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Resource Management

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QUEENSLAND GOVERNMENT

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Summary

A 1:50 000 land resource survey and irrigated land suitability evaluation has been completed over 123 315 ha of the Bundaberg Area, Queensland. The survey was conducted primarily to improve the land resource information available for regional and catchment planning purposes. State and Local Government Departments, the sugar and horticultural industries, community groups, educational facilities, rural business and individual property owners will benefit from the information collected.

Eighty soils were identified within five landform patterns based on difference in geomorphology or geology. A total of 2 954 individual mapping units (UMAs) coded with the major soil of that unit are shown in the two accompanying soils maps of the North and South sections. A brief description of the soils of the mapping units as well as variants, phases and miscellaneous units are shown on the map reference. Miscellaneous units including urban areas, wetlands, dams and watercourses, quarries and aquaculture occupy 13 579 ha.

Podosols are the major soils on the coastal plains which occupy about 1491 ha. Associated soils include Tenosols and Sodosols. These soils have sandy surfaces and are infertile.

The alluvial plains of the Burnett and Kolan River occupy about 16 196 ha of which 10 062 ha consists of older alluvia and the remainder on more recent alluvia. Sodosols and Vertosols are the major soils of the older alluvia, while Dermosols and Rudosols are common on the more recent deposition. Sodosols and minor Kandosols occupy 2278 ha of the alluvial plains of the local streams. The soils of the recent alluvia are fertile and have low sodicity and salt levels while the soils of the older alluvia generally have lower fertility with high salt and sodium levels at depth. The Sodosols of the alluvial plains of the local streams have low fertility levels with low to medium levels of salinity and strongly sodic properties at depth.

The marine plains, situated near the coast between the Burnett and Kolan Rivers, occupy 7333 ha. Hydrosols and Tenosols are the major soils on these plains. Acid sulphate soils are present in this area. The sandy soils on the beach ridges of the marine plains have low salt and sodicity levels. The major soils of the plains and swales of the marine plains are very strongly acid with high exchangeable aluminium reflecting the oxidisation of pyrite which is often found at depth in these profiles.

The sedimentary rocks of the area have been divided into coarse grained and fine grained deeply weathered rocks which have been separated from the moderately weathered sedimentary rocks. Kandosols and Dermosols are the main soils of the plains, and upper and mid slopes of the rises of the sedimentary rocks with 15 032 ha formed from the coarse grained rocks and 18 969 ha from the fine grained rocks. The soils of the deeply weathered sedimentary rocks have low nutrient levels in the virgin state. Generally the well drained soils on the upper and mid slopes have low salinity and sodicity levels.

About 11 483 ha of Hydrosols and Podosols occur on the lower slopes and drainage depressions of the rises and plains on the coarse grained deeply weathered sedimentary rocks with about 5249 ha, mainly Hydrosols, occupying similar positions on the fine grained rocks. These soils are usually sodic at depth often with high salt levels. The poorly drained soils are usually magnesic at depth.

A total of 3 869 ha occupy areas of greater relief on the deeply weathered fine grained sedimentary rocks and about 16 113 ha on the moderately weathered rocks. Sodosols and Kurosols are the major soils developed on these rises and low hills. The soils of the moderately weathered rocks are generally more fertile than those of the deeply weathered rocks. Sodicity levels are often high associated with high salt levels.

The rises and low hills on basic volcanic rocks, mainly Tertiary Basalt in the south-west corner of the

north section of the study area occupy about 1558 ha. Major soils are Vertosols, Dermosols and Ferrosols. Ferrosols and Vertosols, occupying 10 190 ha, are the major soils found on the rises and plains of the Quaternary Basalt in the southern section. The soils on basic volcanic rocks are usually medium to high in nutrients although phosphorus may be low in some of the clay soils. The deeply weathered soils have low salt and sodicity levels. Medium to high salt levels associated with sodic to strongly sodic properties may occur in the subsoils of the soils developed on fresh basalt especially in the deeper cracking clays.

Land suitability, using a five class system, was assessed for 26 irrigated land uses for each UMA. The area and land suitability for five of the land uses including sugarcane, macadamia, cucurbits (pumpkin, cucumber, melon), vegetables (tomato, capsicum) and peanuts for each UMA is given in the report. Other information is available on request from Department of Natural Resources, Bundaberg. About 63 000 ha are assessed as being suitable (Class 1-3) for sugarcane, 25 000 ha for macadamia, 56 100 ha for cucurbits, 56 100 ha for vegetables and 28 000 ha for peanuts.

To assist Local Government and State Government departments in developing strategic plans for the area, the study area was classified into four agricultural land classes. A total of 72 993 ha is class A land, 16 007 ha class B land, 1134 ha class C land and 33 098 ha has been assessed as class D land.

The major soil and land limitations affecting the land uses have been identified and management remarks to decrease the effects of these limitations are outlined for the 24 broad soil management groups identified.

Ninety four UMAs are affected by salinity but currently less than 1000 ha are severely affected. A similar area over 92 UMAs is presently affected by moderate to severe erosion.

Introduction

The information collected during a land resource survey of 123 315 ha land in the Bundaberg area will provide information to a range of clients. This information is essential to improve the sustainable use of land resources of the area. Major objectives of the project were to:

- undertake a land resource survey at 1:50 000 scale over the Bundaberg and Kolan 1:50 000 sheets
- assess the limitations and suitability of the land for a range of land uses
- provide appropriate interpreted data to a range of clients.

The information collected from the survey will:

- identify Good Quality Agricultural Land (GQAL) and provide other land resource information to assist Local Government in developing strategic plans for the shires of the area;
- provide an appropriate planning base for the expansion of the sugarcane, horticultural and other rural industries;
- assist in the Regional Planning and Integrated Catchment Management processes;
- provide a base for the development of better irrigation management and sustainable farming systems;
- enhance the information available for the property management planning process; and
- provide useful soils information, land suitability and management requirements for landholders to address existing and current land use issues.

The project was initiated due to a lack of appropriate land resource information in the district. A reconnaissance soil map for the Bundaberg Irrigation Area (BIA) (van Wijk and Crack, 1972), the Atlas of Australian Soils (Isbell *et al.,* 1967) and the Coastal Burnett Land Management Manual (Glanville *et al.,* 1991) are the only regional soils information available. This information is of too broad a scale or lacks information of suitable detail to be used for agricultural suitability assessment and to address current land use issues.

A summary of the resources of the area, suitability for irrigated crops, limitations to agricultural production and management considerations are outlined. This report should be used in conjunction with the published soils and suitability maps.

For map production, the Bundaberg area was divided into two sections: North Section, covering the area north of the Burnett River to west of the Kolan area; and South Section covering south of the Burnett River and adjoining the Childers Survey Area (Wilson, 1997) (Figure 1).

The land resource information is available in both electronic format (Geographical Information System, GIS), printed maps and this report. GIS packages such as MapInfo or Arcview can be used to interrogate the digital data to obtain information to assist in resolving a range of land resource issues. Hard copies of a range of products such as soils maps, suitability maps for the 26 different land uses as described in Table 7, and an Agricultural Land Class map are available from the Department of Natural Resources in Bundaberg. Specific maps depicting various soil and land attributes and limitations are also able to be produced on request.

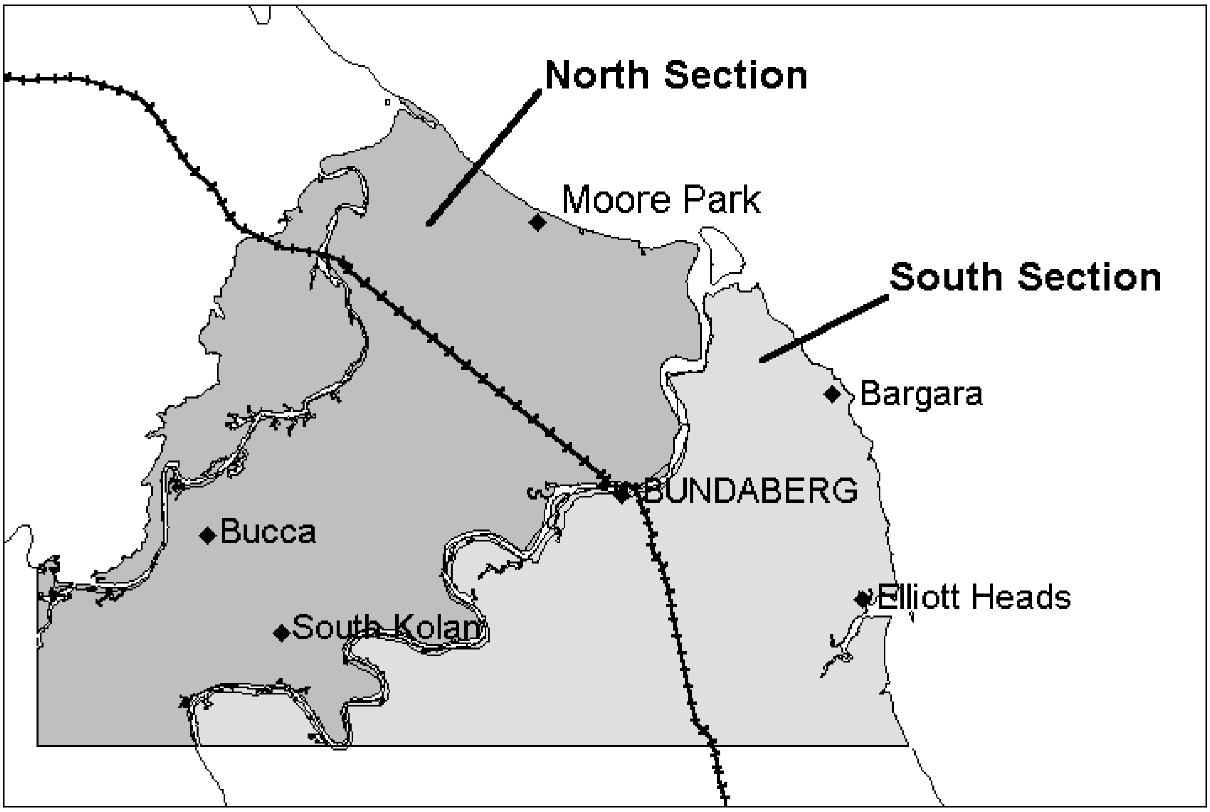

Figure 1. Locality map of the North and South sections of the Bundaberg land resource survey.

Survey methodology

Wilson (1997) developed soil profile classes (SPCs) as a mapping base for the Childers 1:100 000 land resource survey. An SPC may be defined as a three dimensional soil body such that any profile within the body has a similar number and arrangements of horizons whose attributes are within a defined range. As the geology and geomorphology of the Bundaberg and Childers areas are similar, the SPCs developed for the Childers survey were also used in this survey. Thirty two additional SPCs were developed during the mapping phase to accommodate those soils from landforms not present in the Childers area and to account for the much greater density of observations carried out in this more detailed survey (1:50 000). A total of 80 SPCs were identified in the whole study area with 65 occurring in the northern section and 58 in the southern section. The SPCs were given a name which usually corresponded with a locality name from where the SPC was first described. Throughout this report the names of the SPCs are in italics for ease of identification.

Mapping was done at a medium intensity (1:50 000) by free survey (Reid, 1988). Preliminary soil and landscape boundaries were identified on 1:25 000 scale coloured aerial photographs. Sites were described in the field to identify the soils and verify soil boundaries. At each site a soil profile to a depth of 1.5 m or shallower if hard layers were encountered, was described and land attributes such as slope, gilgai, amount of stone, vegetation and current land use recorded. The terminology and codes of McDonald *et al.* (1990) were used for this description. Each site described was allocated to a SPC. Variants of the SPCs were used to distinguish soils which were similar to an existing SPC but differed in one or more soil attributes. Boundaries on the aerial photographs were closed after field checking and after completing aerial photograph interpretation. Site locations and their descriptions were recorded on computer database.

Mapping units (Beckett and Webster, 1971) were named after the major SPC found in each unit where that SPC occupied more than 60–70% of the area. Complex areas where single soil profile classes could not be mapped at the 1:50 000 scale were named after the two most commonly occurring SPCs in that unit. Phases were used to separate those areas in which land use or management would be affected due to the presence of certain land properties not normally present in areas with the normal SPC, for instance, rocky phase indicates the presence of surface rock and stone. Each occurrence of a mapping unit was named a unique map area or UMA (after Basinski, 1978). Each UMA was given a number. A number of miscellaneous units such as Water, Urban areas, Wetlands, Quarries, Aquaculture and Other units were also identified.

The dominance of the major SPC and the range of associated SPCs vary among the UMAs. An estimate of the percentage occurrence of SPCs, as well as land use, soil and land attributes, limitations to production, land suitability for a range of crops, size of UMA and other information for the UMA are stored on a computer database.

The UMA boundaries were transferred from the aerial photos to the Geographical Information System (GIS). The UMA database was then attached to the GIS. This linkage allows for rapid data manipulation and provides flexibility in the presentation of information such as maps, tables and specific queries for a wide range of uses. For simplicity, the SPCs are referred to as soils in the remainder of this report.

Resources of the area

Climate

The climate of the Bundaberg area may be described as subtropical with long hot summers and mild winters. January is usually the hottest month of the year with an average of 18 days with temperature >30°C while July is the coolest. The mean maximum monthly temperatures vary from 30.1°C in January to 21.8° in July. Although the Bundaberg climate station is free of frosts, frosts occur on the alluvial plains as well as on lower lying areas on the rises, especially towards the southern and western boundaries of the study area. The mean minimum temperatures range from 21.6°C in January to 10.5°C in July. The mean maximum and minimum monthly temperatures for Bundaberg obtained from Australian Rainman (Clewett *et al.*, 1994) are shown in Table 1.

Mean monthly evaporation varies from 5.3 mm/day in January and December to 2.8 mm/day in July. These figures from Australian Rainman have been calculated from temperature records using the Fitzpatrick (1963) equation. These figures are also shown in Table 1.

Annual average rainfall for Bundaberg is 1117 mm with about 56 percent falling between December and March. Generally, rainfall decreases slightly towards the south-west with Bingera having an annual rainfall of about 1000 mm, although records for this station are shorter than those for Bundaberg. Rainfall variability is high with the standard deviation for the month often being similar to the monthly mean. The highest recorded annual rainfall is 2362 mm and the lowest 340 mm. The statistical summary of the rainfall for the Bundaberg station from Australian Rainman (Clewett *et al.*, 1994) is shown in Table 2.

Table 1. The mean maximum and minimum monthly temperatures for the Bundaberg climate station

	Jan	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Mean maximum temperature ºC	30.1	29.9	29.1	27.5	24.7	22.4	21.8	23.2	25.2	26.9	28.3	29.6
Mean minimum temperature ºC	21.6	21.5	20.4	18.0	14.9	12.0	10.5	11.5	14.0	17.0	19.3	20.8
Pan evaporation mm/day	5.3	4.6	3.9	3.4	2.9	2.8	3.1	3.7	4.2	4.6	5.1	5.3

Table 2. Statistical summary of rainfall for the Bundaberg climate station

	Jan	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Total**
Mean (mm)	196	171	136	83	73	62	51	33	37	63	83	127	**1117**
Median (mm)	140	124	108	56	52	36	27	26	25	48	67	96	**1042**
Std. Dev. (mm)	178	156	109	74	67	78	69	30	41	53	68	97	**371**
Lowest rain (mm)	4	3	2	0	0	0	0	0	0	1	2	0	**340**
Highest rain (mm)	1162	816	519	346	397	499	466	142	277	281	354	490	**2362**
Mean raindays	12	12	12	8	8	6	5	5	5	7	8	9	**97**
No of years	116	116	116	116	116	116	116	116	116	116	115	115	**115**

Irrigation water sources

As the average rainfall for Bundaberg is about 1100 mm and is extremely variable, irrigation is necessary for viable crop yields.

The expansion of the sugarcane industry in the area in the 1960s combined with the droughts of 1964, 1965 and 1969 increased the demand on the small sub-artesian water resource that was used for irrigation purposes at that time. This increased demand lowered the aquifer reserves and in some areas salinity levels increased due to salt water intrusion. To address this problem the Queensland government in 1970, proposed to augment the water available for irrigation by constructing a number of water storage facilities. The provision of surface water for irrigation was designed to restrict the total use of underground water to the estimated safe annual yield of the groundwater supply. The Bundaberg Irrigation Area (BIA) was therefore established and covers over 57 500 ha in the Bundaberg-Childers-Gin Gin area and covers both surface and groundwater allocation areas.

The main water storage facility is the Fred Haigh Dam on the Kolan River which was completed in 1975. The Kolan and Ben Anderson Barrages, Bucca Weir, Bingera Weir and the recently completed Walla Weir are additional storages within the area. Surface water is conveyed via a series of channels and pipes to appropriate irrigation outlets. Areas adjacent to the Kolan and Burnett Rivers are irrigated directly from these streams. The full surface water allocation from these sources is about 187 000 megalitres.

