigated								

Soil adhesiveness (Pa)

Adhesive soils affect the recoverability (i.e. cause harvest difficulties) and condition of root crops (i.e. quality of subsurface harvest material).

Limitation class determination
In general the degree of adhesiveness increases as clay content and/or consistency increase and the degree of pedality decreases. Soil germination and seedling development problems are associated with adverse conditions of the surface soil such as hard setting, coarse aggregates and crusting clays - see soil surface condition (Ps).

Additional Information

- Peanut crops ideally require friable soils to enable harvesting machinery to easily lift and remove crops from the soil.
- A majority of the massive surface clay loam soils or poorly to imperfectly drained soils with clay texture surfaces are adhesive to varying degrees.
- Tillage operations may be successfully completed at specific moisture ranges.

Pa - Soil adhesiveness

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
0	No restriction	1	1	1	1
1	Slightly adhesive soils	1	1	1	2
2	Moderately adhesive soils	1	1	2	3
3	Strongly adhesive soils	1	2	3	4

Group A	Group A cont.	Group B	Group C	Group D
Asparagus-Spray Irrigated	Navy Bean-Furrow/row Irrigated	Strawberry-Trickle Irrigated	Potato-Spray Irrigated	Peanut-Furrow/row Irrigated
Avocado-Microsprinkler Irrigated	Navy Bean-Spray Irrigated		Sweet Potato-Spray Irrigated	Peanut-Spray Irrigated
Banana-Trickle Irrigated	Pineapple-Dryland			
Beans-Spray Irrigated	Pineapple-Spray Irrigated			
Capsicum-Trickle Irrigated	Radiata Pine-Dryland			
Citrus-Microsprinkler Irrigated	Sorghum (forage)-Furrow/row Irrigated			
Cruciferae-Trickle Irrigated	Sorghum (forage)-Spray Irrigated			
Cucurbit-Furrow/row Irrigated	Soybean-Dryland			
Cucurbit-Spray Irrigated	Soybean-Furrow/row Irrigated			
Grapes-Trickle Irrigated	Soybean-Spray Irrigated			
Gympie messmate-Dryland	Spotted gum-dryland			
Improved Pasture-Dryland	Stone Fruit-Microsprinkler Irrigated			
Improved Pastures-Spray Irrigated	Sugarcane-Dryland			
Lucerne-Spray Irrigated	Sugarcane-Furrow Irrigated			
Lychee-Microsprinkler Irrigated	Sugarcane-Spray Irrigated			
Macadamia-Dryland	Sweet corn-Furrow/row Irrigated			
Macadamia-Microsprinkler Irrigated	Sweet corn-Spray Irrigated			
Maize-Furrow/row Irrigated	Tomato-Trickle Irrigated			
Maize-Spray Irrigated	Turf-Spray Irrigated			
Mango-Microsprinkler Irrigated	Zucchini-Trickle Irrigated			

Soil depth (Pd)

Shallow soils limit root proliferation and anchorage. Plants may dislodge or become uprooted during strong winds.

Limitation class determination
Consultation with agronomic extension staff and local landholder experience.

Additional Information

- All crops require an adequate depth of soil for physical support of the aerial portion of the plant. Requirements for physical support will increase with crops that have large canopies such as tree crops. Uprooting of trees is particularly a problem on shallow, wet soils during windy conditions.
- Vine crops and some small crops (e.g. tomatoes) are normally trellised and poor lodging due to shallow soil depth is not considered an issue. As such these crops have been treated in the same way as shallow rooted, small crops of low height.

Pd - Soil depth

Limitation Value	Description	Suitability subclasses for various land management options Group A	Group B	Group C	Group D	Group E	Group F	Group G
1	Effective soil depth >1m	1	1	1	1	1	1	1
2	Effective soil depth 0.6-1m	1	1	1	1	2	2	2
3	Effective soil depth 0.4-0.6m	1	1	1	1	3	4	4
4	Effective soil depth 0.3-0.4m	1	1	1	2	4	4	5
5	Effective soil depth <0.3m	1	4	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G
Improved Pastures-Spray Irrigated	Turf-Spray Irrigated	Asparagus-Spray Irrigated	Sugarcane-Dryland	Avocado-Microsprinkler Irrigated	Gympie messmate-Dryland	Radiata Pine-Dryland
		Beans-Spray Irrigated	Sugarcane-Furrow Irrigated	Banana-Trickle Irrigated	Spotted gum-dryland	
		Capsicum-Trickle Irrigated	Sugarcane-Spray Irrigated	Citrus-Microsprinkler Irrigated		
		Cruciferae-Trickle Irrigated		Lychee-Microsprinkler Irrigated		
		Cucurbit-Furrow/row Irrigated		Macadamia-Dryland		
		Cucurbit-Spray Irrigated		Macadamia-Microsprinkler Irrigated		
		Grapes-Trickle Irrigated		Mango-Microsprinkler Irrigated		
		Improved Pasture-Dryland		Stone Fruit-Microsprinkler Irrigated		
		Lucerne-Spray Irrigated				
		Maize-Furrow/row Irrigated				
		Maize-Spray Irrigated				
		Navy Bean-Furrow/row Irrigated				
		Navy Bean-Spray Irrigated				
		Peanut-Furrow/row Irrigated				
		Peanut-Spray Irrigated				
		Pineapple-Dryland				
		Pineapple-Spray Irrigated				
		Potato-Spray Irrigated				
		Sorghum (forage)-Furrow/row Irrigated				
		Sorghum (forage)-Spray Irrigated				
		Soybean-Dryland				
		Soybean-Furrow/row Irrigated				
		Soybean-Spray Irrigated				
		Strawberry-Trickle Irrigated				

Sweet corn-Furrow/row Irrigated
Sweet corn-Spray Irrigated
Sweet Potato-Spray Irrigated
Tomato-Trickle Irrigated
Zucchini-Trickle Irrigated

Narrow moisture range (Pm)

The workability limitation relates to the ease and timeliness with which a soil may be cultivated. Successful soil tillage depends largely on the inherent characteristics of the surface soil as it dries following a wetting cycle and the length of time during which the moisture range of the surface material is appropriate for mechanical disturbance. The time period following rainfall or irrigation during which a soil is capable of being successfully cultivated to achieve favourable seedbed conditions (i.e. adequate depth of ploughed layer and favourable tilth) is known as the tillage window.

Limitation class determination
Some soils have a narrow tillage window while other soils may be cultivated at any time. Such differences relate directly to the inherent morphological properties of the surface soil including texture, structure, sand fraction, clay mineralogy and sub-surface cation chemistry (e.g. soil sodicity to 0.3m). How easily a soil works up and the width of the tillage window become particularly important for crops where land preparation is required to fit a distinct cropping cycle, such as strictly defined planting times. Typically, workability is only an issue for crops that require cultivation on a regular basis (i.e. annually).

Additional Information

- Local landholder or industry experience is a valuable guide to problems associated with certain soils in a district or for particular land uses. Assessment of this limitation attempts to identify soils where only a narrow timeframe exists between when soils are too wet and then too dry to undertake tillage. Assessment is land use specific due to the different tillage requirements of different crops.

Pm - Narrow moisture range

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
0	No restriction	1	1	1
1	Moderate moisture range	1	1	2
2	Narrow moisture range	1	2	3

Group A	Group B	Group C	Group C cont.
Avocado-Microsprinkler Irrigated	Improved Pasture-Dryland	Asparagus-Spray Irrigated	Sweet Potato-Spray Irrigated
Banana-Trickle Irrigated	Improved Pastures-Spray Irrigated	Beans-Spray Irrigated	Tomato-Trickle Irrigated
Citrus-Microsprinkler Irrigated		Capsicum-Trickle Irrigated	Turf-Spray Irrigated
Grapes-Trickle Irrigated		Cruciferae-Trickle Irrigated	Zucchini-Trickle Irrigated
Gympie messmate-Dryland		Cucurbit-Furrow/row Irrigated	
Lychee-Microsprinkler Irrigated		Cucurbit-Spray Irrigated	
Macadamia-Dryland		Lucerne-Spray Irrigated	
Macadamia-Microsprinkler Irrigated		Maize-Furrow/row Irrigated	
Mango-Microsprinkler Irrigated		Maize-Spray Irrigated	
Radiata Pine-Dryland		Navy Bean-Furrow/row Irrigated	
Spotted gum-dryland		Navy Bean-Spray Irrigated	
Stone Fruit-Microsprinkler Irrigated		Peanut-Furrow/row Irrigated	
		Peanut-Spray Irrigated	
		Pineapple-Dryland	
		Pineapple-Spray Irrigated	
		Potato-Spray Irrigated	
		Sorghum (forage)-Furrow/row Irrigated	
		Sorghum (forage)-Spray Irrigated	
		Soybean-Dryland	
		Soybean-Furrow/row Irrigated	
		Soybean-Spray Irrigated	
		Strawberry-Trickle Irrigated	
		Sugarcane-Dryland	
		Sugarcane-Furrow Irrigated	
		Sugarcane-Spray Irrigated	
		Sweet corn-Furrow/row Irrigated	
		Sweet corn-Spray Irrigated	

Soil surface condition (Ps)

Problems with germination and seedling development during crop establishment are typically associated with adverse physical conditions in the surface soil, such as hard setting behaviour, coarse aggregates and crusting.

Limitation class determination
Plant tolerance limits and requirements in relation to germination are matched with soil properties and supported by agronomic experience.

Additional Information

- Crops planted from seed (particularly small seeded grasses or pasture species) are most affected by this limitation. Horticultural small crops such as tomatoes, capsicum and cucurbits, which are planted as seedlings, are less affected. Tree and vine crops, which are planted as large tree seedlings, and also crops planted using vegetative material (e.g. pineapple, sugarcane) are least affected.

Ps - Surface condition

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
		Suitability subclasses for various land management options							
0	No restriction to cultivation, loose consistence	1	1	1	1	1	1	1	1
1	Hardsetting massive soils with sandy loam to clay loam surface textures & dry firm consistency	1	1	1	1	2	2	2	2
2	Hardsetting massive soils with loam fine sandy to clay loam fine sandy textures & dry very firm consistency	1	2	2	2	3	3	3	3
3	Surface crusts present	1	1	2	3	2	2	2	3
4	Large soil aggregate size on surface (>20 mm)	1	2	3	3	2	3	4	4

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
Avocado-Microsprinkler Irrigated	Sugarcane-Dryland	Asparagus-Spray Irrigated	Turf-Spray Irrigated	Potato-Spray Irrigated	Improved Pasture-Dryland	Lucerne-Spray Irrigated	Soybean-Dryland
Banana-Trickle Irrigated	Sugarcane-Furrow Irrigated	Beans-Spray Irrigated		Sweet Potato-Spray Irrigated	Improved Pastures-Spray Irrigated	Navy Bean-Furrow/row Irrigated	Soybean-Furrow/row Irrigated
Citrus-Microsprinkler Irrigated	Sugarcane-Spray Irrigated	Capsicum-Trickle Irrigated				Navy Bean-Spray Irrigated	Soybean-Spray Irrigated
Grapes-Trickle Irrigated		Cruciferae-Trickle Irrigated				Peanut-Furrow/row Irrigated	
Gympie messmate-Dryland		Cucurbit-Furrow/row Irrigated				Peanut-Spray Irrigated	
Lychee-Microsprinkler Irrigated		Cucurbit-Spray Irrigated					
Macadamia-Dryland		Maize-Furrow/row Irrigated					
Macadamia-Microsprinkler Irrigated		Maize-Spray Irrigated					
Mango-Microsprinkler Irrigated		Pineapple-Dryland					
Radiata Pine-Dryland		Pineapple-Spray Irrigated					
Spotted gum-dryland		Sorghum (forage)-Furrow/row Irrigated					
Stone Fruit-Microsprinkler Irrigated		Sorghum (forage)-Spray Irrigated					
		Strawberry-Trickle Irrigated					
		Sweet corn-Furrow/row Irrigated					
		Sweet corn-Spray Irrigated					
		Tomato-Trickle Irrigated					
		Zucchini-Trickle Irrigated					

Rockiness (R)

Coarse fragments (pebbles, gravel, cobbles, stones and boulders) and rock in the plough zone can damage and/or interfere with the efficient use of agricultural machinery, including planting, cultivation and harvesting of crops such as sugarcane, soybeans, root crops, macadamias, some small crops, and annual forage crops.

Limitation class determination
The volume of rock fragments within the soil profile is extremely variable and difficult to estimate for any particular map unit. Assessment of rockiness is based on the size, abundance and distribution of coarse fragments in the soil profile and the proportion of rock outcrop. The limitation increases with the increase in size and/or amount encountered. Limitation classes were determined by way of cons

Additional Information

- Coarse fragments are particles >2 mm and are not continuous with underlying bedrock. Rock is identified as being continuous with bedrock.
- In some areas extensive stone picking operations have occurred in previous years to clear soils for cropping purposes.
- In general, crops which require several cultivations annually and have low harvest heights (chickpeas, navy beans and soy beans) have a low tolerance to rock; root crops (potatoes, peanuts) are very sensitive; and horticultural tree crops can tolerate considerable amounts. However, gravel-sized coarse fragments (<60mm) cause significant problems for macadamias due to similarity in size with nuts (on the ground post-shaking).
- The presence of rock in relation to plant available water capacity (PAWC) is considered in the Soil water availability (M) limitation.

R - Rockiness

Limitation Value	Description	Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L	Grp M
		Suitability subclasses for various land management options												
B1	<2% boulders (>600mm) present	2	3	3	3	3	4	4	4	5	5	5	5	5
B2	2-10% boulders (>600mm) present	3	3	4	4	4	5	5	5	5	5	5	5	5
B3	10-20% boulders (>600mm) present	4	3	5	5	5	5	5	5	5	5	5	5	5
B4	20-50% boulders (>600mm) present	5	4	5	5	5	5	5	5	5	5	5	5	5
B5	50-90% boulders (>600mm) present	5	5	4	5	5	5	5	5	5	5	5	5	5
C1	<2% cobbles (60-200mm) present	1	3	1	1	1	2	2	2	3	4	4	4	5
C2	2-10% cobbles (60-200mm) present	1	3	2	2	2	3	3	3	4	5	5	5	5
C3	10-20% cobbles (60-200mm) present	2	3	3	3	3	4	4	4	5	5	5	5	5
C4	20-50% cobbles (60-200mm) present	3	3	4	4	4	5	5	5	5	5	5	5	5
C5	50-90% cobbles (60-200mm) present	4	4	5	5	5	5	5	5	5	1	5	5	5
G1	<2% gravel (20-60mm) present	1	3	1	1	1	1	1	1	2	1	3	3	4
G2	2-10% gravel (20-60mm) present	1	3	1	1	1	1	2	2	3	2	4	4	5
G3	10-20% gravel (20-60mm) present	1	3	2	1	2	2	3	3	4	3	5	5	5
G4	20-50% gravel (20-60mm) present	2	3	3	2	3	3	4	4	5	4	5	5	5
G5	50-90% gravel (20-60mm) present	3	4	4	3	4	4	5	5	5	5	3	5	5
P1	<2% pebbles 6-20mm	1	3	1	1	1	1	1	1	1	2	2	2	1
P2	2_10% pebbles 6-20mm present	1	3	1	1	1	2	1	1	2	3	3	3	4
P3	10-20% pebbles 6-20mm present	1	3	1	2	1	3	2	2	3	4	4	4	4
P4	20-50% pebbles 6-20mm present	1	3	2	3	2	4	2	3	4	5	5	5	5
P5	50-90% pebbles 6-20mm present	2	4	3	4	3	5	4	4	5	5	5	5	5
R0	No surface rock or course fragments present	1	1	1	1	1	1	1	1	1	1	1	1	1
R1	Rock slab covering <2% of UMA	2	2	3	3	3	4	4	4	5	5	5	5	5
R2	Rock slab covering 2-10% of UMA	3	3	4	4	4	5	5	5	5	5	5	5	5
R3	Rock slab covering 10-20% of UMA	4	5	5	5	5	5	5	5	5	5	5	5	5
R4	Rock slab covering 20-50% of UMA	5	5	5	5	5	5	5	5	5	5	5	5	5
R5	Rock slab covering 50-90% of UMA	5	5	5	5	5	5	5	5	5	5	5	5	5
S1	<2% stones (200-600mm) present	1	3	2	2	2	3	3	3	4	4	5	5	5
S2	2-10% stones (200-600mm) present	2	3	3	3	3	4	4	4	5	5	5	5	5
S3	10-20% stones (200-600mm) present	3	3	4	4	4	5	5	5	5	5	5	5	5
S4	20-50% stones (200-600mm) present	4	4	5	4	5	5	5	5	5	5	5	5	5
S5	50-90% stones (200-600mm) present	5	5	5	5	5	5	5	5	5	5	5	5	5

Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L	Grp M
Avocado-Microsprinkler Irrigated	Gympie messmate-Dryland	Sugarcane-Furrow Irrigated	Banana-Trickle Irrigated	Pineapple-Dryland	Sugarcane-Dryland	Sweet corn-Furrow/row Irrigated	Maize-Furrow/row Irrigated	Asparagus-Spray Irrigated	Strawberry-Trickle Irrigated	Potato-Spray Irrigated	Navy Bean-Furrow/row Irrigated	Turf-Spray Irrigated
Citrus-Microsprinkler Irrigated	Spotted gum-dryland			Pineapple-Spray Irrigated			Maize-Spray Irrigated	Beans-Spray Irrigated		Sweet Potato-Spray Irrigated	Navy Bean-Spray Irrigated	
Grapes-Trickle Irrigated				Radiata Pine-Dryland			Sorghum (forage)-Furrow/row Irrigated	Capsicum-Trickle Irrigated			Peanut-Furrow/row Irrigated	
Improved Pasture-Dryland				Sugarcane-Spray Irrigated			Sorghum (forage)-Spray Irrigated	Cruciferae-Trickle Irrigated			Peanut-Spray Irrigated	
Improved Pastures-Spray Irrigated							Sweet corn-Spray Irrigated	Cucurbit-Furrow/row Irrigated				
Lychee-Microsprinkler Irrigated								Cucurbit-Spray Irrigated				
Macadamia-Dryland								Lucerne-Spray Irrigated				
Macadamia-Microsprinkler Irrigated								Soybean-Dryland				
Mango-Microsprinkler Irrigated								Soybean-Furrow/row Irrigated				
Stone Fruit-Microsprinkler Irrigated								Soybean-Spray Irrigated				
								Tomato-Trickle Irrigated				
								Zucchini-Trickle Irrigated				

Salinity (Sa)

High soluble salts at the surface can severely limit plant growth.

Limitation class determination
Subclass determination is based on the evidence of surface salinity as indicated by high EC (dS/m) reading, salt crystals or salinity scalds.

Additional Information

- Nil.

Sa - Salinity

Limitation		Suitability subclasses for various land management options
Value	**Description**	**Group A**
0	No existing salinity	1
1	Existing salinity	5

Group A		
Asparagus-Spray Irrigated	Peanut-Spray Irrigated	Sweet Potato-Spray Irrigated
Avocado-Microsprinkler Irrigated	Pineapple-Dryland	Tomato-Trickle Irrigated
Banana-Trickle Irrigated	Pineapple-Spray Irrigated	Turf-Spray Irrigated
Beans-Spray Irrigated	Potato-Spray Irrigated	Zucchini-Trickle Irrigated
Capsicum-Trickle Irrigated	Radiata Pine-Dryland	Maize-Spray Irrigated
Citrus-Microsprinkler Irrigated	Sorghum (forage)-Furrow/row Irrigated	Mango-Microsprinkler Irrigated
Cruciferae-Trickle Irrigated	Sorghum (forage)-Spray Irrigated	Navy Bean-Furrow/row Irrigated
Cucurbit-Furrow/row Irrigated	Soybean-Dryland	Navy Bean-Spray Irrigated
Cucurbit-Spray Irrigated	Soybean-Furrow/row Irrigated	Peanut-Furrow/row Irrigated
Grapes-Trickle Irrigated	Soybean-Spray Irrigated	
Gympie messmate-Dryland	Spotted gum-dryland	
Improved Pasture-Dryland	Stone Fruit-Microsprinkler Irrigated	
Improved Pastures-Spray Irrigated	Strawberry-Trickle Irrigated	
Lucerne-Spray Irrigated	Sugarcane-Dryland	
Lychee-Microsprinkler Irrigated	Sugarcane-Furrow Irrigated	
Macadamia-Dryland	Sugarcane-Spray Irrigated	
Macadamia-Microsprinkler Irrigated	Sweet corn-Furrow/row Irrigated	
Maize-Furrow/row Irrigated	Sweet corn-Spray Irrigated	

Secondary salinisation (Ss)

Deep drainage losses from permeable soils, usually higher in the landscape, may cause secondary salinisation downslope.

Limitation class determination
Soil permeability and position in the landscape are used to determine areas of high recharge potential, and the effect that deep drainage may have on watertables downslope. The development of shallow groundwater (and subsequent surface expression in discharge areas) may occur on footslopes/lower slopes where drainage is restricted (e.g. heavy textured, slowly permeable soils, lack of incised drainage etc.). Drainage class, permeability (see wetness) and position in the landscape determine the likelihood of salinisation.

Additional Information

- Intake or recharge areas are those where there is a downward component to groundwater flow near the soil surface. These recharge areas tend to occur upslope and on convex topography often with shallow or permeable soils over fractured rock.
- In discharge (seepage) areas, there is an upward component to groundwater flow near the soil surface which may result in secondary salinisation. Discharge areas frequently occur at breaks of slope, in flat or incised areas or in regions of concave slope.
- The landscape positions and soil permeability drainage combinations where recharge is likely has been removed from this limitation. Many land suitability classification schemes for local projects within the Coastal Burnett have assessed this.

Ss - Outflow potential

		Suitability subclasses for various land management options											
Value	Description	Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L
1HD	Very poorly drained, Highly permeable (>500 mm/day), Drainage depression	5	5	5	5	5	5	5	5	5	5	5	5
1HL	Very poorly drained and highly permeable soils on lower slopes	3	3	3	4	4	4	4	4	4	4	4	4
1HP	Very poorly drained and highly permeable soils on level plain	2	3	3	3	3	3	3	3	3	3	3	3
1MD	Very poorly drained, Moderately permeable (50-500 mm/day), Drainage depression	5	5	5	4	5	5	5	5	5	5	5	5
1ML	Very poorly drained and moderately permeable soils on lower slopes	3	3	3	4	4	4	4	4	4	4	4	4
1MP	Very poorly drained and moderately permeable soils on level plain	2	3	3	3	3	3	3	3	3	3	3	3
1SD	Very poorly drained, Slowly permeable (5-50 mm/day), Drainage depression	5	5	5	5	5	5	5	5	5	5	5	5
1SL	Very poorly drained and slowly permeable soils on lower slopes	3	4	4	4	4	4	4	4	4	4	4	4
1SP	Very poorly drained and slowly permeable soils on level ground	2	3	3	3	3	3	3	3	3	3	3	3
1VD	Very poorly drained, Very slowly permeable (<5mm/day), Drainage depression	5	5	5	5	5	5	5	5	5	5	5	5
1VL	Very poorly drained and very slowly permeable soils on lower slopes	3	5	5	5	3	4	4	4	4	4	4	4
1VP	Very poorly drained and very slowly permeable soils on level ground	2	3	3	2	3	3	3	3	3	3	3	3
2HD	Poorly drained, Highly permeable (>500 mm/day), Drainage depression	5	4	4	5	5	4	5	5	5	5	5	5
2HL	Poorly drained and highly permeable soils on lower slopes	2	3	3	3	3	3	3	3	3	3	3	3
2HP	Poorly drained and highly permeable soils on level ground	1	3	3	2	2	2	1	2	2	2	2	2
2MD	Poorly drained, Moderately permeable (50-500 mm/day), Drainage depression	5	5	5	5	5	5	5	4	5	5	5	5
2ML	Poorly drained and moderately permeable soils on lower slopes	3	3	3	4	4	4	4	4	4	4	4	4
2MP	Poorly drained and moderately permeable soils on level ground	2	3	3	3	3	3	3	3	3	3	3	3
2SD	Poorly drained, Slowly permeable (5-50 mm/day), Drainage depression	5	5	5	5	5	5	5	5	5	5	5	5
2SL	Poorly drained and slowly permeable soils on lower slopes	4	4	4	5	5	5	5	5	5	5	5	5
2SP	Poorly drained and slowly permeable soils on level ground	3	3	3	4	4	4	4	4	4	4	4	4
2VD	Poorly drained, Very slowly permeable (<5mm/day), Drainage depression	5	5	5	5	5	5	5	5	5	5	5	5
2VL	Poorly drained and very slowly permeable soils on lower slopes	5	5	5	5	5	5	5	5	5	5	5	5
2VP	Poorly drained and very slowly permeable soils on level ground	4	3	3	5	4	4	4	4	4	4	4	4
3HD	Imperfectly drained, Highly permeable (>500 mm/day), Drainage depression	5	5	5	5	5	5	5	5	5	5	5	5
3HL	Imperfectly drained and highly permeable soils on lower slopes	1	3	3	2	2	2	2	2	2	2	2	2
3HP	Imperfectly drained and highly permeable soils on level ground	1	3	3	1	1	1	1	1	1	1	1	1
3MD	Imperfectly drained, Moderately permeable (50-500 mm/day), Drainage depression	5	5	5	5	5	5	5	5	4	5	5	5
3ML	Imperfectly drained and moderately permeable soils on lower slopes	2	3	3	3	3	3	3	3	3	3	3	3
3MP	Imperfectly drained and moderately permeable soils on level ground	1	3	3	2	2	2	2	2	2	2	2	2
3SD	Imperfectly drained, Slowly permeable (5-50 mm/day), Drainage depression	5	5	5	5	5	5	5	5	5	5	5	5
3SL	Imperfectly drained and slowly permeable soils on lower slopes	3	3	3	3	4	4	4	4	4	4	4	4

3SP	Imperfectly drained and slowly permeable soils on level ground	2	3	3	3	3	3	3	3	3	3	3	3
3VD	Imperfectly drained, Very slowly permeable (<5mm/day), Drainage depression	5	5	5	5	5	5	5	5	5	4	5	5
3VL	Imperfectly drained and very slowly permeable soils on lower slopes	4	4	4	5	5	5	5	5	5	5	5	5
3VP	Imperfectly drained and very slowly permeable soils on level ground	3	3	3	3	3	3	3	3	3	3	3	3
4HL	Moderately well drained and highly permeable soils on lower slopes	2	2	2	2	2	2	2	2	2	2	2	2
4HP	Moderately well drained and highly permeable soils on level ground	1	3	3	1	1	1	1	1	1	1	1	1
4ML	Moderately well drained and moderately permeable soils on lower slopes	2	2	2	2	2	2	2	2	2	2	2	2
4MP	Moderately well drained and moderately permeable soils on level ground	1	2	3	1	1	1	1	1	1	1	1	1
4SL	Moderately well drained and slowly permeable soils on lower slopes	1	2	3	3	3	3	3	3	3	3	3	3
4SP	Moderately well drained and slowly permeable soils on level ground	1	3	3	2	2	2	2	2	2	2	2	2
4VL	Moderately well drained and very slowly permeable soils on lower slopes	2	3	3	3	3	3	3	3	3	3	2	3
4VP	Moderately well drained and very slowly permeable soils on level ground	1	3	3	2	2	2	2	2	2	2	2	2
5HP	Well drained and highly permeable soils on level ground	1	3	3	1	1	1	1	1	1	1	1	1
5MP	Well drained and moderately permeable soils on level ground	1	3	3	1	1	1	1	1	1	1	1	1
6HP	Rapidly drained and highly permeable soils on level ground	1	3	3	1	1	1	1	1	1	1	1	1

Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L
Radiata Pine-Dry	Spotted gum-Dry	Gympie messmate-Dry	Sweet corn-Spray Irrig	Turf-Spray Irrig	Sugarcane -Furrow Irrig	Grapes-Trickle Irrig	Sweet corn-Furrow/row Irrig	Beans-Spray Irrig	Sweet Potato-Spray Irrig	Zucchini-Trickle Irrig	Asparagus-Spray Irrig Avocado-Microsprinkler Irrig Banana-Trickle Irrig Capsicum-Trickle Irrig Citrus-Microsprinkler Irrig Cruciferae-Trickle Irrig Cucurbit-Furrow/row Irrig Cucurbit-Spray Irrig Improved Pasture-Dry Improved Pastures-Spray Irrig Lucerne-Spray Irrig Lychee-Microsprinkler Irrig Macadamia-Dry Macadamia-Microsprinkler Irrig Maize-Furrow/row Irrig Maize-Spray Irrig Mango-Microsprinkler Irrig Navy Bean-Furrow/row Irrig Navy Bean-Spray Irrig Peanut-Furrow/row Irrig Peanut-Spray Irrig

Pineapple-Dry
Pineapple-Spray Irrig
Potato-Spray Irrig
Sorghum (forage)-Furrow/row Irrig
Sorghum (forage)-Spray Irrig
Soybean-Dry
Soybean-Furrow/row Irrig
Soybean-Spray Irrig
Stone Fruit-Microsprinkler Irrig
Strawberry-Trickle Irrig
Sugarcane-Dry
Sugarcane-Spray Irrig
Tomato-Trickle Irrig

Microrelief (Tm)

Uneven ground surface (e.g. gilgai) can cause uneven and lower productivity due to irregular water distribution (e.g. ponding in depressions), irregular cultivation and impeded trafficability.

Limitation class determination
The vertical interval of microrelief typically dictates the amount of levelling required and/or the potential for reduced productivity. Therefore the vertical interval is used to determine the severity of the limitation. Limitation class was determined by way of land resource surveys, consultation with agronomic extension staff and local landholder experience.

Additional Information

- Microrelief includes: gilgai, channels, melon holes, swamp hummock, rills and small gullies.
- Effects associated with the presence of microrelief such as temporary waterlogging and poor surface condition are covered in the Wetness (W) and soil surface condition (Ps) limitations respectively.

Tm - Microrelief

Limitation		Suitability subclasses for various land management options		
Value	Description	Group A	Group B	Group C
0	No surface microrelief	1	1	1
1	Microrelief with a vertical interval <0.3m	1	2	3
2	Microrelief with a vertical interval 0.3-0.5m	2	3	4
3	Microrelief with a vertical interval >0.5m	3	4	5

Group A	Group B	Group C	Group C cont.
Gympie messmate-Dryland	Turf-Spray Irrigated	Asparagus-Spray Irrigated	Peanut-Furrow/row Irrigated
Spotted gum-dryland		Avocado-Microsprinkler Irrigated	Peanut-Spray Irrigated
		Banana-Trickle Irrigated	Pineapple-Dryland
		Beans-Spray Irrigated	Pineapple-Spray Irrigated
		Capsicum-Trickle Irrigated	Potato-Spray Irrigated
		Citrus-Microsprinkler Irrigated	Radiata Pine-Dryland
		Cruciferae-Trickle Irrigated	Sorghum (forage)-Furrow/row Irrigated
		Cucurbit-Furrow/row Irrigated	Sorghum (forage)-Spray Irrigated
		Cucurbit-Spray Irrigated	Soybean-Dryland
		Grapes-Trickle Irrigated	Soybean-Furrow/row Irrigated
		Improved Pasture-Dryland	Soybean-Spray Irrigated
		Improved Pastures-Spray Irrigated	Stone Fruit-Microsprinkler Irrigated
		Lucerne-Spray Irrigated	Strawberry-Trickle Irrigated
		Lychee-Microsprinkler Irrigated	Sugarcane-Dryland
		Macadamia-Dryland	Sugarcane-Furrow Irrigated
		Macadamia-Microsprinkler Irrigated	Sugarcane-Spray Irrigated
		Maize-Furrow/row Irrigated	Sweet corn-Furrow/row Irrigated
		Maize-Spray Irrigated	Sweet corn-Spray Irrigated
		Mango-Microsprinkler Irrigated	Sweet Potato-Spray Irrigated
		Navy Bean-Furrow/row Irrigated	Tomato-Trickle Irrigated
		Navy Bean-Spray Irrigated	Zucchini-Trickle Irrigated

Topography (Ts)

The safety and/or efficiency of farm vehicle / machinery operation is affected by:

- steep gradients, specifically rolling and side-slip hazards; and
- erosion control layouts on land with significant variability in the degree and direction of slopes (e.g. complex slopes); which is particularly important with row crops where final layouts on such lands would necessitate impractical short rows and sharp curves.

Limitation class determination

- Steepness of slope in relation to safety and efficiency (including local experience and consultation regarding the upper machinery slope limit for various land uses).
- Variation in slope causing short rows in erosion control layouts (and farmer tolerance of short rows)
- Variation in slope direction causing excessive row curvature in erosion control layouts (and inability of tailing implements to effectively negotiate curves with <30m radius).

Additional Information

- Complex slopes are not downgraded. A suitability subclass of three (3) has been applied in areas where tillage and modified erosion control structures have to be applied in lieu of conventional erosional control structures. Note: Historical land suitability classification schemes for local projects may have used a suitability subclass of zero (0) instead.

Ts - Slope

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C	Group D	Group E	Group F
0	Slope 0-15%,use heavy machinery with caution	1	1	1	1	1	3
1	Slope 15-20%,use heavy machinery with extreme caution	1	2	4	4	4	3
2	Slope 20-30%, heavy machinery not safe to use	2	4	4	5	5	3
3	Slope >30%, heavy machinery not safe to use	5	5	5	5	5	5
C	Complex slopes 0-15%	1	1	3	1	3	3

Group A	Group B	Group C	Group D	Group E	Group F
Improved Pasture-Dryland	Avocado-Microsprinkler Irrigated	Soybean-Dryland	Strawberry-Trickle Irrigated	Asparagus-Spray Irrigated	Gympie messmate-Dryland
Improved Pastures-Spray Irrigated	Banana-Trickle Irrigated		Sugarcane-Dryland	Beans-Spray Irrigated	Spotted gum-dryland
	Citrus-Microsprinkler Irrigated			Capsicum-Trickle Irrigated	
	Grapes-Trickle Irrigated			Cruciferae-Trickle Irrigated	
	Lychee-Microsprinkler Irrigated			Cucurbit-Furrow/row Irrigated	
	Macadamia-Dryland			Cucurbit-Spray Irrigated	
	Macadamia-Microsprinkler Irrigated			Lucerne-Spray Irrigated	
	Mango-Microsprinkler Irrigated			Maize-Furrow/row Irrigated	
	Radiata Pine-Dryland			Maize-Spray Irrigated	
	Stone Fruit-Microsprinkler Irrigated			Navy Bean-Furrow/row Irrigated	
				Navy Bean-Spray Irrigated	
				Peanut-Furrow/row Irrigated	
				Peanut-Spray Irrigated	
				Pineapple-Dryland	
				Pineapple-Spray Irrigated	
				Potato-Spray Irrigated	
				Sorghum (forage)-Furrow/row Irrigated	
				Sorghum (forage)-Spray Irrigated	
				Soybean-Furrow/row Irrigated	
				Soybean-Spray Irrigated	
				Sugarcane-Furrow Irrigated	
				Sugarcane-Spray Irrigated	
				Sweet corn-Furrow/row Irrigated	
				Sweet corn-Spray Irrigated	
				Sweet Potato-Spray Irrigated	
				Tomato-Trickle Irrigated	
				Turf-Spray Irrigated	
				Zucchini-Trickle Irrigated	

Wetness (W1, W2, W3)

Waterlogged soils reduce plant growth and delay effective machinery operations.

Limitation class determination
Internal and external drainage are assessed. Indicator attributes of internal drainage include texture, grade and type of structure, colour, mottles, segregations and impermeable layers. Drainage class and soil permeability are assessed in relation to plant rooting depth. Slope and topographic position determine external drainage. Limitation classes have been determined by way of consultation with agronomic extension staff and local landholders, crop tolerance information and the effects of delays in machinery operation.

Additional Information

- Imperfectly drained soils significantly affect plant growth for many crops and are usually the soils where mounding is important. Mounding is a standard management practice for tree crops.

W1 - Wetness to 1m

Limitation		Suitability subclasses for various land management options			
Value	**Description**	**Group A**	**Group B**	**Group C**	**Group D**
6H	The top 100cm of the soil is rapidly drained/highly permeable	1	1	2	1
6M	The top 100cm of the soil is rapidly drained/moderately permeable	1	1	1	1
5H	The top 100cm of the soil is well drained/highly permeable	1	1	1	1
5M	The top 100cm of the soil is well drained/moderately permeable	1	1	2	2
5S	The top 100cm of the soil is well drained/slowly permeable	1	1	1	2
4H	The top 100cm of the soil is moderately well drained/highly permeable	1	1	2	2
4M	The top 100cm of the soil is moderately well drained/moderately permeable	1	2	3	3
4S	The top 100cm of the soil is moderately well drained/slowly permeable	2	3	4	4
4V	The top 100cm of the soil is moderately well drained/very slowly permeable	2	3	4	4
3H	The top 100cm of the soil is imperfectly drained/highly permeable	2	2	3	3
3M	The top 100cm of the soil is imperfectly drained/moderately permeable	2	3	4	4
3S	The top 100cm of the soil is imperfectly drained/slowly permeable	3	4	5	5
3V	The top 100cm of the soil is imperfectly drained/very slowly permeable	4	4	5	5
2H	The top 100cm of the soil is poorly drained/highly permeable	3	5	5	5
2M	The top 100cm of the soil is poorly drained/moderately permeable	3	5	5	5
2S	The top 100cm of the soil is poorly drained/slowly permeable	4	5	5	5
2V	The top 100cm of the soil is poorly drained/very slowly permeable	5	5	5	5
1H	The top 100cm of the soil is very poorly drained/highly permeable	5	5	5	5
1M	The top 100cm of the soil is very poorly drained/moderately permeable	5	5	5	5
1S	The top 100cm of the soil is very poorly drained/slowly permeable	5	5	5	5
1V	The top 100cm of the soil is very poorly drained/very slowly permeable	5	5	5	5
1V	The top 100cm of the soil is very poorly drained/very slowly permeable	5	5	5	5

Group A	Group B	Group B cont.	Group C	Group D
Radiata Pine-Dryland	Maize-Furrow/row Irrigated	Sweet corn-Furrow/row Irrigated	Grapes-Trickle Irrigated	Lucerne-Spray Irrigated
	Maize-Spray Irrigated	Sweet corn-Spray Irrigated		Stone Fruit-Microsprinkler Irrigated
	Sorghum (forage)-Furrow/row Irrigated			
	Sorghum (forage)-Spray Irrigated			
	Soybean-Dryland			
	Soybean-Furrow/row Irrigated			
	Soybean-Spray Irrigated			

W2 - Wetness to 0.5m

Limitation		Suitability subclasses for various land management options					
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
6H	The top 50cm of the soil is rapidly drained/highly permeable	1	1	1	1	1	1
6M	The top 50cm of the soil is rapidly drained/moderately permeable	1	1	1	1	1	1
5H	The top 50cm of the soil is well drained/highly permeable	1	1	1	1	1	1
5M	The top 50cm of the soil is well drained/moderately permeable	1	1	1	1	2	1
4H	The top 50cm of the soil is moderately well drained/highly permeable	1	1	1	1	2	4
4M	The top 50cm of the soil is moderately well drained/moderately permeable	1	2	2	2	3	4
4S	The top 50cm of the soil is moderately well drained/slowly permeable	2	2	3	3	4	4
4V	The top 50cm of the soil is moderately well drained/very slowly permeable	2	2	3	3	4	4
3H	The top 50cm of the soil is imperfectly drained/highly permeable	2	2	2	3	3	5
3M	The top 50cm of the soil is imperfectly drained/moderately permeable	2	2	3	4	4	5
3S	The top 50cm of the soil is imperfectly drained/slowly permeable	3	3	4	4	5	5
3V	The top 50cm of the soil is imperfectly drained/very slowly permeable	3	3	4	4	5	5
2H	The top 50cm of the soil is poorly drained/highly permeable	3	4	5	5	5	5
2M	The top 50cm of the soil is poorly drained/moderately permeable	3	4	5	5	5	5
2S	The top 50cm of the soil is poorly drained/slowly permeable	4	5	5	5	5	5
2V	The top 50cm of the soil is poorly drained/very slowly permeable	4	5	5	5	5	5
1M	The top 50cm of the soil is very poorly drained/moderately permeable	4	5	5	5	5	5
1S	The top 50cm of the soil is very poorly drained/slowly permeable	5	5	5	5	5	5
1V	The top 50cm of the soil is very poorly drained/very slowly permeable	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F
Improved Pasture-Dryland	Banana-Trickle Irrigated	Asparagus-Spray Irrigated	Spotted gum-dryland	Beans-Spray Irrigated	Gympie messmate-Dryland
Improved Pastures-Spray Irrigated		Capsicum-Trickle Irrigated		Navy Bean-Furrow/row Irrigated	
Sugarcane-Dryland		Cruciferae-Trickle Irrigated		Navy Bean-Spray Irrigated	
Sugarcane-Furrow Irrigated		Cucurbit-Furrow/row Irrigated		Peanut-Furrow/row Irrigated	
Sugarcane-Spray Irrigated		Cucurbit-Spray Irrigated		Peanut-Spray Irrigated	
Turf-Spray Irrigated		Pineapple-Dryland			
		Pineapple-Spray Irrigated			
		Potato-Spray Irrigated			
		Strawberry-Trickle Irrigated			
		Sweet Potato-Spray Irrigated			
		Tomato-Trickle Irrigated			
		Zucchini-Trickle Irrigated			

W3 - Wetness to 1.5m

Limitation		Suitability subclasses for various land management options				
Value	**Description**	**Group A**	**Group B**	**Group C**	**Group D**	**Group E**
6H	The top 150cm of the soil is rapidly drained/highly permeable	1	1	1	2	1
5H	The top 150cm of the soil is well drained/highly permeable	1	1	1	1	2
5M	The top 150cm of the soil is well drained/moderately permeable	1	1	2	2	3
5S	The top 150cm of the soil is well drained/slowly permeable	1	1	2	2	3
4H	The top 150cm of the soil is moderately well drained/highly permeable	1	1	2	2	3
4M	The top 150cm of the soil is moderately well drained/moderately permeable	1	2	3	3	4
4S	The top 150cm of the soil is moderately well drained/slowly permeable	2	3	4	4	5
4V	The top 150cm of the soil is moderately well drained/very slowly permeable	2	3	4	4	5
3H	The top 150cm of the soil is imperfectly drained/highly permeable	2	2	3	3	4
3M	The top 150cm of the soil is imperfectly drained/moderately permeable	2	3	4	4	5
3S	The top 150cm of the soil is imperfectly drained/slowly permeable	3	4	5	5	5
3V	The top 150cm of the soil is imperfectly drained/very slowly permeable	3	4	5	5	5
2H	The top 150cm of the soil is poorly drained/highly permeable	3	3	5	5	5
2M	The top 150cm of the soil is poorly drained/moderately permeable	3	4	5	5	5
2S	The top 150cm of the soil is poorly drained/slowly permeable	4	5	5	5	5
2V	The top 150cm of the soil is poorly drained/very slowly permeable	4	5	5	5	5
1H	The top 150cm of the soil is very poorly drained/highly permeable	5	5	5	5	5
1M	The top 150cm of the soil is very poorly drained/moderately permeable	5	5	5	5	5
1S	The top 150cm of the soil is very poorly drained/slowly permeable	5	5	5	5	5
1V	The top 150cm of the soil is very poorly drained/very slowly permeable	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E
Lychee-Microsprinkler Irrigated	Mango-Microsprinkler Irrigated	Citrus-Microsprinkler Irrigated Macadamia-Microsprinkler Irrigated	Macadamia-Dryland	Avocado-Microsprinkler Irrigated

Landscape complexity (X)

An area of suitable land may be too small to justify its use as an isolated production area for a particular land use. This occurs where there is soil complexity or topographic dissection.