Groundwater areas are located east of the Elliott River in the Calavos-Alloway area in the south section as well as in the area east of the Gooburrum Road towards Moore Park in the north section. The full groundwater allocation is about 65 500 megalitres.

Geomorphology and geology

Parent material, weathering, erosion and deposition, hydrology and geomorphology are the main factors influencing the development of the soils and their distribution. Detailed information of the geology of this area is described in Ellis and Whitaker (1976) and Robertson (1979).

The Bundaberg area may be divided into five broad landform patterns based on geomorphology and geology and include:

(1) Coastal plains
(2) Alluvial plains of (a) Burnett and Kolan River
(b) Local streams
(3) Marine plain
(4) Plains, rises and low hills on sedimentary rocks
(5) Plains, rises and low hills on basic volcanic rocks.

The coastal plains occur south of the Elliott River and along the coast north of Bargara and in the vicinity of Burnett Heads. The alluvial plains occur along the Burnett and Kolan Rivers as well as along the local streams. The marine plains lie between the Burnett and Kolan Rivers east of the Elliott scarp. Areas formed form basic volcanic rocks are located in the south-west corner of the north section and are centred on the Hummock in the south section. The remainder is formed from sedimentary rocks.

Coastal plains

Beach ridges, dunes and swales are the major elements associated with the coastal plains of the Southern Section. Aeolian and wave deposition have been the major sources of sedimentation.

Alluvial plains

(a) Burnett and Kolan Rivers

The alluvial plains of the Burnett and Kolan Rivers have been formed from deposition from these rivers. Two relative ages of deposition have been recognised with the youngest sediments occupying the lower landscape usually adjacent to the stream channels. The older alluvial deposits, usually some distance from the rivers, are up to five metres higher and were deposited when the sea levels were higher than the present level.

The younger alluvia consists of levees, scrolls, plains, lower terraces and swales of flats and terrace plains. Plains are the major landform element in the older alluvial terrace with minor drainage depressions and relict levees.

(b) Local streams

Plains, terrace flats, backplains, levees and scrolls are the common elements associated with the alluvial plains derived from the local streams, mainly Splitters Creek and Elliott River.

Marine plain

The area between the Burnett and Kolan Rivers was inundated by the sea which was several metres higher than the present sea level during the Late Pleistocene (post 1.1–0.9 m yr) (Robertson, 1979). During this period the Elliott scarp was developed and formed the south-western extremity of sea inundation. Sea subsidence to the present level subsequently developed a series of depressions (swales) and beach ridges lying roughly parallel to the present coastline.

The area is presently one to five metres above sea level. Frontal dunes (2.5–6 m high) protect this area from inundation by the sea.

Sulfidic sediments or mineral or organic material that contains oxidisable sulfur compounds usually pyrite, have developed in the swales and often underlie the beach ridges. Closer to the Burnett River in the vicinity of the Fairymead Mill, alluvia have been deposited over these sulfidic sediments. Sulfuric material is also present as a result of the oxidation of these sulfidic materials.

High groundwater levels are present in this area and a network of drains have been constructed to lower groundwater to manageable levels. A number of tidal gates prevent the intrusion of sea water at high tide.

Sedimentary rocks

A range of sedimentary rock formations occur throughout the area and include the Elliott Formation, Burrum Coal Measures, Maryborough Formation, Grahams Creek Formation and Broweena Formation. Sandstone, siltstone, mudstone, shale and conglomerate are the major rock types of these formations although Grahams Creek Formation consists of intermediate to acid volcanic flows, pyroclastics, tuffaceous sandstone and siltstone. The Elliott Formation has been deeply weathered and silicified in the upper part while the other formations have been weathered to various degrees. The soils developed on these formations are usually related more closely to the rock type and degree of weathering rather than the formation.

The youngest formation, the Tertiary Elliott Formation, occupies the largest proportion of the study area occurring on plains and rises on both the south and north section. It also occurs as relict crests and upper slopes overlying other sedimentary rock formations and volcanic rocks. Erosion and dissection has exposed the underlying formations namely the Burrum Coal Measures and the Maryborough Formation especially adjacent to the Kolan and Burnett Rivers. Rises and low hills have developed usually some metres lower than the rises and plains of the Elliott Formation and adjoin the alluvial plains of the Kolan and Burnett Rivers.

The underlying geology of the south-west portion of the study area is predominantly of the Broweena Formation and the Grahams Creek Formation. The more undulating landscape and the greater occurrence of outcrop in this area is largely due to the folding and faulting that occurred in this area.

Basic volcanic rocks

Rises and low hills have developed on Tertiary volcanic rocks, including the Gin Gin Basalt, in the south-west corner of the north section. Quaternary basalt is also present as small areas in the Hillend area and west of Bullyard. In the south section, plains and rises have developed on the Quaternary basalt centred on the sloping Hummock.

Soils - morphology

Soils have been grouped according to landform and parent material. Eighty soils have been recognised and mapped. A total of 3280 soil profiles were described. A brief description of the soils accompanies the soils maps of both the South and North Sections. Variants and phases are defined on the map.

The soils have been classified using the Australian Soil Classification (Isbell, 1996). A brief description of the soil orders that are present in the study area is given in Table 3. Features to distinguish soils within the same geomorphological or geological group are given below.

Table 3. A brief description of the Soil Orders of the Australian Soil Classification (Isbell, 1996) from the Bundaberg area

Soil Order	Brief description
Chromosols	Soils with strong texture contrast between A and B horizons. The latter are not strongly acid and are not sodic.
Dermosols	Soils with structured B horizons and lacking strong texture contrast between A and B horizons.
Ferrosols	Soils with B2 horizons which are high in free iron oxide and which lack strong texture contrast between the A and B horizons.
Hydrosols	Soils in which the greater part of the profile is saturated for at least 2–3 months in most years.
Kandosols	Soils which lack strong texture contrast, have massive or only weakly structured B horizons, and are not calcareous throughout.
Kurosols	Soils with strong texture contrast between the A horizons and the strongly acid B horizons.
Podosols	Soils with B horizons dominated by the accumulation of compounds of organic matter, aluminium and/or iron.
Rudosols	Soils with negligible pedologic organisation.
Sodosols	Soils with strong texture contrast between the A horizons and B horizons which are not strongly acid but are sodic in the upper 0.2 m.
Tenosols	Soils with weak pedologic organisation apart from the A horizons.
Vertosols	Clay soils with shrink-swell properties that exhibit strong cracking when dry and at depth have slickensides and/or lenticular structural aggregates.

Soils of coastal plains

Podosols, Tenosols, Kandosols and Sodosols have been developed on the coastal plains. These soils are only found in the Southern section.

All the soils have sandy surfaces. The Podosols are *Toogum*, *Woodgate* and *Coonar*. *Toogum* has a deep bleached A horizon over brown or brown mottled grey sand below 0.85 to 1.2 m while *Woodgate* has a black sand or coffee rock pan at 0.6 to 1.2 m overlying grey sand. *Coonar* has a thick (3 to 4 m) bleached A2 horizon over a black sand or coffee rock pan. *Beelbi,* a Tenosol, has a wind deposited topsoil, 0.5 to 1 m deep, over buried basalt rocks while the subsoils of *Qunaba,* a Sodosol, is a mottled grey clay originating from the underlying basalt.

Soils of alluvial plains of the Burnett and Kolan rivers

Tenosols and Rudosols and Dermosols are found on the more recent alluvia. Sodosols, Vertosols, minor Chromosols, Kandosols and Dermosols are found on the older alluvia.

Recent alluvia

The two major soils on the levees and scrolls of the recent alluvia are *Barubbra* and *Burnett* (Tenosols and Rudosols). *Barubbra* is sandy throughout while *Burnett* contains a number of depositional layers varying in thickness and from sandy loam to clay loam in texture.

On the plains, swales and terrace flats, three major soils have been identified. *Flagstone*, *Gahan* and *Sugarmill* all have clay loam to light clay topsoils and subsoils. However, the subsoil of *Flagstone* continues to 1.5 m. *Gahan* has loamy sand to loam fine sandy buried horizons below 0.5 to 0.9 m while *Sugarmill* has buried mottled grey clay at 0.5 to 0.9 m. The buried soil under *Sugarmill* is similar to the subsoils of *Fairymead* and *Fairydale* of the marine sediments described below.

Older alluvia

Boyne, a Chromosol or Dermosol, is a minor soil with a red structured subsoil found on the old levees and scrolls.

Auburn, Moorland and *Crossing* occupy the plains. These soils are Sodosols with *Crossing* having a grey to brown subsoil and a sandy topsoil, while the other two soils have a loamy to clay loam topsoil with *Moorland* having a red subsoil and *Auburn* a grey to brown subsoil. *Pocket* (a Kandosol*),* a minor soil on the plains, has a sandy topsoil over a massive, red clay subsoil.

Hinkler and *Walla* are Vertosols which are found on the plains and drainage depressions. *Hinkler* has a black upper subsoil while *Walla* has a grey to brown subsoil.

Soils of alluvial plains of the local streams

Three contrasting soils have been developed from the range of sediments derived from the Elliott River and local creeks.

On the levees and plains, *Littabella,* (a Kandosol) with a sandy loam to loam topsoil has a massive yellow, grey or rarely red, sandy loam to clay loam subsoil. A common soil on the plains is *Peep* which is a Sodosol with topsoil textures ranging from sandy loam to clay loam over a mottled grey to brown medium clay subsoil. *Weithew*, a black or grey Vertosol, is a minor soil on the creeks draining the Gin Gin basalt areas.

Soils of marine plains

Seven soils have been identified in this area; they are quite variable and belong to the Order of Hydrosols, Podosols, Tenosols, Chromosols and Dermosols. These soils occur in the Fairymead-Moore Park area and small areas near the Kolan, Burnett and Elliott Rivers.

Soils formed in a marine environment which include acid sulfate soils are present in the area. The acid sulfate soils may contain large quantities of iron sulfides, mainly iron pyrite (FeS_2), in their waterlogged sediments. Oxidation commences if these waterlogged sediments are drained. Oxidation may:

- produce sulfuric acid which can be released into streams and drains;
- deposit ochre (iron) which can clog drains;
- lower the pH of the soil to extremely acid (pH <4.5);
- increase the solubility of aluminium and heavy metals which may become toxic to some crops;
- decrease the availability of some nutrients such as phosphorus.

The soils within the marine sediments, especially those in the depressions or swales between the relict beach ridges, show various stages of oxidation. Prominent red, brown and yellow mottles within the grey subsoils are morphological features of these soils indicating past oxidation. The presence of jarosite (a sulfur by-product of oxidation) in association with extremely acid conditions (pH <4.5) is another indication of more recent oxidation.

The construction of drains to lower the watertable to manageable levels for sugarcane production has exposed these soils to oxidation. Analyses of a number of sites have also confirmed that high oxidisable sulfur (S_{ox}) levels exist in some areas, especially below 0.9 m.

Soils of plains and swales

Two soils have been identified in the plains and swales and are the major acid sulfate soils of the area in various stages of oxidation.

Fairymead and *Fairydale* (Hydrosols) are similar, with both having a black surface clayey horizon over mottled grey clay subsoils. The clay continues to depths greater than 1.5 m in *Fairymead*, while sand to sandy clay loam horizons occur below 0.8 to 1.2 m in *Fairydale*. Jarosite is often found in the lower horizons of *Fairymead*. *Fairymead* has the greatest potential to release acid if further drainage lowers the watertable as the clay subsoil has a much higher content of pyrite than the sandy layers of *Fairydale.*

Whymere (Hydrosol), usually found near the beach ridges below the Elliott scarp, has a sandy clay loam to clay loam topsoil over clayey subsoils. Often the topsoil shows dilatant properties.

Soils of beach ridges

Four soils have been described on the beach ridges. These soils are usually sandy but clay sediments with quantities of pyrite and jarosite may be present at depths greater than 1.5 m.
Colvin and *Moore Park*, Podosols or Tenosols, are sandy to 1.5 m and are the most extensive soils on these ridges. *Colvin* has a thick bleached A2 horizon while *Moore Park*, on the higher beach ridges, has no A2 horizon. *Tantitha* (Tenosols) has red loamy sand to sandy loam subsoil.

Booloongie, a Chromosol, Hydrosol or Dermosol, usually found on the lower slopes of the beach ridges has a topsoil texture as heavy as clay loam with a subsoil of clay loam sandy to sandy light clay overlying sandy horizons.

Soils of plains, rises and low hills on sedimentary rocks

The contrasting weathering pattern, the range of sediments and erosion has resulted in a complex distribution of 40 soils. The geological unit has been divided into (i) deeply weathered coarse grained sedimentary rocks (mainly sandstone); (ii) deeply weathered fine grained sedimentary rocks (mainly siltstone, mudstone shale and fine sandstone); and (iii) moderately weathered sedimentary rocks (includes coarse and fine sandstone, siltstone, mudstone and shale).

(i) Soils of deeply weathered coarse grained sedimentary rocks

Soils of plains, crests and upper and mid slopes of rises
Seven soils, mainly Kandosols, Dermosols and minor Chromosols, are associated on the plains, and crests, upper and mid slopes of the deeply weathered coarse grained sedimentary rocks. All these soils have sandy topsoils.

The well drained *Farnsfield* and *Gooburrum* have red subsoils and are usually found on the crests and upper slopes of the rises, and slight rises on the plains. *Gooburrum* has a structured subsoil (Dermosol) while the subsoil of *Farnsfield* is massive (Kandosol). Usually the subsoil textures range from clay loam to light clay.

The other soils, *Calavos, Isis, Meadowvale, Quart* and *Rothchild* have yellow to brown subsoils and are usually found on the mid and upper slopes of the rises and on the plains. *Calavos, Isis* and *Meadowvale* have structured subsoils (Dermosols or Chromosols) while *Quart* and *Rothchild* have massive subsoils (Kandosols).

Both *Isis* and *Meadowvale* have bleached A2 horizons while *Calavos*, a minor soil on the plains has no A2 horizon. The light to medium clay structured B horizon is at a lower depth in *Meadowvale* than *Isis*. Textures of clay loam to light clay are present in the B horizon of *Calavos*.

The subsoil texture of *Quart*, which is common on the plains especially in the southern section and mid to lower slopes of the rises in association with *Farnsfield* varies from sandy clay loam to light clay. *Rothchild* with a much sandier texture of loamy sand to sandy loam throughout the profile is randomly distributed throughout the Elliott Formation.

Soils of plains, drainage depressions of plains and lower slopes of rises
Seven soils, mainly Hydrosols and Podosols, with minor Kandosols and Sodosols, are associated with the poorly drained areas on the lower slopes of rises, drainage depressions and the poorly drained areas of the plains. All these soils have a grey subsoil and thick sandy surface horizons and most have some restrictions in the subsoils including pans or clay layers. Perched watertables may develop in these soils during wet periods. If these watertables reach the surface, salinisation may subsequently develop.

Robur, a Hydrosol, with a texture contrast between the topsoil and subsoil, has a sodic clay layer between 0.5 and 0.9 m. The *Alloway* soil, another Hydrosol, has a non sodic clay horizon below 0.75 to 1.1 m. *Mahogany* and *Winfield*, soils with thick sandy topsoils have mottled, grey, massive subsoils with the texture of *Mahogany* being sandy clay loam to sandy clay and *Winfield*, loamy sand to sandy loam.

Kinkuna, Wallum and *Theodolite* are Podosols with differing subsoils: *Kinkuna* having a orstein or coffee rock pan below 0.45 to 1 m, *Wallum*, a sandy clay loam to sandy clay subsoil below 0.65 to 1.1 m and *Theodolite*, a buried sodic clay horizon below 0.75 to 1.1 m.

(ii) Soils of deeply weathered fine grained sedimentary rocks

Soils of plains, and crests, upper and mid slopes of rises
Ten soils, mainly Kandosols and Dermosols with a minor Sodosol occupy the plains, and crests, upper and mid slopes of the rises. All the soils have clay loam to light clay topsoils except *Woolmer* which has textures of fine sandy loam to loam fine sandy. The well drained soils with red subsoils are usually found on the crests and upper slopes of the rises as well as on slightly elevated flats on the plains.

The moderately well drained soils with yellow to brown subsoils are found on the mid slopes of the rises as well as the plains.

Oakwood and *Gibson* are Red Kandosols. *Gibson* with clay textures throughout occupies the plains in the South Kolan area while *Oakwood* usually with clay loam topsoils occurs on the crests and upper slopes of the rises as well as on the slightly elevated flats on the plains.

Howes and *Watalgan* are Red Dermosols. *Howes,* with clay texture throughout, occupies the plains in the South Kolan area. *Watalgan,* with clay loam topsoils and ferruginous nodules in the subsoil, is often found on the hill crests and upper slopes of the rises as well as the elevated flats on the plains. *Watalgan* also occupies the higher residual crests.