Limitation class determination
The minimum production areas for each land use are determined by consultation. The suitability may be modified according to the proximity and extent of non-contiguous suitable land.

Additional Information

- Landscape complexity has most effect on broad acre crops that require large paddock sizes for efficiency (e.g., sugarcane, forage crops, commercial timber). Surveyed lot size is not considered.
- When the area of contiguous suitable soil in a UMA is less than a minimum production area, the area of any contiguous suitable soil in adjacent UMAs is also included in the assessment of the minimum production area. Distance to adjoining irrigation and/or other infrastructure is important, for example, if greater than 0.5km, suitability is downgraded.

X - Landscape complexity

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
		Suitability subclasses for various land management options									
0	Minimum practical production area >10 hectares	1	1	1	1	1	1	1	1	1	1
1	Minimum practical production area 5-10 hectares	1	1	1	1	1	1	1	1	1	4
2	Minimum practical production area 2.5-5 hectares	1	1	1	1	1	2	3	4	4	5
3	Minimum practical production area 1.5-2.5 hectares	1	1	1	2	2	3	4	5	5	5
4	Minimum practical production area <1.5 hectares	1	2	4	3	4	4	5	3	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
Improved Pasture-Dryland	Turf-Spray Irrigated	Asparagus-Spray Irrigated	Avocado-Microsprinkler Irrigated	Banana-Trickle Irrigated	Cucurbit-Furrow/row Irrigated	Lucerne-Spray Irrigated	Gympie messmate-Dryland	Radiata Pine-Dryland	Maize-Furrow/row Irrigated
Improved Pastures-Spray Irrigated		Beans-Spray Irrigated	Citrus-Microsprinkler Irrigated		Cucurbit-Spray Irrigated	Sugarcane-Dryland		Spotted gum-dryland	Maize-Spray Irrigated
		Capsicum-Trickle Irrigated	Grapes-Trickle Irrigated		Potato-Spray Irrigated	Sugarcane-Furrow Irrigated			Navy Bean-Furrow/row Irrigated
		Cruciferae-Trickle Irrigated	Lychee-Microsprinkler Irrigated			Sugarcane-Spray Irrigated			Navy Bean-Spray Irrigated
		Sweet corn-Furrow/row Irrigated	Macadamia-Dryland						Peanut-Furrow/row Irrigated
		Sweet corn-Spray Irrigated	Macadamia-Microsprinkler Irrigated						Peanut-Spray Irrigated
		Sweet Potato-Spray Irrigated	Mango-Microsprinkler Irrigated						Sorghum (forage)-Furrow/row Irrigated
		Tomato-Trickle Irrigated	Pineapple-Dryland						Sorghum (forage)-Spray Irrigated
		Zucchini-Trickle Irrigated	Pineapple-Spray Irrigated						Soybean-Dryland
			Stone Fruit-Microsprinkler Irrigated						Soybean-Furrow/row Irrigated
			Strawberry-Trickle Irrigated						Soybean-Spray Irrigated

5 Suitability framework for the Inland Burnett area

The following 13 limitations were used to assess land suitability in the Inland Burnett area.

Land use requirements	Limitations	Soil and land use attributes used to assess each limitation
Frost-free	**Frost (Cf)**	Frequency and severity of frosts (based on position in landscape); crop tolerance.
Minimise soil loss from erosion	**Water erosion (E)**	Erodibility and slope.
Absence of damaging floods	**Flooding (F)**	Frequency of flooding based on position in landscape and historic flood levels.
Minimal deep drainage	**Furrow Irrigation (If)**	Subsoil permeability to 1m and position in landscape.
Adequate water supply	**Soil water availability (M)**	PAWC.
Adequate soil depth for physical support	**Soil depth (Pd)**	Depth to hard rock or other impermeable layer, or high salt.
Ease of harvesting and minimal impact on quality of subsurface harvest materials	**Soil adhesiveness (Pa)**	Surface physical condition, texture, structure. Degree of adhesiveness increases as clay content and/or consistency increase and the degree of pedality decreases
Ease of seedbed preparation and plant establishment	**Soil surface condition (Ps)**	Surface physical condition, texture, structure.
Rock-free	**Rockiness (R)**	Size (mm) and abundance (%) of coarse fragments, machinery and farmer tolerance of increase size and abundance.
Favourable levels of soluble salts	**Soil salinity (Sa)**	Evidence of surface salinity as indicated by high EC (dS/m) reading, salt crystals or salinity scalds.
Level land surface	**Microrelief (Tm)**	Height of microrelief (gilgai, channel, other) vertical interval.
Land surface of acceptable slope	**Topography (Ts)**	Slope (%) in relation to machinery safety and efficiency.
Adequate soil aeration	**Wetness (W)**	Internal drainage class and soil permeability are assessed in relation to plant rooting depth. Slope and topographic position determine external drainage.

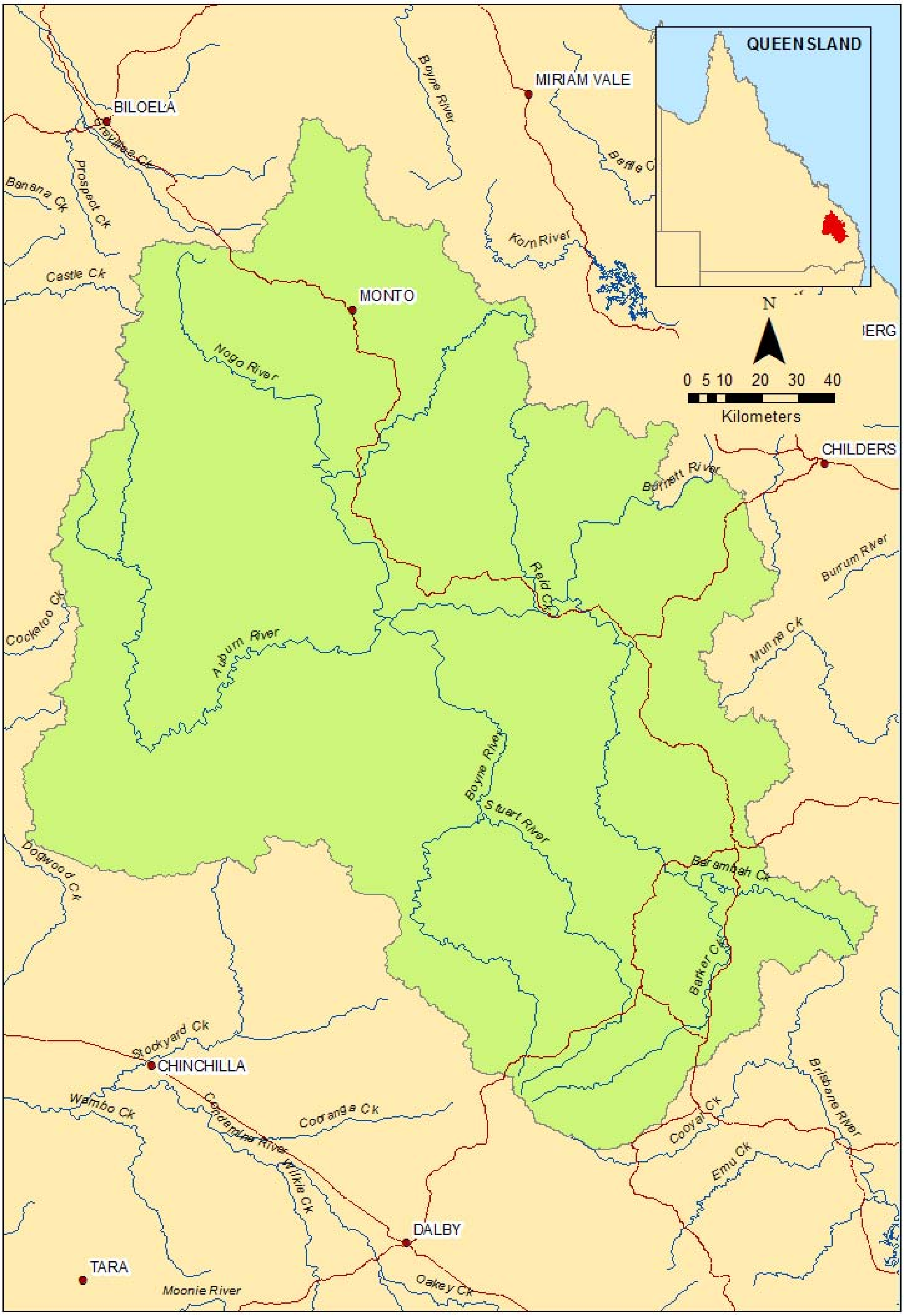

Figure 4. Area covered by the Inland Burnett suitability framework

Frost (Cf)

Frosts can kill plants, suppress growth and reduce yield.

Limitation class determination
Crop tolerance and local experience has been used to determine the incidence and severity of frosts. Seasonal adaptation of crops is not considered (such as frost tolerance of summer crops).

Additional Information

- Generally incidence and severity of frost is determined by position in the landscape. Hill slopes and rises experience fewer and less severe frosts and are suitable for sensitive crops such as avocados and mangoes. Lower lying areas along creeks and drainage lines may experience regular frosts, limiting suitable crops to deciduous plants such as pecans, low-chill stone fruits, grapes, adaptable small crops and field crops.
- Cucurbits, capsicums and tomatoes are highly susceptible to frost and careful management is required in frost-prone areas to avoid all but occasional, very light frosts.

Cf - Climate, frost

Limitation		Suitability subclasses for various land management options				
Value	Description	Group A	Group B	Group C	Group D	Group E
1	Frost free or occasional light frost	1	1	1	2	3
2	Regular frosts	1	2	3	5	3
3	Severe frosts	1	3	4	5	4

Group A	Group A cont.	Group B	Group C	Group D	Group E
Asparagus-Spray Irrigated	Peanut-Furrow Irrigated	Sugarcane-Furrow Irrigated	Beans-Spray Irrigated	Avocado-Spray Irrigated	Barley-Dryland
Brassicaceae-Trickle Irrigated	Peanut-Spray Irrigated	Sugarcane-Spray Irrigated	Capsicum-Trickle Irrigated	Macadamia-Spray Irrigated	
Chickpea-Furrow Irrigated	Pecan-Spray Irrigated		Citrus-Spray Irrigated	Mango-Spray Irrigated	
Chickpea-Spray Irrigated	Potato-Furrow Irrigated		Cucurbit-Furrow Irrigated		
Cotton-Furrow Irrigated	Potato-Spray Irrigated		Cucurbit-Spray Irrigated		
Grapes-Trickle Irrigated	Safflower-Furrow Irrigated		Lychee-Spray Irrigated		
Improved Pasture-Spray Irrigated	Safflower-Spray Irrigated		Navy Bean-Dryland		
Lucerne-Dryland	Sorghum (cereal)-Furrow Irrigated		Peanut-Dryland		
Lucerne-Spray Irrigated	Sorghum (cereal)-Spray Irrigated		Pineapple-Spray Irrigated		
Maize-Furrow Irrigated	Sorghum (forage)-Furrow Irrigated		Radiata pine-Dryland/rainfed		
Maize-Spray Irrigated	Sorghum (forage)-Spray Irrigated		Sorghum (cereal)-Dryland		
Mungbean-Dryland	Soya Bean-Furrow Irrigated		Sorghum (forage)-Dryland		
Mungbean-Furrow Irrigated	Soya Bean-Spray Irrigated		Soya Bean-Dryland		
Mungbean-Spray Irrigated	Stone Fruit-Spray Irrigated		Sunflower-Dryland		
Navy Bean-Furrow Irrigated	Sunflower-Furrow Irrigated		Sweet Corn-Spray Irrigated		
Navy Bean-Spray Irrigated	Sunflower-Spray Irrigated		Sweet Potato-Spray Irrigated		
			Tomato-Trickle Irrigated		
			Wheat-Dryland		
			Zucchini-Trickle Irrigated		

Water erosion (E)

Land degradation and long term productivity decline will occur on any unprotected land due to excessive soil erosion.

Limitation class determination
Slope limits were determined in consultation with soil conservation extension and research personnel, and extension and research agronomists.

Additional Information

- Soil loss will depend on soil erodibility and land slope for a particular crop and surface management system. For each soil type there is a maximum slope above which soil loss cannot be reduced to acceptable levels by erosion control measures or surface management practices.
- Tree crops and vine orchards have higher slope limits than other broadacre crops because of the reduced cultivation and increased surface cover.
- Crops with extended crop cycles (such as sugarcane or pineapples) have a higher erosion potential compared to tree and vine crops, but are considered less critical than annual field and horticultural small crops.
- Most field crops and horticultural small crops are considered most at risk from erosion due to surface exposure frequency, timing and duration, and tillage; therefore making slope limits more stringent.

E - Water erosion

Limitation		Suitability subclasses for various land management options				
Value	Description	Group A	Group B	Group C	Group D	Group E
A0	Stable soils which are non-sloping	1	1	1	1	1
A1	Stable soils with 0-2% slope	1	1	2	2	2
A2	Stable soils with 2-5% slope	1	2	2	3	3
A3	Stable soils with 5-8% slope	2	3	3	4	4
A4	Stable soils with 8-12% slope	3	4	4	5	5
A5	Stable soils with 12-15% slope	3	5	4	5	5
A6	Stable soils with 15-20% slope	4	5	5	5	5
A7	Stable soils with greater than 20% slope	5	5	5	5	5
B0	Unstable soils which are non-sloping	1	1	1	1	1
B1	Unstable soils with 0-1% slope	1	1	1	2	3
B2	Unstable soils with 1-3% slope	1	2	2	3	4
B3	Unstable soils with 3-5% slope	2	3	2	4	5
B4	Unstable soils with 5-8% slope	3	4	3	5	5
B5	Unstable soils with 8-12% slope	4	5	4	5	5
B6	Unstable soils with greater than 12% slope	5	5	4	5	5
E0	Very stable soils which are non-sloping	1	1	1	1	1
E1	Very stable soils with 0-2% slope	1	1	1	1	1
E2	Very stable soils with 2-5% slope	1	2	2	2	3
E3	Very stable soils with 5-8% slope	1	2	3	3	4
E4	Very stable soils with 8-12% slope	2	3	4	4	5
E5	Very stable soils with 12-15% slope	2	4	5	5	5
E6	Very stable soils with 15-20% slope	3	5	5	5	5
E7	Very stable soils with 20-30% slope	4	5	5	5	5
E8	Very stable soils with greater than 30% slope	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E
Avocado-Spray Irrigated	Lucerne-Spray Irrigated	Barley-Dryland	Asparagus-Spray Irrigated	Beans-Spray Irrigated
Citrus-Spray Irrigated	Sugarcane-Furrow Irrigated	Lucerne-Dryland	Brassicaceae-Trickle Irrigated	Chickpea-Furrow Irrigated
Grapes-Trickle Irrigated	Sugarcane-Spray Irrigated	Mungbean-Dryland	Capsicum-Trickle Irrigated	Chickpea-Spray Irrigated
Improved Pasture-Spray Irrigated		Navy Bean-Dryland	Cotton-Furrow Irrigated	Mungbean-Furrow Irrigated
Lychee-Spray Irrigated		Peanut-Dryland	Cucurbit-Furrow Irrigated	Mungbean-Spray Irrigated
Macadamia-Spray Irrigated		Sorghum (cereal)-Dryland	Cucurbit-Spray Irrigated	Navy Bean-Furrow Irrigated
Mango-Spray Irrigated		Sorghum (forage)-Dryland	Maize-Furrow Irrigated	Navy Bean-Spray Irrigated
Pecan-Spray Irrigated		Soya Bean-Dryland	Maize-Spray Irrigated	Peanut-Furrow Irrigated
Stone Fruit-Spray Irrigated		Sunflower-Dryland	Pineapple-Spray Irrigated	Peanut-Spray Irrigated
		Wheat-Dryland	Radiata pine-Dryland/rainfed	Potato-Furrow Irrigated
			Sorghum (cereal)-Furrow Irrigated	Potato-Spray Irrigated
			Sorghum (cereal)-Spray Irrigated	Safflower-Furrow Irrigated
			Sorghum (forage)-Furrow Irrigated	Safflower-Spray Irrigated
			Sorghum (forage)-Spray Irrigated	Soya Bean-Furrow Irrigated
			Sweet Corn-Spray Irrigated	Soya Bean-Spray Irrigated
			Sweet Potato-Spray Irrigated	Sunflower-Furrow Irrigated
			Tomato-Trickle Irrigated	Sunflower-Spray Irrigated
			Zucchini-Trickle Irrigated	

Flooding (F)

Flood events typically involve inundation from overbank stream flows. Effects of flooding include yield reduction or plant death caused by anaerobic conditions and/or high water temperature and/or silt deposition during inundation. Other effects include physical removal or damage to the crop by flowing water, floodplain erosion and damage to infrastructure such as irrigation equipment.

Limitation class determination
Due to the difficulty of assessing the effects of flooding on individual mapping units, landform position in relation to historical flood flows (i.e. flooding frequency) was used to distinguish between suitable and unsuitable land only in extreme frequency situations or for intolerant crops.

Additional Information

- Sugarcane is moderately tolerant of inundation, although different varieties will vary. Horticultural crops, such as small crops (cucurbits, tomatoes and capsicum), avocados, citrus and mangoes are very sensitive to flooding. Lychees are more tolerant and will withstand flooding for short periods. Other crops such as maize, sorghum and soybeans are sensitive.
- A suitability subclass of three (3) has been applied in areas where flood frequency is significant, but not extreme. Note: Historical land suitability classification schemes for local projects may have used a suitability subclass of zero (0) instead.
- Sugarcane and many other crops are commonly grown on low-lying areas, despite regular flooding. In such cases, some degree of crop tolerance means the effects of flooding does not detract from the intrinsic value of the land.
- Some tree crops (e.g. citrus, lychees, mangoes) tolerate inundation for periods of about 1 day. This assumes low velocity floodwaters, relatively low silt loads, reasonable water temperatures and rapid internal soil drainage once floodwaters recede.

F - Flooding

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
		Suitability subclasses for various land management options							
1	No flooding or flooding less than 1 in 10 years	1	1	1	1	1	1	2	2
2	Flooding frequency of approximately 1 in 2 to 1 in 10 years	1	1	1	2	3	5	4	4
3	Flooding frequency approaches annual occurrence	1	4	5	4	5	5	4	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
Brassicaceae-Trickle Irrigated	Asparagus-Spray Irrigated	Chickpea-Furrow Irrigated	Barley-Dryland	Beans-Spray Irrigated	Avocado-Spray Irrigated	Sorghum (cereal)-Dryland	Mungbean-Dryland
Capsicum-Trickle Irrigated	Cotton-Furrow Irrigated	Chickpea-Spray Irrigated	Navy Bean-Dryland		Citrus-Spray Irrigated		Peanut-Dryland
Cucurbit-Furrow Irrigated	Maize-Furrow Irrigated	Lucerne-Dryland	Sorghum (forage)-Dryland		Grapes-Trickle Irrigated		
Cucurbit-Spray Irrigated	Maize-Spray Irrigated	Lucerne-Spray Irrigated	Soya Bean-Dryland		Lychee-Spray Irrigated		
Improved Pasture-Spray Irrigated	Safflower-Furrow Irrigated	Mungbean-Furrow Irrigated	Sunflower-Dryland		Macadamia-Spray Irrigated		
Potato-Furrow Irrigated	Safflower-Spray Irrigated	Mungbean-Spray Irrigated	Wheat-Dryland		Mango-Spray Irrigated		
Potato-Spray Irrigated	Sorghum (cereal)-Furrow Irrigated	Navy Bean-Furrow Irrigated			Pecan-Spray Irrigated		
Radiata pine-Dryland/rainfed	Sorghum (cereal)-Spray Irrigated	Navy Bean-Spray Irrigated			Pineapple-Spray Irrigated		
Sweet Potato-Spray Irrigated	Sorghum (forage)-Furrow Irrigated	Peanut-Furrow Irrigated			Stone Fruit-Spray Irrigated		
Tomato-Trickle Irrigated	Sorghum (forage)-Spray Irrigated	Peanut-Spray Irrigated					
Zucchini-Trickle Irrigated	Soya Bean-Furrow Irrigated						
	Soya Bean-Spray Irrigated						
	Sugarcane-Furrow Irrigated						
	Sugarcane-Spray Irrigated						
	Sunflower-Furrow Irrigated						
	Sunflower-Spray Irrigated						
	Sweet Corn-Spray Irrigated						

Furrow Infiltration (If)

The effects of furrow infiltration relate to the amount of water applied and the rate of application, as furrow irrigation must match the permeability of the soil to minimise deep drainage and to determine suitable furrow length.

Limitation class determination
Limitation classes are related directly to soil permeability, landscape position and whether the site is located within a groundwater area. Hydraulic conductivity (permeability) measurements are required. Indicator attributes for soil permeability include texture, grade and type of structure, sodicity, pH and salt bulge. Furrow irrigation is only suitable on land with gentle slopes and slowly permeable soils, such as cracking clay soils and texture contrast soils. Furrow infiltration was not applied for spray / drip / trickle or micro-sprinkler irrigated crops.

Additional Information

- Where insufficient information was available for class separation, subclass three (3) was applied. Note: Historical land suitability classification schemes for local projects may have used a suitability subclass of zero (0) instead.
- Additional management requirements are associated with short furrows. Long furrow lengths and application times are inappropriate for soils where a significant deep drainage component is likely to occur. This causes excess infiltration, leaching, seepage, wastage of water, and problems with aeration at the head ditch end of the furrows. The most suitable furrow length and field layout for flood irrigation needs to be tailored to the permeability of each soil.
- Deep drainage in recharge areas or undulating landscapes can contribute significantly to watertables in lower landscape positions. The effect of deep drainage on groundwater levels can be managed on very slowly to moderately permeable soils within areas where groundwater is used for irrigation and on level plains with very slowly permeable soils where there is minimal contribution to groundwater levels from the surrounding landscape.
- Where utilising this scheme within a groundwater area (eg. Monto groundwater area), subclasses have been improved (e.g. by a value of one) to allow for the recycling/reuse of water lost through deep drainage. If not within a groundwater area use the limitation classes for undulating landscapes and level plains.

If - Furrow infiltration, deep drainage

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
V0	Very slowly permeable (<5mm/day) Level Plains	3
VD	Very slowly permeable (<5mm/day) Drainage depression	3
VL	Very slowly permeable (<5mm/day) Lower slope	3
VU	Very slowly permeable (<5mm/day) Upper slope	3
S0	Slowly permeable (5-50 mm/day) Level Plains	3
SD	Slowly permeable (5-50 mm/day) Drainage depression	4
SL	Slowly permeable (5-50 mm/day) Lower slope	4
SU	Slowly permeable (5-50 mm/day) Upper slope	4
M0	Moderately permeable (50-500 mm/day) Level Plains	4
MD	Moderately permeable (50-500 mm/day) Drainage depression	5
ML	Moderately permeable (50-500 mm/day) Lower slope	5
MU	Moderately permeable (50-500 mm/day) Upper slope	5
H0	Highly permeable (>500 mm/day) Level Plains	5
HD	Highly permeable (>500 mm/day) Drainage depression	5
HL	Highly permeable (>500 mm/day) Lower slope	5
HU	Highly permeable (>500 mm/day) Upper slope	5

Group A
Chickpea-Furrow Irrigated
Cotton-Furrow Irrigated
Cucurbit-Furrow Irrigated
Maize-Furrow Irrigated
Mungbean-Furrow Irrigated
Navy Bean-Furrow Irrigated
Peanut-Furrow Irrigated
Potato-Furrow Irrigated
Safflower-Furrow Irrigated
Sorghum (cereal)-Furrow Irrigated
Sorghum (forage)-Furrow Irrigated
Soya Bean-Furrow Irrigated
Sugarcane-Furrow Irrigated
Sunflower-Furrow Irrigated

Soil water availability (M)

Plant yield can be severely affected by periods of water stress, particularly during critical growth periods.

Limitation class determination
Plant available water capacity (PAWC) is used as a measure of the amount of water in a soil available to plants over the rooting depth. PAWC is based on predicted values relating to the frequency of irrigation for spray/furrow irrigation only, as negligible limitations apply to micro-sprinkler or drip irrigation systems where small amounts of water are added frequently. Generally soil texture, structure and clay mineralogy over the effective rooting depth are important attributes affecting PAWC.

Additional Information

- Irrigation frequency considers crop rooting depth, seasonal evapotranspiration rates and the amount of labour and equipment required. For example, irrigated shallow-rooted crops (e.g. cucurbits, sweet corn, sweet potato) are usually irrigated using overhead methods and therefore require more frequent irrigation than deep-rooted crops and greater management inputs than micro-sprinkler or drip systems.
- PAWC has been predicted to the effective rooting depth – i.e. soil depth to decomposing rock, pan, high salt or any impermeable layer. For example: tree crops 1-1.5m; small crops 0.5m; field crops, sugarcane and grapes 1.0m.

M – Soil water availability

Limitation		Suitability subclasses for various land management options							
Value	**Description**	**Group A**	**Group B**	**Group C**	**Group D**	**Group E**	**Group F**	**Group G**	**Group H**
1	PAWC greater than 150mm/100cms	1	1	1	1	1	2	2	2
2	PAWC 125-150mm/100cms	1	1	1	1	2	2	2	2
3	PAWC 100-125mm/100cms	1	1	1	2	3	2	3	3
4	PAWC 75-100mm/100cms	1	1	2	2	3	2	4	4
5	PAWC 50-75mm/100cms	1	2	3	2	4	2	4	5
6	PAWC less than 50mm/100cms	1	4	4	3	5	3	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
Avocado-Spray Irrigated	Chickpea-Furrow Irrigated	Sugarcane-Furrow Irrigated	Navy Bean-Furrow Irrigated	Mungbean-Dryland	Asparagus-Spray Irrigated	Barley-Dryland	Peanut-Dryland
Brassicaceae-Trickle Irrigated	Chickpea-Spray Irrigated	Sugarcane-Spray Irrigated	Navy Bean-Spray Irrigated	Soya Bean-Dryland	Beans-Spray Irrigated	Navy Bean-Dryland	
Capsicum-Trickle Irrigated	Cotton-Furrow Irrigated				Cucurbit-Furrow Irrigated	Sorghum (cereal)-Dryland	
Citrus-Spray Irrigated	Improved Pasture-Spray Irrigated				Cucurbit-Spray Irrigated	Sorghum (forage)-Dryland	
Grapes-Trickle Irrigated	Lucerne-Dryland				Potato-Furrow Irrigated	Sunflower-Dryland	
Lychee-Spray Irrigated	Lucerne-Spray Irrigated				Potato-Spray Irrigated	Wheat-Dryland	
Macadamia-Spray Irrigated	Maize-Furrow Irrigated				Radiata pine-Dryland/rainfed		
Mango-Spray Irrigated	Maize-Spray Irrigated				Sweet Corn-Spray Irrigated		
Pecan-Spray Irrigated	Mungbean-Furrow Irrigated				Sweet Potato-Spray Irrigated		
Stone Fruit-Spray Irrigated	Mungbean-Spray Irrigated						
Tomato-Trickle Irrigated	Peanut-Furrow Irrigated						
Zucchini-Trickle Irrigated	Peanut-Spray Irrigated						
	Pineapple-Spray Irrigated						
	Safflower-Furrow Irrigated						
	Safflower-Spray Irrigated						
	Sorghum (cereal)-Furrow Irrigated						
	Sorghum (cereal)-Spray Irrigated						
	Sorghum (forage)-Furrow Irrigated						
	Sorghum (forage)-Spray Irrigated						
	Soya Bean-Furrow Irrigated						
	Soya Bean-Spray Irrigated						
	Sunflower-Furrow Irrigated						
	Sunflower-Spray Irrigated						

Soil adhesiveness (Pa)

Adhesive soils affect the recoverability (i.e. cause harvest difficulties) and condition of root crops (i.e. quality of subsurface harvest material).

Limitation class determination

In general the degree of adhesiveness increases as clay content and/or consistency increase and the degree of pedality decreases. Soil germination and seedling development problems are associated with adverse conditions of the surface soil such as hard setting, coarse aggregates and crusting clays - see soil surface condition (Ps).

Additional Information

- Peanut crops ideally require friable soils to enable harvesting machinery to easily lift and remove crops from the soil.
- A majority of the massive surface clay loam soils or poorly to imperfectly drained soils with clay texture surfaces are adhesive to varying degrees.
- Tillage operations may be successfully completed at specific moisture ranges.

Pa - Soil adhesiveness

Limitation		Suitability subclasses for various land management options				
Value	Description	Group A	Group B	Group C	Group D	Group E
1	No restrictions	1	1	1	1	1
2	Slightly adhesive surface soil (0-0.3m)	1	1	2	2	5
3	Moderately adhesive surface soil (0-0.3m)	1	1	3	3	5
4	Strongly adhesive surface soil (0-0.3m)	1	3	1	4	5

Group A	Group A continued	Group B	Group C	Group D	Group E
Asparagus-Spray Irrigated	Navy Bean-Furrow Irrigated	Barley-Dryland	Potato-Furrow Irrigated	Peanut-Furrow Irrigated	Peanut-Dryland
Avocado-Spray Irrigated	Navy Bean-Spray Irrigated	Mungbean-Dryland	Potato-Spray Irrigated	Peanut-Spray Irrigated	
Beans-Spray Irrigated	Pecan-Spray Irrigated	Navy Bean-Dryland	Sweet Potato-Spray Irrigated		
Brassicaceae-Trickle Irrigated	Pineapple-Spray Irrigated	Sorghum (cereal)-Dryland			
Capsicum-Trickle Irrigated	Radiata pine-Dryland/rainfed	Sorghum (forage)-Dryland			
Chickpea-Furrow Irrigated	Safflower-Furrow Irrigated	Soya Bean-Dryland			
Chickpea-Spray Irrigated	Safflower-Spray Irrigated	Sunflower-Dryland			
Citrus-Spray Irrigated	Sorghum (cereal)-Furrow Irrigated	Wheat-Dryland			
Cotton-Furrow Irrigated	Sorghum (cereal)-Spray Irrigated				
Cucurbit-Furrow Irrigated	Sorghum (forage)-Furrow Irrigated				
Cucurbit-Spray Irrigated	Sorghum (forage)-Spray Irrigated				
Grapes-Trickle Irrigated	Soya Bean-Furrow Irrigated				
Improved Pasture-Spray Irrigated	Soya Bean-Spray Irrigated				
Lucerne-Dryland	Stone Fruit-Spray Irrigated				
Lucerne-Spray Irrigated	Sugarcane-Furrow Irrigated				
Lychee-Spray Irrigated	Sugarcane-Spray Irrigated				
Macadamia-Spray Irrigated	Sunflower-Furrow Irrigated				
Maize-Furrow Irrigated	Sunflower-Spray Irrigated				
Maize-Spray Irrigated	Sweet Corn-Spray Irrigated				
Mango-Spray Irrigated	Tomato-Trickle Irrigated				
Mungbean-Furrow Irrigated	Zucchini-Trickle Irrigated				
Mungbean-Spray Irrigated					

Soil depth (Pd)

Shallow soils limit root proliferation and anchorage. Plants may dislodge or become uprooted during strong winds.

Limitation class determination
Consultation with agronomic extension staff and local landholder experience.

Additional Information

- All crops require an adequate depth of soil for physical support of the aerial portion of the plant. Requirements for physical support will increase with crops that have large canopies such as tree crops. Uprooting of trees is particularly a problem on shallow, wet soils during windy conditions.
- Vine crops and some small crops (e.g. tomatoes) are normally trellised and poor lodging due to shallow soil depth is not considered an issue. As such these crops have been treated in the same way as shallow rooted, small crops of low height.

Pd - Soil depth

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
1	Effective soil depth greater than 1m	1	1	1	1
2	Effective soil depth 0.6-1m	1	1	1	2
3	Effective soil depth 0.4-0.6m	1	1	1	3
4	Effective soil depth 0.3-0.4m	1	1	2	4
5	Effective soil depth less than 0.3m	1	5	5	5

Group A	Group B	Group B continued	Group C	Group D
Mungbean-Dryland	Asparagus-Spray Irrigated	Peanut-Furrow Irrigated	Sugarcane-Furrow Irrigated	Avocado-Spray Irrigated
Peanut-Dryland	Beans-Spray Irrigated	Peanut-Spray Irrigated	Sugarcane-Spray Irrigated	Barley-Dryland
Sorghum (cereal)-Dryland	Brassicaceae-Trickle Irrigated	Pineapple-Spray Irrigated		Citrus-Spray Irrigated
	Capsicum-Trickle Irrigated	Potato-Furrow Irrigated		Lychee-Spray Irrigated
	Chickpea-Furrow Irrigated	Potato-Spray Irrigated		Macadamia-Spray Irrigated
	Chickpea-Spray Irrigated	Radiata pine-Dryland/rainfed		Mango-Spray Irrigated
	Cotton-Furrow Irrigated	Safflower-Furrow Irrigated		Navy Bean-Dryland
	Cucurbit-Furrow Irrigated	Safflower-Spray Irrigated		Pecan-Spray Irrigated
	Cucurbit-Spray Irrigated	Sorghum (cereal)-Furrow Irrigated		Sorghum (forage)-Dryland
	Grapes-Trickle Irrigated	Sorghum (cereal)-Spray Irrigated		Soya Bean-Dryland
	Improved Pasture-Spray Irrigated	Sorghum (forage)-Furrow Irrigated		Stone Fruit-Spray Irrigated
	Lucerne-Dryland	Sorghum (forage)-Spray Irrigated		Sunflower-Dryland
	Lucerne-Spray Irrigated	Soya Bean-Furrow Irrigated		Wheat-Dryland
	Maize-Furrow Irrigated	Soya Bean-Spray Irrigated		
	Maize-Spray Irrigated	Sunflower-Furrow Irrigated		
	Mungbean-Furrow Irrigated	Sunflower-Spray Irrigated		
	Mungbean-Spray Irrigated	Sweet Corn-Spray Irrigated		
	Navy Bean-Furrow Irrigated	Sweet Potato-Spray Irrigated		
	Navy Bean-Spray Irrigated	Tomato-Trickle Irrigated		
		Zucchini-Trickle Irrigated		

Soil surface condition (Ps)

Problems with germination and seedling development during crop establishment are typically associated with adverse physical conditions in the surface soil, such as hard setting behaviour, coarse aggregates and crusting.

Limitation class determination
Plant tolerance limits and requirements in relation to germination are matched with soil properties and supported by agronomic experience.

Additional Information

- Crops planted from seed (particularly small seeded grasses or pasture species) are most affected by this limitation. Horticultural small crops such as tomatoes, capsicum and cucurbits, which are planted as seedlings, are less affected. Tree and vine crops, which are planted as large tree seedlings, and also crops planted using vegetative material (e.g. pineapple, sugarcane) are least affected.

Ps - Surface condition

Limitation		Suitability subclasses for various land management options									
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
0	No restrictions	1	1	1	1	1	1	1	1	1	1
1	Hard setting massive soils with sandy loam to clay loam surface textures with dry moderately firm consistency	1	1	1	1	2	2	2	2	2	4
2	Hard setting massive soils with loam fine sandy to clay loam fine sandy surface textures with dry very firm consistency	1	1	2	2	3	3	3	3	4	5
3	Surface crusts present	1	3	1	2	2	2	2	3	4	5
4	Large soil aggregate size on surface (greater than 20 mm)	1	4	2	3	2	3	4	4	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
Avocado-Spray Irrigated	Barley-Dryland	Sugarcane-Furrow Irrigated	Asparagus-Spray Irrigated	Potato-Furrow Irrigated	Improved Pasture-Spray Irrigated	Chickpea-Furrow Irrigated	Soya Bean-Furrow Irrigated	Mungbean-Dryland	Peanut-Dryland
Citrus-Spray Irrigated	Navy Bean-Dryland	Sugarcane-Spray Irrigated	Beans-Spray Irrigated	Potato-Spray Irrigated		Chickpea-Spray Irrigated	Soya Bean-Spray Irrigated	Sorghum (cereal)-Dryland	
Grapes-Trickle Irrigated	Sorghum (forage)-Dryland		Brassicaceae-Trickle Irrigated	Sweet Potato-Spray Irrigated		Lucerne-Dryland			
Lychee-Spray Irrigated	Soya Bean-Dryland		Capsicum-Trickle Irrigated			Lucerne-Spray Irrigated			
Macadamia-Spray Irrigated	Sunflower-Dryland		Cotton-Furrow Irrigated			Mungbean-Furrow Irrigated			
Mango-Spray Irrigated	Wheat-Dryland		Cucurbit-Furrow Irrigated			Mungbean-Spray Irrigated			
Pecan-Spray Irrigated			Cucurbit-Spray Irrigated			Navy Bean-Furrow Irrigated			
Stone Fruit-Spray Irrigated			Maize-Furrow Irrigated			Navy Bean-Spray Irrigated			
			Maize-Spray Irrigated			Peanut-Furrow Irrigated			
			Pineapple-Spray Irrigated			Peanut-Spray Irrigated			
			Radiata pine-Dryland/rainfed			Safflower-Furrow Irrigated			
			Sorghum (cereal)-Furrow Irrigated			Safflower-Spray Irrigated			
			Sorghum (cereal)-Spray Irrigated			Sunflower-Furrow Irrigated			
			Sorghum (forage)-Furrow Irrigated			Sunflower-Spray Irrigated			
			Sorghum (forage)-Spray Irrigated						
			Sweet Corn-Spray Irrigated						
			Tomato-Trickle Irrigated						
			Zucchini-Trickle Irrigated						

Rockiness (R)

Coarse fragments (pebbles, gravel, cobbles, stones and boulders) and rock in the plough zone can damage and/or interfere with the efficient use of agricultural machinery, including planting, cultivation and harvesting of crops such as sugarcane, soybeans, root crops, macadamias, some small crops, and annual forage crops.

Limitation class determination
The volume of rock fragments within the soil profile is extremely variable and difficult to estimate for any particular map unit. Assessment of rockiness is based on the size, abundance and distribution of coarse fragments in the soil profile and the proportion of rock outcrop. The limitation increases with the increase in size and/or amount encountered. Limitation classes were determined by way of consultation, particularly relating to landholder / machinery operator tolerances (which are implicitly related to profitability and technological capability).

Additional Information
- Coarse fragments are particles >2 mm and are not continuous with underlying bedrock. Rock is identified as being continuous with bedrock.
- In some areas extensive stone picking operations have occurred in previous years to clear soils for cropping purposes. Note: In areas with high clay content soils, coarse fragments located within the profile may move to the surface over time, having implications for paddock management / maintenance (e.g. stone picking).
- In general, crops which require several cultivations annually and have low harvest heights (chickpeas, navy beans and soy beans) have a low tolerance to rock; root crops (potatoes, peanuts) are very sensitive; and horticultural tree crops can tolerate considerable amounts. However, gravel-sized coarse fragments (<60mm) cause significant problems for macadamias due to similarity in size with nuts on the ground post-shaking.
- The presence of rock in relation to plant available water capacity (PAWC) is considered in the Soil water availability (M) limitation.

R - Rockiness

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
		Suitability subclasses for various land management options									
0	No surface rock or coarse fragments present	1	1	1	1	1	1	1	1	1	1
G1	Gravels 6-20mm and abundance less than 2%	1	1	1	1	1	1	1	2	2	2
G2	Gravels 6-20mm and abundance 2-10%	1	1	1	1	2	2	2	3	3	3
G3	Gravels 6-20mm and abundance 10-20%	1	1	1	2	3	3	3	4	4	4
G4	Gravels 6-20mm and abundance 20-50%	1	2	2	3	4	4	4	5	5	5
G5	Gravels 6-20mm and abundance greater than 50%	2	3	3	4	5	5	5	5	5	5
P1	Pebbles 20 to 60mm and abundance less than 2%	1	1	1	1	1	1	2	1	2	2
P2	Pebbles 20 to 60mm and abundance 2-10%	1	1	1	2	2	3	3	2	3	3
P3	Pebbles 20 to 60mm and abundance 10-20%	1	1	2	3	3	4	4	3	4	4
P4	Pebbles 20 to 60mm and abundance 20-50%	2	1	3	4	4	5	5	4	5	5
P5	Pebbles 20 to 60mm and abundance greater than 50%	3	2	4	5	5	5	5	5	5	5
C1	Cobbles 60 to 200mm and abundance less than 2%	1	1	1	2	2	2	3	3	2	4
C2	Cobbles 60 to 200mm and abundance 2-10%	1	1	2	3	3	3	4	4	3	5
C3	Cobbles 60 to 200mm and abundance 10-20%	2	2	3	4	4	4	5	5	4	5
C4	Cobbles 60 to 200mm and abundance 20-50%	3	3	4	5	5	5	5	5	5	5
C5	Cobbles 60 to 200mm and abundance greater than 50%	4	4	5	5	5	5	5	5	5	5
S1	Stones 200 to 600mm and abundance less than 2%	1	1	2	3	2	2	4	4	2	5
S2	Stones 200 to 600mm and abundance 2-10%	2	2	3	4	3	3	5	5	3	5
S3	Stones 200 to 600mm and abundance 10-20%	3	3	4	5	4	4	5	5	4	5
S4	Stones 200 to 600mm and abundance 20-50%	4	4	5	5	5	5	5	5	5	5
S5	Stones 200 to 600mm and abundance greater than 50%	5	5	5	5	5	5	5	5	5	5
B1	Boulders greater than 600mm and abundance less than 2%	2	2	3	4	4	4	5	5	4	5
B2	Boulders greater than 600mm and abundance 2-10%	3	3	4	5	5	5	5	5	5	5
B3	Boulders greater than 600mm and abundance 10-20%	4	4	5	5	5	5	5	5	5	5
B4	Boulders greater than 600mm and abundance 20-50%	5	5	5	5	5	5	5	5	5	5
B5	Boulders greater than 600mm and abundance greater than 50%	5	5	5	5	5	5	5	5	5	5
R1	Rock slab abundance less than 2%	2	2	3	4	3	3	5	5	3	5
R2	Rock slab abundance 2-10%	3	3	4	5	4	4	5	5	4	5
R3	Rock slab abundance 10-20%	4	4	5	5	5	5	5	5	5	5
R4	Rock slab abundance 20-50%	5	5	5	5	5	5	5	5	5	5
R5	Rock slab abundance greater than 50%	5	5	5	5	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
Avocado-Spray Irrigated	Improved Pasture-Spray Irrigated	Pineapple-Spray Irrigated	Maize-Furrow Irrigated	Mungbean-Dryland	Barley-Dryland	Asparagus-Spray Irrigated	Beans-Spray Irrigated	Peanut-Dryland	Chickpea-Furrow Irrigated
Citrus-Spray Irrigated	Stone Fruit-Spray Irrigated		Maize-Spray Irrigated	Sorghum (forage)-Dryland	Navy Bean-Dryland	Brassicaceae-Trickle Irrigated			Chickpea-Spray Irrigated
Grapes-Trickle Irrigated			Safflower-Furrow Irrigated		Sorghum (cereal)-Dryland	Capsicum-Trickle Irrigated			Navy Bean-Furrow Irrigated
Lychee-Spray Irrigated			Safflower-Spray Irrigated		Soya Bean-Dryland	Cotton-Furrow Irrigated			Navy Bean-Spray Irrigated
Macadamia-Spray Irrigated			Sorghum (cereal)-Furrow Irrigated		Sunflower-Dryland	Cucurbit-Furrow Irrigated			Peanut-Furrow Irrigated
Mango-Spray Irrigated			Sorghum (cereal)-Spray Irrigated		Wheat-Dryland	Cucurbit-Spray Irrigated			Peanut-Spray Irrigated
Pecan-Spray Irrigated			Sorghum (forage)-Furrow Irrigated			Lucerne-Dryland			Potato-Furrow Irrigated
			Sorghum (forage)-Spray Irrigated			Lucerne-Spray Irrigated			Potato-Spray Irrigated
			Sugarcane-Furrow Irrigated			Mungbean-Furrow Irrigated			Sweet Potato-Spray Irrigated
			Sugarcane-Spray Irrigated			Mungbean-Spray Irrigated			
			Sunflower-Furrow Irrigated			Radiata pine-Dryland/rainfed			
			Sunflower-Spray Irrigated			Soya Bean-Furrow Irrigated			
			Sweet Corn-Spray Irrigated			Soya Bean-Spray Irrigated			
						Tomato-Trickle Irrigated			
						Zucchini-Trickle Irrigated			

Salinity (Sa)

High soluble salts at the surface can severely limit plant growth.

Limitation class determination
Subclass determination is based on the evidence of surface salinity as indicated by high EC (dS/m) reading, salt crystals or salinity scalds.

Additional Information

- Nil.

Sa - Salinity

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
0	No existing salinity	1
S1	Existing Salinity-Seepage	5

Group A		
Asparagus-Spray Irrigated	Maize-Spray Irrigated	Sorghum (cereal)-Furrow Irrigated
Avocado-Spray Irrigated	Mango-Spray Irrigated	Sorghum (cereal)-Spray Irrigated
Barley-Dryland	Mungbean-Dryland	Sorghum (forage)-Dryland
Beans-Spray Irrigated	Mungbean-Furrow Irrigated	Sorghum (forage)-Furrow Irrigated
Brassicaceae-Trickle Irrigated	Mungbean-Spray Irrigated	Sorghum (forage)-Spray Irrigated
Capsicum-Trickle Irrigated	Navy Bean-Dryland	Soya Bean-Dryland
Chickpea-Furrow Irrigated	Navy Bean-Furrow Irrigated	Soya Bean-Furrow Irrigated
Chickpea-Spray Irrigated	Navy Bean-Spray Irrigated	Soya Bean-Spray Irrigated
Citrus-Spray Irrigated	Peanut-Dryland	Stone Fruit-Spray Irrigated
Cotton-Furrow Irrigated	Peanut-Furrow Irrigated	Sugarcane-Furrow Irrigated
Cucurbit-Furrow Irrigated	Peanut-Spray Irrigated	Sugarcane-Spray Irrigated
Cucurbit-Spray Irrigated	Pecan-Spray Irrigated	Sunflower-Dryland
Grapes-Trickle Irrigated	Pineapple-Spray Irrigated	Sunflower-Furrow Irrigated
Improved Pasture-Spray Irrigated	Potato-Furrow Irrigated	Sunflower-Spray Irrigated
Lucerne-Dryland	Potato-Spray Irrigated	Sweet Corn-Spray Irrigated
Lucerne-Spray Irrigated	Radiata pine-Dryland/rainfed	Sweet Potato-Spray Irrigated
Lychee-Spray Irrigated	Safflower-Furrow Irrigated	Tomato-Trickle Irrigated
Macadamia-Spray Irrigated	Safflower-Spray Irrigated	Wheat-Dryland
Maize-Furrow Irrigated	Sorghum (cereal)-Dryland	Zucchini-Trickle Irrigated

Microrelief (Tm)

Uneven ground surface (e.g. gilgai) can cause uneven and lower productivity due to irregular water distribution (e.g. ponding in depressions), irregular cultivation and impeded trafficability.

Limitation class determination
The vertical interval of microrelief typically dictates the amount of levelling required and/or the potential for reduced productivity. Therefore the vertical interval is used to determine the severity of the limitation. Limitation class was determined by way of land resource surveys, consultation with agronomic extension staff and local landholder experience.

Additional Information

- Microrelief includes: gilgai, channels, melon holes, swamp hummock, rills and small gullies.
- Effects associated with the presence of microrelief such as temporary waterlogging and poor surface condition are covered in the Wetness (W) and soil surface condition (Ps) limitations respectively.

Tm - Microrelief

Limitation		Suitability subclasses for various land management options
Value	**Description**	**Group A**
0	No surface microrelief	1
1	Vertical interval of microrelief 0.1-0.3m	3
2	Vertical interval of microrelief 0.3-0.6m	4
3	Vertical interval of microrelief greater than 0.6m	5

Group A

Asparagus-Spray Irrigated
Avocado-Spray Irrigated
Barley-Dryland
Beans-Spray Irrigated
Brassicaceae-Trickle Irrigated
Capsicum-Trickle Irrigated
Chickpea-Furrow Irrigated
Chickpea-Spray Irrigated
Citrus-Spray Irrigated
Cotton-Furrow Irrigated
Cucurbit-Furrow Irrigated
Cucurbit-Spray Irrigated
Grapes-Trickle Irrigated
Improved Pasture-Spray Irrigated
Lucerne-Dryland
Lucerne-Spray Irrigated
Lychee-Spray Irrigated
Macadamia-Spray Irrigated
Maize-Furrow Irrigated
Maize-Spray Irrigated
Mango-Spray Irrigated
Mungbean-Dryland
Mungbean-Furrow Irrigated
Mungbean-Spray Irrigated
Navy Bean-Dryland
Navy Bean-Furrow Irrigated
Navy Bean-Spray Irrigated
Peanut-Dryland
Peanut-Furrow Irrigated
Peanut-Spray Irrigated
Pecan-Spray Irrigated
Pineapple-Spray Irrigated
Potato-Furrow Irrigated
Potato-Spray Irrigated
Radiata pine-Dryland/rainfed
Safflower-Furrow Irrigated
Safflower-Spray Irrigated
Sorghum (cereal)-Dryland
Sorghum (cereal)-Furrow Irrigated
Sorghum (cereal)-Spray Irrigated
Sorghum (forage)-Dryland
Sorghum (forage)-Furrow Irrigated
Sorghum (forage)-Spray Irrigated
Soya Bean-Dryland
Soya Bean-Furrow Irrigated
Soya Bean-Spray Irrigated
Stone Fruit-Spray Irrigated
Sugarcane-Furrow Irrigated
Sugarcane-Spray Irrigated
Sunflower-Dryland
Sunflower-Furrow Irrigated
Sunflower-Spray Irrigated
Sweet Corn-Spray Irrigated
Sweet Potato-Spray Irrigated
Tomato-Trickle Irrigated
Wheat-Dryland
Zucchini-Trickle Irrigated

Topography (Ts)

The safety and/or efficiency of farm vehicle / machinery operation is affected by:

- steep gradients, specifically rolling and side-slip hazards; and
- erosion control layouts on land with significant variability in the degree and direction of slopes (e.g. complex slopes); which is particularly important with row crops where final layouts on such lands would necessitate impractical short rows and sharp curves.

Limitation class determination

- Steepness of slope in relation to safety and efficiency (including local experience and consultation regarding the upper machinery slope limit for various land uses).
- Variation in slope causing short rows in erosion control layouts (and farmer tolerance of short rows)
- Variation in slope direction causing excessive row curvature in erosion control layouts (and inability of tailing implements to effectively negotiate curves with <30m radius).

Additional Information

- Complex slopes are not downgraded. A suitability subclass of three (3) has been applied in areas where tillage and modified erosion control structures have to be applied in lieu of conventional erosional control structures. Note: Historical land suitability classification schemes for local projects may have used a suitability subclass of zero (0) instead.

Ts - Slope

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
0	Slope 0-15% use heavy machinery with caution	1	1	1	1
1	Slope 15-20% use heavy machinery with extreme caution	1	2	4	4
2	Slope 20-30% heavy machinery not safe to use	2	4	5	5
3	Slope greater than 30% heavy machinery not safe to use	5	5	5	5
C	Complex slopes	1	1	1	3

Group A	Group B	Group C	Group C cont.	Group D
Improved Pasture-Spray Irrigated	Avocado-Spray Irrigated	Asparagus-Spray Irrigated	Potato-Spray Irrigated	Beans-Spray Irrigated
	Citrus-Spray Irrigated	Barley-Dryland	Radiata pine-Dryland/rainfed	
	Grapes-Trickle Irrigated	Brassicaceae-Trickle Irrigated	Safflower-Furrow Irrigated	
	Lychee-Spray Irrigated	Capsicum-Trickle Irrigated	Safflower-Spray Irrigated	
	Macadamia-Spray Irrigated	Chickpea-Furrow Irrigated	Sorghum (cereal)-Dryland	
	Mango-Spray Irrigated	Chickpea-Spray Irrigated	Sorghum (cereal)-Furrow Irrigated	
	Pecan-Spray Irrigated	Cotton-Furrow Irrigated	Sorghum (cereal)-Spray Irrigated	
	Stone Fruit-Spray Irrigated	Cucurbit-Furrow Irrigated	Sorghum (forage)-Dryland	
		Cucurbit-Spray Irrigated	Sorghum (forage)-Furrow Irrigated	
		Lucerne-Dryland	Sorghum (forage)-Spray Irrigated	
		Lucerne-Spray Irrigated	Soya Bean-Dryland	
		Maize-Furrow Irrigated	Soya Bean-Furrow Irrigated	
		Maize-Spray Irrigated	Soya Bean-Spray Irrigated	
		Mungbean-Dryland	Sugarcane-Furrow Irrigated	
		Mungbean-Furrow Irrigated	Sugarcane-Spray Irrigated	
		Mungbean-Spray Irrigated	Sunflower-Dryland	
		Navy Bean-Dryland	Sunflower-Furrow Irrigated	
		Navy Bean-Furrow Irrigated	Sunflower-Spray Irrigated	
		Navy Bean-Spray Irrigated	Sweet Corn-Spray Irrigated	
		Peanut-Dryland	Sweet Potato-Spray Irrigated	
		Peanut-Furrow Irrigated	Tomato-Trickle Irrigated	
		Peanut-Spray Irrigated	Wheat-Dryland	
		Pineapple-Spray Irrigated	Zucchini-Trickle Irrigated	
		Potato-Furrow Irrigated		

Wetness (W1, W2, W3)

Waterlogged soils reduce plant growth and delay effective machinery operations.

Limitation class determination
Internal and external drainage are assessed. Indicator attributes of internal drainage include texture, grade and type of structure, colour, mottles, segregations and impermeable layers. Drainage class and soil permeability are assessed in relation to plant rooting depth. Slope and topographic position determine external drainage. Limitation classes have been determined by way of consultation with agronomic extension staff and local landholders, crop tolerance information and the effects of delays in machinery operation.

Additional Information

- Imperfectly drained soils significantly affect plant growth for many crops and are usually the soils where mounding is important. Mounding is a standard management practice for tree crops.

W1 - Wetness to 1m

Limitation Value	Description	Suitability subclasses for various land management options Group A	Group B
6H	Rapidly drained and highly permeable	1	1
6M	Rapidly drained and moderately permeable	1	1
6S	Rapidly drained and slowly permeable	2	2
6V	Rapidly drained and very slowly permeable	2	2
5H	Well drained and highly permeable	1	1
5M	Well drained and moderately permeable	1	2
5S	Well drained and slowly permeable	2	3
5V	Well drained and very slowly permeable	2	3
4H	Moderately well drained and highly permeable	1	2
4M	Moderately well drained and moderately permeable	2	3
4S	Moderately well drained and slowly permeable	3	4
4V	Moderately well drained and very slowly permeable	3	4
3H	Imperfectly drained and highly permeable	2	3
3M	Imperfectly drained and moderately permeable	3	4
3S	Imperfectly drained and slowly permeable	4	5
3V	Imperfectly drained and very slowly permeable	4	5
2H	Poorly drained and highly permeable	5	5
2M	Poorly drained and moderately permeable	5	5
2S	Poorly drained and slowly permeable	5	5
2V	Poorly drained and very slowly permeable	5	5
1H	Very poorly drained and highly permeable	5	5
1M	Very poorly drained and moderately permeable	5	5
1S	Very poorly drained and slowly permeable	5	5
1V	Very poorly drained and very slowly permeable	5	5

W1 - Wetness to 1m

Group A	Group A cont.	Group B
Barley-Dryland	Soya Bean-Dryland	Chickpea-Furrow Irrigated
Cotton-Furrow Irrigated	Soya Bean-Furrow Irrigated	Chickpea-Spray Irrigated
Maize-Furrow Irrigated	Soya Bean-Spray Irrigated	Grapes-Trickle Irrigated
Maize-Spray Irrigated	Sunflower-Furrow Irrigated	Lucerne-Dryland
Sorghum (cereal)-Dryland	Sunflower-Spray Irrigated	Lucerne-Spray Irrigated
Sorghum (cereal)-Furrow Irrigated	Sweet Corn-Spray Irrigated	Mungbean-Furrow Irrigated
Sorghum (cereal)-Spray Irrigated	Wheat-Dryland	Mungbean-Spray Irrigated
Sorghum (forage)-Dryland		Pecan-Spray Irrigated
Sorghum (forage)-Furrow Irrigated		Safflower-Furrow Irrigated
Sorghum (forage)-Spray Irrigated		Safflower-Spray Irrigated
		Stone Fruit-Spray Irrigated
		Sunflower-Dryland

W2 - Wetness to 0.5m

Limitation Value	Description	Suitability subclasses for various land management options Group A	Group B	Group C	Group D	Group E
6H	Rapidly drained and highly permeable	1	1	1	1	1
6M	Rapidly drained and moderately permeable	1	1	1	1	1
6S	Rapidly drained and slowly permeable	2	2	1	1	2
6V	Rapidly drained and very slowly permeable	3	2	2	2	2
5H	Well drained and highly permeable	1	1	1	1	1
5M	Well drained and moderately permeable	2	1	1	1	2
5S	Well drained and slowly permeable	3	2	2	2	3
5V	Well drained and very slowly permeable	3	2	2	2	3
4H	Moderately well drained and highly permeable	2	1	1	1	2
4M	Moderately well drained and moderately permeable	3	1	1	2	3
4S	Moderately well drained and slowly permeable	4	2	1	3	4
4V	Moderately well drained and very slowly permeable	4	2	1	3	4
3H	Imperfectly drained and highly permeable	3	2	1	2	3
3M	Imperfectly drained and moderately permeable	4	2	1	3	4
3S	Imperfectly drained and slowly permeable	5	3	2	4	5
3V	Imperfectly drained and very slowly permeable	5	3	2	4	5
2H	Poorly drained and highly permeable	5	3	3	5	5
2M	Poorly drained and moderately permeable	5	3	3	5	5
2S	Poorly drained and slowly permeable	5	4	4	5	5
2V	Poorly drained and very slowly permeable	5	4	4	5	5
1H	Very poorly drained and highly permeable	5	4	5	5	5
1M	Very poorly drained and moderately permeable	5	4	5	5	5
1S	Very poorly drained and slowly permeable	5	5	5	5	5
1V	Very poorly drained and very slowly permeable	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E
Sugarcane-Furrow Irrigated	Improved Pasture-Spray Irrigated	Asparagus-Spray Irrigated	Beans-Spray Irrigated	Mungbean-Dryland
Sugarcane-Spray Irrigated		Brassicaceae-Trickle Irrigated		Navy Bean-Dryland
		Capsicum-Trickle Irrigated		Navy Bean-Furrow Irrigated
		Cucurbit-Furrow Irrigated		Navy Bean-Spray Irrigated
		Cucurbit-Spray Irrigated		Peanut-Dryland
		Pineapple-Spray Irrigated		Peanut-Furrow Irrigated
		Potato-Furrow Irrigated		Peanut-Spray Irrigated
		Potato-Spray Irrigated		
		Radiata pine-Dryland/rainfed		
		Sweet Potato-Spray Irrigated		
		Tomato-Trickle Irrigated		
		Zucchini-Trickle Irrigated		

W3 - Wetness to 1.5m

Limitation Value	Description	Suitability subclasses for various land management options Group A	Group B	Group C	Group D
6H	Rapidly drained and highly permeable	1	1	1	1
6M	Rapidly drained and moderately permeable	1	1	2	2
6S	Rapidly drained and slowly permeable	1	1	3	4
6V	Rapidly drained and very slowly permeable	1	1	3	4
5H	Well drained and highly permeable	1	1	1	2
5M	Well drained and moderately permeable	1	1	2	3
5S	Well drained and slowly permeable	2	2	3	4
5V	Well drained and very slowly permeable	2	2	3	4
4H	Moderately well drained and highly permeable	1	1	2	3
4M	Moderately well drained and moderately permeable	1	2	3	4
4S	Moderately well drained and slowly permeable	2	3	4	5
4V	Moderately well drained and very slowly permeable	2	3	4	5
3H	Imperfectly drained and highly permeable	2	2	3	4
3M	Imperfectly drained and moderately permeable	2	3	4	5
3S	Imperfectly drained and slowly permeable	3	4	5	5
3V	Imperfectly drained and very slowly permeable	3	4	5	5
2H	Poorly drained and highly permeable	3	5	5	5
2M	Poorly drained and moderately permeable	3	5	5	5
2S	Poorly drained and slowly permeable	4	5	5	5
2V	Poorly drained and very slowly permeable	4	5	5	5
1H	Very poorly drained and highly permeable	5	5	5	5
1M	Very poorly drained and moderately permeable	5	5	5	5
1S	Very poorly drained and slowly permeable	5	5	5	5
1V	Very poorly drained and very slowly permeable	5	5	5	5

Group A	Group B	Group C	Group D
Lychee-Spray Irrigated	Mango-Spray Irrigated	Citrus-Spray Irrigated	Avocado-Spray Irrigated
		Macadamia-Spray Irrigated	

6 Suitability framework for the Eastern Downs area

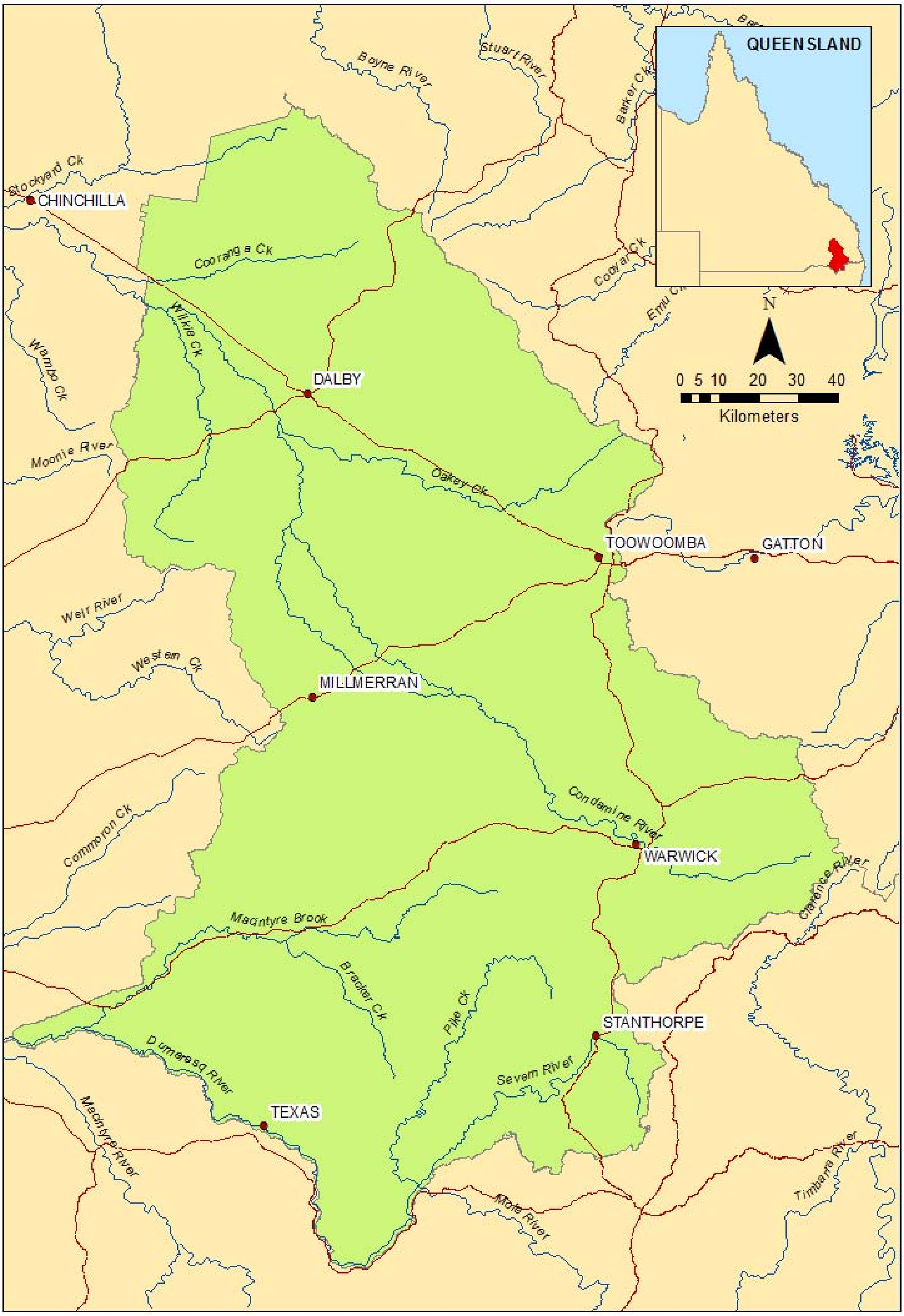

Figure 5. Area covered by the Eastern Downs suitability framework

E - Water erosion

Limitation		Suitability subclasses for various land management options
Value	**Description**	**Group A**
11	Slopes of 0-0.5% with non dispersive moderate to strongly coherent soil in the surface 200mm	1
12	Slopes of 0-0.5% with non dispersive weakly coherent soil in the surface 200mm	1
13	Slopes of 0-0.5% with dispersive soil in the surface 200mm	3
21	Slopes of 0.5-1% with non dispersive moderate to strongly coherent soil in the surface 200mm	1
22	Slopes of 0.5-1% with non dispersive weakly coherent soil in the surface 200mm	2
23	Slopes of 0.5-1% with dispersive soil in the surface 200mm	4
31	Slopes of 1-3% with non dispersive moderate to strongly coherent soil in the surface 200mm	2
32	Slopes of 1-3% with non dispersive weakly coherent soil in the surface 200mm	3
33	Slopes of 1-3% with dispersive soil in the surface 200mm	5
41	Slopes of 3-5% with non dispersive moderate to strongly coherent soil in the surface 200mm	3
42	Slopes of 3-5% with non dispersive weakly coherent soil in the surface 200mm	4
43	Slopes of 3-5% with dispersive soil in the surface 200mm	5
51	Slopes of 5-8% with non dispersive moderate to strongly coherent soil in the surface 200mm	3
52	Slopes of 5-8% with non dispersive weakly coherent soil in the surface 200mm	4
53	Slopes of 5-8% with dispersive soil in the surface 200mm	5
61	Slopes greater than 8% with non dispersive moderate to strongly coherent soil in the surface 200mm	5
62	Slopes greater than 8% with non dispersive weakly coherent soil in the surface 200mm	5
63	Slopes greater than 8% with dispersive soil in the surface 200mm	5

Group A	
Barley-Dryland	Sunflower-Dryland
Canola-Dryland	Triticale-Dryland
Chickpea-Dryland	Wheat-Dryland
Cotton-Furrow Irrigated	
Maize-Dryland	
Millet-Dryland	
Mungbean-Dryland	
Navy Bean-Dryland	
Oat-Dryland	
Peanut-Dryland	
Safflower-Dryland	
Sorghum-Dryland	
Soybean-Dryland	

Es - Erosion hazard, subsoil erodibility

Limitation		Suitability subclasses for various land management options
Value	**Description**	**Group A**
11	Slopes of 0-0.5% with no subsoil (200-1000mm) dispersion	1
12	Slopes of 0-0.5% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	1
13	Slopes of 0-0.5% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	2
21	Slopes of 0.5-1% with no subsoil (200-1000mm) dispersion	1
22	Slopes of 0.5-1% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	2
23	Slopes of 0.5-1% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	3
31	Slopes of 1-3% with no subsoil (200-1000mm) dispersion	1
32	Slopes of 1-3% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	3
33	Slopes of 1-3% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	4
41	Slopes of 3-5% with no subsoil (200-1000mm) dispersion	3
42	Slopes of 3-5% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	3
43	Slopes of 3-5% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	5
51	Slopes of 5-8% with no subsoil (200-1000mm) dispersion	3
52	Slopes of 5-8% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	4
53	Slopes of 5-8% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	5
61	Slopes greater than 8% with no subsoil (200-1000mm) dispersion	5
62	Slopes greater than 8% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	5
63	Slopes greater than 8% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	5

Group A	
Barley-Dryland	Peanut-Dryland
Canola-Dryland	Safflower-Dryland
Chickpea-Dryland	Sorghum-Dryland
Cotton-Furrow Irrigated	Soybean-Dryland
Maize-Dryland	Sunflower-Dryland
Millet-Dryland	Triticale-Dryland
Mungbean-Dryland	Wheat-Dryland
Navy Bean-Dryland	
Oat-Dryland	

M – Soil water availability

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
1	PAWC greater than 150mm/100cms	1	1	1
2	PAWC 125-150mm/100cms	1	2	2
3	PAWC 100-125mm/100cms	2	2	3
4	PAWC 75-100mm/100cms	3	3	3
5	PAWC 50-75mm/100cms	4	4	4
6	PAWC less than 50mm/100cms	5	5	5

Group A	Group B	Group C
Sorghum-Dryland	Barley-Dryland	Cotton-Furrow Irrigated
	Canola-Dryland	Maize-Dryland
	Chickpea-Dryland	Safflower-Dryland
	Millet-Dryland	Sunflower-Dryland
	Mungbean-Dryland	
	Navy Bean-Dryland	
	Oat-Dryland	
	Peanut-Dryland	
	Soybean-Dryland	
	Triticale-Dryland	
	Wheat-Dryland	

Pm - Narrow moisture range

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
1	Wide moisture range for cultivation – moderately well drained to rapidly drained; not hard setting when dry and not 'spewy' (i.e. boggy) when wet. Deep sands and thick sandy surfaced texture contrast soils	1
2	Moderate moisture range for cultivation – moderately well drained to rapidly drained; not hard setting when dry and not 'spewy' when wet. Moderately to strongly self-mulching clays	1
3	Moderate moisture range for cultivation – moderately well drained to rapidly drained; predominantly hard setting when dry and not 'spewy' when wet. Well drained earths and moderately well drained hard setting loamy surfaced soils	2
4	Moderate moisture range for cultivation (but less than Pm 3) – imperfectly drained to moderately well drained; not hard setting (or only weakly) when dry and 'spewy' when wet. Sandy surfaced (less than 0.4 m), sodic texture contrast soils	3
5	Narrow moisture range for cultivation – imperfectly drained to moderately well drained; hard setting, firm or weakly self-mulching when dry and not 'spewy' when wet. Hard setting, firm or weakly self-mulching, pedal clays	3
6	Narrow moisture range for cultivation – imperfectly drained to moderately well drained; hard setting when dry and 'spewy' when wet. Loamy surfaced (less than 0.4 m), sodic texture contrast soils or dermosols	3
7	Very narrow moisture range for cultivation – imperfectly drained to moderately well drained; very hard setting when dry and 'spewy' when wet. Very hard setting, sodic clays	4

Group A
Barley-Dryland
Canola-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Navy Bean-Dryland
Oat-Dryland
Peanut-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Triticale-Dryland
Wheat-Dryland

Ps - Surface condition

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
1	Soils with soft or loose sandy to sandy loam surface horizons	1
2	Very fine self-mulching clays (peds less than 2mm)	1
3	Soils with soft, firm or only weakly hard setting, sandy to loamy surface horizons	2
4	Fine self-mulching clays (peds greater than 2-5mm)	2
5	Coarse self-mulching clays (peds greater than 5–10mm); poor seed soil contact due to separation of large peds with drying	3
6	Clay soils with hard setting, firm pedal or weakly self-mulching surface horizons	3
7	Very coarse self-mulching clays (peds greater than 10mm)	4
8	Loamy, fine sand, silty or clayey surface soils that are extremely hard setting, massive or crusting	4

Group A
Barley-Dryland
Canola-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Navy Bean-Dryland
Oat-Dryland
Peanut-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Triticale-Dryland
Wheat-Dryland

R - Rockiness

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
C2	Cobbles 60 to 200mm and abundance less than 10%	3	3
C3	Cobbles 60 to 200mm and abundance 10-20%	3	4
C4	Cobbles 60 to 200mm and abundance 20-50%	4	4
C5	Cobbles 60 to 200mm and abundance greater than 50%	4	4
G2	Gravels less than 20mm and abundance less than 10%	1	1
G3	Gravels less than 20mm and abundance 10-20%	2	2
G4	Gravels less than 20mm and abundance 20-50%	2	3
G5	Gravels less than 20mm and abundance greater than 50%	3	3
P2	Pebbles 20 to 60mm and abundance less than 10%	2	2
P3	Pebbles 20 to 60mm and abundance 10-20%	2	2
P4	Pebbles 20 to 60mm and abundance 20-50%	3	4
P5	Pebbles 20 to 60mm and abundance greater than 50%	4	4
S2	Stones greater than 200mm and abundance less than 10%	3	3
S3	Stones greater than 200mm and abundance 10-20%	3	4
S4	Stones greater than 200mm and abundance 20-50%	5	5
S5	Stones greater than 200mm and abundance greater than 50%	5	5

Group A	Group B
Barley-Dryland	Mungbean-Dryland
Canola-Dryland	Navy Bean-Dryland
Chickpea-Dryland	Peanut-Dryland
Cotton-Furrow Irrigated	Soybean-Dryland
Maize-Dryland	
Millet-Dryland	
Oat-Dryland	
Safflower-Dryland	
Sorghum-Dryland	
Sunflower-Dryland	
Triticale-Dryland	
Wheat-Dryland	

Tm - Microrelief

Limitation Value	Description	Suitability subclasses for various land management options Group A
1	No microrelief across the majority (greater than 70%) of the land surface	1
2	Very weakly developed microrelief (VI less than 0.1m) that occurs across much (30–70%) of the land surface	2
3	Normal, lattice or linear gilgai (VI 0.1–0.3m) that occurs across less than 30% of the land surface	2
4	Normal, lattice or linear gilgai (VI 0.1–0.3m) that occurs across much (30–70%) of the land surface	2
5	Normal, lattice or linear gilgai (VI 0.1–0.3m) across the majority (greater than 70%) of the land surface	2
6	Shallow, melonhole gilgai (VI 0.3–0.6m) that occurs across less than 30% of the land surface	2
7	Shallow, melonhole gilgai (VI 0.3–0.6m) that occurs across much (30–70%) of the land surface	3
8	Shallow, melonhole gilgai (VI 0.3–0.6m) across the majority (greater than 70%) of the land surface	4
9	Strongly developed, deep, melonhole gilgai (VI 0.6–1.5m) that occurs across less than 30% of the land surface	4
10	Strongly developed, deep, melonhole gilgai (VI 0.6–1.5m) that occurs across much (30–70%) of the land surface	5
11	Strongly developed, deep, melonhole gilgai (VI 0.6–1.5m) across the majority (greater than 70%) of the land surface	5

Group A
Barley-Dryland
Canola-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Navy Bean-Dryland
Oat-Dryland
Peanut-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Triticale-Dryland
Wheat-Dryland

W - Wetness

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
2	Very poorly to poorly drained	5	5	5
3H	Imperfectly drained and highly permeable	3	3	3
3M	Imperfectly drained and moderately permeable	3	3	3
3S	Imperfectly drained and slowly permeable	4	4	4
4H	Moderately well drained and highly permeable	1	2	2
4M	Moderately well drained and moderately permeable	1	2	2
4S	Moderately well drained and slowly permeable	2	2	3
5	Well drained	1	1	1
6	Rapidly drained	1	1	1

Group A	Group B	Group C
Safflower-Dryland	Cotton-Furrow Irrigated	Barley-Dryland
Sunflower-Dryland		Canola-Dryland
		Chickpea-Dryland
		Maize-Dryland
		Millet-Dryland
		Mungbean-Dryland
		Navy Bean-Dryland
		Oat-Dryland
		Peanut-Dryland
		Sorghum-Dryland
		Soybean-Dryland
		Triticale-Dryland
		Wheat-Dryland

7 Suitability framework for the Western Downs, Balonne and Maranoa area

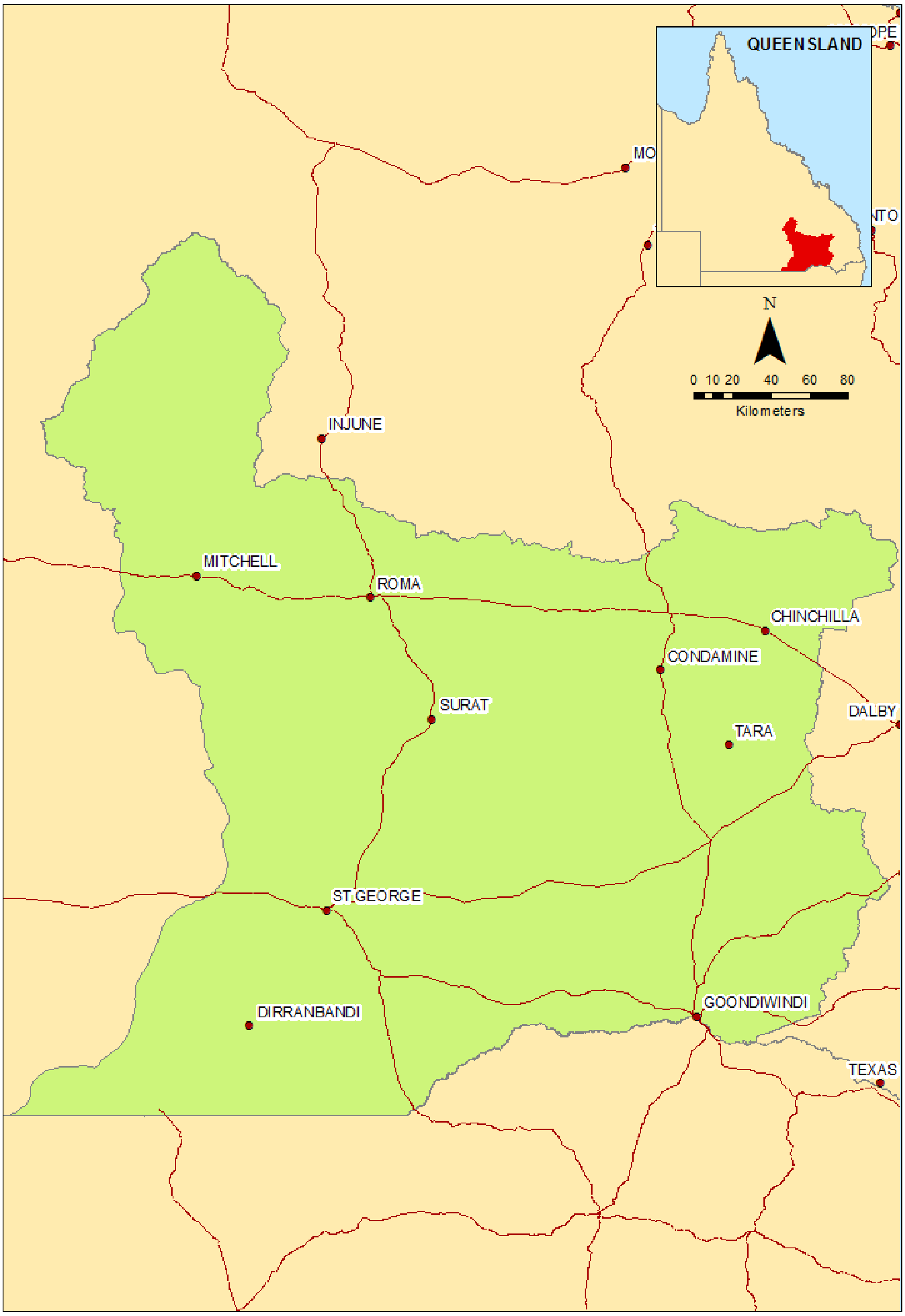

Figure 6. Area covered by the Western Downs, Balonne and Maranoa suitability framework

E - Water erosion

Limitation Value	Description	Suitability subclasses for various land management options Group A
11	Slopes of 0-0.5% with non dispersive moderate to strongly coherent soil in the surface 200mm	1
12	Slopes of 0-0.5% with non dispersive weakly coherent soil in the surface 200mm	1
13	Slopes of 0-0.5% with dispersive soil in the surface 200mm	3
21	Slopes of 0.5-1% with non dispersive moderate to strongly coherent soil in the surface 200mm	1
22	Slopes of 0.5-1% with non dispersive weakly coherent soil in the surface 200mm	2
23	Slopes of 0.5-1% with dispersive soil in the surface 200mm	4
31	Slopes of 1-3% with non dispersive moderate to strongly coherent soil in the surface 200mm	2
32	Slopes of 1-3% with non dispersive weakly coherent soil in the surface 200mm	3
33	Slopes of 1-3% with dispersive soil in the surface 200mm	5
41	Slopes of 3-5% with non dispersive moderate to strongly coherent soil in the surface 200mm	3
42	Slopes of 3-5% with non dispersive weakly coherent soil in the surface 200mm	4
43	Slopes of 3-5% with dispersive soil in the surface 200mm	5
51	Slopes of 5-8% with non dispersive moderate to strongly coherent soil in the surface 200mm	3
52	Slopes of 5-8% with non dispersive weakly coherent soil in the surface 200mm	4
53	Slopes of 5-8% with dispersive soil in the surface 200mm	5
61	Slopes greater than 8% with non dispersive moderate to strongly coherent soil in the surface 200mm	5
62	Slopes greater than 8% with non dispersive weakly coherent soil in the surface 200mm	5
63	Slopes greater than 8% with dispersive soil in the surface 200mm	5

Group A
Barley-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Oat-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Wheat-Dryland

Es - Erosion hazard, subsoil erodibility

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
11	Slopes of 0-0.5% with no subsoil (200-1000mm) dispersion	1
12	Slopes of 0-0.5% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	1
13	Slopes of 0-0.5% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	2
21	Slopes of 0.5-1% with no subsoil (200-1000mm) dispersion	1
22	Slopes of 0.5-1% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	2
23	Slopes of 0.5-1% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	3
31	Slopes of 1-3% with no subsoil (200-1000mm) dispersion	1
32	Slopes of 1-3% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	3
33	Slopes of 1-3% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	4
41	Slopes of 3-5% with no subsoil (200-1000mm) dispersion	3
42	Slopes of 3-5% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	3
43	Slopes of 3-5% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	5
51	Slopes of 5-8% with no subsoil (200-1000mm) dispersion	3
52	Slopes of 5-8% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	4
53	Slopes of 5-8% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	5
61	Slopes greater than 8% with no subsoil (200-1000mm) dispersion	5
62	Slopes greater than 8% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	5
63	Slopes greater than 8% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	5

Group A
Barley-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Oat-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Wheat-Dryland

M – Soil water availability

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
1	PAWC greater than 150mm/100cms	1	1	1	2
2	PAWC 125-150mm/100cms	2	2	2	2
3	PAWC 100-125mm/100cms	3	3	3	3
4	PAWC 75-100mm/100cms	3	4	4	4
5	PAWC 50-75mm/100cms	4	4	5	5
6	PAWC less than 50mm/100cms	5	5	5	5

Group A	Group B	Group C	Group D
Barley-Dryland	Chickpea-Dryland	Safflower-Dryland	Mungbean-Dryland
Cotton-Furrow Irrigated	Maize-Dryland	Sunflower-Dryland	Soybean-Dryland
Millet-Dryland	Sorghum-Dryland		
Oat-Dryland			
Wheat-Dryland			

Pm - Narrow moisture range

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
1	Wide moisture range for cultivation – moderately well drained to rapidly drained; not hard setting when dry and not 'spewy' (i.e. boggy) when wet. Deep sands and thick sandy surfaced texture contrast soils	1
2	Moderate moisture range for cultivation – moderately well drained to rapidly drained; not hard setting when dry and not 'spewy' when wet. Moderately to strongly self-mulching clays	1
3	Moderate moisture range for cultivation – moderately well drained to rapidly drained; predominantly hard setting when dry and not 'spewy' when wet. Well drained earths and moderately well drained hard setting loamy surfaced soils	2
4	Moderate moisture range for cultivation (but less than Pm 3) – imperfectly drained to moderately well drained; not hard setting (or only weakly) when dry and 'spewy' when wet. Sandy surfaced (less than 0.4 m), sodic texture contrast soils	3
5	Narrow moisture range for cultivation – imperfectly drained to moderately well drained; hard setting, firm or weakly self-mulching when dry and not 'spewy' when wet. Hard setting, firm or weakly self-mulching, pedal clays	3
6	Narrow moisture range for cultivation – imperfectly drained to moderately well drained; hard setting when dry and 'spewy' when wet. Loamy surfaced (less than 0.4 m), sodic texture contrast soils or dermosols	3
7	Very narrow moisture range for cultivation – imperfectly drained to moderately well drained; very hard setting when dry and 'spewy' when wet. Very hard setting, sodic clays	4

Group A
Barley-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Oat-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Wheat-Dryland

Ps - Surface condition

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
1	Soils with soft or loose sandy to sandy loam surface horizons	1
2	Very fine self-mulching clays (peds less than 2mm)	1
3	Soils with soft, firm or only weakly hard setting, sandy to loamy surface horizons	2
4	Fine self-mulching clays (peds greater than 2-5mm)	2
5	Coarse self-mulching clays (peds greater than 5–10mm); poor seed soil contact due to separation of large peds with drying	3
6	Clay soils with hard setting, firm pedal or weakly self-mulching surface horizons	3
7	Very coarse self-mulching clays (peds greater than 10mm)	4
8	Loamy, fine sand, silty or clayey surface soils that are extremely hard setting, massive or crusting	4

Group A
Barley-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Oat-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Wheat-Dryland