Otoo, a Red Dermosol, with a red subsoil at a much deeper depth (0.55 to 0.95 m) is usually found as an intergrade between the well drained red soils and the moderately well drained soils of the lower slopes.

Cedars, Woolmer, Kepnock and *Gillen* have yellow to brown subsoils. *Cedars, Woolmer* and *Kepnock* are Dermosols while *Gillen* is a Kandosol. *Cedars* has a uniform clay profile throughout while *Kepnock* and *Woolme*r both have bleached A2 horizons with clay subsoils. *Kepnock* usually has a clay loam topsoil while *Woolmer* is usually loamy. *Gillen* with a clay loam topsoil, has a clay loam to light clay massive subsoil with many to abundant iron nodules. *Norville,* a Brown or Grey Sodosol with a clay loam topsoil, occupies only a small area.

Soils of plains, drainage depressions of plains and lower slopes of rises
Hydrosols or soils which are permanently or seasonally wet are found in these low lying areas.

Bingera, a mottled brown or yellow soil with clay texture throughout is found in the South Kolan area. *Clayton, Kalah and Kolbore* are texture contrast soils with loamy topsoils over light to medium clay subsoils. The subsoil of *Clayton* is non sodic, while *Kalah* and *Kolbore* have sodic subsoils. *Kolbore* differs from *Kalah* in having a hard brittle pan below 0.5–1.2 m.

Soils of crests and slopes of rises and low hills
Kurosols, Sodosols, Dermosols and Tenosols have developed on the crests and slopes of the rises and low hills.

All soils have bleached topsoils over sodic clay subsoils except *Takoko,* a Tenosol, which has no subsoil but directly overlies weathered rock. *Avondale, Bungadoo* and *Woco* have loamy topsoils while *Turpin* has a sandy topsoil. *Turpin* with an acid, brown to grey clay subsoil varies in depth to rock from 0.4 to 1.5 m. *Woco*, a deep soil, has a strongly acid, grey to brown light to medium clay subsoil with ferruginous nodules. *Avondale*, varying in depth to rock from 0.35 to 1.5 m has an acid grey sodic clay subsoil. *Bungadoo* (a Dermosol) has a clay loam topsoil with a light clay upper subsoil and a strongly acid medium clay subsoil with rock fragments between 0.75 to 0.9 m overlying silicified rock.

(iii) Moderately weathered sedimentary rocks

Soils of crests and hillslopes
All soils developed on the crests and hillslopes of the moderately weathered sedimentary rocks have sodic subsoils and decomposing rock usually occurs between 0.5 and 1.2 m. Most of these soils are classified as Sodosols or Kurosols except for *Bucca* which is a cracking clay (Vertosol) or non cracking clay (Dermosol).

Givelda, *Brooweena* and *Kolan* have loamy topsoils while *Tirroan* and *Gall* have sandy topsoils. *Gall* has much coarser sand than that of *Tirroan*. The pH of the subsoil of *Givelda* is acid to neutral with no rock fragments while the acid to alkaline subsoil of *Brooweena* contains rock fragments. The subsoil of *Kolan* is always strongly acid. *Bucca* has clay throughout and is acid to strongly acid.

Soils of rises and low hills on basic volcanic rocks

Vertosols, Dermosols and Ferrosols are found on the basic volcanic rocks in the south-western corner of the north section.

Hillend, a shallow to deep Brown Dermosol, occupies a small remnant area derived from Quaternary basalt south of South Kolan. Abundant stone and cobble may occur on the surface.

Berren, a shallow clayey soil throughout occurs on the cone of a volcano. *Corfield*, a Dermosol, is a shallow to moderately deep soil with a loamy to clayey topsoil over brown to red clay subsoil while *Maroondan* has clay throughout and cracks when dry (Vertosol).

Both *Chin* and *Childers* are Red Ferrosols with *Chin* having fine rounded quartz throughout, occurring on the colluvial slopes while *Childers* is found on the crests and higher slopes derived from basalt.

Soils of rises and plains of the Quaternary basalt

Ferrosols, Hydrosols and Vertosols have been developed from the Hummock Basalt on the southern section.

Hummock, a minor soil of the cone and some of the slopes of the Hummock, is a Vertosol.

Woongarra, a Red Ferrosol with uniform clayey texture throughout the profile, occurs on the upper and mid slopes. *Telegraph*, a Brown Ferrosol also with clay texture throughout, occurs on the lower slopes. *Ashgrove*, a Hydrosol with a weakly to strongly cemented ferromanganiferous pan, occurs in the drainage lines.

Seaview, a Brown to Black Ferrosol with a shallow to moderately deep soil with a clay loam to light clay topsoil over a clay subsoil with coarse basaltic gravel or cobble throughout, occurs on the slightly elevated flats of the surrounding plains. Abundant stone and cobble is usually present on the surface. *Windemere*, a Ferrosol with clay texture throughout over a buried grey clay with lenticular structure, is found on the sides slopes of the elevated flats as well as on the lower flats. *Rubyanna*, a grey or black cracking clay, which often is seasonally wet, occurs in the drainage lines.

Table 4 shows the areas of the landform patterns based on the different geomorphology and geology of the whole Bundaberg area as well as the names of the associated SPCs and the Australian Soil Classification (Isbell, 1996).

Tables 5 and 6 show the areas of the mapping units including phases and variants for the north and south sections respectively. These tables only give an indication of the areas associated with a particular SPC as each UMA may contain a number of SPCs in various proportions. More information on the soils association with each UMA is given in Appendix I.

Table 4. Areas of landform patterns with the Australian Soil Classification for the dominant soil profile classes (SPC) for the North and South Sections of the Bundaberg area

Landform pattern		Dominant SPC and map code	Australian Soil Classification	Area (ha)
Coastal plains (South)				**1 491**
		Beelbi (Bi)	Bleached-Orthic Tenosol or Brown Kandosol	
		Quanaba (Qb)	Grey and Brown Sodosol	
		Coonar (Cn)	Aquic Podosol	
		Toogum (To)	Aquic Podosol	
		Woodgate (Wd)	Aquic Podosol	
Alluvial plains of the Burnett and Kolan rivers				
(a)	Recent alluvia	Barrubra (Bb)	Orthic Tenosol, Stratic Rudosol	**6 134**
		Burnett (Bn)	Stratic Rudosol, Chernic-Leptic Tenosol Brown and Black Dermosol	
		Flagstone (Fs)	Brown and Black Dermosol	
		Gahan (Gh)	Black and Grey Dermosol/Redoxic Hydrosol	
		Sugarmill (Sm)		
(b)	Older alluvia	Boyne (By)	Red Chromosol or Dermosol	**10 062**
		Pocket (Pk)	Red Kandosol	
		Hinkler (Hk)	Black Vertosol	
		Walla (Wl)	Grey Vertosol	
		Auburn (Ab)	Grey and Brown Sodosol	
		Moorland (Ml)	Red Sodosol or Chromosol	
		Crossing (Cg)	Grey and Brown Sodosol	
Alluvial plains of the local streams				**2 278**
		Littabella (lt)	Yellow, Grey and Red Kandosol	
		Peep (Pp)	Grey and Brown Sodosol	
		Weithew (Wh)	Black and Grey Vertosol	
Marine plains				**7 333**
		Colvin (Cv)	Semiaquic Podosols, Bleached-Orthic Tenosol	
		Moore Park (Mp)	Orthic Tenosol, Aquic Podosol	
		Tantitha (Tt)	Orthic Tenosols	
		Booloongie (Bo)	Brown Chromosol, Redoxic Hydrosol, Brown Dermosol	
		Whymere (Wy)	Oxy aquic Hydrosol, Redoxic Hydrosol	
		Fairymead (Fm)	Redoxic Hydrosol	
		Fairydale (Fd)	Redoxic Hydrosol	
		Summerville (Sv)	Grey Sodosol	
Plains, rises and low hills on sedimentary rocks				
(1)	*Deeply weathered coarse grained sedimentary rocks*			
(a)	Plains, crests and upper and mid slopes of rises	Farnsfield (Ff)	Red Kandosol	**15 032**
		Gooburrum (Gb)	Red Dermosol	
		Calavos (Ca)	Brown Chromosol or Dermosol	
		Isis (Is)	Yellow Chromosol or Dermosol	
		Meadowvale (Md)	Yellow and Brown Dermosol	
		Quart (Qr)	Yellow and Brown Kandosol	
		Rothchild (Rt)	Red, Brown and Yellow Kandosol	

Table 4 (continued)

Landform Pattern	Dominant SPC and map code	Australian Soil Classification	Area (ha)
(b) Plains, drainage depressions of plains and lower slopes of rises	Robur (Rb)	Redoxic Hydrosol or Grey Sodosol	**11 483**
	Alloway (Al)	Redoxic Hydrosol	
	Mahogany (Mh)	Redoxic Hydrosol or Grey Kandosol	
	Winfield (Wf)	Redoxic Hydrosol	
	Kinkuna (Kn)	Aquic or Semiaquic Podosol	
	Wallum (Wm)	Aquic Podosol/Redoxic Hydrosol	
	Theodolite (Th)	Aquic Podosol/Redoxic Hydrosol	
(2) Deeply weathered fine grained sedimentary rocks			
(a) Plains and crests, upper and mid slopes of rises	Oakwood (Ok)	Red Kandosol	**18 969**
	Gibson (Gb)	Red Kandosol	
	Howes (Hs)	Red Dermosol	
	Watalgan (Wt)	Red Dermosol	
	Otoo (Ot)	Red Dermosol	
	Cedars (Cr)	Brown Dermosol	
	Woolmer (Wr)	Yellow and Brown Dermosol	
	Kepnock (Kp)	Yellow Dermosol	
	Gillen (Gi)	Yellow and Brown Kandosol	
	Norville (Nv)	Brown and Grey Sodosol	
(b) Plains, drainage depressions of plains and lower slopes of rises	Bingera (Br)	Redoxic Hydrosol	**5 249**
	Clayton (Cl)	Redoxic Hydrosol	
	Kalah (Kh)	Redoxic Hydrosol	
	Kolbore (Kl)	Redoxic Hydrosol or Salic Hydrosol	
(c) Crests and slopes of rises and low hills	Avondale (Av)	Grey Sodosol or Kurosol	**3 869**
	Bungadoo (Bg)	Brown or Yellow Dermosol	
	Woco (Wo)	Grey and Brown Dermosol or Kurosol	
	Turpin (Tp)	Grey and Brown Sodosol or Kurosol	
	Takoka (Tk)	Bleached-Leptic Tenosol	
(3) Moderately weathered sedimentary rocks			**16 113**
	Givelda (Gv)	Brown and Yellow Sodosol	
	Brooweena (Bw)	Brown and Grey Sodosol	
	Kolan (Ko)	Grey and Brown Kurosol	
	Tirroan (Tr)	Grey Sodosol	
	Gall (Gl)	Grey Sodosol or Kurosol	
	Bucca (Bc)	Grey or Brown Vertosol or Dermosol	
Rises and low hills on basic volcanic rocks (North Section)			**1 558**
	Childers (Cd)	Red Ferrosol	
	Chin (Ch)	Red Ferrosol	
	Berren (Be)	Brown Dermosol	
	Hillend (He)	Brown Dermosol	
	Corfield (Cf)	Brown and Red Dermosol	
	Maroondan (Mr)	Black or Brown Vertosol	
Rises and plains of the Quaternary basalt (South Section)			**10 196**
	Hummock (Hm)	Brown and Grey Vertosol	
	Woongarra (Wg)	Red Ferrosol	
	Telegraph (Tg)	Brown Ferrosol	
	Ashgrove (Ag)	Redoxic Hydrosol	
	Seaview (Sw)	Black and Brown Ferrosol	
	Windemere (Wi)	Black, Brown and Grey Ferrosol	
	Rubyanna (Rb)	Grey, Black and Aquic Vertosol	
Miscellaneous units			**13 549**
	Aquaculture (F)		
	Wetlands (M)		
	Quarry (Q)		
	Urban (U)		
	Water (W)		
	Other (O)		

Table 5. Mapping units, areas of mapping units and number of UMAs in each mapping unit, North Section, Bundaberg area

Mapping Unit	Area (ha)	Number of UMAs
Ab	4111	88
Ab-Wl	44	3
AbEp	96	2
AbRv	135	4
Al	1381	53
Al-Cl	9	1
Al-Mh	52	1
AlRp	5	1
Av	645	32
Av-Ko	63	1
AvRp	314	11
AvRp-Av	70	1
AvTv	30	1
Bb	231	13
Bb-Bn	71	3
Bb-Fd	19	1
Bb-Gh	62	1
Bc	637	18
Be	26	1
Bg	199	10
Bg-Tk	182	2
BgRv	4	1
BgRv-Tk	66	2
Bn	975	36
Bn-Bb	18	1
Bn-Fs	265	5
Bn-Gh	87	2
Bo	409	11
Br	196	5
Bw	1264	23
By	58	8
Cd	88	5
Cf	85	3
Cg	679	23
Ch	118	4
Cl	979	29
Cl-Kh	63	2
Cr	39	1
Cv	1990	16
Cv-Fd	29	1
Fd	1553	17
Ff	1682	79
FfGv	4	1
Fm	1298	6
Fs	1276	42
Fs-Ab	34	1
Fs-Bn	27	2
Fs-Gh	104	1
Gb	1206	57
GbMv	370	11
Gh	375	12
Gh-Bn	19	1
Gh-Fs	79	2
Gl	497	8
Gs	346	2
Gv	2181	65
GvRp	57	3
He	51	3
Hk	394	3
Hs	451	3
Is	2312	88
IsRp	15	2
Kh	552	12
Kl	470	18
Kn	952	24
Kn-Rb	22	1
Ko	6047	95
KoRp	531	15
KoRv	44	4
Kp	4792	59
KpGv	6	1
Lt	217	6
M	2458	6
Md	3969	65
MdGv	9	1
MdRp	10	1
Mh	248	16
Mh-Al	166	2
Ml	245	12
Mp	1257	8
Mr	1190	16
Nv	77	4

Table 5 (continued)

Mapping Unit	Area (ha)	Number of UMAs
Ok	1493	29
Ot	2056	37
Ot-Kp	12	1
Ot-OtSv	44	1
OtSv	63	4
Pk	8	2
Pp	951	11
PpSv	31	2
Q	50	7
Qr	232	13
Rb	993	23
Rb-Kn	54	1
Rt	400	26
RtRp	3	1
Sm	702	6
SmAv	244	1
SmGv	73	2
Th	392	11
ThSp	96	3
Tk	34	8
Tk-Bg	95	1
Tp	667	26
TpRp	122	10
Tr	2584	64
TrPv	28	1
TrRp	5	1
Tt	184	3
U	2299	8
W	604	51
Wf	350	17
Wh	9	1
Wl	2719	45
Wl-Ab	26	2
WlEp	46	1
Wm	69	3
WmSp	12	1
Wo	56	2
Wo-Av	154	1
Wr	638	18
Wt	1486	71
WtMv	164	8
WtRp	157	13
Wy	151	7
Total	**73957**	**1745**

Table 6. Mapping units, areas of mapping units and number of UMAs in each mapping unit, South Section, Bundaberg area

Mapping Unit	Area (ha)	Number of UMAs
Ab	993	24
Ab-Wl	31	1
Ag	735	48
Al	2064	35
Av	293	8
AvRp	34	4
Bb	73	5
Bi	352	14
Bi-Qb	10	1
Bn	358	14
By	7	1
Ca	74	3
Cg	216	4
Cl	1648	20
Cn	581	6
Cv	74	2
F	57	1
Fd	10	1
Ff	893	40
Ff-Gb	140	1
Ff-Qr	47	2
Fm	133	6
Fs	760	22
Gb	239	11
Gh	183	7
Gi	341	6
Gv	1251	18
Hm	6	1
Is	1282	45
IsRp	62	6
Kh	214	6
Kh-Kp	222	1
Kl	906	10
Kn	1328	20
Ko	628	10
KoRp	146	2
KoRv	11	1
Kp	3941	29
Kp-Av	9	2
Lt	70	3
M	728	11
Md	392	22
Mh	1040	34
Ml	8	1
Mp	13	1
O	105	2
Ok	1829	20
Ot	540	19
OtSv	16	1
Pp	757	16
Pp-Lt	247	1
Q	242	10
Qb	159	10
Qr	1572	31
Qr-Ff	11	1
Ra	957	49
Ra-Sw	33	2
RaSv	5	1
Rb	1128	43
Rb-Kn	23	1
Rt	95	5
Sv	232	7

Table 6 (continued)

Mapping Unit	Area (ha)	Number of UMAs
Sw	2841	145
Sw-Qb	14	1
Sw-Ra	48	2
Sw-Tg	17	1
Sw-Wi	23	2
Tg	1574	63
Tg-Wg	6	1
Th	230	5
To	164	2
Tp	785	25
Tr	152	5
TrRp	46	1
U	6494	27
W	510	24
Wd	222	5
Wg	2890	50
Wi	1020	39
WiSv	24	2
Wl	244	10
Wm	783	28
Wm-Kn	87	1
Wo	58	3
Wr	280	20
Wt	181	5
WtMv	7	1
Total	**49358**	**1201**

Soils - chemistry

A total of 172 soil profiles in the Bundaberg-Childers area representing 48 soil profile classes (SPCs) and two variants in the Bundaberg study area have been analysed for chemical and physical properties. The remaining 32 SPCs have not been analysed but they generally represent minor soils. The analysed soils within similar landform patterns are discussed below in terms of soil pH, salinity, sodicity, soil nutrients and cation exchange capacity.