R - Rockiness

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
C2	Cobbles 60 to 200mm and abundance less than 10%	3	3
C3	Cobbles 60 to 200mm and abundance 10-20%	3	4
C4	Cobbles 60 to 200mm and abundance 20-50%	4	4
C5	Cobbles 60 to 200mm and abundance greater than 50%	4	4
G2	Gravels less than 20mm and abundance less than 10%	1	1
G3	Gravels less than 20mm and abundance 10-20%	2	2
G4	Gravels less than 20mm and abundance 20-50%	2	3
G5	Gravels less than 20mm and abundance greater than 50%	3	3
P2	Pebbles 20 to 60mm and abundance less than 10%	2	2
P3	Pebbles 20 to 60mm and abundance 10-20%	2	2
P4	Pebbles 20 to 60mm and abundance 20-50%	3	4
P5	Pebbles 20 to 60mm and abundance greater than 50%	4	4
S2	Stones greater than 200mm and abundance less than 10%	3	3
S3	Stones greater than 200mm and abundance 10-20%	3	4
S4	Stones greater than 200mm and abundance 20-50%	5	5
S5	Stones greater than 200mm and abundance greater than 50%	5	5

Group A	Group B
Barley-Dryland	Mungbean-Dryland
Chickpea-Dryland	Soybean-Dryland
Cotton-Furrow Irrigated	
Maize-Dryland	
Millet-Dryland	
Oat-Dryland	
Safflower-Dryland	
Sorghum-Dryland	
Sunflower-Dryland	
Wheat-Dryland	

Tm - Microrelief

Limitation Value	Description	Suitability subclasses for various land management options Group A
1	No microrelief across the majority (greater than 70%) of the land surface	1
2	Very weakly developed microrelief (VI less than 0.1m) that occurs across much (30–70%) of the land surface	2
3	Normal, lattice or linear gilgai (VI 0.1–0.3m) that occurs across less than 30% of the land surface	2
4	Normal, lattice or linear gilgai (VI 0.1–0.3m) that occurs across much (30–70%) of the land surface	2
5	Normal, lattice or linear gilgai (VI 0.1–0.3m) across the majority (greater than 70%) of the land surface	2
6	Shallow, melonhole gilgai (VI 0.3–0.6m) that occurs across less than 30% of the land surface	2
7	Shallow, melonhole gilgai (VI 0.3–0.6m) that occurs across much (30–70%) of the land surface	3
8	Shallow, melonhole gilgai (VI 0.3–0.6m) across the majority (greater than 70%) of the land surface	4
9	Strongly developed, deep, melonhole gilgai (VI 0.6–1.5m) that occurs across less than 30% of the land surface	4
10	Strongly developed, deep, melonhole gilgai (VI 0.6–1.5m) that occurs across much (30–70%) of the land surface	5
11	Strongly developed, deep, melonhole gilgai (VI 0.6–1.5m) across the majority (greater than 70%) of the land surface	5

Group A
Barley-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Oat-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Wheat-Dryland

W - Wetness

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E
		Suitability subclasses for various land management options				
2	Very poorly to poorly drained	5	5	5	5	5
3H	Imperfectly drained and highly permeable	2	3	3	3	3
3M	Imperfectly drained and moderately permeable	3	3	3	3	3
3S	Imperfectly drained and slowly permeable	4	4	4	4	4
4H	Moderately well drained and highly permeable	2	1	1	2	2
4M	Moderately well drained and moderately permeable	2	1	1	2	2
4S	Moderately well drained and slowly permeable	3	2	3	2	3
5	Well drained	1	1	1	1	1
6	Rapidly drained	1	1	1	1	1

Group A	Group B	Group C	Group D	Group E
Chickpea-Dryland	Mungbean-Dryland	Maize-Dryland	Cotton-Furrow Irrigated	Barley-Dryland
	Soybean-Dryland	Sorghum-Dryland		Millet-Dryland
				Oat-Dryland
				Safflower-Dryland
				Sunflower-Dryland
				Wheat-Dryland

8 Suitability framework for the Central Queensland Coast area

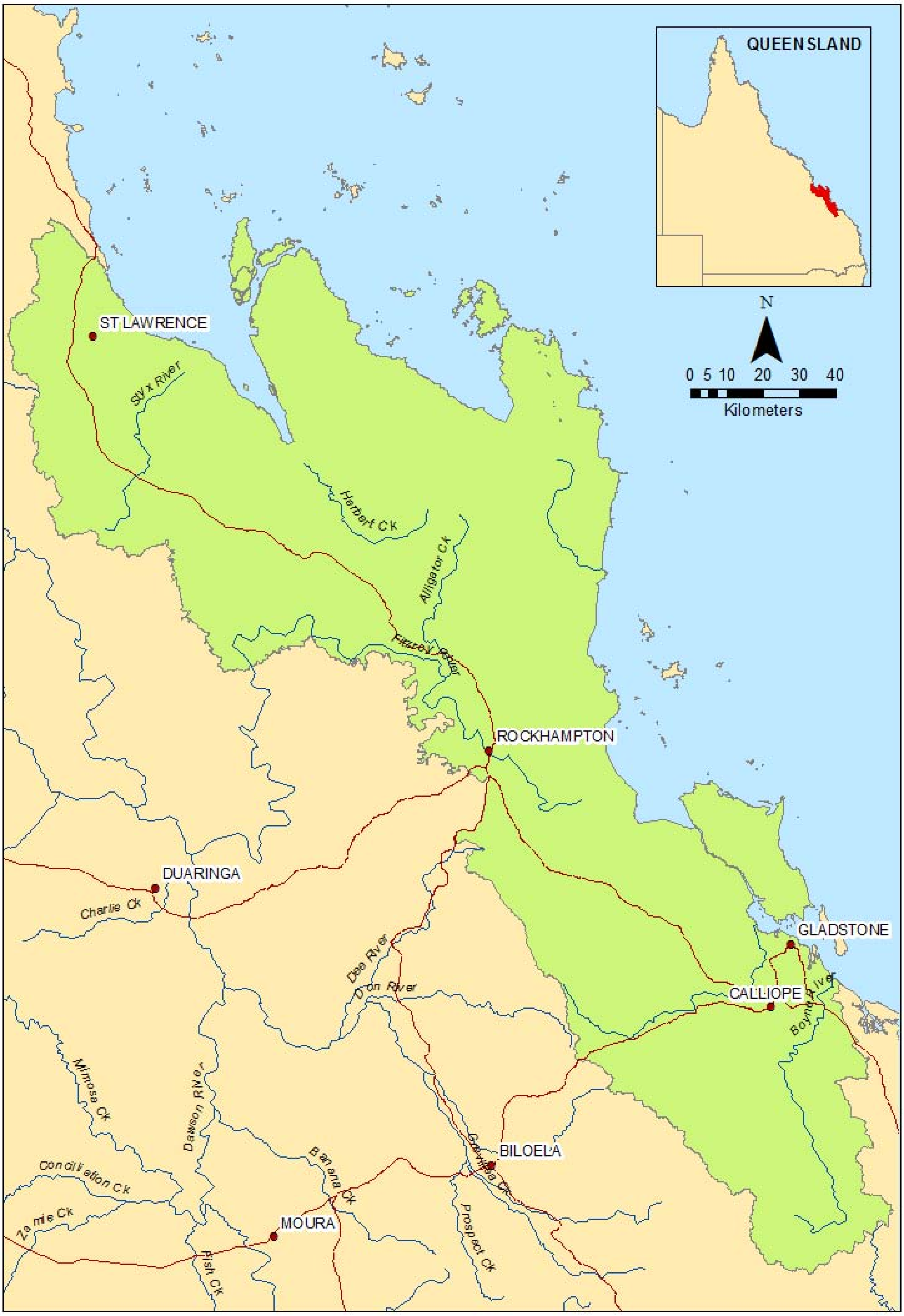

Figure 7. Area covered by the Central Queensland Coast suitability framework

A - Wind erosion

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
1	Coherent soil surface	1	1
2	Loose fine to medium grain sands	4	5

Group A	Group B
Avocado-Irrigated	Capsicum-Irrigated
Carambola-Irrigated	Curcubit-Irrigated
Citrus-Irrigated	Pineapple-Dryland
Custard Apple-Irrigated	Tomato-Irrigated
Figs-Irrigated	
Grapes-Irrigated	
Lychee-Irrigated	
Macadamia Nuts-Irrigated	
Mango-Irrigated	
Papaw-Irrigated	
Passionfruit-Irrigated	
Persimmon-Irrigated	
Stone Fruit-Irrigated	

Cf - Climate, frost

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
1	Frost free	1	1	1	1
2	Light frost winter only	1	2	2	3
3	Light frost autumn to spring	1	3	3	4
4	Heavy frost winter only	1	4	5	5
5	Heavy frost autumn to spring	1	5	5	5

Group A	Group B	Group C	Group D
Citrus-Irrigated	Carambola-Irrigated	Avocado-Irrigated	Capsicum-Irrigated
Figs-Irrigated	Lychee-Irrigated	Custard Apple-Irrigated	Curcubit-Irrigated
Grapes-Irrigated	Macadamia Nuts-Irrigated	Papaw-Irrigated	Tomato-Irrigated
Persimmon-Irrigated	Mango-Irrigated	Passionfruit-Irrigated	
Stone Fruit-Irrigated		Pineapple-Dryland	

Cp - Rainfall

Limitation		Suitability subclasses for various land management options					
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
1	Less than 1000 mm (e.g. Calliope Area)	1	1	1	1	2	2
2	1000 to 1400 mm (e.g. Yeppoon Area)	1	1	2	2	2	5
3	Greater than 1400 mm (e.g. Byfield Area)	2	3	3	4	5	5

Group A	Group B	Group C	Group D	Group E	Group F
Lychee-Irrigated	Citrus-Irrigated	Capsicum-Irrigated	Avocado-Irrigated	Figs-Irrigated	Grapes-Irrigated
Papaw-Irrigated	Custard Apple-Irrigated	Curcubit-Irrigated	Carambola-Irrigated		
Passionfruit-Irrigated	Macadamia Nuts-Irrigated	Tomato-Irrigated	Mango-Irrigated		
Pineapple-Dryland	Persimmon-Irrigated		Stone Fruit-Irrigated		

E - Water erosion

Limitation		Suitability subclasses for various land management options		
Value	Description	Group A	Group B	Group C
1	Slopes less than 2%	1	1	1
2	Slopes 2 to 5%	1	2	2
3	Slopes 5 to 8%	2	3	3
4	Slopes 8 to 12%	3	4	4
5	Slopes 12 to 15%	3	4	5
6	Slopes 15 to 20%	4	5	5
7	Slopes greater than 20%	5	5	5

Group A	Group B	Group C
Avocado-Irrigated	Pineapple-Dryland	Capsicum-Irrigated
Carambola-Irrigated		Curcubit-Irrigated
Citrus-Irrigated		Tomato-Irrigated
Custard Apple-Irrigated		
Figs-Irrigated		
Grapes-Irrigated		
Lychee-Irrigated		
Macadamia Nuts-Irrigated		
Mango-Irrigated		
Papaw-Irrigated		
Passionfruit-Irrigated		
Persimmon-Irrigated		
Stone Fruit-Irrigated		

F - Flooding

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
1	Flood free	1
2	Less than 1 in 10 years	2
3	1 in 5 to 1 in 10 years	3
4	Greater than 1 in 5 years	4

Group A
Avocado-Irrigated
Capsicum-Irrigated
Carambola-Irrigated
Citrus-Irrigated
Curcubit-Irrigated
Custard Apple-Irrigated
Figs-Irrigated
Grapes-Irrigated
Lychee-Irrigated
Macadamia Nuts-Irrigated
Mango-Irrigated
Papaw-Irrigated
Passionfruit-Irrigated
Persimmon-Irrigated
Pineapple-Dryland
Stone Fruit-Irrigated
Tomato-Irrigated

M – Soil water availaibility

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
1	PAWC greater than 150mm/100cms	1	1	1	1
2	PAWC 125-150mm/100cms	1	1	1	2
3	PAWC 100-125mm/100cms	1	1	2	2
4	PAWC 75-100mm/100cms	1	1	2	3
5	PAWC 60-75mm/100cms	1	2	3	4
6	PAWC 40-60mm/100cms	3	3	3	5
7	PAWC less than 40mm/100cms	4	4	4	5

Group A	Group B	Group C	Group D
Pineapple-Dryland	Capsicum-Irrigated	Grapes-Irrigated	Avocado-Irrigated
	Curcubit-Irrigated	Passionfruit-Irrigated	Carambola-Irrigated
	Tomato-Irrigated		Citrus-Irrigated
			Custard Apple-Irrigated
			Figs-Irrigated
			Lychee-Irrigated
			Macadamia Nuts-Irrigated
			Mango-Irrigated
			Papaw-Irrigated
			Persimmon-Irrigated
			Stone Fruit-Irrigated

Pm - Narrow moisture range

Limitation Value	Description	Suitability subclasses for various land management options Group A	Group B	Group C
1	Sands/structured loams/self mulching clays	1	1	1
2	Hard setting fine sandy loams to silty clay loams	1	2	2
3	Very hard setting surface soils or medium heavy clays	1	3	3
4	Gravelly abrasive soils	1	3	4
5	Heavy clays	1	3	4

Group A	Group B	Group C
Avocado-Irrigated	Papaw-Irrigated	Capsicum-Irrigated
Carambola-Irrigated	Pineapple-Dryland	Curcubit-Irrigated
Citrus-Irrigated		Tomato-Irrigated
Custard Apple-Irrigated		
Figs-Irrigated		
Grapes-Irrigated		
Lychee-Irrigated		
Macadamia Nuts-Irrigated		
Mango-Irrigated		
Passionfruit-Irrigated		
Persimmon-Irrigated		
Stone Fruit-Irrigated		

Ps - Surface condition

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
1	Fine soil surface structure or sand	1	1	1
2	Coarse soil surface structure	1	1	2
3	Hard setting surface soils	1	1	3
4	Very hard setting or crusting surface soils	1	1	4
5	Loose soil surface	1	5	1

Group A	Group B	Group C
Avocado-Irrigated	Macadamia Nuts-Irrigated	Capsicum-Irrigated
Carambola-Irrigated		Curcubit-Irrigated
Citrus-Irrigated		Tomato-Irrigated
Custard Apple-Irrigated		
Figs-Irrigated		
Grapes-Irrigated		
Lychee-Irrigated		
Mango-Irrigated		
Papaw-Irrigated		
Passionfruit-Irrigated		
Persimmon-Irrigated		
Pineapple-Dryland		
Stone Fruit-Irrigated		

R - Rockiness

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
0	No Rockiness limitation	1	1	1	1
C1	Cobbles 60 to 200mm and abundance less than 2%	1	1	3	3
C2	Cobbles 60 to 200mm and abundance 2 -10%	2	2	4	5
C3	Cobbles 60 to 200mm and abundance 10-20%	3	3	5	5
C4	Cobbles 60 to 200mm and abundance 20-50%	4	5	5	5
C5	Cobbles 60 to 200mm and abundance greater than 50%	5	5	5	5
P1	Pebbles 20 to 60mm and abundance less than 2%	1	1	2	2
P2	Pebbles 20 to 60mm and abundance 2-10%	1	1	3	3
P3	Pebbles 20 to 60mm and abundance 10-20%	1	2	4	4
P4	Pebbles 20 to 60mm and abundance 20-50%	1	3	5	5
P5	Pebbles 20 to 60mm and abundance greater than 50%	2	4	5	5
S1	Stones greater than 200mm and abundance less than 2%	1	3	4	3
S2	Stones greater than 200mm and abundance 2-10%	2	4	5	5
S3	Stones greater than 200mm and abundance 10-20%	3	5	5	5
S4	Stones greater than 200mm and abundance 20-50%	5	5	5	5
S5	Stones greater than 200mm and abundance greater than 50%	5	5	5	5

Group A	Group B	Group C	Group D
Avocado-Irrigated	Pineapple-Dryland	Capsicum-Irrigated	Macadamia Nuts-Irrigated
Carambola-Irrigated		Curcubit-Irrigated	
Citrus-Irrigated		Tomato-Irrigated	
Custard Apple-Irrigated			
Figs-Irrigated			
Grapes-Irrigated			
Lychee-Irrigated			
Mango-Irrigated			
Papaw-Irrigated			
Passionfruit-Irrigated			
Persimmon-Irrigated			
Stone Fruit-Irrigated			

Ts - Slope

Limitation		Suitability subclasses for various land management options	
Value	**Description**	**Group A**	**Group B**
1	Slopes less than 12%	1	2
2	Slopes of 12 to 15%	3	5
3	Slopes of 15 to 20%	4	5
4	Slopes greater than 20%	5	5

Group A	Group B
Avocado-Irrigated	Capsicum-Irrigated
Carambola-Irrigated	Curcubit-Irrigated
Citrus-Irrigated	Tomato-Irrigated
Custard Apple-Irrigated	
Figs-Irrigated	
Grapes-Irrigated	
Lychee-Irrigated	
Macadamia Nuts-Irrigated	
Mango-Irrigated	
Papaw-Irrigated	
Passionfruit-Irrigated	
Persimmon-Irrigated	
Pineapple-Dryland	
Stone Fruit-Irrigated	

W - Wetness

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
1	Rapidly drained	1	1	1	1
2	Well drained	1	1	1	2
3	Moderately well drained	3	3	4	5
4	Imperfectly drained	4	5	5	5
5	Poorly drained	5	5	5	5
6	Very poorly drained	5	5	5	5

Group A	Group B	Group C	Group D
Carambola-Irrigated	Capsicum-Irrigated	Custard Apple-Irrigated	Avocado-Irrigated
Citrus-Irrigated	Curcubit-Irrigated	Papaw-Irrigated	Grapes-Irrigated
Figs-Irrigated	Tomato-Irrigated		
Lychee-Irrigated			
Macadamia Nuts-Irrigated			
Mango-Irrigated			
Passionfruit-Irrigated			
Persimmon-Irrigated			
Pineapple-Dryland			
Stone Fruit-Irrigated			

Xt - Topographic complexity

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
1	No topographic dissection across the mapping unit	1
2	Very weakly dissected mapping unit	2
3	Weakly dissected mapping unit	3
4	Moderately dissected mapping unit or complex slopes	4
5	Strongly dissected mapping unit or steep complex slopes and crests	5

Group A
Avocado-Irrigated
Capsicum-Irrigated
Carambola-Irrigated
Citrus-Irrigated
Curcubit-Irrigated
Custard Apple-Irrigated
Figs-Irrigated
Grapes-Irrigated
Lychee-Irrigated
Macadamia Nuts-Irrigated
Mango-Irrigated
Papaw-Irrigated
Passionfruit-Irrigated
Persimmon-Irrigated
Pineapple-Dryland
Stone Fruit-Irrigated
Tomato-Irrigated

9 Suitability framework for the Mackay and Whitsunday area

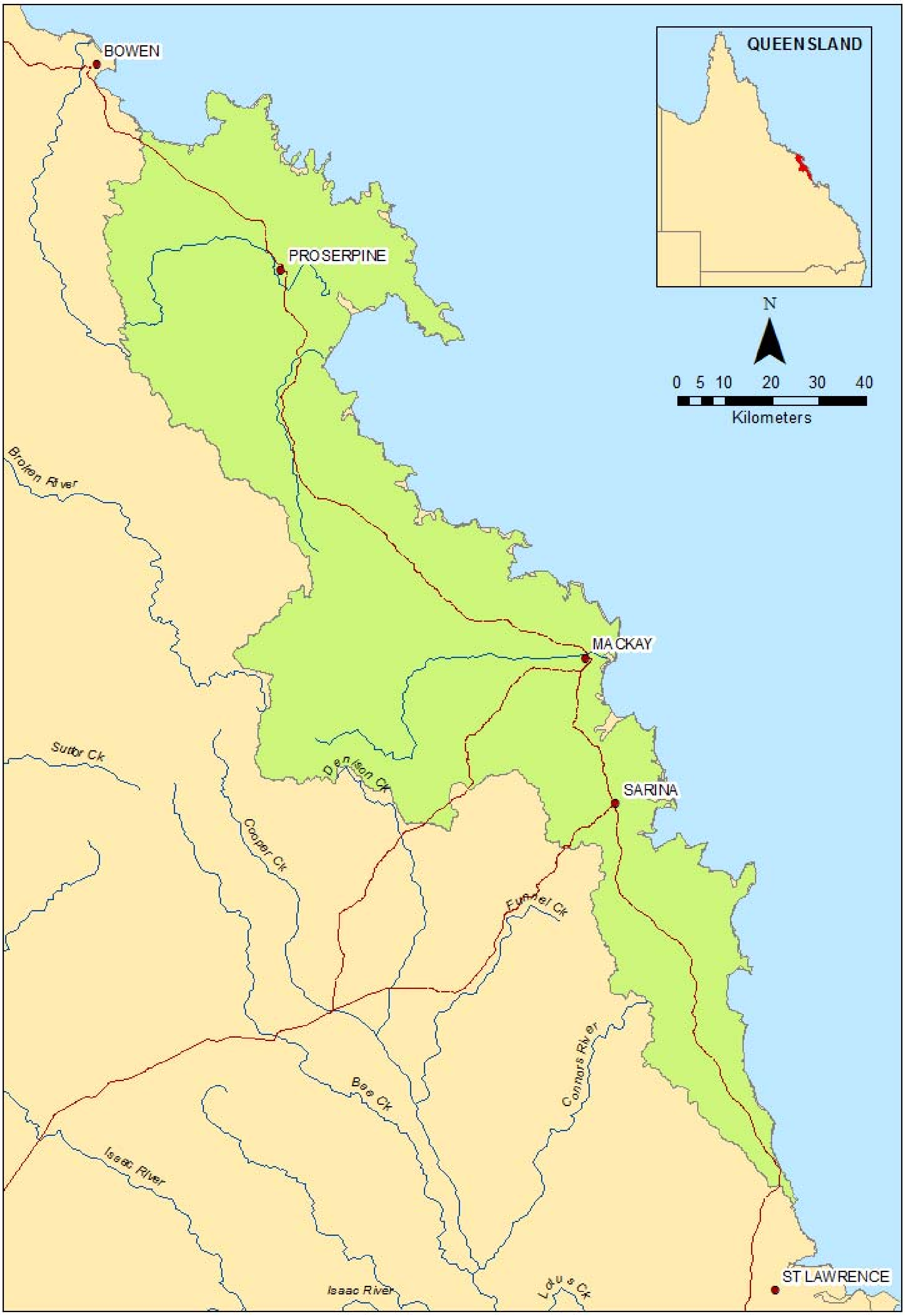

Figure 8. Area covered by the Mackay and Whitsunday suitability framework

C - Climate

Limitation		Suitability subclasses for various land management options					
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
C1	Mean annual rainfall > 2000 mm	1	2	2	3	3	4
C2	Mean annual rainfall 1600 to 2000 mm	1	1	2	2	3	3
C3	Mean annual rainfall 1200 to 1600 mm	1	1	1	1	2	3
C4	Mean annual rainfall 800 to 1200 mm	1	1	1	1	1	1

Group A	Group B	Group C	Group D	Group E	Group F
Banana-Irrigated	Citrus-Irrigated	Chickpea-Irrigated	Cucurbit-Irrigated	Mango-Irrigated	Maize-Irrigated
Macadamia Nuts-Irrigated		Kenaf-Irrigated	Lychee-Irrigated		Peanut-Irrigated
Papaw-Irrigated		Navy Bean-Irrigated	Seedling Vegetables-Irrigated		Sorghum grain-Irrigated
Sugarcane-Dryland		Sorghum cereal-Irrigated			
		Soybean-Irrigated			
		Sugar Beet-Irrigated			
		Sunflower-Irrigated			
		Sunn Hemp-Irrigated			

Cf - Climate, frost

Limitation		Suitability subclasses for various land management options					
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
CF1	Frost free	1	1	1	1	1	1
CF2	Rare frosts	1	1	1	2	2	3
CF3	Mainly light frosts-less than five frosts	1	2	3	3	3	4
CF4	Mainly heavy frosts-more than five frosts	1	3	4	4	5	5
CF5	Unknown	1	1	1	1	1	1

Group A	Group B	Group C	Group D	Group E	Group F
Citrus-Irrigated	Sugarcane-Dryland	Kenaf-Irrigated	Lychee-Irrigated	Banana-Irrigated	Chickpea-Irrigated
		Maize-Irrigated	Macadamia Nuts-Irrigated	Papaw-Irrigated	Cucurbit-Irrigated
		Sorghum cereal-Irrigated	Mango-Irrigated		Navy Bean-Irrigated
		Sorghum grain-Irrigated			Peanut-Irrigated
		Sunflower-Irrigated			Seedling Vegetables-Irrigated
		Sunn Hemp-Irrigated			Soybean-Irrigated
					Sugar Beet-Irrigated

E - Water erosion

Limitation Value	Description	Suitability subclasses for various land management options Group A	Group B	Group C
EB1	Stream beds and areas subject to stream bank erosion	5	5	5
ED1	Non sodic duplex soils, slope < 1%	1	1	1
ED2	Non sodic duplex soils, slope 1-2%	1	1	2
ED3	Non sodic duplex soils, slope 2-4%	1	2	3
ED4	Non sodic duplex soils, slope 4-10%	2	3	4
ED5	Non sodic duplex soils, slope 10-14%	3	4	5
ED6	Non sodic duplex soils, slope 14-20%	4	5	5
ED7	Non sodic duplex soils, slope 20-30%	5	5	5
ED8	Non sodic duplex soils, slope > 30%	5	5	5
EN1	Depositional or low energy environment, no or minimal erosion; eg swamps and mangroves	1	1	1
ES1	Sodic Duplex soils, slopes < 1%	1	1	1
ES2	Sodic Duplex soils, slopes 1-2%	1	1	2
ES3	Sodic Duplex soils, slopes 2-4%	2	3	4
ES4	Sodic Duplex soils, slopes 4-10%	3	4	5
ES5	Sodic Duplex soils, slopes 10-20%	5	5	5
ES6	Sodic Duplex soils, slopes > 20%	5	5	5
ES7	Highly erosive sodic duplex soils, slopes 1-4%. Thin < 0.15m A horizon. B horizon ESP > 25%	5	5	5
ES8	Highly erosive sodic duplex soils, slopes > 4%. Thin < 0.15m A horizon. B horizon ESP > 15%	5	5	5
EW1	Gradational and uniform soils, slope < 1%	1	1	1
EW2	Gradational and uniform soils, slope 1-2%	1	1	2
EW3	Gradational and uniform soils, slope 2-4%	1	2	3
EW4	Gradational and uniform soils, slope 4-8%	2	3	4
EW5	Gradational and uniform soils, slope 8-14%	3	4	4
EW6	Gradational and uniform soils, slope 14-20%	3	5	5
EW7	Gradational and uniform soils, slope 20-30%	4	5	5
EW8	Gradational and uniform soils, slope > 30%	5	5	5

Group A	Group B	Group C	Group C cont.
Banana-Irrigated	Sugarcane-Dryland	Chickpea-Irrigated	Sunn Hemp-Irrigated
Citrus-Irrigated		Cucurbit-Irrigated	
Lychee-Irrigated		Kenaf-Irrigated	
Macadamia Nuts-Irrigated		Maize-Irrigated	
Mango-Irrigated		Navy Bean-Irrigated	
Papaw-Irrigated		Peanut-Irrigated	
		Seedling Vegetables-Irrigated	
		Sorghum cereal-Irrigated	
		Sorghum grain-Irrigated	
		Soybean-Irrigated	
		Sugar Beet-Irrigated	
		Sunflower-Irrigated	

F - Flooding

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
F1	Not flooded	1	1	1
F2	Flooded 1 in 50 to 100 years	1	1	1
F3	Flooded 1 in 10 to 50 years; depth usually < 1 m	1	1	2
F4	Flooded 1 in 10 to 50 years; depth usually > 1 m	2	2	2
F5	Flooded 1 in 1 to 10 years; depth usually < 1 m	2	2	4
F6	Flooded 1 in 1 to 10 years; depth usually > 1 m	2	2	4
F7	Flooded on an almost annual basis	3	4	5
F8	Subject to severely erosive flooding; eg. stream beds and gullies	5	5	5

Group A	Group B	Group C
Citrus-Irrigated	Chickpea-Irrigated	Banana-Irrigated
Sugarcane-Dryland	Cucurbit-Irrigated	Lychee-Irrigated
	Kenaf-Irrigated	Macadamia Nuts-Irrigated
	Maize-Irrigated	Mango-Irrigated
	Navy Bean-Irrigated	Papaw-Irrigated
	Peanut-Irrigated	
	Seedling Vegetables-Irrigated	
	Sorghum cereal-Irrigated	
	Sorghum grain-Irrigated	
	Soybean-Irrigated	
	Sugar Beet-Irrigated	
	Sunflower-Irrigated	
	Sunn Hemp-Irrigated	

M1 – Soil water availability, PAWC to 0.5m

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
M15	PAWC of 100-125mm to 0.5m	1
M16	PAWC of 75-100mm to 0.5m	1
M17	PAWC of 60-75mm to 0.5m	2
M18	PAWC of 40-60mm to 0.5m	3
M19	PAWC of < 40mm to 0.5m	4

Group A
Cucurbit-Irrigated
Navy Bean-Irrigated
Seedling Vegetables-Irrigated
Sugar Beet-Irrigated

M2 – Soil water availability, PAWC to 0.9m

Limitation		Suitability subclasses for various land management options	
Value	**Description**	**Group A**	**Group B**
M1	PAWC > 150mm to 0.9m	1	1
M2	PAWC of 125-150mm to 0.9m	1	2
M3	PAWC of 100-125mm to 0.9m	1	2
M4	PAWC of 75-100mm to 0.9m	2	3
M5	PAWC of 60-75mm to 0.9m	2	3
M6	PAWC of 40-60mm to 0.9m	3	4
M7	PAWC of < 40mm to 0.9m	4	5

Group A	Group B
Sugarcane-Dryland	Chickpea-Irrigated
	Kenaf-Irrigated
	Maize-Irrigated
	Peanut-Irrigated
	Sorghum cereal-Irrigated
	Sorghum grain-Irrigated
	Soybean-Irrigated
	Sunflower-Irrigated
	Sunn Hemp-Irrigated

M3 – Soil water availability, PAWC to 1.2m

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
M8	PAWC > 150mm to 1.2m	1
M9	PAWC of 125-150mm to 1.2m	1
M10	PAWC of 100-125mm to 1.2m	1
M11	PAWC of 75-100mm to 1.2m	2
M12	PAWC of 60-75mm to 1.2m	3
M13	PAWC of 40-60mm to 1.2m	4
M14	PAWC of < 40mm to 1.2m	5

Group A
Banana-Irrigated
Citrus-Irrigated
Lychee-Irrigated
Macadamia Nuts-Irrigated
Mango-Irrigated
Papaw-Irrigated

Pm - Narrow moisture range

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
PM1	No restriction to cultivation, such as loose sands	1	1	1	1
PM2	Firm to hardsetting surface, moderate to strong subangular-blocky to angular blocky structured A horizon, usually clay loam texture	1	1	1	2
PM3	Hardsetting surface, massive loam to sandy loam A horizon with a very firm dry consistency (2-4) (sandy bulldust soils)	1	2	2	3
PM4	Hardsetting surface, massive to weakly structured sandy clay loam to clay loam A horizon, firm to very firm dry consistence (2-4) (bulldust soils)	1	2	2	3
PM5	Very hardsetting surface, fine sandy or silty A horizon	1	3	4	4
PM6	Clay soils, cracking or non-cracking pedal but do not have a self mulching surface	1	1	1	2
PM7	Cracking soils, self-mulching A horizon with ped size < 5 mm	1	2	2	3
PM8	Heavy clays with a narrow moisture range for ploughing	1	2	3	4
PM9	Gravelly abrasive soils	1	4	4	4

Group A	Group B	Group C	Group D
Citrus-Irrigated	Banana-Irrigated	Sorghum cereal-Irrigated	Chickpea-Irrigated
Lychee-Irrigated	Papaw-Irrigated		Cucurbit-Irrigated
Macadamia Nuts-Irrigated	Sugarcane-Dryland		Kenaf-Irrigated
Mango-Irrigated			Maize-Irrigated
			Navy Bean-Irrigated
			Peanut-Irrigated
			Seedling Vegetables-Irrigated
			Sorghum grain-Irrigated
			Soybean-Irrigated
			Sugar Beet-Irrigated
			Sunflower-Irrigated
			Sunn Hemp-Irrigated

Ps - Surface condition

Limitation		Suitability subclasses for various land management options						
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G
PS1	No restriction to cultivation	1	1	1	1	1	1	1
PS2	Firm surface horizon, usually clay loam texture	1	1	1	1	2	2	2
PS3	Hardsetting surface, sandy loam to clay loam	2	2	2	3	3	3	4
PS4	Clay soils, hardsetting	2	2	2	3	3	5	4
PS5	Cracking soils, self-mulching A horizon with ped size < 5 mm. Non-cracking clay soils, self-mulching	1	2	4	2	2	3	3
PS6	Soils with large surface aggregate size (>5 mm)	1	2	1	3	3	5	4
PS7	Very hardsetting silty or fine sandy surface soils; dilatant	1	4	1	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G
Banana-Irrigated	Sugarcane-Dryland	Citrus-Irrigated	Chickpea-Irrigated	Cucurbit-Irrigated	Seedling Vegetables-Irrigated	Kenaf-Irrigated
Lychee-Irrigated			Maize-Irrigated			Sugar Beet-Irrigated
Macadamia Nuts-Irrigated			Navy Bean-Irrigated			Sunn Hemp-Irrigated
Mango-Irrigated			Peanut-Irrigated			
Papaw-Irrigated			Sorghum cereal-Irrigated			
			Sorghum grain-Irrigated			
			Soybean-Irrigated			
			Sunflower-Irrigated			

R - Rockiness

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
R0	No rock outcrop or surface gravel, cobble, stone or boulder	1	1	1	1
RB1	Less than 2% surface boulder (> 600 mm)	2	3	4	4
RB2	2-10% surface boulder (> 600 mm)	3	4	5	5
RB3	10-20% surface boulder (> 600 mm)	4	5	5	5
RB4	20-50% surface boulder (> 600 mm)	5	5	5	5
RB5	> 50% surface boulder (> 600 mm)	5	5	5	5
RC1	Less than 2% surface cobble (60-200 mm)	1	2	2	3
RC2	2-10% surface cobble (60-200 mm)	1	2	3	5
RC3	10-20% surface cobble (60-200 mm)	2	3	4	5
RC4	20-50% surface cobble (60-200 mm)	3	4	5	5
RC5	> 50% surface cobble (60-200 mm)	4	5	5	5
RG1	Less than 20% surface gravel (20-60 mm)	1	1	1	3
RG2	20-50% surface gravel (20-60 mm)	2	3	3	5
RG3	50-90% surface gravel (20-60 mm)	3	4	4	5
RG4	> 90% surface gravel (20-60 mm)	4	5	5	5
RO1	Less than 2% rock outcrop	2	3	3	3
RO2	2-10% rock outcrop	4	4	4	4
RO3	10-20% rock outcrop	4	5	5	5
RO4	20-50% rock outcrop	5	5	5	5
RO5	> 50% rock outcrop	5	5	5	5
RS1	Less than 2 % surface stone (200-600 mm)	1	2	1	3
RS2	2-10 % surface stone (200-600 mm)	2	3	4	5
RS3	10-20 % surface stone (200-600 mm)	3	4	5	5
RS4	20-50 % surface stone (200-600 mm)	4	5	5	5
RS5	> 50 % surface stone (200-600 mm)	5	5	5	5
RU0	Unknown	1	1	1	1

Group A	Group B	Group C	Group D
Banana-Irrigated	Sugarcane-Dryland	Chickpea-Irrigated	Macadamia Nuts-Irrigated
Citrus-Irrigated		Cucurbit-Irrigated	Peanut-Irrigated
Lychee-Irrigated		Kenaf-Irrigated	
Mango-Irrigated		Maize-Irrigated	
Papaw-Irrigated		Navy Bean-Irrigated	
		Seedling Vegetables-Irrigated	
		Sorghum cereal-Irrigated	
		Sorghum grain-Irrigated	
		Soybean-Irrigated	
		Sugar Beet-Irrigated	
		Sunflower-Irrigated	
		Sunn Hemp-Irrigated	

Sa – Salinity

Limitation Value	Description	Suitability subclasses for various land management options Group A	Group B	Group C	Group D	Group E
SA1	Electrical Conductivity 1:5 < 0.6 dSm to 1.5m depth	1	1	1	1	1
SA2	Electrical Conductivity 1:5 0.6 - 1.0 dSm at > 0.6m depth	1	1	1	1	1
SA3	Electrical Conductivity 1:5 > 1.0 dSm at > 0.6m depth	1	1	1	2	2
SA4	Electrical Conductivity 1:5 0.6 - 1.0 dSm at 0.3 to 0.6m depth	1	2	2	3	3
SA5	Electrical Conductivity 1:5 > 1.0 dSm at 0.3 to 0.6m depth	3	3	3	4	5
SA6	Electrical Conductivity 1:5 > 1.0 dSm at < 0.3m depth	4	4	5	5	5
SA7	Surface salting; Subject to sea water influence, indicators usually mangroves and salt marshes	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E
Cucurbit-Irrigated	Chickpea-Irrigated	Navy Bean-Irrigated	Citrus-Irrigated	Banana-Irrigated
Sorghum cereal-Irrigated	Kenaf-Irrigated	Peanut-Irrigated	Macadamia Nuts-Irrigated	Lychee-Irrigated
Sorghum grain-Irrigated	Maize-Irrigated	Seedling Vegetables-Irrigated	Mango-Irrigated	Papaw-Irrigated
Sugar Beet-Irrigated	Soya Bean-Irrigated			
	Sugarcane-Dryland			
	Sunflower-Irrigated			
	Sunn Hemp-Irrigated			

W1 - Wetness to 1m

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
W1	Rapidly drained to depth 0.9m	1	1
W2	Well drained to depth 0.9m	1	1
W3	Moderately well drained to depth 0.9m	1	1
W4	Imperfectly drained to depth 0.9m	2	3
W5	Poorly drained to depth 0.9m	3	5
W6	Very poorly drained to depth 0.9m	4	5

Group A	Group B
Kenaf-Irrigated	Chickpea-Irrigated
Peanut-Irrigated	Maize-Irrigated
Sorghum cereal-Irrigated	Sorghum grain-Irrigated
Soybean-Irrigated	Sunflower-Irrigated
Sugarcane-Dryland	Sunn Hemp-Irrigated

W2 - Wetness to 0.5m

Limitation		Suitability subclasses for various land management options
Value	**Description**	**Group A**
W13	Rapidly drained to depth 0.5m	1
W14	Well drained to depth 0.5m	1
W15	Moderately well drained to depth 0.5m	3
W16	Imperfectly drained to depth 0.5m	4
W17	Poorly drained to depth 0.5m	5
W18	Very poorly drained to depth 0.5m	5

Group A
Cucurbit-Irrigated
Navy Bean-Irrigated
Seedling Vegetables-Irrigated
Sugar Beet-Irrigated

W4 - Wetness to 1.2m

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
W7	Rapidly drained to depth 1.2m	1	1
W8	Well drained to depth 1.2m	1	1
W9	Moderately well drained to depth 1.2m	3	4
W10	Imperfectly drained to depth 1.2m	4	5
W11	Poorly drained to depth 1.2m	5	5
W12	Very poorly drained to depth 1.2m	5	5

Group A	Group B
Citrus-Irrigated	Banana-Irrigated
Lychee-Irrigated	Papaw-Irrigated
Macadamia Nuts-Irrigated	
Mango-Irrigated	

Xt - Topographic complexity

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
XT1	The landscape is relatively uniform, no dissection	1
XT2	The landscape is usually dissected by small gullies	2
XT3	The landscape is usually moderately dissected by small gullies	3
XT4	The landscape is strongly dissected by gullies.	4
XT5	The landscape is very strongly dissected by gullies.	5
XT6	Land set aside for and/or disturbed by urban and rural residential development	5

Group A
Banana-Irrigated
Chickpea-Irrigated
Citrus-Irrigated
Cucurbit-Irrigated
Kenaf-Irrigated
Lychee-Irrigated
Macadamia Nuts-Irrigated
Maize-Irrigated
Mango-Irrigated
Navy Bean-Irrigated
Papaw-Irrigated
Peanut-Irrigated
Seedling Vegetables-Irrigated
Sorghum cereal-Irrigated
Sorghum grain-Irrigated
Soybean-Irrigated
Sugar Beet-Irrigated
Sugarcane-Dryland
Sunflower-Irrigated
Sunn Hemp-Irrigated

10 Suitability framework for the Inland Fitzroy and Southern Burdekin area

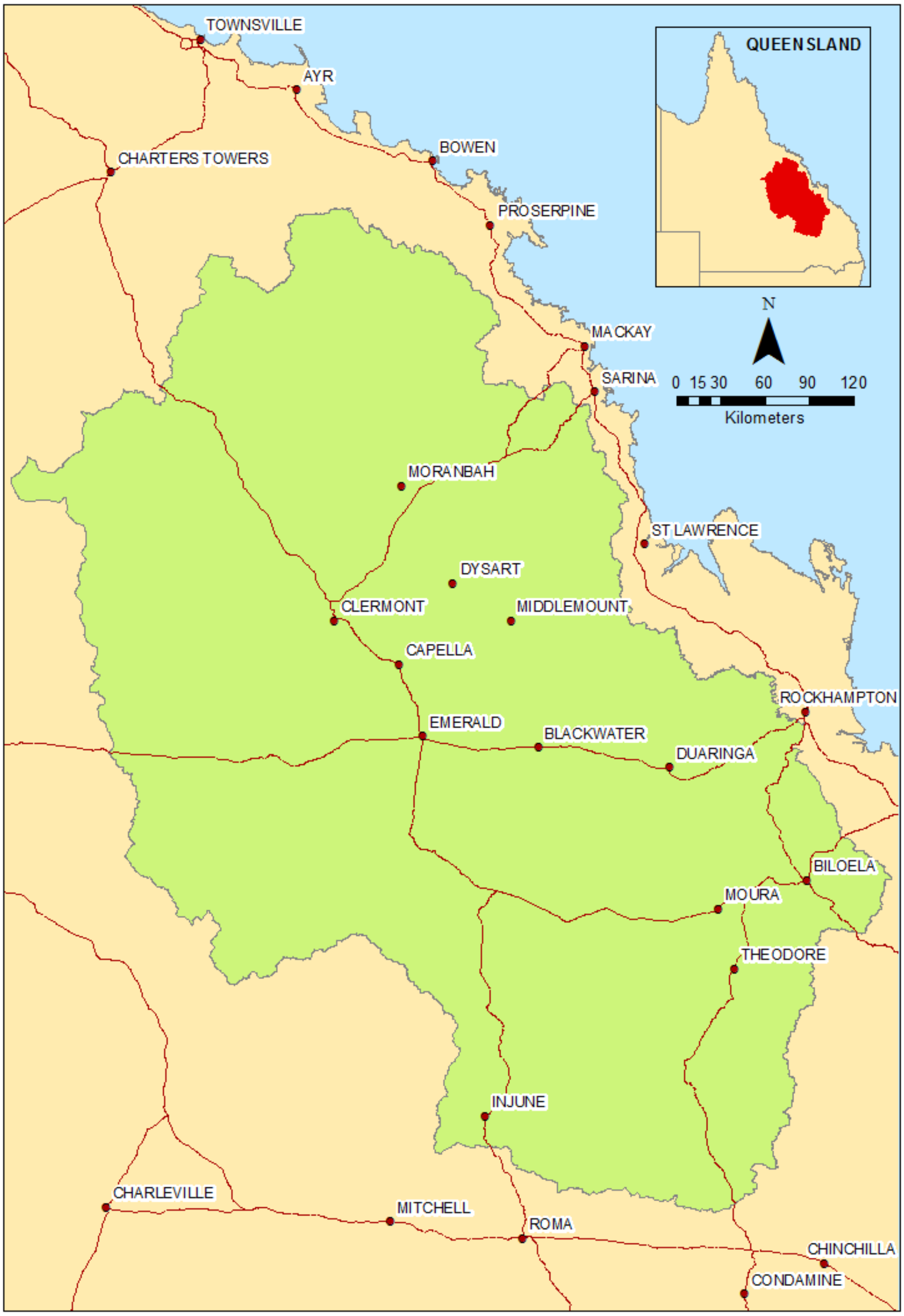

Figure 9. Area covered by the Inland Fitzroy and Southern Burdekin suitability framework