Soil pH represents the degree of acidity (pH <7) and alkalinity (pH >7) in a soil. Salinity is a measure of the concentration of soluble salts present in a soil. Electrical conductivity (EC) (1 part soil:5 parts water) measures total soluble salts in dSm^{-1} and a separate measurement is used to determine how much is chloride. Sodicity is the ratio of exchangeable sodium and cation exchange capacity expressed as a percentage (ESP); soils with an ESP <6 are non sodic, ESP 6–15 are sodic, ESP >15 are strongly sodic. Soil fertility is the ability of a soil to supply nutrient for normal plant growth. Cation exchange capacity (CEC) or effective cation exchange capacity (ECEC) is a measure of the soils capacity to hold cations (Ca, Mg, Na, K, H, Al). Generally soils with low CEC have sandy surfaces. Clay activity indicates the type of clay present in the soil. Kaolinitic clays have <10 meq/100 g clay, while montmorillonitic clays have >30 meq/100 g clay.

Analytical methods and nutrient ratings are based on Baker (1991). Appendix III shows the results of a range of chemical analyses for three soil depths. Appendix IV shows the results for the major nutrients for the surface samples for the analysed profiles.

Soils of the coastal plains

Only one profile, a representative of SPC *Beelbi*, has been analysed on the coastal plains as they are not widespread and the associated soils are not usually used for agricultural purposes.

Soil pH: The young *Beelbi* soil formed from wind blown sand deposited over basaltic materials, is influenced by soil carbonates and bicarbonates from shell fragments at depth corresponding to a strongly alkaline pH (pH 9.1).

Salinity: EC and chloride values are very low (EC <0.28 dS/m, Cl 0.019%) throughout corresponding to the permeable, sandy profiles.

Sodicity: The analysed site is non sodic (ESP <6). The unanalysed *Qunaba* originating from wind blown sand overlying grey basaltic clays would be expected to have sodic subsoils (ESP >6).

Soil nutrients: *Beelbi* is high in calcium (2.3–25 meq/100 g) throughout the profile reflecting shell fragments in the parent sands. *Beelbi* is typically low in other nutrients (Mg 0.9 meq/100 g, K 0.12 meq/100 g, OC 0.2%, TN 0.02%, Cu 0.24 ppm, Zn 0.2 ppm) except in phosphorus (AP 74 ppm, AP 43 ppm) applied as fertiliser.

Cation exchange capacity (CEC): Low CEC (<4 meq/100 g) corresponds to low clay content in the upper horizons but increases to high (>23 meq/100 g) in the deep subsoil containing shell fragments.

Soils of the Alluvial Plains of the Burnett and Kolan Rivers

Recent alluvia

Representative profiles of the *Burnett* and *Flagstone* SPCs, the main soils of the recent alluvia, have been analysed for major soil chemical characteristics.

Soil pH: The *Burnett* and *Flagstone* soils are generally slightly acid to neutral (pH 6.2–7.3) in the surface and neutral to mildly alkaline (pH 7.1–7.7) in the subsoil.

Salinity: Very low electrical conductivity (EC <0.12 dS/m) and chloride (<0.17%) levels reflect the generally well drained, permeable profiles.

Sodicity: Soils of the alluvial plains are non sodic.

Soil nutrients: These young soils generally have medium to high levels of most nutrients. Calcium and available phosphorus are high to very high (Ca 2.1–18 meq/100 g, AP 0.56–0.86 ppm, BP 43–130 ppm) while potassium, copper and zinc are medium (K 0.33–0.84 meq/100 g, Cu 0.7–3 ppm, Zn 1.5–2.3 ppm). Calcium/magnesium ratios (1.3–3.9) are calcium dominant throughout the profile. Soils generally have low organic carbon (0.6–1.5%) and total nitrogen (0.03–0.11%) in the surface while lower potassium levels at depth compared to those of the surface reflect accumulation of organic matter.

Cation exchange capacity (CEC): The effective cation exchange capacity (ECEC) of the soils reflects soil texture and origin with the *Burnett* soil having low ECEC (<5 meq/100 g) due to sandy textures. The clay activity in these soils of approximately 60 meq/100 g clay corresponds to a high proportion of montmorillonite clay indicating generally younger soil material originating from the upper catchment.

Older alluvia

The major soils of the older alluvia, *Auburn* and *Crossing* (Sodosols) and *Walla* (Vertosol) have been analysed.

Soil pH: Surface pH ranges from strongly acid to slightly acid (pH 5.4–6.2) while subsoil pH is extremely variable ranging from medium acid to strongly alkaline (pH 5.5–9.2). *Auburn* and *Crossing* generally have higher pH values in the subsoil.

Salinity: Very low EC (0.04–0.1 dS/m) and chloride (0.002–0.009%) values occur in the surface with medium to very high (EC 0.5–1.21 dS/m, Cl 0.053–0.178%) values at depth. High salinity corresponds to impermeable clay subsoils.

Sodicity: The analysed soils are generally non sodic in the surface but become strongly sodic at depth (ESP 18–48). Of the soils unanalysed, the better drained soils (*Boyne* and *Pocket*) are expected to be non sodic throughout while *Moorland* would vary from being sodic (ESP 6–15) either in the upper B horizon or at depth.

Soil nutrients: Calcium levels are generally high (0.5–7.6 meq/100g but may be low (<2 meq/100g) usually corresponding to lower pH. Magnesium is high (6.6–17 meq/100 g) at depth resulting in a rapid decrease in calcium/magnesium ratio with depth (0.28–5.5 surface, 0.03–0.48 subsurface). Potassium is generally medium (0.15–1 meq/100 g) in the surface corresponding to organic matter accumulation but decreases with depth (0.1–0.38 meq/100 g). Organic carbon, total nitrogen and available phosphorus are very low to medium (C 1.1–2.8%, TN 0.07–0.2%, AP 5–39 ppm, BP 9–29 ppm) while copper and zinc are medium (Cu 0.7–2.7 ppm, Zn 1.1–3.3 ppm).

Cation exchange capacity (CEC): The ECEC and CEC values strongly reflect changes in textures between the topsoil and subsoil. The relatively high clay activity ratio of 50–60 meq/100 g clay in the subsoil indicates a high proportion of montmorillonite clay. This is frequently reflected as vertic properties (lenticular structure, slickensides).

Soils of the Alluvial Plains of local streams

Three profiles of *Peep*, the major soil of the local alluvia, have been analysed.

Soil pH: Surface pH is very strongly acid to slightly acid (pH 4.8–6.1) with subsoil pH ranging from strongly acid to mildly alkaline (pH 4.8–7.4).

Salinity: EC and chloride values are very low (EC 0.04–0.07 dS/m, Cl 0.003–0.007%) in the surface and generally low to medium (EC 0.14–0.38 dS/m, Cl 0.047–0.1%) at depth. Higher values correspond to impermeable subsoils.

Sodicity: The clay subsoil of *Peep* is strongly sodic (ESP 28–55).

Soil nutrients: All nutrients are very low to low (Ca 0.53–0.2 meq/100 g, K 0.07–0.2 meq/100 g, OC 1.1–2.3%, TN 0.08–0.12%, AP 5–7 ppm, BP 3 ppm, Cu 0.1–0.21 ppm, Zn 0.3–0.35 ppm), except magnesium, reflecting the predominance of deeply weathered geology in the local catchments. Soils are calcium dominant (Ca/Mg 1.1) in the surface becoming strongly magnesium dominant (Ca/Mg 0.02–0.83) at depth.

Cation exchange capacity (CEC): ECEC increases with clay content down the profile. The relative low clay activity ratio of 30–40 meq/100 g clay in the clay subsoil reflects a mixture of clay types.

Soils of the marine plains

Soils of the beach ridges

Only one profile from the SPC *Moore Park* has been analysed from the beach ridges on the marine plains.

Soil pH: *Moore Park* is medium acid (5.8) near the surface and becomes moderately alkaline (pH 8.0) at depth.

Salinity: EC and chloride values are very low (EC <0.11 dS/m, Cl <0.006%) throughout, corresponding to the permeable, sandy profile.

Sodicity: The analysed profile becomes sodic below 0.5 m.

Soil nutrients: The analysed site is high in calcium (2.4 meq/100 g) in the surface corresponding to mill mud applications. Mill mud and fertiliser applications has also resulted in medium potassium (0.36 meq/100 g), and very high phosphorus (AP 178 ppm, BP 180 ppm).

Cation exchange capacity (CEC): Low ECEC (<5 meq%) corresponds to low clay content.

Soils of the plains and swales

The major soils, *Fairymead* and *Fairydale*, on the swales and plains of the marine plains have been analysed. These soils have been extensively drained.

Soil pH: *Fairydale* and *Fairymead* are very strongly acid in the surface (pH 4.6–4.8) decreasing at depth (pH 4.2–4.3). These low pH values are typical of acid sulfate soils.

Salinity: EC values range from low to very low (0.12–0.2 dS/m) throughout the *Fairydale* profile and medium (0.36–0.48 dS/m) throughout the *Fairymead* profile. Chloride values are low to very low (0.006–0.027%). The medium EC and low chloride levels in the *Fairymead* soil may reflect the presence of other salts such as gypsum originating from soil calcium reacting with sulfuric acid in this acid sulfate soil.

Sodicity: Soils are sodic (ESP 6–11) in the surface generally increasing to sodic-strongly sodic (ESP 16–40) in the subsoils. The very strongly acid pH and high exchangeable aluminium (up to 70% of ECEC) results in strongly structured, permeable soils, generally overriding the affect of sodicity. The high permeability corresponds to generally low salinity.

Soil nutrients: Calcium levels are variable possibly reflecting past liming. Generally calcium decreases from low to very low levels (0.22–0.41 meq/100 g) at depth corresponding to a decrease in pH, a strong decrease in calcium/magnesium ratio (surface 0.88–1.9, subsurface 0.12–0.3), and an increase in exchange acidity (up to 80% of ECEC). The low pH and high exchange acidity has resulted from the oxidation of pyrites to form sulfuric acid as a result of drainage. Other nutrients are medium to high (OC 1.5–2.2%, TN 0.12–0.16%, AP 25–26 ppm, Cu 0.35–0.91 ppm, Zn 0.85–1 ppm). Total sulfur (0.17–0.7%) and potassium (1.2–1.6%) are typically high resulting from oxidation of pyrite to form jarosite (a potassium-sulfur compound).

Cation exchange capacity (CEC): ECEC decreases with depth, the higher values at the surface corresponding to surface accumulation of organic matter. Clay activity (<20 meq/100 g clay) and ECEC (subsurface 3–7 meq/100 g) are generally low compared to similar soils in the Maryborough area.

Soils of the plains, rises and low hills on sedimentary rocks

Deeply weathered coarse grained sedimentary rocks

Eleven SPCs have been analysed on the deeply weathered coarse grained sedimentary rocks. The well drained *Farnsfield*, *Gooburrum*, *Isis*, *Meadowvale* and *Quart* generally occur on crests and upper and mid slopes of rises and on slightly elevated flats on the plains. The poorer drained *Alloway*, *Kolbore*, *Kinkuna*, *Mahogany*, *Robur* and *Theodolite* generally occur on lower slopes, drainage depressions and plains.

Soil pH: The well drained soils group are very strongly acid to slightly acid (pH 4.8–6.3) throughout the profile. The surface pH of the poorly drained group of soils ranges from extremely acid to slightly acid (pH 4.2–6.2) with some cultivated soils having higher pH. Subsoil pH is very strongly acid to neutral (pH 4.6–6.7). The surface soils of the Podosols (*Kinkuna*, *Theodolite*) frequently have strongly acid pH reflecting the presence of organic acids in the organic matter.

Salinity: All soils have very low EC (0.01–0.24 dS/m) and chloride (0.001–0.014%) levels throughout the profile. However surface salinity frequently occurs on cleared, poorly drained soils due to long term evaporation of the water from non saline watertables.

Sodicity: All well drained soils are non sodic (ESP <6) in the surface and generally non sodic to sodic in the subsoils, with some subsoils being strongly sodic (ESP 2–16). The poorly drained soils are predominantly sodic to strongly sodic (ESP 2–36) in the subsoil. This sodicity is always associated with high magnesium and very low calcium levels. Sodicity is associated with very low ECEC (<5 meq/100 g) and dispersion ratio (<0.75) in all soils except *Robur* and therefore, the affects of sodicity are probably not expressed.

Soil nutrients: Generally, all soils on the deeply weathered sedimentary rocks are low to very low in all nutrients but may have high levels under cultivation (Ca 0.06–4.5 meq/100 g, Mg 0.09–2.32 meq/100g, OC 0.3–4.1%, TN 0.01–0.13%, AP 2–22 ppm, BP 1–15 ppm, Cu 0.05–2.3 ppm, Zn 0.1–1 ppm). Potassium shows a strong surface accumulation corresponding to organic matter (surface 0.05–0.63 meq/100 g, subsurface 0.01–0.15 meq/100 g). Calcium and magnesium show a strong correlation to soil wetness. As soils become more poorly drained, calcium decreases in the subsoil while magnesium increases to a point where nearly all subsoils of the poorly drained soils group (Ca 0.03–1.9 meq/100 g, Mg 0.09–7.9 meq/100 g) are magnesic (Ca/Mg <0.1).

Cation exchange capacity (CEC): ECEC is always low (<10 meq/100 g) but predominantly very low (<5 meq/100 g) and is generally higher in the surface due to organic matter. Increases at depth correspond to increases in clay content. A clay activity ratio of <20 meq/100 g clay and predominantly <10 meq/100 g clay indicates a dominance of kaolinitic clays.

Soils of deeply weathered fine grained sedimentary rocks

Analysed soils have been divided into three broad groups comprising the well drained soils representing rapidly drained to imperfectly drained soils on crests and upper slopes of rises and slightly elevated flats on plains *(Gibson, Howes, Kepnock, Oakwood, Otoo, Watalgan, Woolmer)*, the poorly drained soils on plains and drainage depressions *(Bingera, Clayton, Kalah, Kolbore)* and the soils which predominantly occur on lower slopes of rises *(Avondale, Turpin, Woco)*.

Soil pH: Surface and subsoil pH of the well drained group ranges from very strongly acid to neutral (pH 4.7–7.4). Surface pH of the poorly drained soil group is very strongly acid to neutral (pH 4.6–6.6) but subsoil pH is variable ranging from very strongly acid to strongly alkaline (pH 4.9–8.9). Surface pH for the lower slope soils group is strongly acid to slightly acid (pH 5.2–6.5) while subsoil pH is very strongly acid to strongly acid (pH 4.6–5.3). Strongly acid pH in the subsoil corresponds to very low calcium except in *Kalah* where alkaline pH is associated with very strongly sodic subsoils.

Salinity: EC and chloride levels in the well drained group of soils are typically very low (EC 0.02–0.14 dS/m, Cl 0.001–0.01%) throughout the profile. Salt levels in the group of poorly drained soils are variable ranging from very low to very high in the surface (EC 0.01–1.5 dS/m, Cl 0.001–0.336%) and subsoils (EC 0.03–0.89 dS/m, Cl 0.004–0.15%). The poorly drained *Kalah* and *Kolbore* associated with drainage depressions are consistently saline.

The soil group on lower slopes (*Avondale*, *Turpin* and *Woco*) have low EC (0.01–0.03 dS/m) and chloride (0.001–0.004%) levels in the surface, frequently increasing to medium levels (EC 0.04–0.59 dS/m, Cl 0.022–0.085%) at depth associated with the strongly sodic subsoils levels. Secondary salinisation is always associated with clearing and irrigation of this group of soils occurring in discharge areas lower in the landscape.

Sodicity: The well drained soils group are predominantly non sodic in the surface (ESP 2–10, predominantly (<6) and sodic in the subsoil (ESP 4–11) and occasionally strongly sodic (ESP 27) in

Kepnock. The poorly drained soil group are generally sodic to strongly sodic (ESP 4–65) in the subsoil while *Avondale, Turpin* and *Woco* are always strongly sodic (ESP 19–51) in the subsoil.