E - Water erosion

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
11	Slopes of 0-0.5% with non dispersive moderate to strongly coherent soil in the surface 200mm	1
12	Slopes of 0-0.5% with non dispersive weakly coherent soil in the surface 200mm	1
13	Slopes of 0-0.5% with dispersive soil in the surface 200mm	3
21	Slopes of 0.5-1% with non dispersive moderate to strongly coherent soil in the surface 200mm	1
22	Slopes of 0.5-1% with non dispersive weakly coherent soil in the surface 200mm	2
23	Slopes of 0.5-1% with dispersive soil in the surface 200mm	4
31	Slopes of 1-3% with non dispersive moderate to strongly coherent soil in the surface 200mm	2
32	Slopes of 1-3% with non dispersive weakly coherent soil in the surface 200mm	3
33	Slopes of 1-3% with dispersive soil in the surface 200mm	5
41	Slopes of 3-5% with non dispersive moderate to strongly coherent soil in the surface 200mm	3
42	Slopes of 3-5% with non dispersive weakly coherent soil in the surface 200mm	4
43	Slopes of 3-5% with dispersive soil in the surface 200mm	5
51	Slopes of 5-8% with non dispersive moderate to strongly coherent soil in the surface 200mm	3
52	Slopes of 5-8% with non dispersive weakly coherent soil in the surface 200mm	4
53	Slopes of 5-8% with dispersive soil in the surface 200mm	5
61	Slopes greater than 8% with non dispersive moderate to strongly coherent soil in the surface 200mm	5
62	Slopes greater than 8% with non dispersive weakly coherent soil in the surface 200mm	5
63	Slopes greater than 8% with dispersive soil in the surface 200mm	5

Group A
Barley-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Oat-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Triticale-Dryland
Wheat-Dryland

Es - Erosion hazard, subsoil erodibility

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
11	Slopes of 0-0.5% with no subsoil (200-1000mm) dispersion	1
12	Slopes of 0-0.5% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	1
13	Slopes of 0-0.5% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	2
21	Slopes of 0.5-1% with no subsoil (200-1000mm) dispersion	1
22	Slopes of 0.5-1% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	2
23	Slopes of 0.5-1% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	3
31	Slopes of 1-3% with no subsoil (200-1000mm) dispersion	1
32	Slopes of 1-3% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	3
33	Slopes of 1-3% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	4
41	Slopes of 3-5% with no subsoil (200-1000mm) dispersion	3
42	Slopes of 3-5% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	3
43	Slopes of 3-5% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	5
51	Slopes of 5-8% with no subsoil (200-1000mm) dispersion	3
52	Slopes of 5-8% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	4
53	Slopes of 5-8% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	5
61	Slopes greater than 8% with no subsoil (200-1000mm) dispersion	5
62	Slopes greater than 8% with low to moderate dispersive subsoil (200-1000mm) and clay content greater than 20%	5
63	Slopes greater than 8% with strongly dispersive subsoil (200-1000mm) on 2 or more tests and clay content greater than 20%	5

Group A	
Barley-Dryland	Triticale-Dryland
Chickpea-Dryland	Wheat-Dryland
Cotton-Furrow Irrigated	
Maize-Dryland	
Millet-Dryland	
Mungbean-Dryland	
Oat-Dryland	
Safflower-Dryland	
Sorghum-Dryland	
Soybean-Dryland	
Sunflower-Dryland	

M – Soil water availability

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
1	PAWC greater than 150mm/100cms	1	2	2
2	PAWC 125-150mm/100cms	2	2	3
3	PAWC 100-125mm/100cms	3	3	4
4	PAWC 75-100mm/100cms	3	4	5
5	PAWC 50-75mm/100cms	4	5	5
6	PAWC less than 50mm/100cms	5	5	5

Group A	Group B	Group C
Cotton-Furrow Irrigated	Maize-Dryland	Barley-Dryland
	Mungbean-Dryland	Chickpea-Dryland
	Safflower-Dryland	Millet-Dryland
	Sorghum-Dryland	Oat-Dryland
	Soybean-Dryland	Triticale-Dryland
	Sunflower-Dryland	Wheat-Dryland

Pm - Narrow moisture range

Limitation		Suitability subclasses for various land management options
Value	**Description**	**Group A**
1	Wide moisture range for cultivation – moderately well drained to rapidly drained; not hard setting when dry and not 'spewy' (i.e. boggy) when wet. Deep sands and thick sandy surfaced texture contrast soils	1
2	Moderate moisture range for cultivation – moderately well drained to rapidly drained; not hard setting when dry and not 'spewy' when wet. Moderately to strongly self-mulching clays	1
3	Moderate moisture range for cultivation – moderately well drained to rapidly drained; predominantly hard setting when dry and not 'spewy' when wet. Well drained earths and moderately well drained hard setting loamy surfaced soils	2
4	Moderate moisture range for cultivation (but less than Pm 3) – imperfectly drained to moderately well drained; not hard setting (or only weakly) when dry and 'spewy' when wet. Sandy surfaced (less than 0.4 m), sodic texture contrast soils	3
5	Narrow moisture range for cultivation – imperfectly drained to moderately well drained; hard setting, firm or weakly self-mulching when dry and not 'spewy' when wet. Hard setting, firm or weakly self-mulching, pedal clays	3
6	Narrow moisture range for cultivation – imperfectly drained to moderately well drained; hard setting when dry and 'spewy' when wet. Loamy surfaced (less than 0.4 m), sodic texture contrast soils or dermosols	3
7	Very narrow moisture range for cultivation – imperfectly drained to moderately well drained; very hard setting when dry and 'spewy' when wet. Very hard setting, sodic clays	4

Group A
Barley-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Oat-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Triticale-Dryland
Wheat-Dryland

Ps - Surface condition

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
1	Soils with soft or loose sandy to sandy loam surface horizons	1
2	Very fine self-mulching clays (peds less than 2mm)	1
3	Soils with soft, firm or only weakly hard setting, sandy to loamy surface horizons	2
4	Fine self-mulching clays (peds greater than 2-5mm)	2
5	Coarse self-mulching clays (peds greater than 5–10mm); poor seed soil contact due to separation of large peds with drying	3
6	Clay soils with hard setting, firm pedal or weakly self-mulching surface horizons	3
7	Very coarse self-mulching clays (peds greater than 10mm)	4
8	Loamy, fine sand, silty or clayey surface soils that are extremely hard setting, massive or crusting	4

Group A
Barley-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Oat-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Triticale-Dryland
Wheat-Dryland

R - Rockiness

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
C2	Cobbles 60 to 200mm and abundance less than 10%	3	3
C3	Cobbles 60 to 200mm and abundance 10-20%	3	4
C4	Cobbles 60 to 200mm and abundance 20-50%	4	4
C5	Cobbles 60 to 200mm and abundance greater than 50%	4	4
G2	Gravels less than 20mm and abundance less than 10%	1	1
G3	Gravels less than 20mm and abundance 10-20%	2	2
G4	Gravels less than 20mm and abundance 20-50%	2	3
G5	Gravels less than 20mm and abundance greater than 50%	3	3
P2	Pebbles 20 to 60mm and abundance less than 10%	2	2
P3	Pebbles 20 to 60mm and abundance 10-20%	2	2
P4	Pebbles 20 to 60mm and abundance 20-50%	3	4
P5	Pebbles 20 to 60mm and abundance greater than 50%	4	4
S2	Stones greater than 200mm and abundance less than 10%	3	3
S3	Stones greater than 200mm and abundance 10-20%	3	4
S4	Stones greater than 200mm and abundance 20-50%	5	5
S5	Stones greater than 200mm and abundance greater than 50%	5	5

Group A	Group B
Barley-Dryland	Mungbean-Dryland
Chickpea-Dryland	Soybean-Dryland
Cotton-Furrow Irrigated	
Maize-Dryland	
Millet-Dryland	
Oat-Dryland	
Safflower-Dryland	
Sorghum-Dryland	
Sunflower-Dryland	
Triticale-Dryland	
Wheat-Dryland	

Tm - Microrelief

Limitation		Suitability subclasses for various land management options
Value	Description	Group A
1	No microrelief across the majority (greater than 70%) of the land surface	1
2	Very weakly developed microrelief (VI less than 0.1m) that occurs across much (30–70%) of the land surface	2
3	Normal, lattice or linear gilgai (VI 0.1–0.3m) that occurs across less than 30% of the land surface	2
4	Normal, lattice or linear gilgai (VI 0.1–0.3m) that occurs across much (30–70%) of the land surface	2
5	Normal, lattice or linear gilgai (VI 0.1–0.3m) across the majority (greater than 70%) of the land surface	2
6	Shallow, melonhole gilgai (VI 0.3–0.6m) that occurs across less than 30% of the land surface	2
7	Shallow, melonhole gilgai (VI 0.3–0.6m) that occurs across much (30–70%) of the land surface	3
8	Shallow, melonhole gilgai (VI 0.3–0.6m) across the majority (greater than 70%) of the land surface	4
9	Strongly developed, deep, melonhole gilgai (VI 0.6–1.5m) that occurs across less than 30% of the land surface	4
10	Strongly developed, deep, melonhole gilgai (VI 0.6–1.5m) that occurs across much (30–70%) of the land surface	5
11	Strongly developed, deep, melonhole gilgai (VI 0.6–1.5m) across the majority (greater than 70%) of the land surface	5

Group A
Barley-Dryland
Chickpea-Dryland
Cotton-Furrow Irrigated
Maize-Dryland
Millet-Dryland
Mungbean-Dryland
Oat-Dryland
Safflower-Dryland
Sorghum-Dryland
Soybean-Dryland
Sunflower-Dryland
Triticale-Dryland
Wheat-Dryland

W - Wetness

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
2	Very poorly to poorly drained	5	5	5
3H	Imperfectly drained and highly permeable	2	3	3
3M	Imperfectly drained and moderately permeable	3	3	3
3S	Imperfectly drained and slowly permeable	4	4	4
4H	Moderately well drained and highly permeable	1	1	2
4M	Moderately well drained and moderately permeable	1	1	2
4S	Moderately well drained and slowly permeable	2	2	2
5	Well drained	1	1	1
6	Rapidly drained	1	1	1

Group A	Group B	Group C
Barley-Dryland	Mungbean-Dryland	Cotton-Furrow Irrigated
Chickpea-Dryland	Safflower-Dryland	
Maize-Dryland	Soybean-Dryland	
Millet-Dryland	Sunflower-Dryland	
Oat-Dryland		
Sorghum-Dryland		
Triticale-Dryland		
Wheat-Dryland		

11 Suitability framework for the Bowen and lower Burdekin area

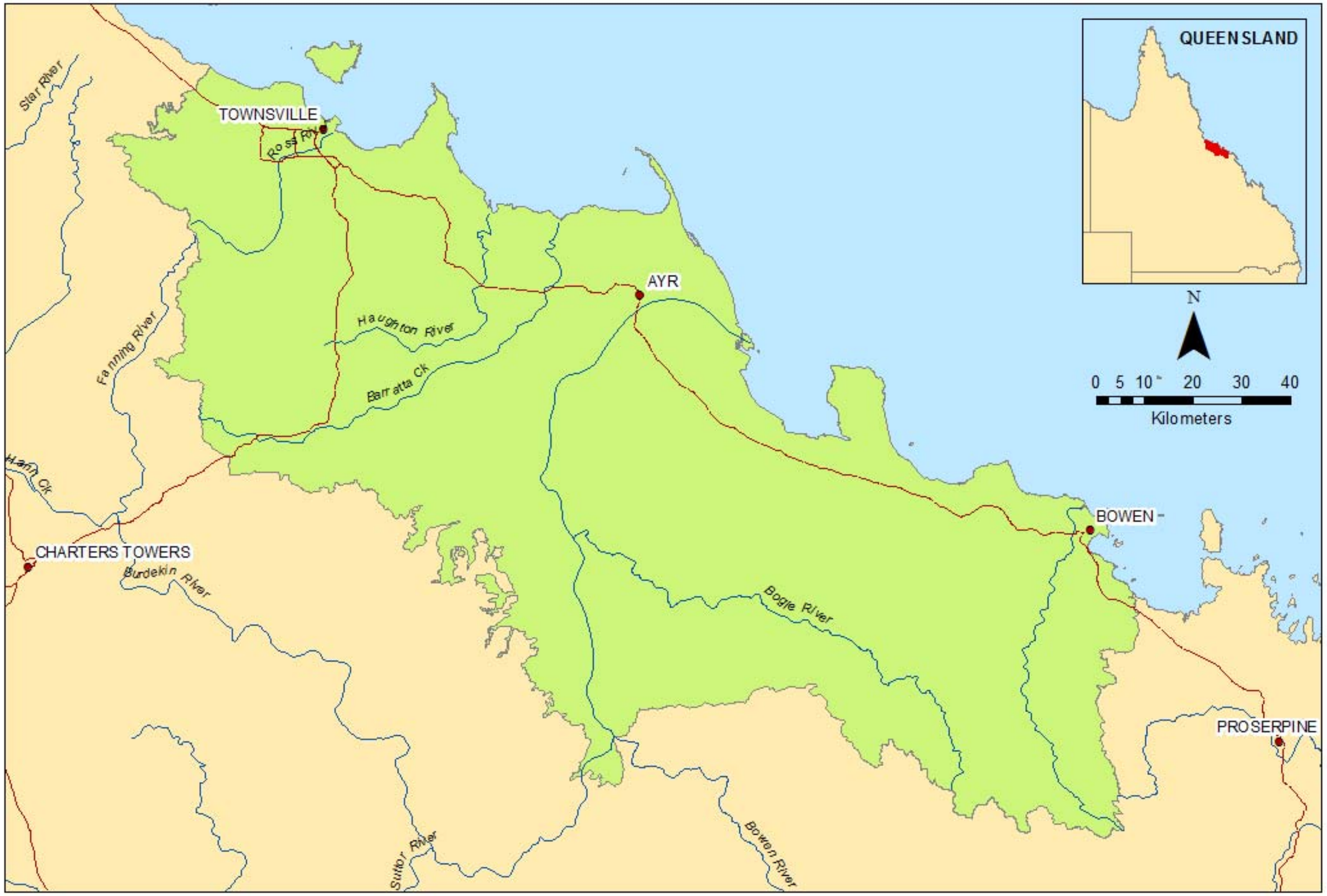

Figure 10. Area covered by the Bowen and Lower Burdekin suitability framework

Da - Drainage water hazard, acid sulfate

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
0	No Acid Sulfate Soil & Elevation > or equal to 5 m.	1	1	1
1	Elevation < 5 m & Depth to Potential Acid Sulfate Soil or Actual Acid Sulfate Soil < 0.5m	5	5	5
2	Elevation < 5 m & Depth to Potential Acid Sulfate Soil or Actual Acid Sulfate Soil 0.5-1.0 m	4	5	5
3	Elevation < 5 m & Depth to Potential Acid Sulfate Soil or Actual Acid Sulfate Soil 1.0-1.5 m	4	4	5
4	Elevation < 5 m & Depth to Potential Acid Sulfate Soil or Actual Acid Sulfate Soil > 1.5 m (if present)	1	1	4

Group A	Group B	Group C
Sugarcane-Furrow Irrigated	Aubergine-Furrow Irrigated	Avocado-Trickle Irrigated
	Aubergine-Trickle Irrigated	Mango-Trickle Irrigated
	Beans-Furrow Irrigated	
	Beans-Trickle Irrigated	
	Capsicum-Furrow Irrigated	
	Capsicum-Trickle Irrigated	
	Cotton-Furrow Irrigated	
	Maize-Furrow Irrigated	
	Pumpkin-Furrow Irrigated	
	Sorghum-Furrow Irrigated	
	Soybean-Trickle Irrigated	
	Squash-Furrow Irrigated	
	Squash-Trickle Irrigated	
	Tomato-Furrow Irrigated	
	Tomato-Trickle Irrigated	

E - Water erosion

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
0	No erosion risk. < 0.5 % slope for soils with sodic horizon by 60 cm or < 1 % slope for other soils	1	1	1
1	0.5-1 % slope for soils with sodic horizon by 60 cm or 1.0-2.0 % slope for other soils	2	2	2
2	1.0-2.0 % slope for soil with sodic horizon by 60 cm or 2.0-4.0 % slope for other soils	2	3	3
3	2.0-3.0 % slope for soils with sodic horizon by 60 cm or 4.0-5.0 % slope for other soils	3	4	4
4	3.0-5.0 % slope for soils with sodic horizon by 60 cm or 5.0-10.0 % slope for other soils	4	4	5
5	> 5.0 % slope for soils with sodic horizon by 60 cm or > 10.0 % slope for other soils	5	5	5
6	Minor existing gully or stream bank erosion	4	4	4
7	Moderate to severe existing gully or stream bank erosion	5	5	5

Group A	Group B	Group C
Aubergine-Trickle Irrigated	Aubergine-Furrow Irrigated	Tomato-Furrow Irrigated
Avocado-Trickle Irrigated	Beans-Furrow Irrigated	
Beans-Trickle Irrigated	Capsicum-Furrow Irrigated	
Capsicum-Trickle Irrigated	Cotton-Furrow Irrigated	
Mango-Trickle Irrigated	Maize-Furrow Irrigated	
Squash-Trickle Irrigated	Pumpkin-Furrow Irrigated	
Tomato-Trickle Irrigated	Sorghum-Furrow Irrigated	
	Soybean-Trickle Irrigated	
	Squash-Furrow Irrigated	
	Sugarcane-Furrow Irrigated	

F - Flooding

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
0	No flooding limitation	1	1	1	1
1	Areas subject to local flooding at frequency < 1 in 10 years	1	1	1	1
2	Areas subjected to local flooding at frequency of 1 in 5-10 years	2	2	4	5
3	Areas subjected to local flooding at frequency > 1 in 5 years	2	3	4	5
4	Flooding at least or almost annually or areas subject to erosive flooding	4	4	4	5

Group A	Group B	Group C	Group D
Aubergine-Furrow Irrigated	Sugarcane-Furrow Irrigated	Mango-Trickle Irrigated	Avocado-Trickle Irrigated
Aubergine-Trickle Irrigated			
Beans-Furrow Irrigated			
Beans-Trickle Irrigated			
Capsicum-Furrow Irrigated			
Capsicum-Trickle Irrigated			
Cotton-Furrow Irrigated			
Maize-Furrow Irrigated			
Pumpkin-Furrow Irrigated			
Sorghum-Furrow Irrigated			
Soybean-Trickle Irrigated			
Squash-Furrow Irrigated			
Squash-Trickle Irrigated			
Tomato-Furrow Irrigated			
Tomato-Trickle Irrigated			

I - Furrow infiltration

Limitation		Suitability subclasses for various land management options				
Value	Description	Group A	Group B	Group C	Group D	Group E
0	Soils with textures sand to sandy loam to <0.30 m OR Duplex soil with textures finer than sandy loam to depths > 0.40 m deep	1	1	1	1	1
1	Soils with textures of sand to sandy loam to 0.30-0.50 m deep OR Duplex soils with textures finer than sandy loam to 0.21-40 m deep	1	2	2	2	2
2	Soils with textures of sand to sandy loam to 0.51-0.90 m deep OR Duplex soil with textures finer than sandy loam to < 0.20 m deep OR Other soils eg Um or Gn and some better drained Uf soils	1	3	3	3	3
3	Soils with textures of sand to sandy loam to > 0.90 m deep	1	4	4	4	4
4	Clay soils with light to light medium clay topsoil without bleach or < 10 % mottling	1	2	2	3	4
5	Clay soils with topsoil medium clay or finer or light to light medium clay with bleach and/or > 10 % mottling	1	2	3	4	4

Group A	Group B	Group C	Group D	Group E
Aubergine-Trickle Irrigated	Sorghum-Furrow Irrigated	Cotton-Furrow Irrigated	Aubergine-Furrow Irrigated	Beans-Furrow Irrigated
Avocado-Trickle Irrigated	Soybean-Trickle Irrigated	Maize-Furrow Irrigated	Capsicum-Furrow Irrigated	
Beans-Trickle Irrigated	Sugarcane-Furrow Irrigated		Pumpkin-Furrow Irrigated	
Capsicum-Trickle Irrigated			Squash-Furrow Irrigated	
Mango-Trickle Irrigated			Tomato-Furrow Irrigated	
Squash-Trickle Irrigated				
Tomato-Trickle Irrigated				

M – Soil water availability

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
0	PAWC >100 mm	1	1
1	PAWC 75-100 mm	1	2
2	PAWC 50-75 mm	2	3
3	PAWC <50 mm	3	4

Group A	Group B
Aubergine-Trickle Irrigated	Aubergine-Furrow Irrigated
Avocado-Trickle Irrigated	Beans-Furrow Irrigated
Beans-Trickle Irrigated	Capsicum-Furrow Irrigated
Capsicum-Trickle Irrigated	Cotton-Furrow Irrigated
Mango-Trickle Irrigated	Maize-Furrow Irrigated
Squash-Trickle Irrigated	Pumpkin-Furrow Irrigated
Tomato-Trickle Irrigated	Sorghum-Furrow Irrigated
	Soybean-Trickle Irrigated
	Squash-Furrow Irrigated
	Sugarcane-Furrow Irrigated
	Tomato-Furrow Irrigated

N - Nutrient supply

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
0	pH to 0.30 m 5.5-8.0	1	1
1	pH to 0.30 m 4.0-5.5 or 8.0-8.5	3	4
2	pH to 0.30 m < 4.0 or > 8.5	4	5

Group A	Group B
Aubergine-Furrow Irrigated	Avocado-Trickle Irrigated
Aubergine-Trickle Irrigated	Beans-Furrow Irrigated
Capsicum-Furrow Irrigated	Beans-Trickle Irrigated
Capsicum-Trickle Irrigated	Soybean-Trickle Irrigated
Cotton-Furrow Irrigated	
Maize-Furrow Irrigated	
Mango-Trickle Irrigated	
Pumpkin-Furrow Irrigated	
Sorghum-Furrow Irrigated	
Squash-Furrow Irrigated	
Squash-Trickle Irrigated	
Sugarcane-Furrow Irrigated	
Tomato-Furrow Irrigated	
Tomato-Trickle Irrigated	

Nd - Nutrient deficiency

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
0	Standard fertilizer application and practices	1	1
1	Phosphorus 20-40 ppm or Phosphorus 10-20 ppm and Potassium > 0.2 meq (milliequivalents) & Nitrogen assumed to be always low	1	1
2	Phosphorus 10-20 ppm and Potassium < 0.2 meq (milliequivalents) or Phosphorus < 10 ppm and Potassium > 0.2 meq & Nitrogen assumed to be always low	2	3
3	Phosphorus < 10 ppm and Potassium < 0.2 meq (milliequivalents) & Nitrogen assumed to be always low	3	3

Group A	Group B
Aubergine-Furrow Irrigated	Soybean-Trickle Irrigated
Aubergine-Trickle Irrigated	
Avocado-Trickle Irrigated	
Beans-Furrow Irrigated	
Beans-Trickle Irrigated	
Capsicum-Furrow Irrigated	
Capsicum-Trickle Irrigated	
Cotton-Furrow Irrigated	
Maize-Furrow Irrigated	
Mango-Trickle Irrigated	
Pumpkin-Furrow Irrigated	
Sorghum-Furrow Irrigated	
Squash-Furrow Irrigated	
Squash-Trickle Irrigated	
Sugarcane-Furrow Irrigated	
Tomato-Furrow Irrigated	
Tomato-Trickle Irrigated	

Nt - Nutrient toxicity

Limitation		Suitability subclasses for various land management options					
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
0	No sodicity limitation. Non-sodic soils to at least 1.50 m	1	1	1	1	1	1
1	ESP < 6.0 at 0.30 -0.90m; but 6-14 by 1.5 m	1	1	1	1	1	3
2	ESP < 6.0 at 0.30-0.90m; but > 14 by 1.5 m	1	1	1	1	1	4
3	ESP < 6.0 at 0.30m; but 6-14 by 0.90 m and > 14 by 1.50 m	1	1	2	2	2	4
4	ESP < 6.0 at 0.30m; but > 14 by 0.90 m	1	2	2	2	3	4
5	ESP 6-14 to 0.30m and 6-14 by 1.50m	2	3	3	4	4	4
6	ESP 6-14 to 0.30m and > 14 by 1.50m	2	3	3	4	4	4
7	ESP 14.1-25 to 0.30m	3	4	4	4	5	4
8	ESP > 25 to 0.30m	4	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F
Cotton-Furrow Irrigated	Pumpkin-Furrow Irrigated	Soybean-Trickle Irrigated	Maize-Furrow Irrigated	Aubergine-Furrow Irrigated	Avocado-Trickle Irrigated
Sorghum-Furrow Irrigated	Squash-Furrow Irrigated			Aubergine-Trickle Irrigated	Mango-Trickle Irrigated
Sugarcane-Furrow Irrigated	Squash-Trickle Irrigated			Beans-Furrow Irrigated	
Tomato-Furrow Irrigated				Beans-Trickle Irrigated	
Tomato-Trickle Irrigated				Capsicum-Furrow Irrigated	
				Capsicum-Trickle Irrigated	

Pd - Soil depth

Limitation		Suitability subclasses for various land management options					
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
0	Soil depth no limitation	1	1	1	1	1	1
1	Effective soil depth (depth to decomposing rock/pan or salt bulge)-1.5-2.0m	1	1	1	1	1	2
2	Effective soil depth (depth to decomposing rock/pan or salt bulge)-1.0-1.5m	1	1	1	1	2	4
3	Effective soil depth (depth to decomposing rock/pan or salt bulge)-0.6-1.0m	1	1	2	3	3	5
4	Effective soil depth (depth to decomposing rock/pan or salt bulge)-0.45-0.6m	2	4	4	4	4	5
5	Effective soil depth (depth to decomposing rock/pan or salt bulge)-< 0.45m	4	4	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F
Aubergine-Furrow Irrigated	Squash-Furrow Irrigated	Sugarcane-Furrow Irrigated	Cotton-Furrow Irrigated	Mango-Trickle Irrigated	Avocado-Trickle Irrigated
Aubergine-Trickle Irrigated	Squash-Trickle Irrigated		Maize-Furrow Irrigated		
Beans-Furrow Irrigated			Sorghum-Furrow Irrigated		
Beans-Trickle Irrigated			Soybean-Trickle Irrigated		
Capsicum-Furrow Irrigated					
Capsicum-Trickle Irrigated					
Pumpkin-Furrow Irrigated					
Tomato-Furrow Irrigated					
Tomato-Trickle Irrigated					

Ps - Surface condition

Limitation		Suitability subclasses for various land management options						
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G
0	No limitation of soil surface conditions	1	1	1	1	1	1	1
1	Cracking clay soils with < 24 % surface aggregates > 5 mm diameter or moderate susceptibility to compaction using standard farming practices	1	1	1	1	1	1	2
2	Cracking clay soils-24-45% of dry aggregates of surface horizon >5 mm in diameter OR other soils-depth to slow perm sodic B hor 0.21-0.4m and/or firm or h/set surf and/or sandy loam to clay surf text and/or mod-strong ped and/or dry D3-D4 consist	1	1	2	2	2	3	3
3	Cracking clay soils->45% of dry aggregates of surface horizon >5 mm in diameter OR other soils-depth to slowly permeable sodic B hor 0.1-0.2 m and/or h/set surf and/or sandy loam to clay surf text and/or mass or weak ped and/or dry D3-D4 consist	1	2	3	3	3	4	3
4	Surface soil prone to sealing after rainfall (eg Bulldust soils)-depth to slowly permeable sodic B hor <0.1 m and/or h/set surf and/or sandy clay loam to clay loam surf text and/or mass or weak ped and/or dry D5-D6 consist	1	2	1	3	3	4	4
5	Surface soil not prone to sealing but surface soil consistence very firm to rigid when dry (most HS soils)	1	2	2	2	3	3	3

Group A	Group B	Group C	Group D	Group E	Group F	Group G
Aubergine-Furrow Irrigated	Sugarcane-Furrow Irrigated	Squash-Furrow Irrigated	Cotton-Furrow Irrigated	Pumpkin-Furrow Irrigated	Beans-Furrow Irrigated	Soybean-Trickle Irrigated
Aubergine-Trickle Irrigated		Squash-Trickle Irrigated	Maize-Furrow Irrigated		Beans-Trickle Irrigated	
Avocado-Trickle Irrigated			Sorghum-Furrow Irrigated			
Capsicum-Furrow Irrigated						
Capsicum-Trickle Irrigated						
Mango-Trickle Irrigated						
Tomato-Furrow Irrigated						
Tomato-Trickle Irrigated						

R - Rockiness

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
0	No rockiness limitation	1	1
1	No rock outcrop and boulders and/or 2-10% 6-60 mm pebbles or <2% 60-600 mm cobble and stone on the surface only (for assessed crops) or within upper 0.45 m (soybeans/sugar cane and beans)	1	1
2	<2% >600 mm rock outcrop and boulders and/or 10-20% 6-60 mm pebbles or 2-10% 60-600 mm cobble and stone on the surface only (for assessed crops) or within upper 0.45 m (soybeans/sugar cane and beans)	1	2
3	2-10% >600 mm rock outcrop and boulders and/or 20-50% 6-60 mm pebbles or 10-20% 60-600 mm cobble and stone on the surface or within profile (for assessed crops) or within upper 0.45 m (soybeans/sugar cane and beans)	2	3
4	10-20% >600 mm rock outcrop and boulders and/or >50% 6-60 mm pebbles or 20-50% 60-600 mm cobble and stone on the surface only or within profile (for assessed crops) or within upper 0.45 m (soybeans/sugar cane and beans)	3	4
5	>20% >600 mm rock outcrop and boulders and/or >50% 60-600 mm cobble and stone on the surface only or within profile (for assessed crops) or within upper 0.45 m (soybeans/sugar cane and beans)	4	5

Group A	Group B
Avocado-Trickle Irrigated	Aubergine-Furrow Irrigated
Mango-Trickle Irrigated	Aubergine-Trickle Irrigated
	Beans-Furrow Irrigated
	Beans-Trickle Irrigated
	Capsicum-Furrow Irrigated
	Capsicum-Trickle Irrigated
	Cotton-Furrow Irrigated
	Maize-Furrow Irrigated
	Pumpkin-Furrow Irrigated
	Sorghum-Furrow Irrigated
	Soybean-Trickle Irrigated
	Squash-Furrow Irrigated
	Squash-Trickle Irrigated
	Sugarcane-Furrow Irrigated
	Tomato-Furrow Irrigated
	Tomato-Trickle Irrigated

S1 - Salinity-weighted profile mean <.6m

Limitation		Suitability subclasses for various land management options											
Value	**Description**	**Group A**	**Group B**	**Group C**	**Group D**	**Group E**	**Group F**	**Group G**	**Group H**	**Group I**	**Group J**	**Group K**	**Group L**
0	No salinity limitation	1	1	1	1	1	1	1	1	1	1	1	1
1	Weighted profile mean to 0.6 m. ECse (dSm-1) 1.5-2.5	1	1	1	1	1	1	1	1	1	1	2	2
2	Weighted profile mean to 0.6 m. ECse (dSm-1) 2.6-3.5	1	1	1	1	1	1	1	2	2	3	3	3
3	Weighted profile mean to 0.6 m. ECse (dSm-1) 3.6-4.5	1	1	1	1	1	1	2	3	3	4	4	4
4	Weighted profile mean to 0.6 m. ECse (dSm-1) 4.6-5.5	1	1	1	1	1	1	3	3	3	4	4	5
5	Weighted profile mean to 0.6 m. ECse (dSm-1) 5.6-6.5	1	1	1	1	2	2	3	4	4	5	4	5
6	Weighted profile mean to 0.6 m. ECse (dSm-1) 6.6-7.5	1	1	1	1	2	3	4	4	4	5	5	5
7	Weighted profile mean to 0.6 m. ECse (dSm-1) 7.6-9.0	1	1	2	2	3	4	4	4	4	5	5	5
8	Weighted profile mean to 0.6 m. ECse (dSm-1) 9.1-10.0	1	2	3	3	3	4	4	4	5	5	5	5
9	Weighted profile mean to 0.6 m. ECse (dSm-1) 10.1-15.0	2	3	4	4	4	4	5	5	5	5	5	5
10	Weighted profile mean to 0.6 m. ECse (dSm-1) 15.1-22.5	3	4	4	5	4	4	5	5	5	5	5	5
11	Weighted profile mean to 0.6 m. ECse (dSm-1) > 22.5	4	4	5	5	5	4	5	5	5	5	5	5

Group A	**Group B**	**Group C**	**Group D**	**Group E**	**Group F**	**Group G**	**Group H**	**Group I**	**Group J**	**Group K**	**Group L**
Cotton-Furrow Irrigated	Sorghum-Furrow Irrigated	Sugarcane-Furrow Irrigated	Soybean-Trickle Irrigated	Squash-Furrow Irrigated	Maize-Furrow Irrigated	Pumpkin-Furrow Irrigated	Aubergine-Furrow Irrigated	Tomato-Furrow Irrigated	Avocado-Trickle Irrigated	Beans-Furrow Irrigated	Mango-Trickle Irrigated
				Squash-Trickle Irrigated			Aubergine-Trickle Irrigated	Tomato-Trickle Irrigated		Beans-Trickle Irrigated	
							Capsicum-Furrow Irrigated				
							Capsicum-Trickle Irrigated				

S2 - Salinity-weighted profile mean <.9m

Limitation		Suitability subclasses for various land management options						
Value	**Description**	**Group A**	**Group B**	**Group C**	**Group D**	**Group E**	**Group F**	**Group G**
0	No salinity limitation	1	1	1	1	1	1	1
1	Weighted profile mean to 0.9 m. ECse (dSm-1) 1.5-2.5	1	1	1	1	1	1	2
2	Weighted profile mean to 0.9 m. ECse (dSm-1) 2.6-3.5	1	1	1	1	1	2	3
3	Weighted profile mean to 0.9 m. ECse (dSm-1) 3.6-5.5	1	1	1	1	2	3	4
4	Weighted profile mean to 0.9 m. ECse (dSm-1) 5.6-6.5	1	1	1	2	2	3	5
5	Weighted profile mean to 0.9 m. ECse (dSm-1) 6.6-7.5	1	1	1	3	3	4	5
6	Weighted profile mean to 0.9 m. ECse (dSm-1) 7.6-9.0	1	1	2	4	3	4	5
7	Weighted profile mean to 0.9 m. ECse (dSm-1) 9.1-10.0	1	1	3	4	3	4	5
8	Weighted profile mean to 0.9 m. ECse (dSm-1) 10.1-12.5	1	2	4	4	4	5	5
9	Weighted profile mean to 0.9 m. ECse (dSm-1) 12.6-17.0	1	3	4	4	4	5	5
10	Weighted profile mean to 0.9 m. ECse (dSm-1) > 17.0	1	4	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G
Aubergine-Furrow Irrigated	Cotton-Furrow Irrigated	Sorghum-Furrow Irrigated	Soybean-Trickle Irrigated	Sugarcane-Furrow Irrigated	Maize-Furrow Irrigated	Avocado-Trickle Irrigated
Aubergine-Trickle Irrigated						Mango-Trickle Irrigated
Beans-Furrow Irrigated						
Beans-Trickle Irrigated						
Capsicum-Furrow Irrigated						
Capsicum-Trickle Irrigated						
Pumpkin-Furrow Irrigated						
Squash-Furrow Irrigated						
Squash-Trickle Irrigated						
Tomato-Furrow Irrigated						
Tomato-Trickle Irrigated						

S3 - Salinity-weighted profile mean <1.2m

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
0	No salinity limitation	1	1	1
1	Weighted profile mean to 1.2 m. ECse (dSm-1) 1.0-1.2	1	1	2
2	Weighted profile mean to 1.2 m. ECse (dSm-1) 1.3-1.7	1	1	3
3	Weighted profile mean to 1.2 m. ECse (dSm-1) 1.8-2.5	1	2	4
4	Weighted profile mean to 1.2 m. ECse (dSm-1) 2.6-3.7	1	3	4
5	Weighted profile mean to 1.2 m ECse (dSm-1) 3.8-5.5	1	4	5
6	Weighted profile mean to 1.2 m ECse (dSm-1) > 5.5	1	5	5

Group A	Group B	Group C
Aubergine-Furrow Irrigated	Avocado-Trickle Irrigated	Mango-Trickle Irrigated
Aubergine-Trickle Irrigated		
Beans-Furrow Irrigated		
Beans-Trickle Irrigated		
Capsicum-Furrow Irrigated		
Capsicum-Trickle Irrigated		
Cotton-Furrow Irrigated		
Maize-Furrow Irrigated		
Pumpkin-Furrow Irrigated		
Sorghum-Furrow Irrigated		
Soybean-Trickle Irrigated		
Squash-Furrow Irrigated		
Squash-Trickle Irrigated		
Sugarcane-Furrow Irrigated		
Tomato-Furrow Irrigated		
Tomato-Trickle Irrigated		

Sa - Salinity

Limitation		Suitability subclasses for various land management options	
Value	**Description**	**Group A**	**Group B**
0	No salinity intake (recharge) limitation	1	1
1	Moderately well to imperfectly drained soils (clay soils; some non-sodic and weakly sodic duplex soils eg 6Dyd; 6Drc)	1	2
2	Imperfectly to better drained soils underlain by pans or prone to the development of high non-saline water tables due to landscape position or in relation to adjacent soils	1	3
3	Well drained soils acting as intake areas (red and yellow non-sodic duplex soils). Usually higher in the landscape. Drainage losses may cause secondary salinisation downslope. Special irrigation management required eg overhead sprinklers	2	4
4	Rapidly drained soils (coarse textured soils). Irrigation technique restricted to trickle and drip methods	3	5
5	>20% >600 mm rock outcrop and boulders and/or >50% 60-600 mm cobble and stone on the surface only or within profile (for assessed crops) or within upper 0.45 m (soybeans/sugar cane and beans)	4	5

Group A	Group B
Aubergine-Trickle Irrigated	Aubergine-Furrow Irrigated
Avocado-Trickle Irrigated	Beans-Furrow Irrigated
Beans-Trickle Irrigated	Capsicum-Furrow Irrigated
Capsicum-Trickle Irrigated	Cotton-Furrow Irrigated
Mango-Trickle Irrigated	Maize-Furrow Irrigated
Squash-Trickle Irrigated	Pumpkin-Furrow Irrigated
Tomato-Trickle Irrigated	Sorghum-Furrow Irrigated
	Soybean-Trickle Irrigated
	Squash-Furrow Irrigated
	Sugarcane-Furrow Irrigated
	Tomato-Furrow Irrigated

Ss - Outflow potential

Limitation		Suitability subclasses for various land management options	
Value	**Description**	**Group A**	**Group B**
0	No outflow or discharge potential	1	1
1	Areas susceptible or known to be susceptible to saline seep development	4	5

Group A	Group B
Cotton-Furrow Irrigated	Aubergine-Furrow Irrigated
Maize-Furrow Irrigated	Aubergine-Trickle Irrigated
Pumpkin-Furrow Irrigated	Avocado-Trickle Irrigated
Sorghum-Furrow Irrigated	Beans-Furrow Irrigated
Squash-Furrow Irrigated	Beans-Trickle Irrigated
Squash-Trickle Irrigated	Capsicum-Furrow Irrigated
Sugarcane-Furrow Irrigated	Capsicum-Trickle Irrigated
	Mango-Trickle Irrigated
	Soybean-Trickle Irrigated
	Tomato-Furrow Irrigated
	Tomato-Trickle Irrigated

Tm - Microrelief

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
0	No microrelief	1	1
1	Vertical Interval < 0.10m & no soil with sodic B horizon at 0.60 m deep associated	1	1
2	Vertical interval < 0.10m & soil with sodic B horizon < 0.60 m associated	1	3
3	Vertical interval 0.1-0.3m & mound area > depression or mound and shelf > depression	3	2
4	Vertical interval 0.3-0.6 m or 0.1-0.3 m if mound area < depression	4	3
5	Vertical interval > 0.60 m	4	4

Group A	Group B
Avocado-Trickle Irrigated	Aubergine-Furrow Irrigated
Mango-Trickle Irrigated	Aubergine-Trickle Irrigated
	Beans-Furrow Irrigated
	Beans-Trickle Irrigated
	Capsicum-Furrow Irrigated
	Capsicum-Trickle Irrigated
	Cotton-Furrow Irrigated
	Maize-Furrow Irrigated
	Pumpkin-Furrow Irrigated
	Sorghum-Furrow Irrigated
	Soybean-Trickle Irrigated
	Squash-Furrow Irrigated
	Squash-Trickle Irrigated
	Sugarcane-Furrow Irrigated
	Tomato-Furrow Irrigated
	Tomato-Trickle Irrigated

Ts - Slope

Limitation		Suitability subclasses for various land management options		
Value	Description	Group A	Group B	Group C
0	No slope limitation	1	1	1
1	Sodic duplex soils slope 0.2-0.5% OR Other soils slope 0.2-0.5%	1	2	2
2	Sodic duplex soils slope 0.06-0.1% or 0.5-1.0% OR Other soils slope 0.06-0.1% or 0.5-2.0%	1	3	3
3	Sodic duplex soils slope < 0.06% or 1.0-2.0% OR Other soils slope < 0.06% or 2.0-4.0%	1	3	4
4	Sodic duplex soils slope > 2.1% OR Other soils slope > 4.0%	1	4	5

Group A	Group B	Group C
Aubergine-Trickle Irrigated	Sugarcane-Furrow Irrigated	Aubergine-Furrow Irrigated
Avocado-Trickle Irrigated		Beans-Furrow Irrigated
Beans-Trickle Irrigated		Capsicum-Furrow Irrigated
Capsicum-Trickle Irrigated		Cotton-Furrow Irrigated
Mango-Trickle Irrigated		Maize-Furrow Irrigated
Squash-Trickle Irrigated		Pumpkin-Furrow Irrigated
Tomato-Trickle Irrigated		Sorghum-Furrow Irrigated
		Soybean-Trickle Irrigated
		Squash-Furrow Irrigated
		Tomato-Furrow Irrigated

W - Wetness

Limitation		Suitability subclasses for various land management options					
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
0	No internal drainage limitation	1	1	1	1	1	1
1	Very poorly drained. Areas which are wet for most of the year or pond water for considerable periods. Require major drainage and reclamation work eg swamps or slopes < 0.1%	4	5	5	5	5	5
2	Poorly drained. Areas which are wet for most of the year or pond water for considerable periods. Require major drainage and reclamation work eg slopes < 0.1%	4	4	4	4	5	5
3	Imperfectly drained. Areas remaining wet for several months(water remains on the surface for long periods). Requires filling or special drainage or reclamation eg small closed depressions	3	2	3	4	4	5
4	Moderately well drained	2	2	2	3	3	3
5	Well drained	1	1	1	1	1	1
6	Rapidly drained	1	1	1	1	1	1

Group A	Group B	Group C	Group D	Group E	Group F
Cotton-Furrow Irrigated	Sugarcane-Furrow Irrigated	Maize-Furrow Irrigated	Aubergine-Furrow Irrigated	Mango-Trickle Irrigated	Avocado-Trickle Irrigated
		Pumpkin-Furrow Irrigated	Aubergine-Trickle Irrigated	Tomato-Furrow Irrigated	Beans-Furrow Irrigated
		Sorghum-Furrow Irrigated	Capsicum-Furrow Irrigated	Tomato-Trickle Irrigated	Beans-Trickle Irrigated
		Soybean-Trickle Irrigated	Capsicum-Trickle Irrigated		
			Squash-Furrow Irrigated		
			Squash-Trickle Irrigated		

X - Landscape complexity

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
0	UMA soil complexity not a limitation	1	1	1	1
1	B horizon permeability between soils similar & Depth A horizon of both soils < 0.2 m & texture differences 1.5-2.0 texture groups	2	2	2	2
2	B horizon permeability between soils similar & Depth A horizon of one soil > 0.2 m & texture difference 1.5-2.0 groups or 1.5-2.0 depth difference factor	3	3	3	3
3	B horizon permeability between soils similar & Depth A horizon of one soil > 0.2 m & texture difference > 2.0 groups and/or > 2.0 depth difference factor OR B horizon permeability markedly different between soils	4	4	4	4
4	Refers to (i) a complex UMA where no component soil exceeds 70% of the area and (ii) any UMA less than 250m width for sugar cane and 100m for small crops and a surrounding UMA-depending on slope magnitude and direction	1	3	4	4
5	> 10 Ha and > 250 m wide of soils with similar surface texture and subsoil permeability	1	1	1	1
6	Areas 5-10 Ha & > 250 m wide of soils with similar surface texture and subsoil permeability	2	2	4	4
7	Areas 5-10 Ha & 100-250 m wide of soils with markedly differing surface texture & Depth or subsoil permeability	3	3	4	4
8	Areas 5-10 Ha & < 100 m wide of soils with markedly differing surface texture & Depth or subsoil permeability	4	4	4	5
9	< 5 Ha of similar soils or 'useable' agricultural area OR areas < 5 Ha of soils with differing surface texture and subsoil permeability	5	4	5	5
10	Short slopes/dissected for 10-50% of the unit	5	4	5	5
11	Short slopes/dissected for 50-100% of the unit	5	5	5	5
12	Urban areas-committed to non-agricultural land uses eg industrial area/township etc	5	5	5	5

Group A	Group B	Group C	Group D
Aubergine-Furrow Irrigated	Avocado-Trickle Irrigated	Sugarcane-Furrow Irrigated	Cotton-Furrow Irrigated
Aubergine-Trickle Irrigated	Mango-Trickle Irrigated		Maize-Furrow Irrigated
Beans-Furrow Irrigated			Sorghum-Furrow Irrigated
Beans-Trickle Irrigated			Soybean-Trickle Irrigated
Capsicum-Furrow Irrigated			
Capsicum-Trickle Irrigated			
Pumpkin-Furrow Irrigated			
Squash-Furrow Irrigated			
Squash-Trickle Irrigated			
Tomato-Furrow Irrigated			
Tomato-Trickle Irrigated			

12 Suitability framework for the Wet Tropics and Tablelands area

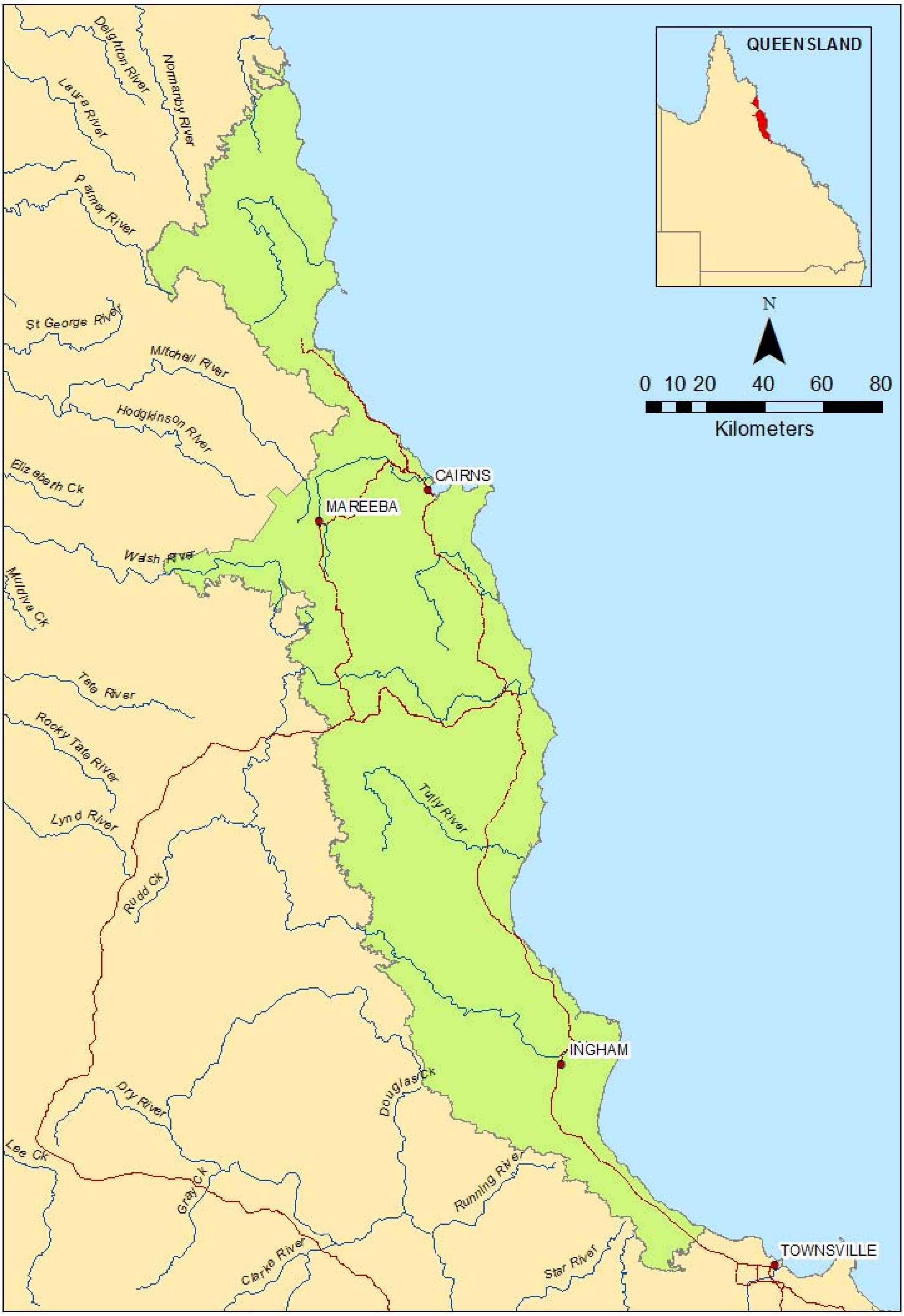

Figure 11. Area covered by the Wet Tropics and Tablelands suitability framework

C - Climate

Limitation Value	Description	Suitability subclasses for various land management options: Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L	Grp M	Grp N	Grp O	Grp P	Grp Q	Grp R	Grp S
-	not known, historical data	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	Mean annual rainfall > 2500 mm, mean monthly max temperature exceeds 25oC for 5 months or more and mean monthly min temperatures exceeds 14oC	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3
2	Mean annual rainfall > 2500 mm, mean monthly max temperatures less than 25oC for the 5 hottest months	1	1	1	1	1	1	1	1	1	2	2	4	1	1	2	2	2	3	3
3	2500 mm to 2000 mm mean annual rainfall, mean monthly max temperature exceeds 25oC for 5 months and mean monthly min temperature exceeds 14oC	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	3	3
4	2500mm to 2000mm mean annual rainfall, mean monthly max temp exceeds 25oC for 5 months and mean monthly min temps are less than 14oC in coldest months	1	1	1	1	1	1	1	1	2	1	1	4	1	1	2	2	2	3	3
5	1500-2000 mm mean annual rainfall, mean monthly max temperature exceeds 25oC for 5 months and mean monthly min temps are less than 14oC in coldest months	1	1	1	1	1	1	2	2	4	1	1	4	1	1	2	2	2	2	2
6	Mean annual rainfall 1500-2000; range max temp. 20-30; range min temp. 12-19; frost incidence very uncommon (common in small areas)	1	1	1	1	2	3	2	2	4	2	2	4	1	1	3	2	2	2	2
7	Mean annual rainfall 1500-2000; range max temp. 20-28; range min temp. 10-19; frost incidence common	2	3	4	5	3	4	2	5	5	3	3	5	2	2	3	2	2	3	3
8	Mean annual rainfall 1250-1500mm; range max temp. 20-29; range min temp. 10-18; frost incidence earliest 2 April, latest 2 Oct; frost incidence common	2	4	4	5	4	5	4	5	5	4	4	5	2	4	4	2	2	4	4
9	Mean annual rainfall 1100-1250, max temp 21-28, min temp 9-18; frost incidence earliest 20 May, latest 12 Sept, frost incidence very common. Wet	2	4	4	5	4	5	4	5	5	5	5	5	2	4	4	2	2	4	4

	zone (RAV-higher altitude area, rainfall is summer dominant with drizzle during the autumn)																			
10	Mean annual rainfall 1100-1250mm; range max temperature 24 to 34; range min temperature 13 to 22; frosts very uncommon	1	1	4	2	4	5	4	4	5	2	5	5	1	4	4	1	2	3	4
11	Mean annual evaporation from E to W of 1830mm-1970mm with average maximum daily temperatures of 31-33 deg C in summer and 23-26 deg C in winter. (RAV-Dry zone-areas receiving < 1100mm of mean annual rainfall)	1	1	4	2	4	5	5	4	5	2	5	5	1	5	4	1	2	3	5

Group A	**Grp B**	**Grp C**	**Grp D**	**Grp E**	**Grp F**	**Grp G**	**Grp H**	**Grp I**	**Grp J**	**Grp K**	**Grp L**	**Grp M**	**Grp N**	**Grp O**	**Grp P**	**Grp Q**	**Grp R**	**Grp S**
Sugarcane -Irrigated	Cucurbit-Irrigated	Sweet Potato	Papaw-Irrigated	Cucurbit	Pineapple	Sugar cane	Papaw	Tea	Banana-Irrigated	Banana	Rambutan	Citrus-Irrigated	Citrus	Sweet Corn	Soybean-Irrigated	Soybean	Coffee-Irrigated	Coffee

C - Climate (continued)

Limitation		Suitability subclasses for various land management options																		
Value	Description	Grp T	Grp U	Grp V	Grp W	Grp X	Grp Y	Grp Z	Grp AA	Grp AB	Grp AC	Grp AD	Grp AE	Grp AF	Grp AG	Grp AH	Grp AI	Grp AJ	Grp AK	Grp AL
-	not known, historical data	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
1	Mean annual rainfall > 2500 mm, mean monthly max temperature exceeds 25oC for 5 months or more and mean monthly min temperatures exceeds 14oC	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	4
2	Mean annual rainfall > 2500 mm, mean monthly max temperatures less than 25oC for the 5 hottest months	3	3	3	2	2	4	4	4	4	4	4	4	4	4	4	5	5	5	4
3	2500 mm to 2000 mm mean annual rainfall, mean monthly max temperature exceeds 25oC for 5 months and mean monthly min temperature exceeds 14oC	3	3	3	4	4	2	2	2	3	3	3	3	4	4	4	4	4	5	2
4	2500mm to 2000mm mean annual rainfall, mean monthly max temp exceeds 25oC for 5 months and mean monthly min temps are less than 14oC in coldest months	3	3	3	4	4	2	2	2	3	3	3	3	4	4	4	4	4	5	2
5	1500-2000 mm mean annual rainfall, mean monthly max temperature exceeds 25oC for 5 months and mean monthly min temps are less than 14oC in coldest months	2	2	3	4	4	1	2	3	3	3	3	3	3	3	4	3	3	5	3
6	Mean annual rainfall 1500-2000; range max temp. 20-30; range min temp. 12-19; frost incidence very uncommon (common in small areas)	2	2	2	4	4	1	2	3	3	3	3	3	3	3	4	3	3	4	3
7	Mean annual rainfall 1500-2000; range max temp. 20-28; range min temp. 10-19; frost incidence common	4	4	2	3	3	3	3	4	3	3	4	5	3	3	4	3	3	4	4
8	Mean annual rainfall 1250-1500mm; range max temp. 20-29; range min temp. 10-18; frost incidence earliest 2 April, latest 2 Oct; frost incidence common	4	4	2	4	4	4	4	4	2	5	4	5	3	3	3	2	4	3	4
9	Mean annual rainfall 1100-1250, max temp 21-28, min temp 9-18; frost incidence earliest 20 May,	4	4	2	4	5	4	4	4	2	5	4	5	3	4	2	2	4	2	4

	latest 12 Sept, frost incidence very common. Wet zone (RAV-higher altitude area, rainfall is summer dominant with drizzle during the autumn)																			
10	Mean annual rainfall 1100-1250mm; range max temperature 24 to 34; range min temperature 13 to 22; frosts very uncommon	2	4	3	2	4	1	3	4	1	4	4	1	1	2	2	2	4	1	2
11	Mean annual evaporation from E to W of 1830mm-1970mm with average maximum daily temperatures of 31-33 deg C in summer and 23-26 deg C in winter. (RAV-Dry zone-areas receiving < 1100mm of mean annual rainfall)	2	4	3	2	5	2	4	4	2	4	4	1	1	4	1	2	5	1	2
		Grp T	**Grp U**	**Grp V**	**Grp W**	**Grp X**	**Grp Y**	**Grp Z**	**Grp AA**	**Grp AB**	**Grp AC**	**Grp AD**	**Grp AE**	**Grp AF**	**Grp AG**	**Grp AH**	**Grp AI**	**Grp AJ**	**Grp AK**	**Grp AL**
		Macadamia Nuts-Irrig	Macadamia Nuts	Persimmon-Irrig	Avocado -Irrig	Avo cado	Mango -Irrig	Man go	Lon gan	Maize	Veget ables	Custard Apple	Vegetable s-Irrig	Stone Fruit-Irrig	Stone Fruit	Pea nut	Potato -Irrig	Potato	Grape -Irrig	Lychee-Irrig

E - Water erosion

Limitation		Suitability subclasses for various land management options											
Value	Description	Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L
-	not known, historical data	1	1	1	1	1	1	1	1	1	1	1	1
B1	< 2% slope for granitic soils or < 3% slope for basaltic and metamorphic soils	1	1	1	1	1	1	1	1	1	1	1	1
B2	3-8% basaltic or metamorphic soils	1	1	2	2	2	2	2	2	2	3	3	3
B3	8-15% basaltic or metamorphic soils	2	2	3	3	3	3	3	3	3	4	4	4
B4	15-20% basaltic or metamorphic soils	3	3	4	4	4	4	4	4	4	4	5	5
B5	20-30% basaltic or metamorphic soils	4	4	5	5	5	5	5	5	5	5	5	5
B6	> 30% basaltic or metamorphic soils	5	5	5	5	5	5	5	5	5	5	5	5
C1	< 1.5% Cracking clays and imperfectly to poorly drained non-cracking clay soils, podzolics, earths and soils with sodic B horizons at >40cm	1	1	1	1	1	1	1	2	2	2	1	2
C2	1.5-4% Cracking clays and imperfectly to poorly drained non-cracking clay soils, podzolics, earths and soils with sodic B horizons at >40cm	2	2	2	2	2	2	3	3	3	3	3	3
C3	4-6% Cracking clays and imperfectly to poorly drained non-cracking clay soils, podzolics, earths and soils with sodic B horizons at >40cm	3	3	3	3	3	3	4	3	4	4	4	4
C4	> 6% Cracking clays and imperfectly to poorly drained non-cracking clay soils, podzolics, earths and soils with sodic B horizons at >40cm	5	5	4	4	4	5	5	4	5	5	5	5
D1	< 2% Other soils (texture contrast/soils with sodic B horizons at < 40cm)	1	1	1	1	2	1	1	1	1	3	2	2
D2	2-4% Other soils (texture contrast/soils with sodic B horizons at < 40cm)	1	1	2	2	3	2	2	2	2	4	3	3
D3	4-6% Other soils (texture contrast/soils with sodic B horizons at < 40cm)	2	2	3	3	4	3	3	3	3	5	4	4
D4	6-8% Other soils (texture contrast/soils with sodic B horizons at < 40cm)	3	3	4	4	4	4	4	4	4	5	5	5
D5	> 8% Other soils (texture contrast/soils with sodic B horizons at < 40cm)	4	4	5	5	5	5	5	5	5	5	5	5
G1	< 2% Granitic soils/well to moderately drained alluvial soils/red-brown clays (excludes texture contrast soils)	1	1	1	1	1	1	1	1	1	1	1	1
G2	2-5% Granitic soils/well to moderately drained alluvial soils/red-brown clays (excludes texture contrast soils)	1	1	2	2	2	2	2	2	2	2	2	2
G3	5-8% Granitic soils/well to moderately drained alluvial soils/red-brown clays (excludes texture contrast soils)	1	1	2	2	3	2	2	2	2	3	3	3
G3M	5-8% Granitic soils/well to moderately drained alluvial soils/red-brown clays (excludes texture contrast soils) in the MDIA area	2	2	3	3	4	3	3	3	3	4	4	4
G4	8-12% Granitic soils/well to moderately drained alluvial soils/red-brown clays (excludes texture contrast soils)	2	2	3	3	4	3	3	3	3	4	5	5
G4M	8-15% Granitic soils/well to moderately drained alluvial soils/red-brown clays (excludes texture contrast soils) in the MDIA area	3	3	4	4	5	4	4	4	4	5	5	5
G5	12-20% Granitic soils/well to moderately drained alluvial soils/red-brown clays (excludes texture contrast soils)	3	3	4	4	5	4	4	4	4	5	5	5
G6	> 20% Granitic soils/well to moderately drained alluvial soils/red-brown clays (excludes texture contrast soils)	5	5	5	5	5	5	5	5	5	5	5	5
S1	< 5% Shallow/skeletal soils/imperfectly to poorly drained soils	2	3	3	4	2	3	3	3	3	3	4	3

S2	5-10% Shallow/skeletal soils/imperfectly to poorly drained soils	3	4	4	5	3	4	4	4	4	4	5	4
S3	10-15% Shallow/skeletal soils/imperfectly to poorly drained soils	5	5	5	5	5	5	5	5	5	5	5	5
S4	> 15% Shallow/skeletal soils/imperfectly to poorly drained soils	5	5	5	5	5	5	5	5	5	5	5	5

Group A	**Group B**	**Group C**	**Group D**	**Group E**	**Group F**	**Group G**	**Group H**	**Group I**	**Group J**	**Group K**	**Group L**
Avocado	Stone Fruit	Banana	Tea	Coffee	Vegetables	Cucurbit	Sugarcane	Peanut	Potato	Soybean	Maize
Avocado-Irrigated		Banana-Irrigated		Coffee-Irrigated	Vegetables-Irrigated	Cucurbit-Irrigated	Sugarcane-Irrigated		Potato-Irrigated	Soybean-Irrigated	
Citrus		Pineapple					Sweet Potato				
Citrus-Irrigated		Sweet Corn									
Custard Apple											
Grapes-Irrigated											
Longan											
Lychee											
Lychee-Irrigated											
Macadamia Nuts											
Macadamia Nuts-Irrigated											
Mango											
Mango-Irrigated											
Papaw											
Papaw-Irrigated											
Persimmon-Irrigated											
Rambutan											
Stone Fruit-Irrigated											

F - Flooding

Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
		Suitability subclasses for various land management options					
-	not known, historical data	1	1	1	1	1	1
0	No flooding or flooding frequency exceeds 1 in 10 years	1	1	1	1	1	1
1	Flooding frequency of approximately 1 in 2 to 1 in 10 years-levees, backswamps and some higher channel benches	1	2	2	3	4	5
2	Flooding frequency approaches annual occurrence-lower channel benches	1	3	4	4	5	5

Group A	Group B	Group C	Group D	Group E	Group F
Cucurbit	Sugarcane	Banana	Maize	Coffee	Avocado
Cucurbit-Irrigated	Sugarcane-Irrigated	Banana-Irrigated	Peanut	Coffee-Irrigated	Avocado-Irrigated
Potato			Soybean	Grapes-Irrigated	Citrus
Potato-Irrigated			Soybean-Irrigated	Papaw	Citrus-Irrigated
Sweet Corn				Papaw-Irrigated	Custard Apple
Sweet Potato					Longan
Vegetables					Lychee
Vegetables-Irrigated					Lychee-Irrigated
					Macadamia Nuts
					Macadamia Nuts-Irrigated
					Mango
					Mango-Irrigated
					Persimmon-Irrigated
					Pineapple
					Rambutan
					Stone Fruit
					Stone Fruit-Irrigated
					Tea

M – Soil water availability

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
-	not known, historical data	1	1	1	1	1	1	1	1	1	1
1	PAWC >125mm	1	1	1	1	1	1	1	1	2	2
2	PAWC 100-125mm	1	1	1	1	1	1	1	2	2	3
3	PAWC 75-100mm	1	1	1	1	1	1	2	3	3	3
4	PAWC 50-75mm	1	1	2	2	2	3	3	5	4	4
5	PAWC <50mm	1	2	2	3	4	4	4	5	4	4

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
Vegetables-Irrigated	Avocado-Irrigated	Papaw-Irrigated	Rambutan	Persimmon-Irrigated	Coffee	Avocado	Macadamia Nuts	Papaw	Cucurbit
	Banana-Irrigated		Soybean-Irrigated		Coffee-Irrigated	Banana		Potato	Peanut
	Citrus-Irrigated				Grapes-Irrigated	Citrus		Sweet Corn	Sweet Potato
	Cucurbit-Irrigated				Lychee	Custard Apple			Vegetables
	Lychee-Irrigated				Mango	Longan			
	Macadamia Nuts-Irrigated					Maize			
	Mango-Irrigated					Pineapple			
	Potato-Irrigated					Soybean			
	Stone Fruit-Irrigated					Stone Fruit			
						Sugarcane			
						Sugarcane-Irrigated			
						Tea			

N - Nutrient supply

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
0	Standard fertiliser rates and practices	1	1
1	> 9% OM and/or humic/organic soils	2	2
2	Deep sands with water table fluctuations deeper than 4m	3	3
3	10-20ppm P(bicarb) and >4ppm SO4-S (RAV)	1	2
4	5-10ppm P(bicarb) and >4ppm SO4-S (RAV)	1	3
5	<5ppm P(bicarb) and >4ppm SO4-S (RAV)	2	3
6	>20ppm P(bicarb) and <=4ppm SO4-S (RAV)	1	1
7	10-20ppm P(bicarb) and <=4ppm SO4-S (RAV)	1	2
8	5-10ppm P(bicarb) and <=4ppm SO4-S (RAV)	2	3
9	<=5ppm P(bicarb) and <=4ppm SO4-S (RAV)	2	3

Group A	Group A cont.	Group B
Avocado	Mango-Irrigated	Sugarcane
Avocado-Irrigated	Papaw	Sugarcane-Irrigated
Banana	Papaw-Irrigated	
Banana-Irrigated	Peanut	
Citrus	Persimmon-Irrigated	
Citrus-Irrigated	Pineapple	
Coffee	Potato	
Coffee-Irrigated	Potato-Irrigated	
Cucurbit	Rambutan	
Cucurbit-Irrigated	Soybean	
Custard Apple	Soybean-Irrigated	
Grapes-Irrigated	Stone Fruit	
Longan	Stone Fruit-Irrigated	
Lychee	Sweet Corn	
Lychee-Irrigated	Sweet Potato	
Macadamia Nuts	Tea	
Macadamia Nuts-Irrigated	Vegetables	
Maize	Vegetables-Irrigated	
Mango		

Nr - Soil reaction trend

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
-	not known, historical data	1	1	1	1
1	pH less than 5.5 for tea only	1	1	1	2
2	pH 5.5-6.0 for tea only	1	1	2	1
3	pH 6.0-6.5 for tea only	1	1	3	1
4	pH 6.5-7.0 for tea only	1	1	4	1
5	pH greater than 7.0 for tea only	1	1	5	1
6	pH 5.5-8.0 (MDIA)	1	1	5	1
7	pH >8.0 (MDIA)	1	2	5	2

Group A	Group B	Group B cont.	Group C	Group D
Sugarcane	Avocado	Mango-Irrigated	Tea	Grapes-Irrigated
Sugarcane-Irrigated	Avocado-Irrigated	Papaw		
	Banana	Papaw-Irrigated		
	Banana-Irrigated	Peanut		
	Citrus	Persimmon-Irrigated		
	Citrus-Irrigated	Pineapple		
	Coffee	Potato		
	Coffee-Irrigated	Potato-Irrigated		
	Cucurbit	Rambutan		
	Cucurbit-Irrigated	Soybean		
	Custard Apple	Soybean-Irrigated		
	Longan	Stone Fruit		
	Lychee	Stone Fruit-Irrigated		
	Lychee-Irrigated	Sweet Corn		
	Macadamia Nuts	Sweet Potato		
	Macadamia Nuts-Irrigated	Vegetables		
	Maize	Vegetables-Irrigated		
	Mango			

Pa - Soil adhesiveness

Limitation		Suitability subclasses for various land management options		
Value	Description	Group A	Group B	Group C
-	not known, historical data	1	1	1
0	No restrictions	1	1	1
1	Slightly adhesive soils	1	1	2
2	Moderately adhesive soils	1	2	3
3	Strongly adhesive soils	1	3	4

Group A	Group A cont.	Group B	Group C
Avocado	Tea	Potato	Peanut
Avocado-Irrigated	Vegetables	Potato-Irrigated	
Banana	Vegetables-Irrigated	Sweet Potato	
Banana-Irrigated			
Citrus			
Citrus-Irrigated			
Coffee			
Coffee-Irrigated			
Cucurbit			
Cucurbit-Irrigated			
Custard Apple			
Grapes-Irrigated			
Longan			
Lychee			
Lychee-Irrigated			
Macadamia Nuts			
Macadamia Nuts-Irrigated			
Maize			
Mango			
Mango-Irrigated			
Papaw			
Papaw-Irrigated			
Persimmon-Irrigated			
Pineapple			
Rambutan			
Soybean			
Soybean-Irrigated			
Stone Fruit			
Stone Fruit-Irrigated			
Sugarcane			
Sugarcane-Irrigated			
Sweet Corn			

Pm - Narrow moisture range

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C
-	not known, historical data	1	1	1
0	No restrictions	1	1	1
1	Narrow moisture range for working	1	1	2
2	Moderate moisture range for working	1	2	3

Group A	Group B	Group C
Avocado	Banana	Cucurbit
Avocado-Irrigated	Banana-Irrigated	Cucurbit-Irrigated
Citrus	Papaw	Maize
Citrus-Irrigated	Papaw-Irrigated	Peanut
Coffee		Pineapple
Coffee-Irrigated		Potato
Custard Apple		Potato-Irrigated
Grapes-Irrigated		Soybean
Longan		Soybean-Irrigated
Lychee		Sugarcane
Lychee-Irrigated		Sugarcane-Irrigated
Macadamia Nuts		Sweet Corn
Macadamia Nuts-Irrigated		Sweet Potato
Mango		Vegetables
Mango-Irrigated		Vegetables-Irrigated
Persimmon-Irrigated		
Rambutan		
Stone Fruit		
Stone Fruit-Irrigated		
Tea		

Ps - Surface condition

Limitation		Suitability subclasses for various land management options				
Value	Description	Group A	Group B	Group C	Group D	Group E
-	not known, historical data	1	1	1	1	1
0	No restrictions	1	1	1	1	1
1	Weakly hardsetting	1	1	1	2	2
2	Moderately hardsetting	1	2	2	3	3
3	Very strongly hardsetting	1	2	2	3	4
4	Large aggregation size > 20 mm	1	2	3	3	4

Group A	Group B	Group C	Group D	Group E
Avocado	Pineapple	Cucurbit	Maize	Peanut
Avocado-Irrigated	Potato	Cucurbit-Irrigated	Soybean	
Banana	Potato-Irrigated	Vegetables	Soybean-Irrigated	
Banana-Irrigated	Sugarcane	Vegetables-Irrigated	Sweet Corn	
Citrus	Sugarcane-Irrigated			
Citrus-Irrigated	Sweet Potato			
Coffee				
Coffee-Irrigated				
Custard Apple				
Grapes-Irrigated				
Longan				
Lychee				
Lychee-Irrigated				
Macadamia Nuts				
Macadamia Nuts-Irrigated				
Mango				
Mango-Irrigated				
Papaw				
Papaw-Irrigated				
Persimmon-Irrigated				
Rambutan				
Stone Fruit				
Stone Fruit-Irrigated				
Tea				

R - Rockiness

Limitation Value	Description	Suitability subclasses for various land management options: Group A	Group B	Group C	Group D	Group E	Group F	Group G
-	not known, historical data	1	1	1	1	1	1	1
0	Nil rock, gravel or coarse fragments in the soil	1	1	1	1	1	1	1
B1	Very few (<2%), > 600mm boulders	2	2	3	4	5	5	5
B2	Few (2-10%), > 600mm boulders	2	3	4	5	5	5	5
B3	Common (10-20%), > 600mm boulders	3	4	5	5	5	5	5
B4	Many (20-50%), > 600mm boulders	4	5	5	5	5	5	5
B5	Abundant (>50%), > 600mm boulders	5	5	5	5	5	5	5
B6	Very abundant (>90%), > 600mm boulders	5	5	5	5	5	5	5
C1	Very few (<2%), 60-200mm cobbles	1	1	1	2	3	3	4
C2	Few (2-10%), 60-200mm cobbles	1	1	2	3	4	4	5
C3	Common (10-20%), 60-200mm cobbles	2	2	3	4	5	5	5
C4	Many (20-50%), 60-200mm cobbles	3	3	4	5	5	5	5
C5	Abundant (>50%), 60-200mm cobbles	4	4	5	5	5	5	5
C6	Very abundant (>90%), 60-200mm cobbles	5	5	5	5	5	5	5
F1	Very few (<2%), 2-6mm fine gravels	1	1	1	1	1	1	1
F2	Few (2-10%), 2-6mm fine gravels	1	1	1	1	1	1	2
F3	Common (10-20%), 2-6mm fine gravels	1	1	1	1	1	2	3
F4	Many (20-50%), 2-6mm fine gravels	1	1	1	2	2	3	4
F5	Abundant (50-90%), 2-6mm fine gravels	2	1	1	3	3	4	5
F6	Very abundant (>90%), 2-6mm fine gravels	3	1	1	4	4	5	5
G1	Very few (<2%), 20-60mm gravels	1	1	1	1	2	2	3
G2	Few (2-10%), 20-60mm gravels	1	1	1	2	3	3	4
G3	Common (10-20%), 20-60mm gravels	2	1	2	3	4	4	5
G4	Many (20-50%), 20-60mm gravels	3	2	3	4	5	5	5
G5	Abundant (>50%), 20-60mm gravels	4	3	4	5	5	5	5
G6	Very abundant (>90%), 20-60mm gravels	5	4	5	5	5	5	5
P1	Very few (<2%), 6-20mm pebbles	1	1	1	1	1	1	2
P2	Few (2-10%), 6-20mm pebbles	1	1	1	1	1	2	3
P3	Common (10-20%), 6-20mm pebbles	1	1	1	2	2	3	4
P4	Many (20-50%), 6-20mm pebbles	2	1	2	3	3	4	5
P5	Abundant (>50%), 6-20mm pebbles	3	2	3	4	4	5	5
P6	Very abundant (>90%), 6-20mm pebbles	4	3	4	5	5	5	5
S1	Very few (<2%), 200-600mm stones	1	1	2	3	4	4	5
S2	Few (2-10%), 200-600mm stones	2	2	3	4	5	5	5
S3	Common (10-20%), 200-600mm stones	3	3	4	5	5	5	5
S4	Many (20-50%), 200-600mm stones	4	4	5	5	5	5	5
S5	Abundant (>50%), 200-600mm stones	4	5	5	5	5	5	5
S6	Very abundant (>90%), 200-600mm stones	5	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G
Coffee	Avocado	Banana	Maize	Cucurbit	Soybean	Peanut
Coffee-Irrigated	Avocado-Irrigated	Banana-Irrigated	Sugarcane	Cucurbit-Irrigated	Soybean-Irrigated	Potato
Grapes-Irrigated	Citrus	Papaw	Sugarcane-Irrigated		Vegetables	Potato-Irrigated
	Citrus-Irrigated	Papaw-Irrigated	Sweet Corn		Vegetables-Irrigated	Sweet Potato
	Custard Apple	Pineapple	Tea			
	Longan					
	Lychee					
	Lychee-Irrigated					
	Macadamia Nuts					
	Macadamia Nuts-Irrigated					
	Mango					
	Mango-Irrigated					
	Persimmon-Irrigated					
	Rambutan					
	Stone Fruit					
	Stone Fruit-Irrigated					

Sa - Salinity

Limitation		Suitability subclasses for various land management options											
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K	Group L
-	not known, historical data	1	1	1	1	1	1	1	1	1	1	1	1
0	<1 ds /m weighted profile mean to 0.9m	1	1	1	1	1	1	1	1	1	1	1	1
1	1-2 ds /m weighted profile mean to 0.9m	1	1	1	1	1	1	1	1	1	1	1	2
2	2-3 ds /m weighted profile mean to 0.9m	1	1	1	1	1	1	2	2	2	2	2	3
3	3-4 ds /m weighted profile mean to 0.9m	1	2	2	2	2	3	2	3	3	3	3	4
4	4-5 ds /m weighted profile mean to 0.9m	1	2	2	2	3	4	3	3	3	4	4	5
5	5-6 ds /m weighted profile mean to 0.9m	2	3	3	3	4	5	4	3	4	4	5	5
6	6-7 ds /m weighted profile mean to 0.9m	3	3	4	4	5	5	4	4	5	5	5	5
7	7-8 ds /m weighted profile mean to 0.9m	4	4	4	5	5	5	5	4	5	5	5	5
8	8-9 ds /m weighted profile mean to 0.9m	5	4	5	5	5	5	5	4	5	5	5	5
9	>9 ds /m weighted profile mean to 0.9m	5	5	5	5	5	5	5	5	5	5	5	5
10	> 6 ds /m weighted profile mean to 0.9m (RAV only)	5	5	5	5	5	5	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K	Group L
Soybean	Macadamia Nuts	Cucurbit	Mango	Stone Fruit	Peanut	Grapes-Irrigated	Sugarcane	Maize	Potato	Coffee	Avocado
Soybean-Irrigated	Macadamia Nuts-Irrigated	Cucurbit-Irrigated	Mango-Irrigated	Stone Fruit-Irrigated			Sugarcane-Irrigated	Sweet Corn	Potato-Irrigated	Coffee-Irrigated	Avocado-Irrigated
			Persimmon-Irrigated	Tea				Sweet Potato		Custard Apple	Banana
										Vegetables	Banana-Irrigated
										Vegetables-Irrigated	Citrus
											Citrus-Irrigated
											Longan
											Lychee
											Lychee-Irrigated
											Papaw
											Papaw-Irrigated
											Pineapple
											Rambutan

Ts - Slope

Limitation		Suitability subclasses for various land management options	
Value	**Description**	**Group A**	**Group B**
-	not known, historical data	1	1
1	0-15% slope	1	1
2	15-20% slope	2	4
3	20-30% slope	4	5
4	> 30% slope	5	5
C	Complex slopes	1	1

Group A	Group B
Avocado	Banana
Avocado-Irrigated	Banana-Irrigated
Citrus	Coffee
Citrus-Irrigated	Coffee-Irrigated
Custard Apple	Cucurbit
Grapes-Irrigated	Cucurbit-Irrigated
Longan	
Lychee	
Lychee-Irrigated	
Macadamia Nuts	Potato
Macadamia Nuts-Irrigated	Potato-Irrigated
Mango	Soybean
Mango-Irrigated	Soybean-Irrigated
Papaw Pineapple	Sugarcane
Papaw-Irrigated Maize	Sugarcane-Irrigated
Persimmon-Irrigated Peanut	Sweet Corn
Rambutan	Sweet Potato
Stone Fruit	Tea
Stone Fruit-Irrigated	Vegetables
	Vegetables-Irrigated

W - Wetness

Limitation		Suitability subclasses for various land management options																			
Value	Description	Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L	Grp M	Grp N	Grp O	Grp P	Grp Q	Grp R	Grp S	Grp T
-	not known, historical data	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1H	Very poorly drained, highly permeable	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
1M	Very poorly drained, moderately permeable	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
1S	Very poorly drained, slowly permeable	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2H	Poorly drained, highly permeable	3	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5
2M	Poorly drained, moderately permeable	3	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5
2S	Poorly drained, slowly permeable	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
3H	Imperfectly drained, highly permeable	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	4	4	4
3M	Imperfectly drained, moderately permeable	2	2	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	5
3SA	Imperfectly drained, slowly permeable, with A horizon deeper than 40cm	3	3	3	4	4	4	4	4	4	4	4	5	4	4	4	4	5	5	5	5
3SB	Imperfectly drained, slowly permeable, with A horizon shallower than 40cm	3	3	3	4	5	5	4	5	4	4	5	5	4	5	5	5	5	5	5	5
4H	Moderately well drained, highly permeable	1	1	1	1	1	1	2	2	2	1	2	2	1	1	2	2	1	2	2	3
4M	Moderately well drained, moderately permeable	1	1	1	2	2	2	2	2	2	2	3	2	2	2	3	4	2	3	3	4
4S	Moderately well drained, slowly permeable	2	2	2	3	3	3	3	3	3	3	4	3	3	3	4	4	3	3	4	5
5H	Well drained, highly permeable	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
5M	Well drained, moderately permeable	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	2	1	2	2	3
5S	Well drained, slowly permeable	1	1	1	2	1	2	2	2	2	2	3	2	1	2	3	3	2	2	3	4
6H	Rapidly drained, highly permeable	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6M	Rapidly drained, moderately permeable	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
6S	Rapidly drained, slowly permeable	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	2	1	1	2	3

Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J	Grp K	Grp L	Grp M	Grp N	Grp O	Grp P	Grp Q	Grp R	Grp S	Grp T
Sugar cane	Cucurbit	Sweet Corn	Mango	Ban ana	Rambutan	Soy bean	Longan	Potato	Lychee	Tea	Pea nut	Maize	Pine apple	Papaw	Citrus	Persimmon-Irrig	Grapes-Irrig	Coffee	Avocado
Sugar cane-Irrig	Cucurbit-Irrig		Mango-Irrig	Ban ana-Irrig		Soy bean-Irrig		Potato-Irrig	Lychee-Irrig					Papaw-Irrig	Citrus-Irrig			Coffee-Irrig	Avocado-Irrig
	Sweet Potato																	Custard Apple	
	Vegetables																	Macadamia	
	Vegetables-Irrig																	Macadamia-Irrig	
																		Stone Fruit	
																		Stone Fruit-Irrig	

X - Landscape complexity

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
		Suitability subclasses for various land management options							
-	not known, historical data	1	1	1	1	1	1	1	1
0	Production area >10 ha	1	1	1	1	1	1	1	1
1	Production area 5-10 ha	1	1	1	1	1	2	2	4
2	Production area size 2.5-5 ha	1	1	2	2	4	3	4	5
3	Production area < 2.5 ha	3	4	3	4	5	4	5	5
4	Isolated and remote occurrences impractical to utilise, gullies or steep slopes, complex UMAs with highly different soils, water bodies, made land, urban areas	5	5	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
Avocado	Cucurbit-Irrigated	Macadamia Nuts-Irrigated	Coffee	Soybean-Irrigated	Macadamia Nuts	Potato	Maize
Avocado-Irrigated	Sweet Corn		Coffee-Irrigated				Peanut
Banana	Sweet Potato		Cucurbit				Soybean
Banana-Irrigated	Tea		Custard Apple				
Citrus	Vegetables		Grapes-Irrigated				
Citrus-Irrigated	Vegetables-Irrigated		Longan				
Lychee			Persimmon-Irrigated				
Lychee-Irrigated			Potato-Irrigated				
Mango			Stone Fruit				
Mango-Irrigated			Sugarcane				
Papaw			Sugarcane-Irrigated				
Papaw-Irrigated							
Pineapple							
Rambutan							
Stone Fruit-Irrigated							