High sodicity levels in these soils are always associated with low calcium and relatively high magnesium levels. However, low dispersion ratios (<0.6) indicates that the effects of sodicity are generally not expressed at low ECEC (predominantly <5 meq/100 g) and in strongly acid conditions.

Soil nutrients: Surface calcium levels range from very low to high (0.1–8.2 meq/100 g) and decrease with depth (0.04–3.2 meq/100 g). Lower calcium seems to be associated with lower pH. Calcium levels decrease while magnesium levels increase in these soils as soil drainage characteristics change from rapidly drained to poorly drained. Subsoil magnesium levels are generally high (1.7–12.1 meq/100 g) in the poorly drained soils and soils on lower slopes. Soils in the poorly drained group and those on the lower slopes of rises are predominantly magnesic (Ca/Mg <0.1).

Potassium is low to medium in the surface (0.04–1.3 meq/100 g) due to surface accumulation of organic matter decreasing with depth (0.01–0.63 meq/100 g). Phosphorus in undisturbed soils is typically very low (AP <10 ppm) while copper and zinc are generally low to medium (Cu 0.05–4.7 ppm, Zn 0.05–4.2 ppm). Organic matter and total nitrogen are higher on the well drained soils (OC 0.9–3.3%, TN 0.04–0.3%) compared to the poorly drained soils (OC 0.54–1.9%, TN 0.03–0.07%) due to larger and/or denser vegetation associated with relatively higher nutrient levels.

Cation exchange capacity (CEC): ECEC is typically very low (<10 meq/100 g) with higher levels corresponding to surface organic matter and increase in clay content with depth. Clay activity ratio is very low (approximately 10 meq/100 g clay) for the well drained and poorly drained soil groups but consistently higher (20–40 meq/100 g day) in the clay subsoil for the soil group of the lower slopes. These low ratios indicate predominantly kaolinitic type clays associated with deeply weathered geology while the higher ratios in soils on lower slopes indicates a mixture of kaolinite and montmorillonite type clays.

Soils of moderately weathered sedimentary rocks

Profiles from the *Givelda*, *Kolan* and *Tirroan* of the moderately weathered sedimentary rocks have been analysed.

Soil pH: Surface pH ranges from very strongly acid to slightly acid (pH 4.7–6.4) while subsoil pH varies from very strongly acid to mildly alkaline (pH 4.5–7.7). Subsoil pH is strongly related to calcium levels, decreasing with increasing acidity.

Salinity: All soils have very low EC (0.03–0.14 dS/m) and chloride (0.001–0.011%) levels in the surface and very low to medium levels (EC 0.48–0.56 dS/m, Cl 0.005–0.085%) in the subsoil. Higher salinity levels are associated with the strongly sodic subsoils, especially in soils developed on mudstones and shales. Secondary salinisation is occasionally evident on gentle concave slopes downslope of recharge areas.

Sodicity: Soils are non sodic to sodic (ESP 3–12) in the surface and generally strongly sodic (ESP 18–40) in the subsoil. The higher sodium levels at depth are associated with very low calcium and high magnesium. Dispersion ratios are high (0.92–0.99) but strongly acid soil pH in some soils may override the effects of sodicity.

Soil nutrients: Calcium is low to high in the surface (0.5–3.2 meq/100 g) decreasing with depth (0.2–0.47 meq/100 g) while magnesium is low to high in the surface (0.5–4.4 meq/100 g) increasing with depth (3.9–18 meq/100 g). Soils (except *Tirroan*) generally have low to medium potassium levels (0.13–0.48 meq/100 g) throughout the profile consistent with higher total potassium (0.235–1.34%) in soils on fresher rocks compared to lower total potassium in soils on deeply weathered rocks. Total nitrogen is medium (0.1–0.19%) phosphorus is low (2–15 ppm) on undisturbed soils while copper and zinc are low to medium (Cu 0.18–0.37 ppm, Zn 0.77–3.8 ppm).

These soils have consistently higher nutrient levels compared to equivalent soils on deeply weathered rocks.

Cation exchange capacity (CEC): ECEC is strongly related to clay content. A clay activity ratio of 30–60 meq/100 g clay indicates a mixture of montmorillonitic and kaolinitic clays. The clay activity ratio is consistently higher than equivalent soils on deeply weathered rocks. This is also consistent with this group of soils often having vertic properties, such as slickensides and lenticular structure, in the clay subsoils.

Soils of the plains, rises and low hills on basic volcanic rocks of both the north and south sections

Representative sites from ten SPCs formed on the basic volcanic rocks including the Quaternary basalt have been sampled and analysed. For ease of discussion similar soils have been grouped into the well drained group (*Childers, Telegraph, Woongarra)*, the shallow soils group (*Ashgrove, Corfield, Hillend, Seaview)* and the deeper clay group (*Maroondan, Rubyanna, Windemere)*.

Soil pH: Surface pH for the well drained soils group is very strongly acid to neutral (pH 4.5–6.9) while subsurface pH varies from very strongly acid to mildly alkaline (pH 4.6–7.6). The lower pH values are associated with *Childers* developed from deeply weathered Tertiary basalt. *Telegraph* and *Woongarra* developed on Quaternary basalt have generally higher pH values.

The shallow soils on fresh basalt are medium acid to slightly acid (pH 5.6–6.5) in the surface and very strongly to slightly acid (pH 4.6–6.5) in the subsoil. These pH values are comparable to the deeper clay soils surface (pH 5.9–6.6) and subsoil (pH 4.6–7.6). The deeper *Maroondan* has lime nodules at depth corresponding to a strongly alkaline pH (pH >8.5).

Salinity: The well drained and shallow soils groups typically have very low to low EC (0.02–0.27 dS/m) and chloride (0.001–0.002%) levels throughout the profile except for those soils with strongly sodic subsoils (*Ashgrove, Seaview*) which have low to medium values in the subsoil (EC 0.17–0.57 dS/m, Cl 0.012–0.075%).

EC and chloride values in the surface of the deeper clays are very low (EC 0.03–0.15 dS/m, Cl 0.001–0.008%) but may increase to medium to very high (EC 0.62–1.2 dS/m, Cl 0.065–0.21%) values at 1.2 m.

Sodicity: The well drained soils group is predominantly non sodic in the surface (ESP 1–13) and non sodic to sodic (ESP 2–17) in the subsoil. However, the low ECEC, high sesquioxides and low acidity in the *Childers* soil correspond to low dispersion ratios (<0.2).

The shallow soils on fresh basalt are non sodic in the surface (ESP 1–5) with non sodic to strongly sodic subsoils (ESP 2–20). Higher subsoil sodicity is generally associated with deeper soils, including the deeper clay soils group (ESP subsoil 15–37). These strongly sodic subsoils correspond to medium to very high salt levels.

Soil nutrients: The well drained soils group, except *Childers*, are medium to high in all nutrients (Ca 1.9–14 meq/100 g, Mg 1.6–6.9 meq/100 g, OC 0.02–1%, TN 0.16–0.4%, AP 20–160 ppm, BP 42–104 ppm, Ca 4.3–19 ppm, Zn 5.8–9.7 ppm). Potassium decreases with depth (surface 0.17–1.9 meq/100 g, subsoil 0.02–0.1%), often to low levels, typical of basalts in the area. The deeply weathered *Childers* is relatively lower in all nutrients (Ca 0.3–0.13 meq/100 g, Mg 0.23–

5.6 meq/100 g, K 0.32–1.4 meq/100 g, OC 1.1–4.6%, TN 0.09–0.46%, AP 5–100 ppm, BP 6–93 ppm, Cu 0.06–4.6 ppm, Zn 0.3–4.7 ppm).

The shallow soils on fresh basalt are medium to high in all nutrients in the surface (Ca 3.6–13 meq/100 g, Mg 3.3–12.6 meq/100 g, K 0.15–0.66 meq/100 g, OC 1.8–4.7%, TN 0.16–0.33%, AP 5–46 ppm, BP 7–78 ppm, Cu 1.7–4.4 ppm, Zn 2–8.8 ppm) except phosphorus which is very low to high (AP 5–46 ppm, BP 7–76 ppm).

The deep clays are medium to high in all nutrients in the surface (Ca 4.6–31 meq/100 g, Mg 6.7–26 meq/100 g, K 0.37–0.2 meq/100 g, OC 2.2–5.3%, TN 0.19–0.34%, AP 35–67 ppm, BP 9–140 ppm, Cu 1.4–5.2 ppm, Zn 1.7–6.7 ppm) except *Windermere* which may be very low (<10 ppm) in phosphorus.

Potassium typically decreases to low values at depth (0.02–0.15 meq/100 g) in all basaltic soils.

Cation exchange capacity (CEC): ECEC of the well drained soils group decreases with depth to low levels (<10 meq/100 g). The clay activity ratio of <15 meq/100 g clay indicates kaolinitic type clays. The deeply weathered *Childers* has variable charged clays (ECEC changes with pH) while the *Woongarra* and *Telegraph* clay subsoils on younger basalts are not variable charged.

The shallow soils on fresh basalt have a ECEC of 15–25 meq/100 g and a clay activity of approximately 40–50 meq/100 g. These higher ECEC and clay activity compared to the well drained soils group indicates a higher proportion of montmorillonite type clays associated with the fresh basalt.

The deeper clay soils generally have a ECEC/CEC of >20 meq/100 g and a subsoil (depth >0.6 m) clay activity generally >50 meq/100 g clay. The lower clay activity of 20–30 meq/100 g clay at 0.5–0.6 m in the *Windemere* would support the non cracking characteristics. The highly montmorillonitic *Maroondan* (clay activity >100 meq/100 g clay) crack extensively and are self mulching.

Land Use

Present land use

Sugarcane production is the major agricultural enterprise carried out in the study area. The area supplies three mills and in 1997 over 3.4m tonnes of sugarcane were processed worth $175m.

The expanding horticultural industry is also important to the study area. The major horticultural tree and fruit crops grown in the area include macadamia nuts, avocadoes, mangoes, bananas and pineapples. Tomatoes, capsicums, zucchini, button squash, beans, pumpkins, rock and water melons, peas and sweet potatoes are the major small crops grown in the area. The study area would contribute a large proportion of the estimated $108.5m gross value of production in 1996 for the whole BIA.

Rapid urban expansion within the study area is also competing for land for subdivisional purposes. Local authorities are endeavouring to protect good agricultural land from urban expansion.

Irrigated land suitability

Land suitability assessment evaluates the potential of land for alternative forms of land use. The procedures of land suitability assessment involves defining the land use requirements for a specific land use and the limitations which cause land to have less than optimum conditions for that particular land use. Land and soil attributes to measure and estimate the effects of each limitation are selected and ranked in terms of an increasing degree of severity for those land uses. The ranking ranges from the least severe to the most severe on a one to five scale. The overall land suitability class ranging from the best to the worst on a one to five scale is then determined usually by the most severe limitation or by a combination of two or more limitations.

The land suitability classes for a specified land use are defined as:

Class 1 Suitable land with negligible limitations
Class 2 Suitable land with minor limitations
Class 3 Suitable land with moderate limitations
Class 4 Marginal land which is presently considered unsuitable due to severe limitations
Class 5 Unsuitable land

Wilson (1997) using the above procedures as described in Land Resources Branch Staff (1990) in consultation with farmers, extension officers and research officers developed a land classification system for use in the Wide Bay area for a range of irrigated land uses.

The potential irrigated land uses in the Bundaberg area are spray and furrow irrigation of a range of field crops and micro irrigation of horticultural and tree crops. The 26 irrigated land uses for the area are listed in Table 7. The land use requirements and the associated limitations that have been identified as important for successfully growing irrigated crops in the Bundaberg area are listed in Table 8.

The land suitability was assessed for the 26 irrigated land uses for each UMA. The suitability, the limitations and the attributes used to evaluate the limitations, the major soils of the UMA and other information for that UMA are stored on a computer database. This UMA database has been linked to the GIS. Enquires for any recorded information for a particular UMA or for the whole coverage is available from the Department of Natural Resources (DNR), Enterprise Street, Bundaberg.

Table 7. The land uses for which irrigated land suitability was assessed in the North and South Sections of the Bundaberg area

Overhead irrigation of:
- Sugarcane
- Maize
- Sorghum
- Lucerne
- Soybeans
- Peanuts
- Pastures
- Asparagus
- Beans
- Navybeans
- Cucurbits (pumpkin, melon, cucumbers)
- Potato
- Sweet corn
- Sweet potato
- Pineapple

Microsprinkler/drip irrigation of:
- Crucifera (turnip, cabbage, cauliflower)
- Avocado
- Citrus
- Grape
- Macadamia
- Stonefruit
- Lychee
- Mango
- Vegetables (tomato, capsicum, eggplant)

Furrow irrigation of:
- Sugarcane
- Other field crops

Table 8. Land use requirements and limitations for irrigated farming systems in the Bundaberg area (from Land Resources Branch Staff 1990)

Land use requirements	Limitations*
Frost free	climate (c)
Adequate water supply	water availability (m)
Adequate nutrient supply	nutrient deficiency (nd)
Adequate retention of added nutrients against leaching	nutrient leaching (nl)
Low nutrient fixing conditions	nutrient fixation (nf)
Low levels of toxic elements	element toxicity (nt)
Adequate soil aeration	wetness (w)
Adequate soil depth for physical support	soil depth (d)
Absence of damaging floods	flooding (f)
Rock-free	rockiness (r)
Adequate production area	landscape complexity (x)
Level land surface	microrelief (tm)
Land surface of acceptable slope	slopes (ts)
Ease of seedbed preparation and plant establishment	surface condition (ps)
Suitable timing for cultivation	narrow moisture range (pm)
Ability to harvest underground crops	soil adhesiveness (pa)
Minimum soil loss from erosion	water erosion (e)
Minimum potential to cause secondary salting	secondary salinisation (s)
Efficient water infiltration for furrow irrigation	water infiltration (if)
Efficient soil water recharge	soil water recharge (ir)

* All the limitations listed do not necessarily apply to each land use or to all soils. Some limitations are more important for some soils than others.

Appendix II shows the suitability class and area for five land uses including the irrigation of sugarcane, macadamia, cucurbits (pumpkins, melons), vegetables (tomato, capsicums) and peanuts for each UMA. Areas for the land suitability classes for these irrigated land uses for the North and South sections are given in Tables 9 and 10 respectively.

The effects of many of the limitations can be overcome or reduced by appropriate management techniques. The major limitations of similar soil groups as well as a brief description of some management options to decrease their effects are given in Table 11.

Table 11 is not appropriate for obtaining information on specific UMAs as only general statements for the broad soil groups are given. Information for a specific UMA should be obtained from the DNR office in Bundaberg.

Table 9. Areas (ha) of land suitability classes for the irrigated land uses for sugarcane, macadamia, cucurbits (pumpkin, cucumber, melon), vegetables (tomato, capsicum) and peanuts for the North Section, Bundaberg area

Land Class	Sugarcane	Macadamia	Cucurbits	Vegetables	Peanuts
Class 1	174	--	--	--	
Class 2	8 731	8 563	9 186	13 438	2 441
Class 3	28 962	6 222	21 119	16 867	14 976
Class 4	17 032	10 065	13 246	13 246	15 662
Class 5	19 058	49 107	30 406	30 406	40 878

Table 10. Areas (ha) of land suitability classes for the irrigated land uses for sugarcane, macadamia, cucurbits (pumpkin, cucumber, melon), vegetables (tomato, capsicum) and peanuts for the South Section, Bundaberg area

Land Class	Sugarcane	Macadamia	Cucurbits	Vegetables	Peanuts
Class 1	262	--	--	52	--
Class 2	8 431	7 041	9 281	12 048	3 094
Class 3	16 431	3 149	16 551	13 732	7 416
Class 4	8 434	10 470	4 541	4 541	16 146
Class 5	15 800	28 698	18 985	18 985	22 702

Table 11. Major soil limitations and management remarks for soil management groups in the Bundaberg area

Soil groups	Major limitations	Management remarks
Tenosols and Kandosols on coastal plains.		
Beelbi (Bi)	• Low PAWC. • Low nutrient status and retention capacity. • Stone or cobble may be present on surface.	The suitability of this soil ranges from Class 2 to 5 for a wide range of crops depending largely on the amount of stone on the surface. Individual UMAs need to be accessed due to the variation. Some management options to reduce the effects of the limitations include: • Assessing whether stone picking is a viable option especially where surface stone is abundant. • Irrigating more effectively with frequent light irrigations using low volume irrigation techniques. • Incorporating crop residues to build up organic matter levels to improve structure, waterholding capacity and nutrient retention ability. • Splitting fertiliser applications or applying low release fertilisers or applying fertilisers with irrigation water.
Podosols on sedimentary rocks and coastal plains.		
Coonar (Cn) *Kinkuna (Kn)* *Toogum (To)* *Wallum (Wm)* *Woodgate (Wd)*	• Low PAWC. • Low nutrient status and retention capacity. • Secondary salinisation may occur on *Wallum* and *Kinkuna.*	The suitability of these soils varies from Class 3 to Class 5 for the land uses considered. Usually these soils are suitable for the irrigation of a range of crops and tree crops often depending on the depth to a seasonal watertable. Individual UMAs need to be accessed due to the variation. Some management options to reduce the affects of the limitations include: • Irrigating more effectively with frequent light irrigations using low volume irrigation techniques. • Incorporating crop residues in topsoil to build up organic matter levels to improve structure, waterholding capacity and nutrient retention ability. • Splitting fertiliser applications, applying slow release fertilisers, and applying fertilisers through irrigation.
Tenosols and Rudosols on recent alluvial plains of the Burnett and Kolan Rivers.		
Barubbra (Bb) *Burnett (Bn)*	• Low PAWC. • Low nutrient status and nutrient retention capacity, especially on those soils with sandy surfaces. • Flooding in lower terraces. • Soil complexity.	These soils are more suitable for tree crops and small crops under low volume irrigation techniques as they are well drained but have low PAWC. Management options that need to be considered when utilising these soils include: • Irrigating more effectively with frequent light irrigations using low volume irrigation techniques. • Incorporating crop residues to build up organic matter levels to improve structure, PAWC and nutrient retention ability. • Using split fertiliser applications or applying slow release fertilisers, or applying fertiliser with irrigation water. • Growing flood tolerant crops in flood prone areas. • Achieving optimum production, by adjusting management strategies to suit particular blocks as these soils are very variable with contrasting management requirements.