13 Suitability framework for the Einasleigh Uplands area

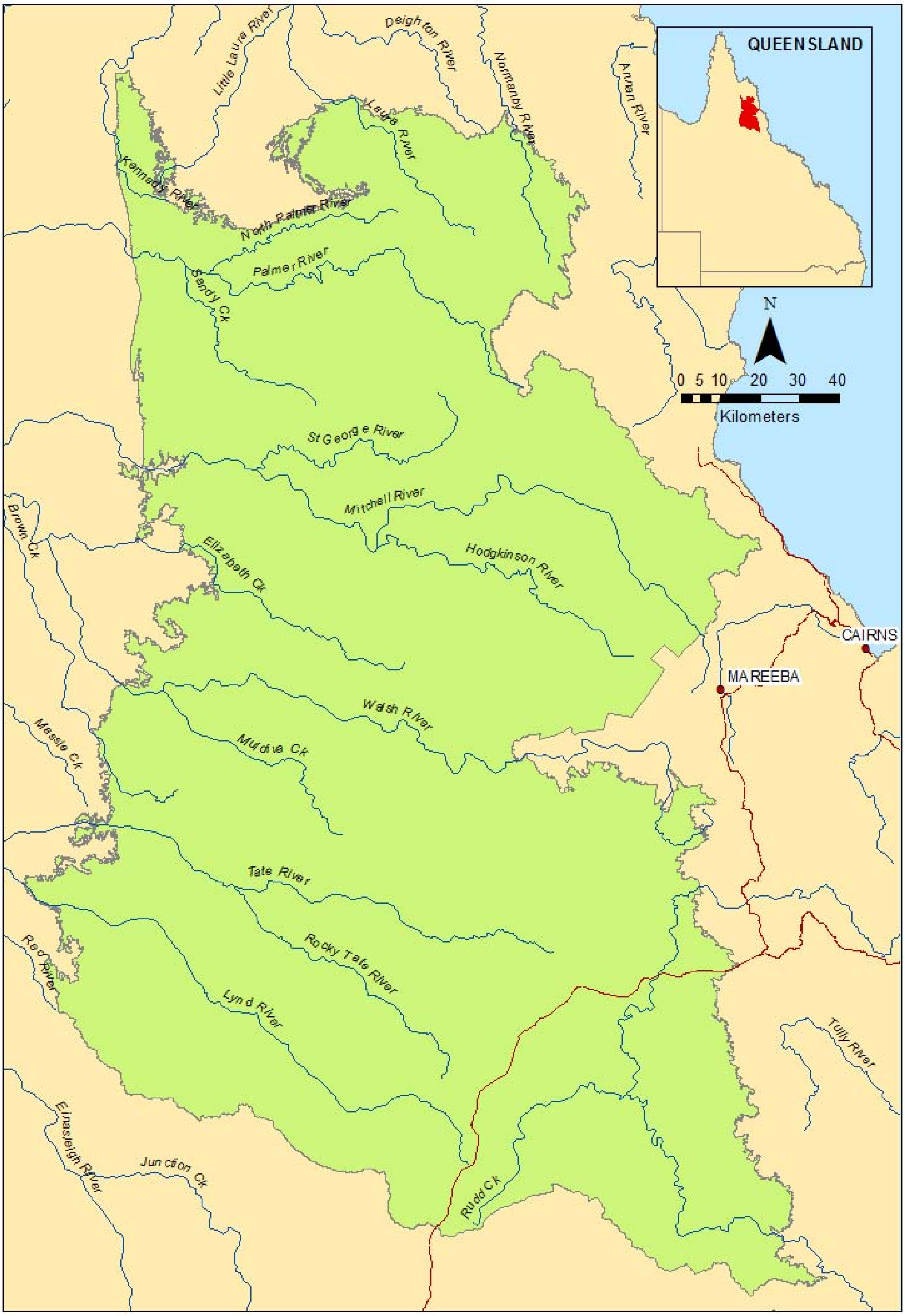

Figure 12. Area covered by the Einasleigh Uplands suistability framework

Cf - Climate, frost

Limitation Value	Description	Grp A	Grp B	Grp C	Grp D	Grp E	Grp F	Grp G	Grp H	Grp I	Grp J
1	Wet zone > 1100mm mean annual rainfall. This zone is east of the 1100mm isohyet and is characterised by higher altitudes, colder temperatures and high frost incidence. Rainfall is summer dominant with a strong likelihood of drizzle during the autumn.	1	2	2	3	3	3	4	4	4	5
2	Dry zone < 1100mm mean annual rainfall. This zone lies west of the 1100mm isohyet and has warmer temperatures, higher evaporation and fewer frosts. Severe frosts are rare however their likelihood increases towards the southern parts of the region.	1	1	3	1	2	3	1	2	3	2

Suitability subclasses for various land management options

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J
Peanut-Rainfed	Capsicum-Irrigated	Onion-Irrigated	Sorghum Cereal-Rainfed	Cucurbit-Irrigated	Avocado-Irrigated	Maize-Rainfed	Mango-Irrigated	Banana-Irrigated	Pineapple-Irrigated
	Maize-Irrigated	Persimmon-Irrigated		Grapes-Irrigated	Cashew nuts-Irrigated	Sweet Potato-Irrigated		Carambola-Irrigated	
	Mungbean (black)-Rainfed	Stone Fruit-Irrigated		Mandarin-Irrigated	Custard Apple-Irrigated			Coffee-Irrigated	
	Navy bean-Irrigated			Oat-Irrigated	Longan-Irrigated			Cotton-Furrow/row Irrigated	
	Potato-Irrigated			Peanut-Irrigated	Macadamia nuts-Irrigated			Cotton-Spray Irrigated	
	Sorghum Forage-Irrigated			Pumpkin-Irrigated	Strawberry-Irrigated			Lychee-Irrigated	
	Sorghum Forage-Rainfed			Rice-Flood Irrigated	Sunflower-Irrigated			Papaw-Irrigated	
	Soybean-Rainfed			Sorghum Cereal-Irrigated					
	Tomato-Irrigated			Soybean-Irrigated					
				Squash-Irrigated					
				Sugarcane-Furrow/row Irrigated					
				Sugarcane-Spray Irrigated					
				Watermelon-Irrigated					
				Wheat-Irrigated					
				Zucchini-Irrigated					

E - Water erosion

Limitation		Suitability subclasses for various land management options										
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K
1P	Imperfectly to very poorly drained soils-<0.5% slope	1	1	1	1	1	1	1	1	1	1	1
1R	Rapidly drained soils <15% slope	1	1	1	1	1	1	1	1	1	1	5
1S	Soils with sodic B horizons within 40cm of the surface-<0.5% slope	1	1	1	1	1	1	1	1	3	3	1
1SH	Shallow and very shallow soils-<1% slope	1	1	1	1	1	1	1	5	2	2	2
1W	Well to moderately well drained soils-<1% slope	1	1	1	1	1	1	1	1	1	1	2
2P	Imperfectly to very poorly drained soils-0.5-1.5% slope	1	1	1	2	2	2	2	2	2	2	2
2R	Rapidly drained soils >15% slope	5	5	5	5	5	5	5	5	5	5	5
2S	Soils with sodic B horizons within 40cm of the surface-0.5-1% slope	1	1	2	2	2	2	2	2	4	4	2
2SH	Shallow and very shallow soils-1-2% slope	1	2	2	2	2	2	2	5	3	3	4
2W	Well to moderately well drained soils-1-3% slope	1	1	1	2	2	2	2	2	1	1	4
3P	Imperfectly to very poorly drained soils-1.5-4% slope	1	2	2	3	3	3	3	3	3	3	4
3S	Soils with sodic B horizons within 40cm of the surface-1-2% slope	1	2	3	3	3	3	4	4	4	4	4
3SH	Shallow and very shallow soils-2-5% slope	1	3	3	3	3	3	3	5	3	3	5
3W	Well to moderately well drained soils-3-6% slope	1	2	2	2	2	2	2	3	2	2	5
4P	Imperfectly to very poorly drained soils-4-6% slope	2	3	3	3	4	4	4	4	4	4	5
4S	Soils with sodic B horizons within 40cm of the surface-2-3% slope	2	3	4	4	4	4	5	5	4	4	5
4SH	Shallow and very shallow soils-5-8% slope	2	4	4	4	4	4	4	5	4	4	5
4W	Well to moderately well drained soils-6-8% slope	2	3	3	3	3	4	4	4	3	4	5
5P	Imperfectly to very poorly drained soils-6-8% slope	2	4	4	4	5	5	5	5	5	5	5
5S	Soils with sodic B horizons within 40cm of the surface-3-5% slope	3	4	5	4	5	5	5	5	5	5	5
5SH	Shallow and very shallow soils-8-12% slope	3	5	5	5	5	5	5	5	5	5	5
5W	Well to moderately well drained soils-8-12% slope	2	3	4	4	4	5	5	5	4	5	5
6P	Imperfectly to very poorly drained soils->8% slope	3	4	5	4	5	5	5	5	5	5	5
6S	Soils with sodic B horizons within 40cm of the surface-5-8% slope	3	4	5	5	5	5	5	5	5	5	5
6SH	Shallow and very shallow soils-12-15% slope	4	5	5	5	5	5	5	5	5	5	5
6W	Well to moderately well drained soils-12-20% slope	3	4	5	5	5	5	5	5	5	5	5
7S	Soils with sodic B horizons within 40cm of the surface->8% slope	4	5	5	5	5	5	5	5	5	5	5
7SH	Shallow and very shallow soils->15% slope	4	5	5	5	5	5	5	5	5	5	5
7W	Well to moderately well drained soils->20% slope	4	5	5	5	5	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K
Avocado-Irrigated	Banana-Irrigated	Capsicum-Irrigated	Sugarcane-Furrow/row Irrigated	Cotton-Furrow/row Irrigated	Maize-Rainfed	Soybean-Rainfed	Mungbean (black)-Rainfed	Peanut-Irrigated	Peanut-Rainfed	Rice-Flood Irrigated
Carambola-Irrigated	Coffee-Irrigated	Cucurbit-Irrigated	Sugarcane-Spray Irrigated	Cotton-Spray Irrigated	Sorghum Cereal-Rainfed					
Cashew nuts-Irrigated	Papaw-Irrigated	Navy bean-Irrigated		Maize-Irrigated	Sorghum Forage-Rainfed					
Custard Apple-Irrigated		Oat-Irrigated		Potato-Irrigated						
Grapes-Irrigated		Onion-Irrigated		Sorghum Cereal-Irrigated						
Longan-Irrigated		Pineapple-Irrigated		Sorghum Forage-Irrigated						
Lychee-Irrigated		Pumpkin-Irrigated		Soybean-Irrigated						
Macadamia nuts-Irrigated		Squash-Irrigated		Sunflower-Irrigated						
Mandarin-Irrigated		Strawberry-Irrigated								
Mango-Irrigated		Sweet Potato-Irrigated								
Persimmon-Irrigated		Tomato-Irrigated								
Stone Fruit-Irrigated		Watermelon-Irrigated								
		Wheat-Irrigated								
		Zucchini-Irrigated								

F - Flooding

Limitation		Suitability subclasses for various land management options				
Value	**Description**	**Group A**	**Group B**	**Group C**	**Group D**	**Group E**
1	Flooding frequency is less than 1 in 10 years	1	1	1	1	1
2	Flooding frequency exceeds 1 in 10 years but is less than 1 in 5 years	2	2	3	3	4
3	Flooding frequency exceeds 1 in 5 to 1 in 2 years	3	3	4	5	5
4	Flooding annually or almost annually	3	4	5	5	5

Group A	Group B	Group C	Group D	Group E
Capsicum-Irrigated	Rice-Flood Irrigated	Cotton-Furrow/row Irrigated	Banana-Irrigated	Avocado-Irrigated
Cucurbit-Irrigated	Sorghum Cereal-Irrigated	Cotton-Spray Irrigated	Papaw-Irrigated	Carambola-Irrigated
Onion-Irrigated	Sorghum Cereal-Rainfed	Maize-Irrigated		Cashew nuts-Irrigated
Potato-Irrigated	Sugarcane-Furrow/row Irrigated	Maize-Rainfed		Coffee-Irrigated
Pumpkin-Irrigated	Sugarcane-Spray Irrigated	Mungbean (black)-Rainfed		Custard Apple-Irrigated
Squash-Irrigated		Navy bean-Irrigated		Grapes-Irrigated
Strawberry-Irrigated		Oat-Irrigated		Longan-Irrigated
Tomato-Irrigated		Peanut-Irrigated		Lychee-Irrigated
Watermelon-Irrigated		Peanut-Rainfed		Macadamia nuts-Irrigated
Zucchini-Irrigated		Pineapple-Irrigated		Mandarin-Irrigated
		Sorghum Forage-Irrigated		Mango-Irrigated
		Sorghum Forage-Rainfed		Persimmon-Irrigated
		Soybean-Irrigated		Stone Fruit-Irrigated
		Soybean-Rainfed		
		Sunflower-Irrigated		
		Sweet Potato-Irrigated		
		Wheat-Irrigated		

I - Furrow infiltration

Limitation		Suitability subclasses for various land management options
Value	**Description**	**Group A**
F0	Soils with a surface texture of sand and sandy loams <45cm or other heavy textured soils, <1% slope	1
F1	Soils with a surface texture of sand and sandy loam to 45-60cm, <1% slope	2
F2	Soils with a surface texture of sand and sandy loam to 60-90cm, <1% slope	3
F3	Soils with a surface texture of sand and sandy loam to 90 cm, 1-2% slope	3
F4	Soils with sodic B horizons within 40cm of the surface, >1% slope	4
F5	Deep, well drained, well structured soils or other deep soils with high infiltration and permeability, <1-2% slope	4
F6	All soils, 2-3% slope	4
F7	All soils, >3% slope	5

Group A
Cotton-Furrow/row Irrigated
Rice-Flood Irrigated
Sugarcane-Furrow/row Irrigated

M1 – Soil water availability, PAWC to 0.5m

Limitation		Suitability subclasses for various land management options			
Value	**Description**	**Group A**	**Group B**	**Group C**	**Group D**
M15	PAWC of 100-125mm to 0.5m	1	1	2	2
M16	PAWC of 75-100mm to 0.5m	1	2	3	4
M17	PAWC of 60-75mm to 0.5m	2	3	3	5
M18	PAWC of 40-60mm to 0.5m	3	4	4	5
M19	PAWC of < 40mm to 0.5m	4	4	4	5

Group A	Group B	Group C	Group D
Pineapple-Irrigated	Cucurbit-Irrigated	Capsicum-Irrigated	Peanut-Rainfed
	Peanut-Irrigated	Navy bean-Irrigated	
	Pumpkin-Irrigated	Onion-Irrigated	
	Squash-Irrigated	Potato-Irrigated	
	Watermelon-Irrigated	Strawberry-Irrigated	
	Zucchini-Irrigated	Sweet Potato-Irrigated	
		Tomato-Irrigated	

M2 – Soil water availability, PAWC to 0.9m

Limitation		Suitability subclasses for various land management options					
Value	**Description**	**Group A**	**Group B**	**Group C**	**Group D**	**Group E**	**Group F**
M1	PAWC > 150mm to 0.9m	1	1	1	1	1	3
M2	PAWC of 125-150mm to 0.9m	1	1	1	1	3	3
M3	PAWC of 100-125mm to 0.9m	2	2	2	2	4	3
M4	PAWC of 75-100mm to 0.9m	2	2	3	3	5	4
M5	PAWC of 60-75mm to 0.9m	3	3	3	4	5	4
M6	PAWC of 40-60mm to 0.9m	4	4	4	4	5	4
M7	PAWC of < 40mm to 0.9m	4	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F
Maize-Irrigated	Oat-Irrigated	Cotton-Furrow/row Irrigated	Sugarcane-Furrow/row Irrigated	Maize-Rainfed	Rice-Flood Irrigated
Sorghum Cereal-Irrigated	Wheat-Irrigated	Cotton-Spray Irrigated	Sugarcane-Spray Irrigated	Mungbean (black)-Rainfed	
Sorghum Forage-Irrigated		Soybean-Irrigated		Sorghum Cereal-Rainfed	
Sunflower-Irrigated				Sorghum Forage-Rainfed	
				Soybean-Rainfed	

M3 – Soil water availablility, PAWC to 1.2m

Limitation		Suitability subclasses for various land management options	
Value	Description	Group A	Group B
M8	PAWC > 150mm to 1.2m	1	1
M9	PAWC of 125-150mm to 1.2m	1	1
M10	PAWC of 100-125mm to 1.2m	1	1
M11	PAWC of 75-100mm to 1.2m	1	1
M12	PAWC of 60-75mm to 1.2m	1	2
M13	PAWC of 40-60mm to 1.2m	2	3
M14	PAWC of < 40mm to 1.2m	3	4

Group A	Group B
Carambola-Irrigated	Avocado-Irrigated
Coffee-Irrigated	Banana-Irrigated
Mandarin-Irrigated	Cashew nuts-Irrigated
Mango-Irrigated	Custard Apple-Irrigated
Stone Fruit-Irrigated	Grapes-Irrigated
	Longan-Irrigated
	Lychee-Irrigated
	Macadamia nuts-Irrigated
	Papaw-Irrigated
	Persimmon-Irrigated

Nr - Soil reaction trend

Limitation		Suitability subclasses for various land management options		
Value	Description	Group A	Group B	Group C
1	pH <5.5	1	1	2
2	pH 5.5-6.5	1	1	1
3	pH 6.5-7.5	1	1	1
4	pH >7.5	1	2	2

Group A	Group B	Group C	Group C cont.
Rice-Flood Irrigated	Macadamia nuts-Irrigated	Avocado-Irrigated	Watermelon-Irrigated
	Oat-Irrigated	Banana-Irrigated	Wheat-Irrigated
	Peanut-Irrigated	Capsicum-Irrigated	Zucchini-Irrigated
	Peanut-Rainfed	Carambola-Irrigated	
	Pineapple-Irrigated	Cashew nuts-Irrigated	
	Sorghum Cereal-Irrigated	Coffee-Irrigated	
	Sorghum Cereal-Rainfed	Cotton-Furrow/row Irrigated	
	Sorghum Forage-Irrigated	Cotton-Spray Irrigated	
	Sorghum Forage-Rainfed	Cucurbit-Irrigated	
	Sugarcane-Furrow/row Irrigated	Custard Apple-Irrigated	
	Sugarcane-Spray Irrigated	Grapes-Irrigated	
	Sweet Potato-Irrigated	Longan-Irrigated	
		Lychee-Irrigated	
		Maize-Irrigated	
		Maize-Rainfed	
		Mandarin-Irrigated	
		Mango-Irrigated	
		Mungbean (black)-Rainfed	
		Navy bean-Irrigated	
		Onion-Irrigated	
		Papaw-Irrigated	
		Persimmon-Irrigated	
		Potato-Irrigated	
		Pumpkin-Irrigated	
		Soybean-Irrigated	
		Soybean-Rainfed	
		Squash-Irrigated	
		Stone Fruit-Irrigated	
		Strawberry-Irrigated	
		Sunflower-Irrigated	
		Tomato-Irrigated	

P - Soil physical factors affecting plant growth

Limitation		Suitability subclasses for various land management options					
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
1	Soils with no restriction to cultivation, germination or seedling emergence	1	1	1	1	1	1
2	Hard setting sandy loam to clay loam textured surface soil	1	1	1	1	2	2
3	Moderately adhesive soils	1	1	1	2	1	3
4	Strongly adhesive soils with well structured A horizons	1	2	2	2	1	4
5	Other strongly adhesive, cloddy or large aggregate soils	1	3	3	3	2	5
6	Soils with sodic B horizons within 0.40m of the surface	3	3	4	3	3	4

Group A	Group B	Group C	Group D	Group E	Group F
Avocado-Irrigated	Cotton-Furrow/row Irrigated	Capsicum-Irrigated	Cashew nuts-Irrigated	Sugarcane-Furrow/row Irrigated	Onion-Irrigated
Banana-Irrigated	Cotton-Spray Irrigated	Cucurbit-Irrigated	Longan-Irrigated	Sugarcane-Spray Irrigated	Peanut-Irrigated
Carambola-Irrigated	Maize-Irrigated	Navy bean-Irrigated	Mungbean (black)-Rainfed		Peanut-Rainfed
Coffee-Irrigated	Maize-Rainfed	Pumpkin-Irrigated	Pineapple-Irrigated		Potato-Irrigated
Custard Apple-Irrigated	Oat-Irrigated	Squash-Irrigated	Sorghum Cereal-Irrigated		Sweet Potato-Irrigated
Grapes-Irrigated	Rice-Flood Irrigated	Strawberry-Irrigated	Sorghum Cereal-Rainfed		
Lychee-Irrigated	Wheat-Irrigated	Sunflower-Irrigated	Sorghum Forage-Irrigated		
Macadamia nuts-Irrigated		Tomato-Irrigated	Sorghum Forage-Rainfed		
Mandarin-Irrigated		Watermelon-Irrigated	Soybean-Irrigated		
Mango-Irrigated		Zucchini-Irrigated	Soybean-Rainfed		
Papaw-Irrigated					
Persimmon-Irrigated					
Stone Fruit-Irrigated					

Pd - Soil depth

Limitation		Suitability subclasses for various land management options	
Value	**Description**	**Group A**	**Group B**
1	Soils with effective rooting depth >1.0m	1	1
2	Soils with effective rooting depth 0.6-1.0m	1	2
3	Soils with effective rooting depth 0.45-0.6m	1	3
4	Soils with effective rooting depth <0.45m	1	4

Group A	Group A cont.	Group B
Capsicum-Irrigated	Wheat-Irrigated	Avocado-Irrigated
Cotton-Furrow/row Irrigated	Zucchini-Irrigated	Banana-Irrigated
Cotton-Spray Irrigated		Carambola-Irrigated
Cucurbit-Irrigated		Cashew nuts-Irrigated
Maize-Irrigated		Coffee-Irrigated
Maize-Rainfed		Custard Apple-Irrigated
Mungbean (black)-Rainfed		Grapes-Irrigated
Navy bean-Irrigated		Longan-Irrigated
Oat-Irrigated		Lychee-Irrigated
Onion-Irrigated		Macadamia nuts-Irrigated
Peanut-Irrigated		Mandarin-Irrigated
Peanut-Rainfed		Mango-Irrigated
Pineapple-Irrigated		Papaw-Irrigated
Potato-Irrigated		Persimmon-Irrigated
Pumpkin-Irrigated		Stone Fruit-Irrigated
Rice-Flood Irrigated		
Sorghum Cereal-Irrigated		
Sorghum Cereal-Rainfed		
Sorghum Forage-Irrigated		
Sorghum Forage-Rainfed		
Soybean-Irrigated		
Soybean-Rainfed		
Squash-Irrigated		
Strawberry-Irrigated		
Sugarcane-Furrow/row Irrigated		
Sugarcane-Spray Irrigated		
Sunflower-Irrigated		
Sweet Potato-Irrigated		
Tomato-Irrigated		
Watermelon-Irrigated		

R - Rockiness

Limitation		Suitability subclasses for various land management options					
Value	**Description**	**Group A**	**Group B**	**Group C**	**Group D**	**Group E**	**Group F**
0	No coarse fragments	1	1	1	1	1	1
1B	Very few (<2%), boulders (>600mm)	1	2	2	2	2	4
1C	Very few (<2%), cobbles (60-200mm)	1	1	1	1	1	1
1G	Very few (<2%), gravels (20-60mm)	1	1	1	1	1	1
1S	Very few (<2%), stones (200-600mm)	1	1	2	2	2	3
2B	Few (2-10%), boulders (>600mm)	2	2	2	3	3	5
2C	Few (2-10%), cobbles (60-200mm)	1	1	2	2	2	2
2G	Few (2-10%), gravels (20-60mm)	1	1	2	1	2	2
2S	Few (2-10%), stones (200-600mm)	2	2	2	3	2	4
3B	Common (10-20%), boulders (>600mm)	3	3	3	4	4	5
3C	Common (10-20%), cobbles (60-200mm)	2	2	3	3	3	3
3G	Common (10-20%), gravels (20-60mm)	2	2	3	2	3	3
3S	Common (10-20%), stones (200-600mm)	3	3	3	4	3	5
4B	Many (20-50%), boulders (>600mm)	4	4	4	5	5	5
4C	Many (20-50%), cobbles (60-200mm)	3	3	4	4	4	5
4G	Many (20-50%), gravels (20-60mm)	3	3	4	3	4	4
4S	Many (20-50%), stones (200-600mm)	4	4	4	5	4	5
5B	Abundant (50-90%), boulders (>600mm)	5	5	5	5	5	5
5C	Abundant (50-90%), cobbles (60-200mm)	4	4	5	5	5	5
5G	Abundant (50-90%), gravels (20-60mm)	4	4	5	4	5	4
5S	Abundant (50-90%), stones (200-600mm)	4	4	5	5	5	5
6B	Very abundant (> 90%), boulders (>600mm)	5	5	5	5	5	5
6C	Very abundant (>90%), cobbles (60-200mm)	5	5	5	5	5	5
6G	Very abundant (>90%), gravels (20-60mm)	5	5	5	5	5	4
6S	Very abundant (>90%), stones (200-600mm)	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F
Rice-Flood Irrigated	Avocado-Irrigated	Capsicum-Irrigated	Banana-Irrigated	Onion-Irrigated	Pineapple-Irrigated
	Carambola-Irrigated	Cotton-Furrow/row Irrigated		Peanut-Irrigated	Sweet Potato-Irrigated
	Cashew nuts-Irrigated	Cotton-Spray Irrigated		Peanut-Rainfed	
	Coffee-Irrigated	Cucurbit-Irrigated		Potato-Irrigated	
	Custard Apple-Irrigated	Maize-Irrigated			
	Grapes-Irrigated	Maize-Rainfed			
	Longan-Irrigated	Mungbean (black)-Rainfed			
	Lychee-Irrigated	Navy bean-Irrigated			
	Macadamia nuts-Irrigated	Oat-Irrigated			
	Mandarin-Irrigated	Pumpkin-Irrigated			
	Mango-Irrigated	Sorghum Cereal-Irrigated			
	Papaw-Irrigated	Sorghum Cereal-Rainfed			
	Persimmon-Irrigated	Sorghum Forage-Irrigated			
	Stone Fruit-Irrigated	Sorghum Forage-Rainfed			
		Soybean-Irrigated			
		Soybean-Rainfed			
		Squash-Irrigated			
		Strawberry-Irrigated			
		Sugarcane-Furrow/row Irrigated			
		Sugarcane-Spray Irrigated			
		Sunflower-Irrigated			
		Tomato-Irrigated			
		Watermelon-Irrigated			
		Wheat-Irrigated			
		Zucchini-Irrigated			

Sa - Salinity

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K	Group L	Group M	Group N	Group O	Group P
		Suitability subclasses for various land management options															
0	<1dS/m	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1-2dS/m	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
2	2-3dS/m	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3	4
3	3-4dS/m	1	1	1	1	1	2	2	2	2	3	3	4	3	3	4	5
4	4-5dS/m	1	1	1	1	2	2	2	3	4	3	4	5	4	4	5	5
5	5-6dS/m	1	1	2	2	3	3	3	3	5	4	5	5	5	5	5	5
6	6-7dS/m	1	1	3	3	3	3	4	4	5	5	5	5	5	5	5	5
7	7-8dS/m	1	2	4	4	4	4	5	5	5	5	5	5	5	5	5	5
8	8-9dS/m	1	2	4	5	5	4	5	5	5	5	5	5	5	5	5	5
9	9-10dS/m	2	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5
10	>10dS/m	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H	Group I	Group J	Group K	Group L	Group M	Group N	Group O	Group P
Cotton-Furrow/row Irrigated	Wheat-Irrigated	Sunflower-Irrigated	Maize-Irrigated	Rice-Flood Irrigated	Cashew-Irrigated	Squash-Irrigated	Grapes-Irrigated	Peanut-Irrigated	Cucurbit-Irrigated	Capsicum-Irrigated	Avocado-Irrigated	Onion-Irrigated	Carambola-Irrigated	Banana-Irrigated	Strawberry-Irrigated
Cotton-Spray Irrigated			Maize-Rainfed		Macadamia-Irrigated	Tomato-Irrigated		Peanut-Rainfed	Potato-Irrigated	Coffee-Irrigated	Stone Fruit-Irrigated			Longan-Irrigated	
Sorghum Cereal-Irrigated			Mungbean (black)-Rainfed		Sugarcane-Furrow/row Irrigated	Zucchini-Irrigated			Pumpkin-Irrigated	Custard Apple-Irrigated				Lychee-Irrigated	
Sorghum Cereal-Rainfed			Oat-Irrigated		Sugarcane-Spray Irrigated				Sweet Potato-Irrigated	Mandarin-Irrigated				Navy bean-Irrigated	
Sorghum Forage-Irrigated			Soybean-Irrigated						Watermelon-Irrigated	Mango-Irrigated				Papaw-Irrigated	
Sorghum Forage-Rainfed			Soybean-Rainfed											Persimmon-Irrigated	
														Pineapple-Irrigated	

W1 - Wetness to 1m

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F
		Suitability subclasses for various land management options					
W1H	Depth to 0.9m very poorly drained and highly permeable	4	4	5	5	5	5
W1M	Depth to 0.9m very poorly drained and moderately permeable	4	4	5	5	5	5
W1S	Depth to 0.9m very poorly drained and slowly permeable	4	4	5	5	5	5
W1V	Depth to 0.9m very poorly drained and very slowly permeable	5	5	5	5	5	5
W2H	Depth to 0.9m poorly drained and highly permeable	3	4	4	4	4	4
W2M	Depth to 0.9m poorly drained and moderately permeable	3	3	4	4	4	4
W2S	Depth to 0.9m poorly drained and slowly permeable	3	3	5	5	5	5
W2V	Depth to 0.9m poorly drained and very slowly permeable	4	4	5	5	5	5
W3H	Depth to 0.9m imperfectly drained and highly permeable	2	3	2	2	3	3
W3M	Depth to 0.9m imperfectly drained and moderately permeable	2	2	2	3	3	3
W3S	Depth to 0.9m imperfectly drained and slowly permeable	2	3	3	3	4	4
W3V	Depth to 0.9m imperfectly drained and very slowly permeable	4	4	4	4	4	5
W4H	Depth to 0.9m moderately well drained and highly permeable	1	2	2	2	2	1
W4M	Depth to 0.9m moderately well drained and moderately permeable	2	2	2	2	2	2
W4S	Depth to 0.9m moderately well drained and slowly permeable	3	1	3	3	3	3
W4V	Depth to 0.9m moderately well drained and very slowly permeable	4	4	4	4	4	5
W5H	Depth to 0.9m well drained and highly permeable	1	1	1	1	1	1
W5M	Depth to 0.9m well drained and moderately permeable	1	1	1	1	1	1
W5S	Depth to 0.9m well drained and slowly permeable	2	2	3	3	3	3
W5V	Depth to 0.9m well drained and very slowly permeable	4	4	4	4	4	4
W6H	Depth to 0.9m rapidly drained and highly permeable	1	1	1	1	1	1
W6M	Depth to 0.9m rapidly drained and moderately permeable	1	1	1	1	1	1
W6S	Depth to 0.9m rapidly drained and slowly permeable	1	1	3	3	3	3
W6V	Depth to 0.9m rapidly drained and very slowly permeable	4	4	4	4	4	4

Group A	Group B	Group C	Group D	Group E	Group F
Rice-Flood Irrigated	Cotton-Furrow/row Irrigated	Sugarcane-Furrow/row Irrigated	Sorghum Cereal-Irrigated	Maize-Irrigated	Oat-Irrigated
	Cotton-Spray Irrigated	Sugarcane-Spray Irrigated	Sorghum Cereal-Rainfed	Maize-Rainfed	Wheat-Irrigated
			Sorghum Forage-Irrigated	Mungbean (black)-Rainfed	
			Sorghum Forage-Rainfed	Soybean-Irrigated	
				Soybean-Rainfed	
				Sunflower-Irrigated	

W2 - Wetness to 0.5m

Limitation Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
		Suitability subclasses for various land management options							
W1H	Depth to 0.5m very poorly drained and highly permeable	4	4	5	5	5	5	5	5
W1M	Depth to 0.5m very poorly drained and moderately permeable	4	5	5	5	5	5	5	5
W1S	Depth to 0.5m very poorly drained and slowly permeable	5	5	5	5	5	5	5	5
W1V	Depth to 0.5m very poorly drained and very slowly permeable	5	5	5	5	5	5	5	5
W2H	Depth to 0.5m poorly drained and highly permeable	4	4	4	4	4	4	5	5
W2M	Depth to 0.5m poorly drained and moderately permeable	4	4	4	5	5	5	5	5
W2S	Depth to 0.5m poorly drained and slowly permeable	5	5	4	5	5	5	5	5
W2V	Depth to 0.5m poorly drained and very slowly permeable	5	5	4	5	5	5	5	5
W3H	Depth to 0.5m imperfectly drained and highly permeable	2	4	3	3	4	4	4	4
W3M	Depth to 0.5m imperfectly drained and moderately permeable	3	4	3	3	4	4	4	5
W3S	Depth to 0.5m imperfectly drained and slowly permeable	4	5	4	4	4	4	5	5
W3V	Depth to 0.5m imperfectly drained and very slowly permeable	5	5	4	5	5	5	5	5
W4H	Depth to 0.5m moderately well drained and highly permeable	1	1	2	2	2	2	3	3
W4M	Depth to 0.5m moderately well drained and moderately permeable	1	1	2	2	3	3	3	3
W4S	Depth to 0.5m moderately well drained and slowly permeable	4	4	4	4	4	4	4	4
W4V	Depth to 0.5m moderately well drained and very slowly permeable	4	4	4	4	4	4	4	4
W5H	Depth to 0.5m well drained and highly permeable	1	1	1	1	1	1	1	1
W5M	Depth to 0.5m well drained and moderately permeable	1	1	1	1	2	2	2	1
W5S	Depth to 0.5m well drained and slowly permeable	4	4	4	4	3	4	4	4
W5V	Depth to 0.5m well drained and very slowly permeable	4	4	4	4	4	4	4	4
W6H	Depth to 0.5m rapidly drained and highly permeable	1	1	1	1	1	1	1	1
W6M	Depth to 0.5m rapidly drained and moderately permeable	1	1	1	1	1	1	1	1
W6S	Depth to 0.5m rapidly drained and slowly permeable	4	4	4	3	3	3	4	4
W6V	Depth to 0.5m rapidly drained and very slowly permeable	4	4	4	4	4	4	4	4

Group A	Group B	Group C	Group D	Group E	Group F	Group G	Group H
Sweet Potato-Irrigated	Potato-Irrigated	Navy bean-Irrigated	Pumpkin-Irrigated	Capsicum-Irrigated	Cucurbit-Irrigated	Pineapple-Irrigated	Peanut-Irrigated
				Onion-Irrigated	Watermelon-Irrigated	Strawberry-Irrigated	Peanut-Rainfed
				Squash-Irrigated			
				Tomato-Irrigated			
				Zucchini-Irrigated			

W3 - Wetness to 1.5m

Limitation		Suitability subclasses for various land management options			
Value	Description	Group A	Group B	Group C	Group D
W1H	Depth to 1.5m very poorly drained and highly permeable	5	5	5	5
W1M	Depth to 1.5m very poorly drained and moderately permeable	5	5	5	5
W1S	Depth to 1.5m very poorly drained and slowly permeable	5	5	5	5
W1V	Depth to 1.5m very poorly drained and very slowly permeable	5	5	5	5
W2H	Depth to 1.5m poorly drained and highly permeable	3	4	5	5
W2M	Depth to 1.5m poorly drained and moderately permeable	4	5	5	5
W2S	Depth to 1.5m poorly drained and slowly permeable	4	5	5	5
W2V	Depth to 1.5m poorly drained and very slowly permeable	4	5	5	5
W3H	Depth to 1.5m imperfectly drained and highly permeable	3	3	4	4
W3M	Depth to 1.5m imperfectly drained and moderately permeable	3	3	5	5
W3S	Depth to 1.5m imperfectly drained and slowly permeable	4	4	5	5
W3V	Depth to 1.5m imperfectly drained and very slowly permeable	4	4	5	5
W4H	Depth to 1.5m moderately well drained and highly permeable	2	1	4	4
W4M	Depth to 1.5m moderately well drained and moderately permeable	2	2	4	5
W4S	Depth to 1.5m moderately well drained and slowly permeable	4	4	5	5
W4V	Depth to 1.5m moderately well drained and very slowly permeable	4	4	5	5
W5H	Depth to 1.5m well drained and highly permeable	1	1	2	2
W5M	Depth to 1.5m well drained and moderately permeable	1	1	2	2
W5S	Depth to 1.5m well drained and slowly permeable	4	4	4	4
W5V	Depth to 1.5m well drained and very slowly permeable	4	4	4	4
W6H	Depth to 1.5m rapidly drained and highly permeable	1	1	1	1
W6M	Depth to 1.5m rapidly drained and moderately permeable	1	1	1	2
W6S	Depth to 1.5m rapidly drained and slowly permeable	4	4	4	4
W6V	Depth to 1.5m rapidly drained and very slowly permeable	4	4	4	4

Group A	Group B	Group C	Group D
Cashew nuts-Irrigated	Banana-Irrigated	Avocado-Irrigated	Grapes-Irrigated
	Macadamia nuts-Irrigated	Carambola-Irrigated	Mandarin-Irrigated
	Mango-Irrigated	Coffee-Irrigated	Papaw-Irrigated
		Custard Apple-Irrigated	Stone Fruit-Irrigated
		Longan-Irrigated	
		Lychee-Irrigated	
		Persimmon-Irrigated	

X - Landscape complexity

Limitation		Suitability subclasses for various land management options						
Value	Description	Group A	Group B	Group C	Group D	Group E	Group F	Group G
1	> 10ha	1	1	1	1	1	1	1
2	5-10ha	1	1	1	1	1	2	4
3	2.5-5ha	1	1	2	3	4	3	5
4	1-2.5ha	1	1	3	4	4	4	5
5	< 1ha	2	3	4	5	5	4	5

Group A	Group B	Group C	Group D	Group E	Group F	Group G
Banana-Irrigated	Papaw-Irrigated	Avocado-Irrigated	Cotton-Furrow/row Irrigated	Maize-Irrigated	Cashew nuts-Irrigated	Maize-Rainfed
		Capsicum-Irrigated	Cotton-Spray Irrigated	Oat-Irrigated	Longan-Irrigated	Mungbean (black)-Rainfed
		Carambola-Irrigated	Navy bean-Irrigated	Sorghum Cereal-Irrigated	Macadamia nuts-Irrigated	Peanut-Rainfed
		Coffee-Irrigated	Peanut-Irrigated	Sorghum Forage-Irrigated	Pumpkin-Irrigated	Pineapple-Irrigated
		Cucurbit-Irrigated	Wheat-Irrigated	Soybean-Irrigated		Rice-Flood Irrigated
		Custard Apple-Irrigated		Sugarcane-Furrow/row Irrigated		Sorghum Cereal-Rainfed
		Grapes-Irrigated		Sugarcane-Spray Irrigated		Sorghum Forage-Rainfed
		Lychee-Irrigated		Sunflower-Irrigated		Soybean-Rainfed
		Mandarin-Irrigated				Sweet Potato-Irrigated
		Mango-Irrigated				
		Onion-Irrigated				
		Persimmon-Irrigated				
		Potato-Irrigated				
		Squash-Irrigated				
		Stone Fruit-Irrigated				
		Strawberry-Irrigated				
		Tomato-Irrigated				
		Watermelon-Irrigated				
		Zucchini-Irrigated				

14 Suitability Framework for the Gulf Plains area

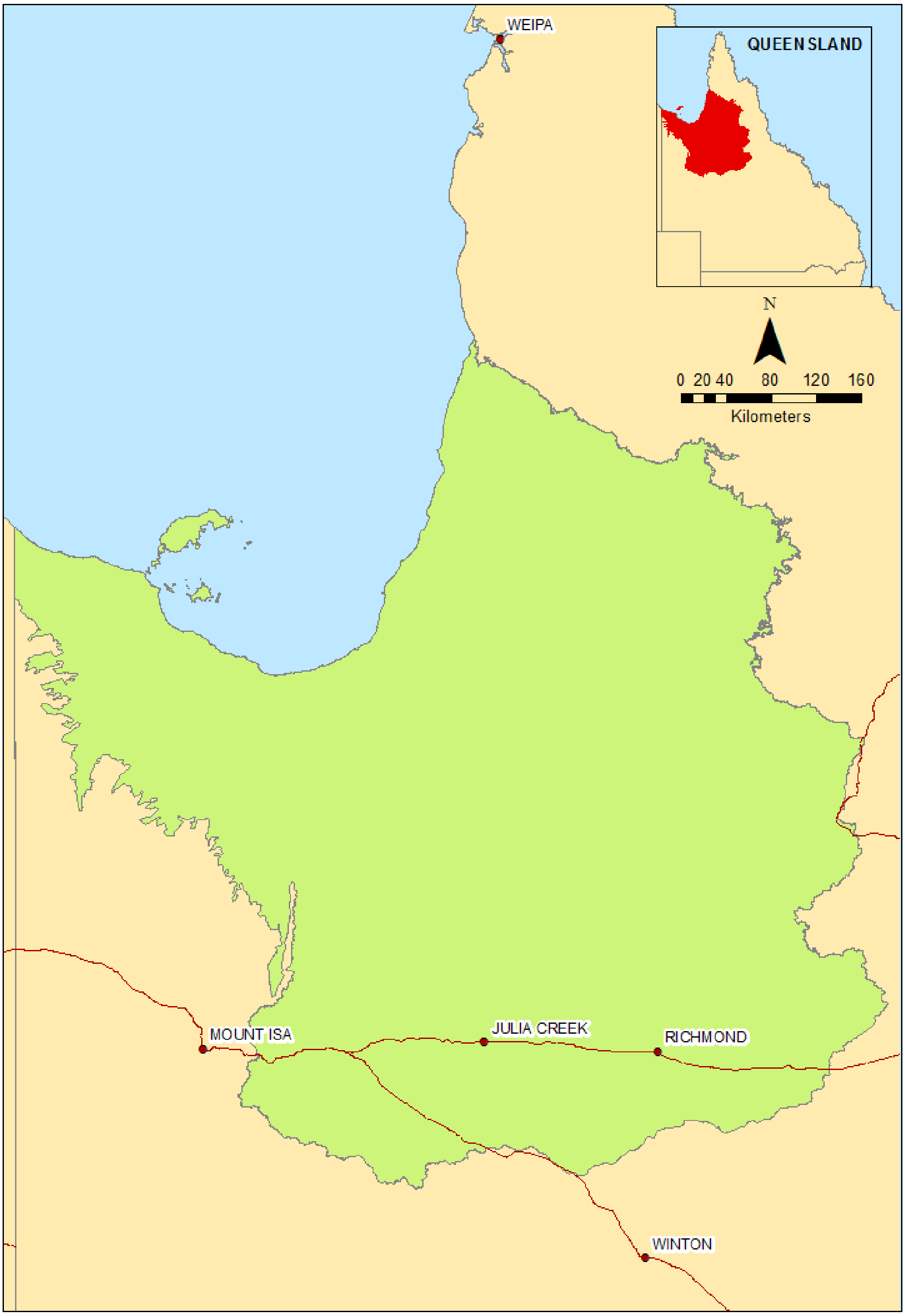

Figure 13. Area covered by the Gulf Plains suitability framework

List of crops

No.	Name	Season (wet, dry, perennial)	Code
1	Cane - furrow	P	Cane_fur
2	Cane - spray	P	Cane_spray
3	Cane - trickle	P	Cane_tric
4	Cotton - furrow	W	Cotton_fur
5	Cotton - spray	W	Cotton_spray
6	Rice-flood	W	Rice_flood
7	Rice-furrow	W	Rice_fur
8	Maize-wet-furrow	W	Maize_wet_fur
9	Maize-wet-spray	W	Maize_wet_spr
10	Sorghum-grain-wet-furrow	W	Sorg_gr_wet_fur
11	Sorghum-grain-wet-spray	W	Sorg_gr_wet_spr
12	Sorghum-grain-dry-furrow	D	Sorg_gr_dry_fur
13	Sorghum-grain-dry-spray	D	Sorghum_gr_dry_spr
14	Millet-wet-furrow	W	Millet_wet_fur
15	Millet-wet-spray	W	Millet_wet_spr
16	Sunflower - furrow	W	Sunflwr_fur
17	Sunflower-wet-spray	W	Sunflwr_wet_spr
18	Oats-dry-furrow	D	Oats_dry_fur
19	Oats-dry-spray	D	Oats-dry-spr
20	Sorghum-forage-wet-spray	W	Sorg_forg_wet_spr
21	Sorghum-forage-dry-spray	D	Sorg_forg_dry_spr
22	Rhodes grass-wet-spray	P	Rhodes_wet_spray
23	Lablab-wet-furrow	W	Lablab_wet_fur
24	Lablab-spray	W	Lablab_spray
25	Lucerne-wet-spray	P	Lucerne_wet_spray
26	Chickpea-dry-furrow	D	Chickpea_dry_fur
27	Chickpea-dry-spray	D	Chickpea_dry_spr
28	Soybean-wet-furrow	W	Soy_wet_fur
29	Soybean-wet-spray	W	Soy_wet_spray

No.	Name	Season (wet, dry, perennial)	Code
30	Mungbean-wet-furrow	W	Mung_wet_fur
31	Mungbean-wet-spray	W	Mung_wet_spr
32	Navy bean-wet-furrow	W	Navy_wet_fur
33	Navy bean-wet-spray	W	Navy_wet_spr
34	Sweet corn-wet-furrow	D	SwtCorn_wet_fur
35	Sweet corn-wet-spray	D	SwtCorn_wet_spr
36	Sweet corn-wet-trickle	D	SwtCorn_wet_tric
37	Sweet corn-dry-furrow	D	SwtCorn_dry_fur
38	Sweet corn-dry-spray	D	SwtCorn_dry_spr
39	Sweet corn-dry-trickle	D	SwtCorn_dry_tric
40	Cucurbit-dry-furrow	D	Cucurbit_dry_fur
41	Cucurbit-dry-spray	D	Cucurbit_dry_spray
42	Cucurbit-dry-trickle	D	Cucurbit_dry_tric
43	Capsicum/chili-dry-furrow	D	CapsChili_dry_fur
44	Capsicum/chili-dry-spray	D	CapsChili_dry_spray
45	Capsicum/chili-dry-trickle	D	CapsChili_dry_tric
46	Tomato-dry-furrow	D	Tomato_dry_fur
47	Tomato-dry-spray	D	Tomato_dry_spray
48	Tomato-dry-trickle	D	Tomato_dry_tric
49	Eggplant-dry-furrow	D	Eggplant_dry_fur
50	Eggplant-dry-trickle	D	Eggplant_dry_tric
51	Peanut-wet-furrow	W	Peanut_wet_fur
52	Peanut-wet-spray	W	Peanut_wet_spr
53	Sweet Potato-wet-furrow	W	SwtPot_wet_fur
54	Sweet Potato-wet-spray	W	SwtPot_wet_spray
55	Cassava-wet-furrow	W	Cassava_wet_fur
56	Cassava-wet-spray	W	Cassava_wet_spray
57	Pineapple-spr	P	Pineapple_spray
58	Pineapple-tri	P	Pineapple_tric
59	Lychee-tri	P	Lychee_tric
60	Cashew-tri	P	Cashew_tric
61	Mango-tri	P	Mango_tric

No.	Name	Season (wet, dry, perennial)	Code
62	Banana-spr	P	Banana_spray
63	Banana-tri	P	Banana_tric
64	Carambola-tri	P	Carambola_tric
65	Citrus-tri	P	Citrus_tric
66	Grape-tri	P	Grape_tric
67	Coffee-tri	P	Coffee_tric
68	Avocado-tri	P	Avocado_tric
69	Cust. apple-tri	P	CustApple_tric
70	Caribbean pine-irrig	P	CaribPine_irr
71	African mahogany-irrig	P	AfrMahog_irr
72	African mahogany-rain	P	AfrMahog_rain
73	Spotted gum-irrig	P	SpotdGum_irr
74	Spotted gum-rain	P	SpotdGum_rain
75	Teak-irrig	P	Teak_irr
76	Indian sandalwood-irrig	P	IndSandlWd_irr
77	Sorghum-grain-rainfed	W	Sorghum_rainfed
78	Maize-grain-rainfed	W	Maize_rainfed
79	Soybean-rainfed	W	Soy_rainfed
80	Mungbean-rainfed	W	Mung_rainfed

Cp – Climate, precipitation

The amount of rain that falls during the growing season is relevant for irrigated cropping in terms of the quantity of supplementary irrigation required. However, suitability subclasses have only been determined for crops that are totally rainfed. The crops are wet season grain/pulse crops and perennial tree crops.