Table 11 (continued)

Soil groups	Major limitations	Management remarks
Black and Brown Dermosols with clay loam to light clay surfaces on recent alluvial plains of the Burnett and Kolan Rivers.		
Flagstone (Fs) *Gahan (Gh)* *Sugarmill (Sm)*	• Sugarmill, poorly drained at depth. • Flooding in lower terraces and drainage depressions. • Lower PAWC for *Gahan*.	These soils are favourable soils for irrigation of sugarcane, field crops, most small crops and a range of tree crops. The management options that may be considered to overcome the minor limitations associated with these soils include: • Irrigating *Gahan* more frequently as PAWC is reduced due to the presence of sandy layers in the profile. • Growing flood tolerant crops in lower flood prone areas. • Avoiding growing tree crops in those areas where drainage at depth is poor such as for *Sugarmill*.
Sodosols of the older alluvial plains of the Burnett and Kolan Rivers, the marine plains, coastal plains and the fine grained sedimentary rocks.		
Auburn (Ab) *Crossing (Cg)* *Moorland (Ml)* *Norville (Nv)* *Peep (Pp)* *Qunaba (Qb)*	• Low PAWC. • Rooting depth limited by high sodicity and salt levels at shallow depths. • Hardsetting surfaces, especially on *Moorland, Auburn* and *Norville*. • Poor internal drainage. • Low nutrient retention capacity in topsoil of *Crossing* and *Qunaba*	These soils are generally suitable for irrigated sugarcane, lychees and pastures but either Class 4 or 5 for other crops. High management inputs are required to achieve acceptable yields. Management options that need to be considered to improve productivity and sustainability include: • Irrigating more effectively with frequent irrigations as depth of water penetration limited by high sodicity and salt levels especially in *Auburn* and *Crossing* (*Moorland* has lower levels and is better drained). • Deep ripping, especially under dry conditions, to improve water penetration and therefore PAWC on these soils. • Combining deep ripping with gypsum which will prolong beneficial effects of deep ripping. • Avoiding mixing subsoil with surface soil as the high sodium levels in the subsoil will present problems with germination and establishment. • Incorporating crop residues to improve structure of the surface and reduce problems of seedling emergence and crop establishment. • Avoiding growing crops that require good internal soil drainage as these soils are usually imperfectly to poorly drained.
Kandosols, Chromosols or Dermosols with either loamy or sandy surfaces on the older alluvial plains of the Burnett and Kolan Rivers and the local streams.		
Boyne (By) *Littabella (Lt)* *Pocket (Pk)*	• Surface crusting on finer textured surfaces. • Low PAWC in A horizons with sandy surfaces. • Soil complexity.	These soils, especially *Boyne*, are favourable soils for a range of crops. The minor occurrence and association with other soils presents some difficulties for successful management. The options available for better management of these soils include: • Incorporating crop residues to build up organic matter levels to improve structure and reduce problems with germination and crop establishment on finer surfaces and improve PAWC on sandier surfaces. • Adjusting management strategies to suit particular blocks as these soils usually occupy small areas and are adjacent to soils with contrasting management requirements. • Irrigating more effectively with frequent light irrigations using low volume irrigation techniques.

Table 11 (continued)

Soil groups	Major limitations	Management remarks
Vertosols of the older alluvial plains of the Burnett and Kolan Rivers and the local streams.		
Hinkler (Hk) *Walla (Wl)* *Weithew (Wh)*	• Surface crusting may occur. • Gilgai occurs on undeveloped land. • Low gradients. • Flooding may occur. • Usually poorly drained at depth. • Narrow moisture range for access and cultural activities. • Strongly adhesive.	These soils are generally suitable for irrigated sugarcane, lychees and pastures but are either Class 4 or 5 for other crops. Appropriate techniques are required to manage these soils effectively. Some management options that need to be considered to increase productivity and sustainability include: • Planning operations to reduce access problems during wet periods. • Cultivating these soils at optimum soil moisture content over a narrow timespan to avoid smearing if too wet and producing clods when dry. • Using short irrigation duration times as water entry is rapid when cracks are open but very slow when cracks close. • Ripping and applying gypsum to improve water infiltration and PAWC in the upper subsoil especially for *Walla*. • Applying gypsum on the surface to reduce problems with germination, seedling emergence and crop establishment. • Avoiding incorporating the upper subsoil of *Walla* into the topsoil as germination and establishment problems may be increased. • Avoiding growing deep rooted crops that require well drained soils as these soils have poor drainage at depth and high watertables during wet periods especially *Hinkler*. • Laser levelling to ensure gradients are sufficient to remove excess surface water.
Tenosols and Podosols with sandy profiles on the beach ridges of the marine plains.		
Colvin (Cv) *Moore Park (Mp)* *Tantitha (Tt)*	• Low PAWC. • Low nutrient status and low nutrient retention capacity. • *Colvin* and occasionally *Moore Park* may be poorly drained at depth especially during excessive wet periods.	These soils are generally suitable for low volume irrigation of a range of crops. High management inputs are required and some options to consider include: • Irrigating more effectively with frequent light irrigations using low volume irrigation techniques. • Incorporating crop residues to build up organic matter levels to improve structure, waterholding capacity and nutrient retention ability. • Splitting fertiliser applications or applying slow release fertilisers, or applying fertilisers with irrigation water. • Understanding that perched watertables which may occur on the lower beach ridges during prolonged wet periods may be detrimental to growth for susceptible crops.
Brown Chromosols or Dermosols with sandy surfaces on marine plains.		
Booloongie (Bo)	• Low PAWC. • Low nutrient retention capacity. • High watertable especially during prolonged wet periods. • Soil complexity.	This soil is generally suitable for a range of tree crops including trees which can tolerate some wetness. Some management options to consider to improve productivity and sustainability include: • Adjusting management strategies to suit particular blocks as this soil usually occupies small areas and is adjacent to soils with contrasting management requirements. • Irrigating more effectively with frequent light irrigations. • Splitting fertiliser applications or applying slow release fertilisers, or applying fertilisers with irrigation water.

Table 11 (continued)

Soil groups	Major limitations	Management remarks
Hydrosols with loamy surfaces on the plains and swales of the marine plains.		
Whymere (Wy)	• Low to moderate PAWC. • Low nutrient status and low nutrient retention capacity. • Hardsetting surfaces. • Structureless, dilatant properties often present in A horizons. • Soil complexity. • High watertable especially during prolonged wet periods. • Secondary salinisation may occur.	Due to the variability of these soils in terms of profile and position in the landscape, a range of irrigated land use suitabilities occurs. Some UMAs are suitable for sugarcane and some other crops while others are unsuitable, so access to the specific UMAs is required. Generally, tree crops are unsuitable. Some management options that may be considered to improve production and sustainability include: • Incorporating crop residues in topsoil to improve structure and reduce problems with seedling emergence and crop establishment. • Constructing drains to lower watertables and decrease likelihood of salinisation. • Rehabilitating degraded areas by growing trees tolerant to high watertables.
Hydrosols with clay surfaces on the plains and swales of the marine plains.		
Fairydale (Fd) *Fairymead (Fm)*	• Low lying areas with low slopes. • Flooding may occur. • Wetness due to high watertables causing surface seeps to develop in some areas, especially during excessive wet periods. • Usually strongly acid subsoils. • Usually poorly drained below 0.5 to 1.0 m. • Secondary salinisation in some areas.	These soils are generally only suitable for sugarcane and a limited number of field and small crops as they are poorly drained at depth, have strongly acid subsoils, fluctuating watertables and may have pyrite at depth. High management inputs at the farm level as well as the district level are required to achieve acceptable and sustainable yields and to protect the environment. Some management options to consider to improve production and sustainability include: • Planning operations to reduce access problems during wet periods. • Dewatering to lower the perched watertable to manageable levels may be necessary during wet periods. • Avoiding lowering the permanent watertable below pyritic layers to avoid acid leakage into streams and drains. • Applying lime to increase pH and nutrient availability. • Avoiding exposing the strongly acid subsoil on the surface or mixing with the surface soil as large quantities of lime will be needed for amelioration. • Introducing salt tolerant crops to rehabilitate saline areas. • Laser levelling to allow excess surface water to be removed off cropped areas quickly. • Constructing shallow drains in preference to deep drains to avoid exposing pyrite layers at depth and subsequent acid leakage.

Table 11 (continued)

Soil groups	Major limitations	Management remarks
Red Kandosols and Dermosols on deeply weathered coarse grained and fine grained sedimentary rocks.		
Farnsfield (Ff) *Gooburrum (Gb)* *Gibson (Gs)* *Howes (Hs)* *Oakwood (Ok)* *Otoo (Ot)* *Watalgan (Wt)*	• Permeable soils occurring in groundwater recharge areas. • Initially low in nutrients. • Susceptible to erosion on slopes. • Hardsetting surfaces are usually associated with loamy surface soils such as *Oakwood, Watalgan, Otoo, Gibson* and *Howes*.	These soils are deep and are well drained and generally suitable for most crops. Some management options that may be considered to improve production and sustainability include: • Using spray and trickle irrigation methods to reduce losses to deep drainage and prevent secondary salinisation downslope. • Using erosion control measures on sloping land. • Avoiding cultivation on slopes greater than 8%. • Incorporating crop residues to improve structure and reduce problems with seedling emergence and crop establishment.
Yellow and Brown Kandosols and Dermosols with sandy surfaces on deeply weathered coarse grained sedimentary rocks.		
Calavos (Ca) *Isis (Is)* *Meadowvale (Md)* *Quart (Qr)* *Rothchild (Rt)*	• Low to moderate PAWC. • Susceptible to erosion on slopes. • Initially low in nutrients. • Low nutrient retention capacity.	These soils are generally suitable for the irrigation of most crops although tree crops such as avocado, macadamia and citrus may be affected by the poorer drainage at depth. Some management options that may be considered to improve production and sustainability include: • Using erosion control measures on sloping land. • Avoiding cultivation on slopes greater than 8%. • Irrigating more effectively with frequent light irrigations using low volume irrigation techniques. • Incorporating crop residues in topsoils to build up organic matter levels to improve structure, waterholding capacity and nutrient retention ability.
Yellow and Brown Kandosols and Dermosols with loamy surfaces on deeply weathered fine grained sedimentary rocks.		
Cedars (Cr) *Gillen (Gi)* *Kepnock (Kp)* *Woolmer (Wr)*	• Susceptible to erosion on slopes. • Initially low in nutrients. • Hardsetting surfaces. • May contain up to 50% iron nodules which reduces PAWC significantly.	Generally these soils are suitable for irrigation of a range of crops, but marginal or unsuitable for land uses such as irrigated beans, navybeans and tree crops such as grapes, citrus, macadamia and avocado. Some management options to consider to improve production and sustainability include: • Using erosion control measures on sloping lands. • Avoiding cultivation on slopes greater than 8%. • Incorporating crop residues to build up organic matter levels to improve structure and reduce problems with seedling emergence and crop establishment. • Irrigating those soils with large amounts of iron nodules more frequently as PAWC is low.

Table 11 (continued)

Soil groups	Major limitations	Management remarks
Hydrosols with deep sandy surfaces on plains, drainage depressions of plains and lower slopes of rises on deeply weathered fine grained sedimentary rocks.		
Alloway (Al) *Mahogany (Mh)* *Robur (Rb)* *Theodolite (Th)* *Winfield (Wf)*	• Occur in discharge areas and may be affected by waterlogging for several months. • Secondary salinisation may occur. • Low PAWC. • Initially low in nutrients. • Low nutrient retention capacity. • Susceptible to erosion on slopes.	The suitability of these soils varies from Class 3 to 4 for a range of land uses depending on their position in the landscape. These soils are generally unsuitable for cropping as they occur on the lower slopes of rises and drainage depressions but may be suitable on the plains. However, most deep rooted crops are unsuitable on these soils. Individual UMAs need to be accessed as to their suitability due to the variation in these soils. Some management considerations that may be considered to reduce the affects of the limitations include: • Planning operations to reduce access problems during wet periods. • Constructing interception drains above discharge areas to reduce effects of waterlogging and salinisation. • Constructing subsurface drains to also assist site drainage. • Irrigating more effectively with frequent light irrigations using low volume irrigation techniques. • Incorporating crop residues to increase organic matter levels to improve structure, PAWC and nutrient retention ability and reduce problems with seedling emergence and crop establishment. • Splitting fertiliser applications or applying slow release fertilisers. • Using erosion control measures on sloping lands. • Avoiding cultivation on slopes greater than 5%.
Hydrosols with loamy surfaces on plains, drainage depressions of plains and lower slopes of rises on deeply weathered coarse grained sedimentary rocks.		
Bingera (Br) *Clayton (Cl)* *Kalah (Kh)* *Kolbore (Kl)*	• Occur in discharge areas and may be affected by waterlogging for several months. • Secondary salinisation may occur. • Initially low in nutrients. • Hardsetting surfaces. • Susceptible to erosion on slopes.	The suitability of these soils varies from Class 3 to 5 for a range of land uses depending on their position in the landscape. These soils are generally unsuitable for cropping as they occur in the lower slopes of rises and drainage depressions and may be waterlogged for considerable periods. However, on the plains, with reduced incidence of waterlogging, these soils especially *Clayton* and *Bingera* may be suitable for a range of crops such as sugarcane, cucurbits, maize, soybeans, lychees, pineapples and pastures. Individual UMAs should be assessed as to their suitability due to the variation in these soils. Some management options that may be considered to reduce the affects of the limitations include: • Planning operations to reduce access problems during wet periods. • Constructing interception drains above discharge areas to reduce effects of waterlogging and salinisation. • Constructing subsurface drains to also assist site drainage. • Incorporating crop residues in topsoil to improve structure and reduce problems with seedling emergence and crop establishment. • Using erosion control measures on sloping lands.

Table 11 (continued)

Soil groups	Major limitations	Management remarks
Tenosol with rocky surface on crests and hillslopes of deeply weathered sedimentary rocks.		
Takoko (Tk)	• Low PAWC. • Common to abundant rock. • Low nutrients. • Shallow soils. • Slopes up to 15%.	This soil is generally unsuitable for all irrigated land uses.
Vertosol or Dermosol on sedimentary rocks.		
Bucca (Bc)	• Moderate PAWC. • Low nutrients. • Acid pH throughout profile. • Most slopes between 5-15%. • High aluminium levels.	This soil is usually only suitable for irrigated sugarcane on slopes less than 8%. Some management options to improve production and decrease degradation include: • Using soil erosion control measures on sloping land. • Using lime to increase pH and increase nutrient availability. • Understanding that high aluminium levels may be toxic for some crops.
Red Ferrosols on the crests and hillslopes on basic volcanic rocks of north section and rises of Quaternary basalt of the south section.		
Childers (Cd) *Chin (Ch)* *Woongarra (Wg)*	• Permeable soils of recharge areas. • Susceptible to erosion on slopes.	These soils are favourable for a wide range of irrigated land uses as they are well drained and have a high waterholding capacity. Management options that need to be considered to improve productivity and reduce degradation include: • Using spray or trickle irrigation methods to reduce losses to deep drainage and reduce watertable levels on lower slopes. • Using erosion control methods on sloping land. • Avoiding cultivation on slopes greater than 12%. • Minimising traffic on these soils to reduce compaction. • Avoiding trafficking in wet conditions.
Brown Ferrosol on the lower slopes of rises of Quaternary basalt of the south section.		
Telegraph (Tg)	• Drainage is impeded by seasonally perched watertables in some areas. • Susceptible to erosion on slopes.	This soil is favourable for a range of irrigated land use but often unsuitable for tree crops which require well drained soils as internal drainage is affected by seasonally perched watertables in some areas. Management options that need to be considered to improve productivity and decrease degradation include: • Using erosion control methods on sloping land. • Avoid growing tree crops in areas where watertables may rise. • Minimising traffic on these soils to reduce compaction. • Avoiding trafficking in wet conditions.

Table 11 (continued)

Soil groups	Major limitations	Management remarks
Black and Brown Dermosols and Ferrosols with clay textures on crests and hillslopes on basic volcanic rocks and slightly elevated flats of plains of Quaternary basalt.		
Berren (Be) *Corfield (Cf)* *Hillend (He)* *Seaview (Sw)*	• Shallow soils. • Usually abundant rock present on surface and as floaters in the profile. • Narrow moisture range for access and cultural activities. • Moderate to strongly adhesive.	These soils are generally unsuitable for cropping unless stone picking is carried out. After stone picking, these soils may be suitable for a range of crops depending on depth of soil, although the clay texture and imperfectly drained profile reduces their suitability for tree crops. Some management considerations to reduce the effect of these limitations include: • Assessing whether stone picking is a viable option especially where surface stone and boulders are abundant. • Being aware that stones continue to appear on the surface after initial stone picking. • Cultivate these soils at optimum soil moisture content over a narrow timespan to avoid smearing if too wet and producing clods when dry.
Hydrosol on lower slopes and drainage lines of rises of Quaternary basalt of the south section.		
Ashgrove (Ag)	• Occurs in discharge areas along drainage lines and becomes wet seasonally as well as from irrigation. • Pan present between 0.55 and 0.9 m. • Rooting depth affected by pan.	Most UMAs occupied by this soil are unsuitable due mainly to the wetness limitation, with a few exceptions depending on position in the landscape. Some of the management options to reduce these limitations include: • Planning operations to reduce access problems during wet periods. • Constructing drains above these areas to intercept water, and reduce effects of waterlogging.
Vertosols and Ferrosols on crests and hillslopes on basic volcanic rocks of the north section and low lying flats and depressions of plains of Quaternary basalt of the south section.		
Maroondan (Mr) *Windemere (Wi)*	• Narrow moisture range for access and cultural activities. • Gilgai may be present on undeveloped land. • Strongly adhesive. • Stone or boulders may be present on surface.	These soils are suitable for a limited number of irrigated land uses such as sugarcane and pasture. Management options to reduce the effects of the limitation include: • Planning operations to reduce problems with access during wet periods. • Cultivating these soils at optimum moisture content over a narrow timespan, to avoid smearing if too wet and producing clods when dry. • Stone picking where necessary. • Using erosional control methods on sloping land.
Vertosol on low lying flats and depressions of plains of Quaternary basalt of the south section.		
Rubyanna (Ra)	• Occurs in discharged areas and becomes wet seasonally as well as from irrigation. • Gilgai may be present on undeveloped land. • Stone may be present on surface. • Narrow moisture range for access and cultural activities. • Strongly adhesive.	Most UMAs of this soil are unsuitable for irrigated cropping, although better drained areas may be suitable for irrigated sugarcane and a limited number of small crops. Some management inputs that may be considered to reduce the effects of the limitations include: • Planning operating to reduce problems with access during wet periods. • Constructing drains above these areas to intercept water, so as to reduce the effects of waterlogging. • Stone picking where necessary. • Levelling where gilgais occur. • Cultivating these soils at optimum soil moisture over a narrow time span to avoid smearing if too wet and producing clods when dry.

Agricultural land classes

The implementation of State Planning Policy 1/92: Development and the Conservation of Agricultural Land, requires decision makers both Local and State Governments to be aware of the location and extent of good quality agricultural land (Anon. 1993). This information is necessary so provisions for the protection of this land can be included in strategic plans, development control plans and other relevant planning schemes.

Four classes of agricultural land have been defined for Queensland to assist in the identification of good agricultural land. The definition of the four classes are:

Class A **Crop land -** Land suitable for current and potential crops with limitations to production which range from none to moderate levels.

Class B **Limited crop land -** Land that is marginal for current and potential crops due to severe limitations; and suitable for pastures. Engineering and/or agronomic improvements may be required before the land is considered suitable for cropping.

Class C **Pasture land -** Land suitable only for improved or nature pastures due to limitations which preclude continuous cultivation for crop production; but some areas may tolerate a short period of ground disturbance for pasture establishment.

Class D **Non-agricultural land -** Land not suitable for agricultural uses due to extreme limitations. This may be undisturbed land with significant habitat, conservation and/or catchment values or land that may be unsuitable because of very steep slopes, shallow soils, rock outcrop or poor drainage.

Agricultural land classes for the Bundaberg area were determined using criteria from the land suitability classes for pastures, mangoes and sugarcane.

The area of the agricultural land classes for the north and south sections of the Bundaberg area is given in Table 12. Maps showing the agricultural land classes are available from DNR office in Bundaberg.

Table 12. Areas of agricultural land classes for the North and South sections of the Bundaberg area

Land Class	North Section - Area (ha)	South Section - Area (ha)
A	43 864	29 129
B	11 235	4 772
C	220	1 094
D	18 638	14 460

Land degradation

Forms of degradation occurring in the study area include salinisation, soil erosion, nutrient leaching, soil acidification, soil structural decline, compaction and waterlogging. Correct management of acid sulfate soils is also an important issue.

Salinity is often associated with discharge areas where there is an upward component to groundwater flow near the soil surface. Discharge areas occur at break of slope, in flat and incised areas or in regions of concave slope.

In this survey area, salinity outbreaks are more likely to occur in the lower slopes and drainage lines below the fine grained sedimentary rocks especially where the landform pattern consists of rises and low hills. Soils in these areas are often poorly drained within their profile as they have restrictions to drainage such as pans or sodic clay layers. If watertables rise to within 1–1.5 m of the surface, salinisation may occur. Intercepting the perched watertables above these discharges areas by drains and conveying the water to a safe disposal area may reduce the incidence of salinity. Ninety four UMAs occupying 3543 ha are affected by salinity with about 1000 ha currently severely affected.

Soil erosion causes soil deterioration and consequently reduces productivity by removing plant nutrients and organic matter. Slope, including both length and steepness, and soil erodibility are the major factors causing erosion in this area. Practices such as contour tillage and contour banks as well as stubble or crop cover are useful management procedures to reduce erosion. Ninety two UMAs were recorded as having being affected by erosion. The UMAs occupy 4860 ha but only 1089 ha are currently affected by moderate to severe erosion.

Nutrient leaching to groundwater is an important issue especially on the highly permeable, well drained soils and irrigation management techniques such as trickle irrigation or more frequent light irrigations to reduce leaching are important considerations on these soils.

Soil acidification has been associated with productivity decline in sugarlands especially on naturally occuring acid soils due mainly to sugarcane monoculture and high fertiliser use. Many soils of the Bundaberg area, especially those formed on sedimentary rocks are naturally acidic. Research into this decline is being addressed in a long term study in the Bundaberg area (Mr G Cunningham and Mr N Halpin, *pers. comm*.).

Many of the soils of the Bundaberg area are naturally poorly structured. Excessive cultivation and the use of implements which pulverise the soil, for example rotary hoes, as well as the burning of residues are further contributing to surface sealing, poor seed-soil contact with subsequent problems with emergence and crop establishment. Reducing the number of cultivations, the incorporation of green legume crop in the rotation as well as the incorporation of crop residues will reduce these problems.

Compaction, due to the excessive traffic associated with land uses such as sugarcane and small crop production, is a problem on most soils. Compaction which causes poor root development and decreases water entry may be reduced by minimising traffic, especially under wet conditions, deep ripping or by using controlled traffic techniques. Controlled traffic involves creating compacted areas which all traffic use in order to create a more favourable environment for plant growth in the rest of the field. Trials are underway in the Bundaberg area to investigate the use of controlled traffic in sugarcane (Dr M Braunach and Dr D McGarry *pers. comm.*).

Waterlogging occurs throughout the area but especially on the lower slopes and drainage depressions of the rises and low hills. Waterlogging decreases productivity by creating unfavourable conditions for plant growth and cultural activities. Drains at strategic positions to intercept the perched watertable and to convey the water to a suitable reservoir for subsequent reuse are a means of decreasing the effects of this problem. Using irrigation techniques such as trickle irrigation to avoid deep drainage losses on the intake areas above these discharge areas may also reduce the incidence of waterlogging.

Acid sulfate soils are present in the study area on the marine plains and in the tidal flats of the rivers and creeks. The cropped area east of the Elliott escarpment between the Burnett and Kolan Rivers needs to be managed correctly to maintain crop production and prevent detrimental onsite and offsite environmental impacts. The watertable must remain at its present level to prevent the oxidation of any pyrite present in sediments below the present watertable to prevent subsequent release of sulphuric acid with undesirable environmental consequences. The tidal flats are best left undisturbed to avoid acid leakage.

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Appendix I.

Areas of land suitability for the irrigated land uses for sugarcane, macadamia, cucurbits (pumpkin,) cucumber, melon), vegetables (tomato, capsicum) and peanuts for the North Section, Bundaberg area

UMA No	UMA name	Minor soils	Land Suitability*					Area (ha)
			S	M	C	V	P	
1	Wl		3	5	4	4	5	545
2	Nv	Ab	3	5	4	4	5	40
3	Ab		3	5	4	4	5	9
4	Nv	Ab	3	5	4	4	5	11
5	Hk	Ab	3	5	3	3	4	202
6	Ab		3	5	4	4	5	12
7	Ab		3	5	4	4	5	15
8	Fs		2	3	2	2	3	164
9	Bn		3	2	2	2	2	2
10	Fs-Gh	Bn	2	3	2	2	3	104
11	Bn		3	2	2	2	2	15
12	Bb-Gh		4	5	3	2	5	62
13	Sm	Fs	2	5	2	2	3	40
14	Tt		4	2	3	2	4	53
15	Ab		3	5	4	4	5	28
16	Hk		3	5	3	3	4	6
17	Cv	Tt, By	4	2	3	2	4	15
18	Wl		3	5	4	4	5	6
19	By		2	2	2	2	3	7
20	Gh	Fs	3	3	2	2	3	9
21	Sm	Fd	3	5	3	3	3	38
22	Gh	Fs	3	3	2	2	3	33
23	Tt	Cv	4	2	3	2	4	113
24	W		5	5	5	5	5	8
25	Fs	Sm, Bn	2	3	2	2	3	77
26	Sm	Fd, Fs	3	5	3	3	3	580
27	Bb	Bn	4	2	3	2	4	5
28	Bb		4	2	3	2	4	1
29	Gh	Bn, Fs	3	3	2	2	3	95
30	Bn	Gh	3	2	2	2	2	9
31	Bn		3	2	2	2	2	5
32	Bn-Bb		3	2	2	2	2	18
33	Fs	Bn, Gh	2	3	2	2	3	22
34	Fm	Fd	3	5	3	3	3	14
35	Sm	Gh	3	5	3	3	3	9
36	Bb		4	2	3	2	4	7
37	Bb		4	2	3	2	4	10
38	Cv		4	5	3	2	4	4
39	Fd	Fm	3	5	5	5	5	92
40	Fd		4	5	5	5	5	31
41	Fm	Fd	3	5	5	5	5	99
42	Fd		3	5	5	5	5	63
43	Mp	Cv	4	2	3	2	4	210
44	Fd		4	5	5	5	5	46
45	SmGv		2	4	2	2	3	45
46	SmAv	Fm	3	5	3	3	3	244
47	Fm	Fd, Sm	3	5	5	5	5	538
48	Fd	Fm	3	5	5	5	5	427
49	SmGv		2	4	2	2	3	28
50	Tt	Cv	4	2	3	2	4	17
51	Cv	Tt, By	4	2	3	2	4	987
52	Fd		3	5	5	5	5	8
53	Bo	Cv, Fd	3	5	2	2	3	212
54	Bo	Cv	3	5	3	3	4	108
55	Cv		4	2	3	2	4	7
56	Gh		3	3	2	2	3	71
57	Fd	Sm	3	5	5	5	5	43
58	Cv		4	2	3	2	4	132
59	Bo	Cv	3	5	3	3	4	4
60	Cv	GhV	4	2	3	2	4	9
61	Bo	Cv	3	5	3	3	4	6
62	Cv		4	5	3	2	4	46
63	Cv		4	5	3	2	4	32
64	Bo		3	5	2	2	3	5
65	Fm	Fd	3	5	5	5	5	607
66	Cv-Fd		4	5	3	2	4	29
67	Mp	Cv	4	5	3	2	4	35
68	Fd	Fm, Mp	3	5	5	5	5	68
69	Mp	Cv	4	2	3	2	4	247
70	Fd		3	5	5	5	5	34
71	Fd	Mp	3	5	5	5	5	29
72	Fd	Mp	3	5	5	5	5	11
73	Mp	Cv	4	5	3	2	4	7
74	Bo		3	5	2	2	3	5
75	Bo	Wy, Cv	3	5	3	3	4	14
76	Cv		4	2	3	2	4	2
77	Bo	Cv	3	5	2	2	3	5
78	Mp		4	5	3	2	4	20
79	Bo	Cv	2	5	3	3	4	22
80	Cv	Bo, Wy	4	5	3	2	4	41
81	M		5	5	5	5	5	1473
82	Wy	Gh	3	5	5	5	5	33
83	Cv	Mp	4	5	3	2	4	8
84	Fd	Fm, Fdv	3	5	5	5	5	317
85	Cv	Mp	4	5	3	2	4	601
86	Cv	Mp	4	5	3	2	4	10
87	Fd		3	5	5	5	5	207
88	Mp	Fd, Cv	4	2	3	2	4	719
89	Cv	Bo, Mp	4	5	3	2	4	39
90	Bo	Wy	3	5	3	3	3	8
91	Wy	Fd, Fm	4	5	5	5	5	38
92	Bo	Fd, Wy	5	5	5	5	5	22
93	Wy		5	5	5	5	5	12
94	Fd	Wy, Bo	5	5	5	5	5	84
95	Wt		4	3	5	5	5	25
96	Cv		4	5	3	2	4	8
97	W		5	5	5	5	5	15
98	Mp	Cv	4	2	3	2	4	15
99	Fd	Mp	5	5	5	5	5	23
100	Ok		2	2	2	2	3	382
101	Ot		2	3	3	3	3	21
102	Ot		2	4	3	3	3	22
103	Is	Al	3	5	3	3	4	30
104	Cl	Al	4	5	4	4	4	21
105	Kp	Is	3	4	3	3	4	24
106	Cl	Al	4	5	5	5	5	22
107	Cl	Al	5	5	5	5	5	25
108	Wt		2	4	3	3	3	38
109	Wy		4	5	5	5	5	19
110	Is	Rt	3	4	3	3	3	43
111	Gb		3	2	3	3	3	157
112	Q		5	5	5	5	5	3
113	Al	Rt	4	5	4	4	4	8
114	Al	Cl	4	5	4	4	4	22
115	Rt		4	2	3	3	4	37
116	Wf	Rt	4	3	3	3	4	55
117	Wy		4	5	5	5	5	16
118	Ff		3	2	3	3	3	18
119	Wt	Gb	2	3	3	3	3	13
120	Qr	QrBv	3	4	3	3	3	19
121	Ff	Ok	2	2	3	3	3	39
122	Al	Wf	4	5	4	4	4	18
123	Ff	Ok	2	2	3	3	3	12
124	Ff	Ok	2	2	2	2	2	24
125	Ff	Ok	2	2	2	2	2	72
126	Ff		3	2	2	2	2	10
127	Is	GbMv	3	4	3	3	3	27
128	Ok		2	2	3	3	3	124
129	Gb		3	3	3	3	3	17
130	GbMv	Ot	3	3	3	3	3	32
131	WtMv		2	4	2	2	3	6
132	Wt	Ot	2	4	2	2	3	41
133	Ok		2	2	3	3	3	3
134	Kp		3	4	2	2	3	30
135	Kp	Ot, Wr	3	4	3	3	4	305
136	Rt		4	2	3	2	4	5
137	Is		3	4	3	3	3	6
138	Wt		2	4	2	2	3	7
139	Wt		5	3	5	5	5	15
140	Ot		2	3	2	2	3	29
141	Ot		2	3	3	3	3	10
142	Ff	Ot	2	2	3	3	3	12
143	Ot		2	3	3	3	3	21
144	Rt		4	2	3	3	4	24
145	GbMv		3	3	2	2	3	23
146	Qr	Mh	3	4	3	3	3	11