Code	Description	Suitability subclasses for various land uses		
	Mean annual rainfall	**A**	**B**	**C**
Cp1	Annual rainfall >1000 mm	2	1	1
Cp2	Annual rainfall 800-1000 mm	3	1	2
Cp3	Annual rainfall 600-800 mm	3	2	3
Cp4	Annual rainfall 500-600 mm	4	3	4
Cr5	Annual rainfall <500 mm	5	4	5
		African mahogany Spotted gum	Sorghum	Maize Soybean Mungbean

Cs – Climate, heat stress

The Gulf Plains region is noted for its exceptionally hot temperatures that occur over a long period. For example, Julia Creek has on average 154 days per year with a maximum of >35°C. The intense solar radiation associated with high temperatures (often combined with wind as well) is likely to cause damage to the leaves and fruit of many crops, being particularly significant for horticulture crops. Small crops (e.g. capsicum) will generally not be significantly affected, as they will be grown in the dry season when temperatures are less intense.

Code	Description	Suitability subclasses for various land uses							
		A		B	C	D	E	F	G
Cs1	Low heat stress (<5 40°days)	1		1	1	1	1	1	2
Cs2	Moderate heat stress (5-20 40°days)	1		1	2	2	2	3	4
Cs3	Severe heat stress (≥20 40°days)	2		3	2	3	4	4	4
		Cane_fur	Navy_wet_fur	Mango_tric	Maize_wet_fur	Teak_irr	Pineapple_spray	Citrus_tric	Coffee_tric
		Cane_spray	Navy_wet_spr		Maize_wet_spr		Pineapple_tric	Grape_tric	CustApple_tric
		Cane_tric	SwtCorn_dry_fur		SwtCorn_wet_fur		Lychee_tric	Avocado_tric	
		Cotton_fur	SwtCorn_dry_spr		SwtCorn_wet_spr		Cashew_tric		
		Cotton_spray	SwtCorn_dry_tric		SwtCorn_wet_tric		Banana_spray		
		Rice_flood	Cucurbit_dry_fur		Maize_rainfed		Banana_tric		
		Rice_fur	Cucurbit_dry_spray				Carambola_tric		
		SorgGrain_wet_fur	Cucurbit_dry_tric						
		SorgGrain_wet_spr	CapsChili_dry_fur						
		SorgGrain_dry_fur	CapsChili_dry_spray						
		SorgGrain_dry_spr	CapsChili_dry_tric						
		Millet_wet_fur	Tomato_dry_fur						
		Millet_wet_spr	Tomato_dry_spray						
		Sunflwr_fur	Tomato_dry_tric						
		Sunflwr_wet_spr	Eggplant_dry_fur						
		Oats_dry_fur	Eggplant_dry_tric						
		Oats_dry_spr	Peanut_wet_fur						
		SorgForag_wet_spr	Peanut_wet_spr						
		SorgForag_dry_spr	SwtPot_wet_fur						
		Rhodes_wet_spray	SwtPot_wet_spray						
		Lablab_wet_fur	Cassava_wet_fur						
		Lablab_spray	Cassava_wet_spray						
		Lucerne_wet_spray	CaribPine_irr						
		Chickpea_dry_fur	AfrMahog_irr						
		Chickpea_dry_spr	AfrMahog_rainfed						
		Soy_wet_fur	SpotdGum_irr						
		Soy_wet_spray	SpotdGum_rainfed						
		Mung_wet_fur	IndSandlWd_irr						
		Mung_wet_spr	Mung_rainfed						
		Soy_rainfed	Sorg_rainfed						

Cf – Climate, frost

Frosts occur in the Gulf Plains region, but these are usually light. However, it is likely that frost would need to be considered in site selection and the management regime for certain frost sensitive crops.

Code	Description	Suitability subclasses for various land uses			
		A	B	C	D
Cf1	frost free	1	1	1	1
Cf2	occasional frost (<2 days)	1	1	2	2
Cf3	regular light frosts (≥2 days)	2	3	2	3
		Cane_fur Cane_spray Cane_tric Cotton_fur Cotton_spray Rice_flood Maize_wet_fur Maize_wet_spr SorgGrain_wet_fur SorgGrain_wet_spr SorgGrain_dry_fur SorgGrain_dry_spr Millet_wet_fur Millet_wet_spr Sunflwr_fur Sunflwr_wet_spr Oats_dry_fur Oats_dry_spr SorgForag_wet_spr SorgForag_dry_spr Rhodes_wet_spray Lablab_wet_fur Lablab_spray Lucerne_wet_spray Chickpea_dry_fur Chickpea_dry_spr Soy_wet_fur Soy_wet_spray Mung_wet_fur Mung_wet_spr Navy_wet_fur Navy_wet_spr SwtCorn_wet_fur SwtCorn_wet_spr SwtCorn_wet_tric SwtCorn_dry_fur SwtCorn_dry_spr SwtCorn_dry_tric Cucurbit_dry_fur Cucurbit_dry_spray Cucurbit_dry_tric Peanut_wet_fur Peanut_wet_spr Sorg_rainfed Maize_rainfed Soy_rainfed Mung_rainfed	CapsChili_dry_fur CapsChili_dry_spray CapsChili_dry_tric Tomato_dry_fur Tomato_dry_spray Tomato_dry_tric Eggplant_dry_fur Eggplant_dry_tric SwtPot_wet_fur SwtPot_wet_spray Cassava_wet_fur Cassava_wet_spray	Rice_fur Pineapple_spray Pineapple_tric Lychee_tric CaribPine_irr SpotdGum_irr SpotdGum_rainfed	Cashew_tric Mango_tric Banana_spray Banana_tric Carambola_tric Citrus_tric Grape_tric Coffee_tric Avocado_tric CustApple_tric AfrMahog_irr AfrMahog_rainfed Teak_irr IndSandlWd_irr

Ct – Climate, temperature variation

Certain crops (e.g. chickpea) require cool temperatures for efficient seed set. Other crops (e.g. Cassava) show a preference for climates that do not include cool winter temperatures.

Code	Description	Suitability subclasses for various land uses				
		A	B	C	D	E
Ct1	Mean min. monthly temperature <15° for 4 months or more	1	1	1	2	3
Ct2	Mean min. monthly temperature <15° for 3 months or less	1	2	3	1	1
		Cane_fur Cane_spray Cane_tric Cotton_fur Cotton_spray Rice_flood Rice_fur Maize_wet_fur Maize_wet_spr SorgGrain_wet_fur SorgGrain_wet_spr SorgGrain_dry_fur SorgGrain_dry_spr Millet_wet_fur Millet_wet_spr Sunflwr_fur Sunflwr_wet_spr Oats_dry_fur Oats_dry_spr SorgForag_wet_spr SorgForag_dry_spr Rhodes_wet_spray Lablab_wet_fur Lablab_spray Lucerne_wet_spray Soy_wet_fur Soy_wet_spray Mung_wet_fur Mung_wet_spr Navy_wet_fur Navy_wet_spr SwtCorn_wet_fur SwtCorn_wet_spr SwtCorn_wet_tric SwtCorn_dry_fur SwtCorn_dry_spr SwtCorn_dry_tric Peanut_wet_fur Peanut_wet_spr SwtPot_wet_fur SwtPot_wet_spray Pineapple_spray Pineapple_tric CaribPine_irr Sorg_rainfed Maize_rainfed Soy_rainfed Mung_rainfed	Citrus_tric Grape_tric CustApple_tric	Chickpea_dry_fur Chickpea_dry_spr Lychee_tric	Cucurbit_dry_fur Cucurbit_dry_spray Cucurbit_dry_tric CapsChili_dry_fur CapsChili_dry_spray CapsChili_dry_tric Tomato_dry_fur Tomato_dry_spray Tomato_dry_tric Eggplant_dry_fur Eggplant_dry_tric Cashew_tric Mango_tric Banana_spray Banana_tric Carambola_tric Coffee_tric Avocado_tric AfrMahog_irr AfrMahog_rainfed SpotdGum_irr SpotdGum_rainfed	Cassava_wet_fur Cassava_wet_spray

A - Wind erosion

Sandy surfaced soils in arid areas (<500 mm annual rainfall) are vulnerable to wind erosion.

Code	Description	Suitability subclasses for various land uses A	Suitability subclasses for various land uses B
A1	No restriction: annual rainfall >= 500 mm OR surface texture not sandy	1	1
A2	Annual rainfall <500 mm AND surface texture class 1 (sandy)	2	3
A3	Annual rainfall <500 mm AND surface texture class 1 (sandy) AND Soil Gen Grp 8 (Sodosols)	3	4
		SwtCorn_wet_fur SwtCorn_wet_spr SwtCorn_wet_tric SwtCorn_dry_fur SwtCorn_dry_spr SwtCorn_dry_tric Cucurbit_dry_fur Cucurbit_dry_spray Cucurbit_dry_tric CapsChili_dry_fur CapsChili_dry_spray CapsChili_dry_tric Tomato_dry_fur Tomato_dry_spray Tomato_dry_tric Eggplant_dry_fur Eggplant_dry_tric Pineapple_spray Pineapple_tric Mango_tric Citrus_tric Coffee_tric Teak_irr IndSandlWd_irr Lychee_tric Cashew_tric Banana_spray Banana_tric Carambola_tric Grape_tric Avocado_tric CustApple_tric CaribPine_irr AfrMahog_irr AfrMahog_rain SpotdGum_irr SpotdGum_rain	Cane_fur Cane_spray Cane_tric Cotton_fur Cotton_spray Rice_flood Rice_fur Maize_wet_fur Maize_wet_spr SorgGrain_wet_fur SorgGrain_wet_spr SorgGrain_dry_fur SorgGrain_dry_spr Millet_wet_fur Millet_wet_spr Sunflwr_fur Sunflwr_wet_spr Oats_dry_fur Oats_dry_spr SorgForag_wet_spr SorgForag_dry_spr Rhodes_wet_spray Lablab_wet_fur Lablab_spray Lucerne_wet_spray Chickpea_dry_fur Chickpea_dry_spr Soy_wet_fur Soy_wet_spray Mung_wet_fur Mung_wet_spr Navy_wet_fur Navy_wet_spr Peanut_wet_fur Peanut_wet_spr SwtPot_wet_fur SwtPot_wet_spray Cassava_wet_fur Cassava_wet_spray Sorg_rainfed Maize_rainfed Soy_rainfed Mung_rainfed

M - Moisture availability, irrigated crops

Adequate water storage in the profile relates to irrigation efficiency (i.e. the frequency of water application required).(Note: rainfed tree crops are also listed in this table)

Description	**Code M1**		**Suitability subclasses for various land uses. Different soil depths apply for various crop groups.**					**Code M5**			
	PAWC to 0.5 m soil depth		PAWC to 1.0 m soil depth **Code M4**					PAWC to 1.5 m soil depth			
	Value	**A**	**Value**	**B**	**C**	**D**	**E**	**Value**	**F**	**G**	**H**
PAWC >150 mm		-	M7	1	1	1	1	M1	1	1	1
PAWC 100-150 mm	M13	1	M8	1	1	1	1	M2	1	1	1
PAWC 75-100 mm	M14	1	M9	1	2	2	2	M3	1	1	2
PAWC 60-75 mm	M15	2	M10	2	2	2	3	M4	2	3	3
PAWC 40-60 mm	M16	3	M11	3	3	3	3	M5	3	3	4
PAWC <40 mm	M17	4	M12	4	3	4	4	M6	4	4	4
		Cucurbit_dry_fur		Millet_wet_fur	SwtCorn_wet_fur	Lychee_tric	Cane_fur		Coffee_tric	SpotdGum_rain	AfrMahog_rain
		Cucurbit_dry_spray		Millet_wet_spr	SwtCorn_wet_spr	Cashew_tric	Cane_spray		Avocado_tric		
		Cucurbit_dry_tric			SwtCorn_wet_tric	Mango_tric	Cane_tric		CaribPine_irr		
		CapsChili_dry_fur			SwtCorn_dry_fur	Banana_spray	Cotton_fur		AfrMahog_irr		
		CapsChili_dry_spray			SwtCorn_dry_spr	Banana_tric	Cotton_spray		SpotdGum_irr		
		CapsChili_dry_tric			SwtCorn_dry_tric	Carambola_tric	Rice_flood		Teak_irr		
		Tomato_dry_fur				Citrus_tric	Rice_fur		IndSandlWd_irr		
		Tomato_dry_spray				Grape_tric	Maize_wet_fur				
		Tomato_dry_tric				CustApple_tric	Maize_wet_spr				
		Eggplant_dry_fur					SorgGrain_wet_fur				
		Eggplant_dry_tric					SorgGrain_wet_spr				
		Peanut_wet_fur					SorgGrain_dry_fur				
		Peanut_wet_spr					SorgGrain_dry_spr				
		SwtPot_wet_fur					Sunflwr_fur				
		SwtPot_wet_spray					Sunflwr_wet_spr				
		Cassava_wet_fur					Oats_dry_fur				
		Cassava_wet_spray					Oats_dry_spr				
		Pineapple_spray					SorgForag_wet_spr				
		Pineapple_tric					SorgForag_dry_spr				
							Rhodes_wet_spray				
							Lablab_wet_fur				
							Lablab_spray				
							Lucerne_wet_spray				
							Chickpea_dry_fur				
							Chickpea_dry_spr				
							Soy_wet_fur				
							Soy_wet_spray				
							Mung_wet_fur				
							Mung_wet_spr				
							Navy_wet_fur				
							Navy_wet_spr				

M - Moisture availability, rainfed crops

Adequate moisture storage in the soil profile is required to maintain crop growth without irrigation. Different suitability subclasses apply in each rainfall zone (A to E).
This section not included in FGARA Technical report.

Attribute description	**Suitability subclasses for various land uses in different rainfall zones**												
PAWC to 1.0 m soil depth	**A. Rainfall >1000 mm (M6)**			**B. Rainfall 800 - 1000 mm (M7)**			**C. Rainfall 600 - 800 mm (M8)**			**D. Rainfall 500 - 600 mm (M9)**		**E. Rainfall <500 mm (M10)**	
	A1	**A2**	**A3**	**B1**	**B2**	**B3**	**C1**	**C2**	**C3**	**D1**	**D2**	**E1**	**E2**
M7 - PAWC >150 mm	1	1	1	1	2	2	2	3	3	3	4	4	5
M8 - PAWC 125-150 mm	1	1	1	2	2	2	3	3	3	4	4	5	5
M9 - PAWC 100-125 mm	2	2	2	3	3	3	4	4	4	5	5	5	5
M10 - PAWC 75-100 mm	2	3	3	4	3	4	5	4	5	5	5	5	5
M11 - PAWC 50-75 mm	3	4	4	5	4	5	5	5	5	5	5	5	5
M12 - PAWC <50 mm	4	4	5	5	5	5	5	5	5	5	5	5	5
	Soybean Mungbean	Sorghum	Maize	Sorghum	Soybean	Maize	Sorghum	Soybean Mungbean	Maize	Sorghum	Maize Soybean Mungbean	Sorghum	Maize Soybean Mungbean

Mungbean

Nr - Nutrient balance, pH

Soil pH is affects the availability of nutrients for plant use. Strong acidity or alkalinity may lead to certain nutrient deficiencies and/or toxicities.

Code	Description	Suitability subclasses for various land uses					
		A		B	C	D	E
Nr1	pH 5.5-7.0	1		1	1	1	3
Nr2	pH 7.0-8.5	1		1	1	2	1
Nr3	pH <5.5	2		2	3	2	4
Nr4	pH >8.5	2		3	3	3	2
		Cane_fur	Navy_wet_fur	Peanut_wet_fur	Cotton_fur	SwtPot_wet_fur	Teak_irr
		Cane_spray	Navy_wet_spr	Peanut_wet_spr	Cotton_spray	SwtPot_wet_spray	
		Cane_tric	SwtCorn_wet_fur	Pineapple_spray		Cassava_wet_fur	
		Rice_flood	SwtCorn_wet_spr	Pineapple_tric		Cassava_wet_spray	
		Rice_fur	SwtCorn_wet_tric	Lychee_tric		Carambola_tric	
		Maize_wet_fur	SwtCorn_dry_fur	Cashew_tric			
		Maize_wet_spr	SwtCorn_dry_spr	Mango_tric			
		SorgGrain_wet_fur	SwtCorn_dry_tric	Banana_spray			
		SorgGrain_wet_spr	Cucurbit_dry_fur	Banana_tric			
		SorgGrain_dry_fur	Cucurbit_dry_spray	Citrus_tric			
		SorgGrain_dry_spr	Cucurbit_dry_tric	Grape_tric			
		Millet_wet_fur	CapsChili_dry_fur	Coffee_tric			
		Millet_wet_spr	CapsChili_dry_spray	Avocado_tric			
		Sunflwr_fur	CapsChili_dry_tric	CustApple_tric			
		Sunflwr_wet_spr	Tomato_dry_fur				
		Oats_dry_fur	Tomato_dry_spray				
		Oats_dry_spr	Tomato_dry_tric				
		SorgForag_wet_spr	Eggplant_dry_fur				
		SorgForag_dry_spr	Eggplant_dry_tric				
		Rhodes_wet_spray	CaribPine_irr				
		Lablab_wet_fur	AfrMahog_irr				
		Lablab_spray	AfrMahog_rainfed				
		Lucerne_wet_spray	SpotdGum_irr				
		Chickpea_dry_fur	SpotdGum_rainfed				
		Chickpea_dry_spr	IndSandlWd_irr				
		Soy_wet_fur	Sorg_rainfed				
		Soy_wet_spray	Maize_rainfed				
		Mung_wet_fur	Soy_rainfed				
		Mung_wet_spr	Mung_rainfed				

P - Physical restrictions (part one)

The physical condition of soil affects a range of cropping activities such as the timing of cultivation and the harvesting of root crops.

Code	Description	Suitability subclasses for various land uses						
		A	B	C	D	E	F	G
Ps1	No restriction: surface condition class 2	1	1	1	1	1	1	1
Ps2	Firm/hardsetting - light texture: surface condition 3; surface texture 1 or 2	1	1	1	1	1	1	1
Ps3	Firm/hardsetting - heavy texture: surface condition 3 or 4; surface texture 4	1	1	1	1	1	2	2
Ps4	Cracking clay soils - fine structure: surface condition 1; soil stucture 3	3	3	3	4	4	2	2
Ps5	Cracking clay soils - coarse structure: surface condition 1; soil stucture 4	3	3	3	4	4	2	3
Ps6	ESP ≥6 or Hardsetting - silty: surface condition 3; surface texture 3	3	3	4	3	4	3	3
Ps7	Depth of A horizon <=0.2 m AND Generic soil group 8 (Sodic/intractable clay B horizons)	3	4	3	3	3	3	3
		CaribPine_irr AfrMahog_irr	Teak_irr IndSandlWd_irr	AfrMahog_rainfed	SpotdGum_irr	SpotdGum_rainfed	Cane_fur Cane_tric Cotton_fur Rice_flood Rice_fur	Maize_wet_fur SorgGrain_wet_fur SorgGrain_dry_fur Millet_wet_fur Sunflwr_fur Oats_dry_fur Lablab_wet_fur Chickpea_dry_fur Soy_wet_fur Mung_wet_fur Navy_wet_fur SwtCorn_wet_fur SwtCorn_wet_tric SwtCorn_dry_fur SwtCorn_dry_spr SwtCorn_dry_tric Cucurbit_dry_fur Cucurbit_dry_spray Cucurbit_dry_tric CapsChili_dry_fur CapsChili_dry_spray CapsChili_dry_tric Tomato_dry_fur Tomato_dry_spray Tomato_dry_tric Eggplant_dry_fur Eggplant_dry_tric

P - Physical restrictions (part two)

The physical condition of soil affects a range of cropping activities such as the timing of cultivation and the harvesting of root crops.

Code	Description	Suitability subclasses for land uses							
		H	I	J	K	L	M	N	O
Ps1	No restriction: surface condition loose	1	1	1	1	1	1	1	1
Ps2	Surface condition firm/hardsetting and light textures of sands and loams	1	1	1	1	1	2	2	2
Ps3	Surface condition firm/hardsetting and heavy texture of clay	2	2	3	3	4	2	2	3
Ps4	Cracking clay soils with fine structure	2	2	3	4	4	2	3	3
Ps5	Cracking clay soils with coarse structure	3	3	4	4	4	3	3	3
Ps6	ESP ≥6 or surface condition firm/hardsetting and silty surface texture	3	4	4	4	4	3	3	3
Ps7	Depth of A horizon <=0.2 m AND the Soil Generic Group – "Sand or loam over intractable clay subsoils"	4	4	5	5	5	3	3	4
		SwtCorn_wet_spr	Cane_spray Cotton_spray Maize_wet_spr SorgGrain_wet_spr SorgGrain_dry_spr Millet_wet_spr Sunflwr_wet_spr Oats_dry_spr SorgForag_wet_spr SorgForag_dry_spr Rhodes_wet_spray Lablab_spray Lucerne_wet_spray Chickpea_dry_spr Soy_wet_spray Mung_wet_spr Navy_wet_spr Sorg_rainfed Maize_rainfed Soy_rainfed Mung_rainfed	Peanut_wet_fur Peanut_wet_spr	SwtPot_wet_fur SwtPot_wet_spr	Cassava_wet_fur Cassava_wet_spr	Pineapple_spr Pineapple_tric Banana_spr Banana_tric	Lychee_tric Cashew_tric Mango_tric Carambola_tric Citrus_tric Citrus_tric Grape_tric	Coffee_tric Avocado_tric CustApple_tric

Pd - Soil depth

The soil depth limitation generally relates to the requirement for physical support for the plant. Additional soil depth is required to fulfil the requirements for certain crops e.g. avocado. Additional soil depth is required for efficient harvesting of root crops.

Code	Description	Suitability subclasses for various land uses							
		A	B	C	D	E	F	G	H
Pd1	Very deep (>=1.5 m)	1	1	1	1	1	1	1	1
Pd2	Deep (1.0-<1.5)	1	1	1	1	1	1	1	2
Pd3	Moderate (0.5-<1.0 m)	1	1	1	2	2	2	3	4
Pd4	Shallow (0.25-<0.5 m)	2	3	4	2	3	4	4	4
Pd5	Very shallow (< 0.25 m)	4	4	5	4	4	5	5	5
		Cane_fur	Cotton_fur	Peanut_wet_fur	SwtCorn_dry_fur	SorgGrainfed_dry_fur	Rice_flood	Lychee_tric	Coffee_tric
		Cane_spray	Cotton_spray	Peanut_wet_spr	SwtCorn_dry_spr	SorgGrainfed_dry_spr	Rice_fur	Cashew_tric	Avocado_tric
		Cane_tric	SorgForag_wet_spr	SwtPot_wet_fur	SwtCorn_dry_tric	Oats_dry_fur	Maize_wet_fur	Mango_tric	
		Millet_wet_fur	SorgForag_dry_spr	SwtPot_wet_spray		Oats_dry_spr	Maize_wet_spr	Banana_spray	
		Millet_wet_spr	Rhodes_wet_spray	Cassava_wet_fur		Chickpea_dry_fur	SorgGrainfed_wet_fur	Banana_tric	
		Cucurbit_dry_fur	Lablab_spray	Cassava_wet_spray		Chickpea_dry_spr	SorgGrainfed_wet_spr	Carambola_tric	
		Cucurbit_dry_spray	Lucerne_wet_spray			SwtCorn_wet_fur	Sunflwr_fur	Grape_tric	
		Cucurbit_dry_tric				SwtCorn_wet_spr	Sunflwr_wet_spr	CustApple_tric	
		CapsChili_dry_fur				SwtCorn_wet_tric	Lablab_wet_fur	AfrMahog_irr	
		CapsChili_dry_spray				Pineapple_spray	Soy_wet_fur	AfrMahog_rainfed	
		CapsChili_dry_tric				Pineapple_tric	Soy_wet_spray	Teak_irr	
		Tomato_dry_fur					Mung_wet_fur		
		Tomato_dry_spray					Mung_wet_spr		
		Tomato_dry_tric					Navy_wet_fur		
		Eggplant_dry_fur					Navy_wet_spr		
		Eggplant_dry_tric					Citrus_tric IndSandlWd_irr		
							SpotdGum_irr CaribPine_irr		
							SpotdGum_rainfed		
							Sorg_rainfed		
							Maize_rainfed		
							Soy_rainfed		
							Mung_rainfed		

E - Water erosion (part one)

Soil loss from water erosion needs to be minimised. Suitability subclasses were also determined for 'very stable' soils (K-factor <0.02), but using the digital soil mapping techniques, none of these soils were predicted to occur.

Code	Description	Suitability subclasses for various land uses						
		A	B	C	D	E	F	G
E11	Stable soils: K factor 0.02-0.04 and slope <0.5%	1	1	1	1	1	1	1
E12	Stable soils: K factor 0.02-0.04 and slope 0.5-1.0%	1	1	1	2	2	2	2
E13	Stable soils: K factor 0.02-0.04 and slope 1-2%	1	1	1	3	2	3	3
E14	Stable soils: K factor 0.02-0.04 and slope 2-3%	1	1	1	3	2	3	3
E15	Stable soils: K factor 0.02-0.04 and slope 3-5%	1	2	2	3	3	3	4
E16	Stable soils: K factor 0.02-0.04 and slope 5-8%	2	2	3	3	3	4	4
E17	Stable soils: K factor 0.02-0.04 and slope 8-12%	3	3	4	4	4	4	5
E18	Stable soils: K factor 0.02-0.04 and slope 12-15%	3	3	4	4	4	5	5
E19	Stable soils: K factor 0.02-0.04 and slope 15-20%	3	4	5	5	5	5	5
E20	Stable soils: K factor 0.02-0.04 and slope >20%	4	5	5	5	5	5	5
E21	Unstable soils: K factor 0.04-0.06 and slope <0.5%	1	1	1	2	2	2	2
E22	Unstable soils: K factor 0.04-0.06 and slope 0.5-1.0%	1	1	1	3	3	3	3
E23	Unstable soils: K factor 0.04-0.06 and slope 1-2%	1	1	1	3	3	3	3
E24	Unstable soils: K factor 0.04-0.06 and slope 2-3%	2	2	2	3	3	3	4
E25	Unstable soils: K factor 0.04-0.06 and slope 3-5%	2	2	3	3	4	4	4
E26	Unstable soils: K factor 0.04-0.06 and slope 5-8%	3	3	4	4	4	4	5
E27	Unstable soils: K factor 0.04-0.06 and slope 8-12%	3	3	4	4	5	5	5
E28	Unstable soils: K factor 0.04-0.06 and slope 12-15%	3	4	5	5	5	5	5
E29	Unstable soils: K factor 0.04-0.06 and slope 15-20%	4	5	5	5	5	5	5
E30	Unstable soils: K factor 0.04-0.06 and slope >20%	5	5	5	5	5	5	5
E31	Very unstable soils: K factor >0.06 and slope <0.5%	1	1	1	2	2	2	2
E32	Very unstable soils: K factor >0.06 and slope 0.5-1.0%	2	2	2	3	3	3	3
E33	Very unstable soils: K factor >0.06 and slope 1-2%	2	2	2	3	3	3	3
E34	Very unstable soils: K factor >0.06 and slope 2-3%	2	2	3	3	3	3	4
E35	Very unstable soils: K factor >0.06 and slope 3-5%	3	2	4	3	4	4	4
E36	Very unstable soils: K factor >0.06 and slope 5-8%	3	3	4	4	5	5	5
E37	Very unstable soils: K factor >0.06 and slope 8-12%	4	4	5	5	5	5	5
E38	Very unstable soils: K factor >0.06 and slope 12-15%	4	4	5	5	5	5	5
E39	Very unstable soils: K factor >0.06 and slope 15-20%	5	5	5	5	5	5	5
E40	Very unstable soils: K factor >0.06 and slope >20%	5	5	5	5	5	5	5
		CaribPine_irr AfrMahog_irr AfrMahog_rain SpotdGum_irr SpotdGum_rain Teak_irr IndSandlWd_irr	Lychee_tric Cashew_tric Mango_tric Banana_tric Carambola_tric Citrus_tric Grape_tric Coffee_tric Avocado_tric CustApple_tric	Banana_spray	Cane_spray Cane_tric	Oats_spray_dry Chickpea_spray_dry	Cotton_spray Maize_spray Sorghum_spray Millet_spray Sunflwr_spray SorghumForg_spray Rhodes_spray Lablab_spray Lucerne_spray Soy_spray Mung_spray Navy_spray Sorghumrainfed Maize_rainfed Soy_rainfed Mung_rainfed	Cane_fur Rice_fur

E - Water erosion (part two)

Minimise land degradation due to soil erosion by water. Suitability subclasses were also determined for ‘very stable’ soils (K-factor <0.02), but using the digital soil mapping techniques, none of these soils were predicted to occur.

Code	Description	Suitability subclasses for various land uses						
		H	I	J	K	L	M	N
E11	Stable soils: K factor 0.02-0.04 and slope <0.5%	1	1	1	1	1	1	1
E12	Stable soils: K factor 0.02-0.04 and slope 0.5-1.0%	2	2	2	2	2	2	2
E13	Stable soils: K factor 0.02-0.04 and slope 1-2%	3	3	2	2	2	2	2
E14	Stable soils: K factor 0.02-0.04 and slope 2-3%	3	4	3	3	3	3	3
E15	Stable soils: K factor 0.02-0.04 and slope 3-5%	4	4	3	3	3	3	4
E16	Stable soils: K factor 0.02-0.04 and slope 5-8%	4	4	3	3	4	4	4
E17	Stable soils: K factor 0.02-0.04 and slope 8-12%	5	5	4	4	4	4	5
E18	Stable soils: K factor 0.02-0.04 and slope 12-15%	5	5	4	5	5	5	5
E19	Stable soils: K factor 0.02-0.04 and slope 15-20%	5	5	5	5	5	5	5
E20	Stable soils: K factor 0.02-0.04 and slope >20%	5	5	5	5	5	5	5
E21	Unstable soils: K factor 0.04-0.06 and slope <0.5%	2	2	2	2	2	2	2
E22	Unstable soils: K factor 0.04-0.06 and slope 0.5-1.0%	3	3	2	2	2	2	2
E23	Unstable soils: K factor 0.04-0.06 and slope 1-2%	3	3	2	3	2	2	2
E24	Unstable soils: K factor 0.04-0.06 and slope 2-3%	4	4	2	3	3	3	4
E25	Unstable soils: K factor 0.04-0.06 and slope 3-5%	4	4	3	3	4	4	4
E26	Unstable soils: K factor 0.04-0.06 and slope 5-8%	5	5	4	4	4	4	5
E27	Unstable soils: K factor 0.04-0.06 and slope 8-12%	5	5	4	5	5	5	5
E28	Unstable soils: K factor 0.04-0.06 and slope 12-15%	5	5	5	5	5	5	5
E29	Unstable soils: K factor 0.04-0.06 and slope 15-20%	5	5	5	5	5	5	5
E30	Unstable soils: K factor 0.04-0.06 and slope >20%	5	5	5	5	5	5	5
E31	Very unstable soils: K factor >0.06 and slope <0.5%	2	2	2	2	2	2	2
E32	Very unstable soils: K factor >0.06 and slope 0.5-1.0%	3	3	2	2	3	2	3
E33	Very unstable soils: K factor >0.06 and slope 1-2%	3	3	3	3	3	3	3
E34	Very unstable soils: K factor >0.06 and slope 2-3%	4	4	3	3	3	4	4
E35	Very unstable soils: K factor >0.06 and slope 3-5%	5	4	4	4	4	5	5
E36	Very unstable soils: K factor >0.06 and slope 5-8%	5	5	5	5	5	5	5
E37	Very unstable soils: K factor >0.06 and slope 8-12%	5	5	5	5	5	5	5
E38	Very unstable soils: K factor >0.06 and slope 12-15%	5	5	5	5	5	5	5
E39	Very unstable soils: K factor >0.06 and slope 15-20%	5	5	5	5	5	5	5
E40	Very unstable soils: K factor >0.06 and slope >20%	5	5	5	5	5	5	5
		Cotton_fur Maize_fur Sorghum_fur Millet_fur Sunflwr_fur Oats_fur_dry Lablab_fur Chickpea_fur_dry Soy_fur Mung_fur Navy_fur	Rice_flood	SwtCorn_tric_wet SwtCorn_tric_dry Cucurbit_tric CapsChili_tric Tomato_tric Eggplant_tric Pineapple_tric	SwtCorn_spray_wet SwtCorn_spray_dry Cucurbit_spray CapsChili_spray Tomato_spray Pineapple_spray	Peanut_spray SwtPot_spray Cassava_spray	SwtCorn_fur_wet SwtCorn_fur_dry Cucurbit_fur CapsChili_fur Tomato_fur Eggplant_fur	Peanut_fur SwtPot_fur Cassava_fur

W - Wetness (part one)

Adequate soil aeration is required for plant growth. Crops grown entirely in the dry season (e.g. all intensive horticulture crops, oats, chickpeas) are less affected by this limitation as they will not generally experience very wet conditions.

Code	Description	Suitability subclasses for various land uses											
		A	B	C	C	D	E	F	G	H	I	J	K
W1	Rapidly drained - Drainage class 6	1	1	1	1	1	1	1	1	1	1	1	1
W2	Well drained - Drainage class 5, permeability class 4	1	1	1	1	1	1	1	1	1	1	1	1
W3	Well drained - Drainage class 5, permeability class 3	1	1	1	1	1	1	1	1	1	1	1	2
W4	Well drained - Drainage class 5, permeability class 2	1	1	1	1	1	1	1	1	1	1	2	2
W5	Well drained - Drainage class 5, permeability class 1	2	2	2	2	3	3	3	3	3	3	4	3
W6	Moderately well-drained - Drainage class 4, permeability class 4	1	1	1	1	1	1	1	2	2	3	3	2
W7	Moderately well-drained - Drainage class 4, permeability class 3	1	1	2	1	1	1	2	3	3	3	3	2
W8	Moderately well-drained - Drainage class 4, permeability class 2	2	2	3	2	2	2	3	3	3	3	4	3
W9	Moderately well-drained - Drainage class 4, permeability class 1	3	3	3	4	3	4	4	3	4	4	4	4
W10	Imperfectly drained - Drainage class 3, permeability class 4	2	2	3	4	2	4	4	3	4	4	4	4
W11	Imperfectly drained - Drainage class 3, permeability class 3	3	3	3	4	3	4	4	3	4	4	4	4
W12	Imperfectly drained - Drainage class 3, permeability class 2	3	4	4	4	4	4	4	4	4	4	5	5
W13	Imperfectly drained - Drainage class 3, permeability class 1	4	4	4	4	4	4	5	4	4	5	5	5
W14	Poorly drained - Drainage class 2, permeability class 3 or 4	4	4	5	4	5	5	5	5	5	5	5	5
W15	Poorly drained - Drainage class 2, permeability class 1 or 2	4	5	5	5	5	5	5	5	5	5	5	5
W16	Very poorly drained - Drainage class 1	5	5	5	5	5	5	5	5	5	5	5	5
		AfrMahog_irrig AfrMahog_rainfed	CaribPine_irrig SpotdGum_irrig SpotdGum_rainfed Sorghum_rainfed	Maize-rainfed Soy_rainfed Mung_rainfed	Teak_irr IndSandlWd_irr	Pineapple_spray Pineapple_tric	Banana_spray	Carambola_tric Citrus_tric	Lychee_tric Cashew_tric Mango_tric	Banana_tric	Grape_tric	Coffee_tric Avocado_tric CustApple_tric	SwtPot_wet_fur SwtPot_wet_spray

W - Wetness (part two)

Adequate soil aeration is required for plant growth. Crops grown entirely in the dry season (e.g. all intensive horticulture crops, oats, chickpeas) are less affected by this limitation as they will not generally experience very wet conditions.

Code	Description	Suitability subclasses for various land uses									
		L	M	N	O	P	Q	R	S	T	U
W1	Rapidly drained - Drainage class 6	1	1	1	1	1	1	1	1	1	1
W2	Well drained - Drainage class 5, permeability class 4	1	1	1	1	1	1	1	1	1	1
W3	Well drained - Drainage class 5, permeability class 3	2	2	2	2	2	2	2	2	2	2
W4	Well drained - Drainage class 5, permeability class 2	2	2	2	2	2	2	2	2	2	2
W5	Well drained - Drainage class 5, permeability class 1	3	3	3	3	3	3	3	3	3	3
W6	Moderately well-drained - Drainage class 4, permeability class 4	2	2	2	2	2	2	2	2	2	2
W7	Moderately well-drained - Drainage class 4, permeability class 3	3	2	2	2	2	2	2	2	2	2
W8	Moderately well-drained - Drainage class 4, permeability class 2	3	3	3	3	3	3	3	3	3	3
W9	Moderately well-drained - Drainage class 4, permeability class 1	4	3	3	3	3	3	3	3	4	4
W10	Imperfectly drained - Drainage class 3, permeability class 4	4	2	2	2	2	2	3	3	3	3
W11	Imperfectly drained - Drainage class 3, permeability class 3	4	2	2	2	2	3	3	3	3	4
W12	Imperfectly drained - Drainage class 3, permeability class 2	5	3	3	3	3	3	4	3	4	4
W13	Imperfectly drained - Drainage class 3, permeability class 1	5	3	4	4	3	4	4	3	4	4
W14	Poorly drained - Drainage class 2, permeability class 3 or 4	5	3	3	4	3	4	4	3	4	4
W15	Poorly drained - Drainage class 2, permeability class 1 or 2	5	4	4	4	4	5	5	4	5	5
W16	Very poorly drained - Drainage class 1	5	5	5	5	5	5	5	5	5	5
		Peanut_wet_furrow Peanut_wet_spray Cassava_wet_furrow Cassava_wet_spray	Cucurbit_dry_fur Cucurbit_dry_spray Cucurbit_dry_tric CapsChili_dry_fur CapsChili_dry_spray CapsChili_dry_tric Tomato_dry_fur Tomato_dry_spray Tomato_dry_tric Eggplant_dry_fur Eggplant_dry_tric	Cane_fur Cane_spray Cane_tric	Cotton_furrow Cotton_spray	SorgGrain_dry_furrow SorgGrain_dry_spray Oats_dry_fur Oats_dry_spr SorgForag_dry_spray Chickpea_dry_furro Chickpea_dry_spray SwtCorn_dry_furrow SwtCorn_dry_spray	Sorg_forag_wet_spr Rhodes_wet_spray Lablab_wet_fur Lablab_spray SwtCorn_wet_fur SwtCorn_wet_spr SwtCorn_wet_tric	Maize_wet_fur Maize_wet_spr SorgGrain_wet_fur SorgGrain_wet_spr Sunflwr_fur Sunflwr_wet_spr Lucerne_wet_spray Soy_wet_fur Soy_wet_spray Soy_rainfed Sorghum_rainfed Maize_rainfed	Rice_flood Rice_fur	Mung_wet_fur Mung_wet_spr Mung_rainfed Navy_wet_fur Navy_wet_spr	Millet_wet_furrow Millet_wet_spray

SwtCorn_dry_tric

R – Rockiness, all crops

Surface rockiness affects machinery and harvesting operations

Code	Description	Suitability subclass
R1	Not rocky or not significantly rocky	1
R2	Rocky	4

Tm - Gilgai microrelief, all crops

Severe gilgai microrelief affects machinery use and irrigation efficiency.

Code	Description	Suitability subclass
Tm1	No gilgai or vertical interval <0.3 m	1
Tm2	Vertical interval >0.3 m	4

If - Irrigation efficiency, all furrow irrigated crops

Applied water must match soil infiltration characteristics to minimise water loss and deep drainage. Waterlogging may also be a problem at the upper end of furrows if they are too long.

Code	Description	Suitability subclass
If1	Very slowly permeable – permeability class 1	1
If2	Slowly permeable – permeability class 2	3
If3	Moderately permeable – permeability class 3	4
If4	Highly permeable – permeability class 4	5

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