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix I (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
147	WtMv		2	4	2	2	3	31
159	Ot	Ff	2	3	2	2	3	25
160	Ff		3	2	2	2	2	10
161	Ot	Gb	2	3	2	2	2	62
162	Ff		2	2	2	2	2	14
163	Gb	Ot	3	2	2	2	2	91
164	Ff		3	2	3	3	3	31
165	Kp		3	4	3	3	4	34
166	Md	Wr	3	4	2	2	3	118
167	Kp	Wr	3	4	3	3	4	313
168	Is	Ot	3	4	4	4	4	64
169	Kp	Wr	3	4	3	3	4	118
170	Rt		4	2	3	2	4	13
171	Ot	Wr	2	3	2	2	3	401
172	Kp		3	4	4	4	5	8
173	Ff		4	3	5	5	5	11
174	Wt		2	3	3	3	4	7
175	Wt		3	3	4	4	5	48
176	Ok		2	2	2	2	3	20
177	Ot		2	3	2	2	3	53
178	Ff		2	2	2	2	2	45
179	Ot		2	3	2	2	3	42
180	GbMv	Gb, Ff	3	3	3	3	3	61
181	Ok		2	2	2	2	3	13
182	Kp		3	4	3	3	4	53
183	Ff		2	2	2	2	2	22
184	Ff		2	2	2	2	2	21
185	Gb		3	3	3	3	3	20
186	Mh	Wr	4	5	4	4	4	14
187	Ff		2	2	2	2	2	4
188	Kp		3	4	4	4	5	81
189	Ot		2	3	2	2	3	143
190	Ot		2	3	3	3	3	37
191	Ot	Kp	2	3	2	2	3	39
192	Kp		3	4	3	3	4	136
193	Ff		3	2	2	2	2	13
194	GbMv		3	3	3	3	3	23
195	Wt	Wf	5	4	5	5	5	22
196	Ok		2	2	2	2	3	47
197	Kp		3	5	3	3	4	16
198	Ff		2	2	3	3	3	11
199	Ff		2	2	3	3	3	62
200	Mh		4	5	4	4	5	11
201	Ok		2	2	2	2	3	155
202	Ot		2	3	2	2	3	45
203	Kp		5	5	5	5	5	53
204	Rt		4	2	3	3	4	18
205	Ot		2	3	2	2	3	270
206	Gb	GbMv	3	2	2	2	2	27
207	Gb		3	2	2	2	2	15
208	Wt		4	3	5	5	5	21
209	Kp		3	4	4	4	5	125
210	Wt		4	3	5	5	5	13
211	Al		5	5	5	5	5	29
212	Wr	Gb	3	4	3	3	4	10
213	Md		3	4	3	3	3	24
214	Wr		3	4	3	3	4	19
215	GbMv		3	3	3	3	3	7
216	Ot	Kp	2	3	2	2	3	197
217	Kp	Is	3	4	3	3	4	53
218	Wr		3	4	3	3	4	8
219	Ok		2	2	2	2	3	40
220	Ff		2	2	2	2	2	14
221	Cl		4	5	5	5	5	5
222	Kp		3	4	3	3	4	110
223	Kp		3	5	5	5	5	8
224	Ot		2	3	2	2	3	39
225	Nv		3	5	4	4	5	9
226	Ok		2	2	2	2	3	54
227	Kp		3	4	3	3	4	179
228	Is		3	4	3	3	3	26
229	Al		5	5	5	5	5	39
230	Md		3	4	2	2	3	19
231	Cl		3	5	5	5	5	31
232	Al		3	5	3	3	4	68
233	Wr		5	5	5	5	5	19
234	Wr		2	4	3	3	4	6
235	Wf		4	3	3	3	4	55
236	Wr		3	4	4	4	5	41
237	Md	Is	3	4	3	3	3	26
238	Al		5	5	5	5	5	6
239	Wr		3	4	4	4	5	11
240	Kn		4	3	3	2	4	160
241	Kp		3	4	3	3	4	1282
242	Md	Is	3	4	3	3	4	345
243	Is		3	4	3	3	3	53
244	Ot		2	3	3	3	3	13
245	Wr		3	4	3	3	4	61
246	AlRp		5	5	5	5	5	5
247	Qr		4	4	3	3	4	14
248	Is		3	4	3	3	3	9
249	Is		3	4	3	3	3	79
250	Md		3	4	2	2	3	223
251	Ot		2	3	2	2	3	32
252	Wr		3	4	4	4	5	21
253	Qr		3	3	3	3	3	14
254	Ff		2	2	2	2	2	35
255	Al		4	5	4	4	4	24
256	Wr		2	4	3	3	4	34
257	Th		5	5	5	5	5	84
258	Md		3	4	2	2	3	82
259	Wf		4	5	3	3	4	25
260	Ff		2	2	2	2	2	10
261	Is		3	4	3	3	3	31
262	Mh		4	5	4	4	5	14
263	Gb	Kp	3	3	3	3	3	45
264	Qr		3	4	3	3	3	16
265	Qr		4	4	5	5	5	7
266	Al		4	5	4	4	4	10
267	Is		3	4	3	3	3	26
268	Rt		4	2	3	3	4	42
269	Md		3	4	3	3	3	41
270	Ot		2	4	2	2	3	35
271	Kp		3	4	3	3	4	139
272	Al	Cl	5	5	5	5	5	23
273	Is		3	4	3	3	4	15
274	Md		3	4	2	2	3	32
275	Kp		4	4	5	5	5	7
276	Md		3	4	3	3	3	33
277	Is		3	4	3	3	3	21
278	Md		3	4	3	3	3	20
279	Wf	Al	4	5	3	3	4	16
280	Gb		3	2	3	3	3	22
281	Mh-Al		4	5	4	4	4	148
282	Ff		2	2	2	2	2	67
283	Ff	Mh	4	3	5	5	5	31
284	Rb		5	5	5	5	5	49
285	Gb		3	2	3	3	3	10
286	Md	Kp	3	4	2	2	3	124
287	Ab	Nv	3	5	4	4	5	4
288	Is		3	4	3	3	4	10
289	Is		3	4	3	3	4	35
290	Qr		3	4	2	2	3	5
291	Kn		4	3	3	2	4	10
292	Kn-Rb		5	5	5	5	5	22
293	Kh		5	5	5	5	5	185
294	Kp		3	4	3	3	4	16
295	Kn		4	3	3	3	4	4
296	Is		3	4	3	3	4	32
297	Kn		4	3	3	2	4	67
298	Al	Cl	4	5	5	5	5	47
299	Mh		3	4	3	3	4	16
300	Cl	Is	4	5	4	4	4	22
301	Is		3	4	3	3	4	87
302	Th		5	5	5	5	5	59
303	Mh	Al	4	5	4	4	4	30
304	Is		3	4	3	3	4	54
305	Fs	Gh	4	5	5	5	5	11
306	Wl	Ab	4	5	5	5	5	35
307	W		5	5	5	5	5	11
308	Wf		4	3	3	2	4	14
309	Ff		2	2	2	2	2	10
310	Ab	Ml	3	5	4	4	5	45
311	By	Ml	2	2	2	2	3	12
312	W		5	5	5	5	5	3
313	Ml	Ab	3	5	3	3	4	21
314	Ab	Ml	3	5	4	4	5	8
315	By	Ml	2	2	2	2	3	4
316	By		2	2	2	2	3	3
317	Fs		3	5	3	3	4	20
318	Ml	By, Ab	3	5	3	3	4	21
319	By		2	2	2	2	3	8

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix I (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)	UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
320	Wl	Ab	3	5	4	4	5	64	402	Ok		2	2	2	2	3	8
321	Ab	Wl	3	5	4	4	5	73	403	Ff		2	2	3	3	3	57
322	Ml	By, Ab	3	5	3	3	4	21	404	GbMv	Gb	2	3	3	3	3	35
323	Ml		3	5	3	3	4	22	405	GbMv		3	3	4	4	4	8
324	Bb		4	5	3	2	4	4	406	GbMv		4	3	5	5	5	21
325	Fs	Bn	2	3	2	2	3	14	407	Wl		3	5	4	4	5	8
326	Bn	Bb, Fs	3	2	2	2	2	103	408	Wl		3	5	4	4	5	54
327	Bb-Bn		4	5	3	3	5	26	409	Wl		4	5	4	4	5	6
328	Bn	Bb, Fs	3	5	2	2	2	22	410	Wl		4	5	4	4	5	14
329	Bb		4	5	3	2	5	10	411	Lt		4	5	3	3	4	9
330	Th		5	5	5	5	5	26	412	Ab		3	5	4	4	5	30
331	Fs		4	5	5	5	5	14	413	Al		5	5	5	5	5	17
332	Th		5	5	5	5	5	4	414	Mh		3	5	4	4	5	8
333	Is		3	4	3	3	4	13	415	Ot		3	4	3	3	4	9
334	Md		3	4	2	2	3	40	416	Rt		4	2	3	2	4	12
335	Mh		5	5	5	5	5	15	417	Kp		3	4	3	3	4	5
336	Kn		4	5	3	3	4	12	418	Is		3	5	3	3	4	11
337	Mp	Cv	4	2	3	2	4	4	419	Is		3	4	3	3	3	19
338	ThSp		5	5	5	5	5	49	420	Is		3	5	3	3	3	7
339	Wy	WySv	2	4	3	3	4	5	421	Pp		5	5	5	5	5	46
340	ThSp		5	5	5	5	5	31	422	Al	Kn, Cl	4	5	4	4	5	79
341	ThSp		5	5	5	5	5	15	423	Ot		2	4	2	2	3	42
342	Mh	Th	4	5	4	4	4	40	424	GbMv	Gb	3	3	2	2	2	143
343	W		5	5	5	5	5	11	425	Ot	Kp	3	4	3	3	4	63
344	Qr		3	4	2	2	3	21	426	Md		3	4	3	3	3	46
345	Ff		2	2	2	2	2	5	427	AvRp		5	5	5	5	5	5
346	Mh		5	5	5	5	5	15	428	Kn		4	5	3	3	4	37
347	Md		3	4	2	2	3	5	429	Kn		4	2	3	3	4	25
348	Md		3	4	2	2	3	12	430	Pp		2	5	3	3	4	9
349	Mh		3	5	3	3	4	20	431	Lt		4	5	3	3	4	29
350	Mh		5	5	5	5	5	4	432	Is		4	4	5	5	5	21
351	KpGv	Md	4	4	5	5	5	6	433	Is	Al	3	4	3	3	3	8
352	Ml	Ab	3	5	4	4	5	10	434	Kn		4	2	3	3	4	9
353	Wl	Ab	3	5	4	4	5	7	435	Kn		4	2	3	3	4	5
354	Fs	Gh	2	5	2	2	3	6	436	Gb		3	3	4	4	4	47
355	Fs-Bn	Bb	2	3	2	2	3	23	437	Gb		3	3	2	2	2	9
356	M		5	5	5	5	5	34	438	Gb		4	3	4	4	5	7
357	Fs	Gh, Bn	2	5	2	2	3	5	439	Gb		3	3	2	2	2	5
358	Bb-Bn	Fs	4	5	3	2	4	34	440	Gb		3	3	2	2	2	56
359	Bb-Fd		4	5	3	3	5	19	441	Gb		3	2	3	3	3	10
360	Gh-Bn	Fs	3	3	2	2	3	19	442	Rb		5	5	5	5	5	8
361	Bn	Bb	3	2	2	2	2	9	443	Gb		4	3	4	4	4	5
362	Fs	Bn	2	5	2	2	3	13	444	Wf		4	2	3	3	4	10
363	Ab	Wl	3	5	4	4	5	362	445	Wf		4	3	4	4	4	16
364	By	Ml	2	2	2	2	3	12	446	Wf		4	4	4	4	4	25
365	Ml	By, Ab	3	5	4	4	5	9	447	Rt		5	5	5	5	5	7
366	Fs		4	5	5	5	5	4	448	Rt		4	2	3	2	4	16
367	Wl	Ab	3	5	4	4	5	7	449	Ff		3	2	4	4	4	11
368	Cv	Mp	4	2	3	2	4	51	450	Ff		2	2	3	3	3	46
369	Wl-Ab		3	5	4	4	5	13	451	Ff		3	2	4	4	4	29
370	Wl	Ab	3	5	4	4	5	38	452	Ff		2	2	3	3	3	14
371	Ml	Ab	3	5	4	4	5	67	453	Gb		3	3	4	4	4	16
372	Wl	Ab	3	5	4	4	5	9	454	Ok		2	2	3	3	3	47
373	Ml	Ab	3	5	3	3	4	4	455	Ok		3	2	4	4	4	8
374	Ab	Wl	3	5	4	4	5	23	456	Md		3	5	3	3	4	6
375	Wl	Ab	3	5	4	4	5	56	457	Is		3	4	3	3	3	9
376	W		5	5	5	5	5	39	458	Qr	Md	3	4	3	3	3	14
377	Wl		5	5	5	5	5	12	459	Ot		2	5	3	3	4	10
378	Cl		4	5	5	5	5	18	460	Kp		4	4	5	5	5	15
379	Al-Cl		4	5	4	4	4	9	461	Kh	Al	5	5	5	5	5	12
380	Fs		2	5	2	2	3	21	462	Md		3	4	2	2	3	8
381	Fs		2	5	2	2	3	13	463	Ot		2	3	2	2	3	42
382	Wl		4	5	5	5	5	3	464	Kp		3	4	3	3	4	11
383	Wl		4	5	5	5	5	3	465	Ff		2	2	2	2	2	11
384	AbRv		2	5	3	3	4	8	466	Ff		2	2	2	2	2	19
385	Cg		3	5	4	4	5	23	467	Ff		2	2	2	2	2	14
386	Wt		4	3	5	5	5	10	468	Gb		3	2	2	2	2	15
388	Ot		2	3	2	2	2	16	469	Ot-OtSv		2	3	2	2	3	44
389	Ok		2	2	3	3	3	46	470	Gb	OtSv	2	3	2	2	3	19
390	Ab		3	5	4	4	5	69	471	Gb		3	3	2	2	3	45
391	Wf		4	2	3	2	4	3	472	Ot		2	3	2	2	3	51
392	Md		3	4	2	2	2	14	473	Ot		2	3	2	2	3	18
393	Kh		4	5	5	5	5	13	474	Wr		2	4	2	2	3	14
394	Kn	Wm	4	3	3	3	4	16	475	Cl		5	5	5	5	5	27
395	M		5	5	5	5	5	749	476	Is		3	4	2	2	3	90
396	By	Ml, Ab	2	2	2	2	2	9	477	Is		3	5	3	3	4	18
397	M		5	5	5	5	5	23	478	Rb		5	5	5	5	5	6
398	Fd	Fm	3	5	5	5	5	38	479	Wr		2	4	3	3	4	162
399	Wy	Gh, Bo	3	5	3	3	4	28	480	Al		4	5	4	4	4	45
400	Ok		2	2	3	3	3	13	481	Rb	Al	5	5	5	5	5	37
401	Ab		5	5	5	5	5	12	482	Rt		4	2	3	3	4	7

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix I (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
483	Wm		4	5	3	3	4	33
484	Wm		5	5	5	5	5	11
485	Rb		5	5	5	5	5	102
486	Rb	Al	5	5	5	5	5	15
487	Is	Wr, Kp	3	4	2	2	3	182
488	Md		3	4	2	2	3	23
489	W		5	5	5	5	5	49
490	Kn		4	5	3	2	4	84
491	Kn		4	2	3	2	4	42
492	Kn		4	2	3	2	4	4
493	Kn		4	5	3	3	4	24
494	Rb		5	5	5	5	5	21
495	Rb		5	5	5	5	5	18
496	Rb		5	5	5	5	5	5
497	Rb		5	5	5	5	5	51
498	Rt		4	3	3	3	4	27
499	Rt		4	3	3	3	4	6
500	GbMv	Ff, Ot	3	3	2	2	2	11
501	Ff		2	2	3	3	3	8
502	Tr	Q	5	4	5	5	5	55
503	Md		3	4	3	3	3	66
504	Md	Is	3	4	2	2	3	36
505	Wf		4	5	3	2	4	14
506	Is		3	4	3	3	3	17
507	Bb		4	5	4	4	5	30
508	Bb		4	5	4	4	5	10
509	Bn		4	5	4	4	5	4
510	Bn		3	5	3	3	3	70
511	Bn		4	5	4	4	5	9
512	Bn		3	5	3	3	3	9
513	Gh-Fs		3	5	4	4	3	46
514	Fs		3	5	4	4	3	16
515	Fs	Gh	3	5	4	4	3	47
516	Ab		3	5	4	4	5	7
517	Sm		4	5	4	4	4	34
518	Ff		2	2	3	3	3	28
519	Gb		2	3	2	2	2	7
520	Gb		3	3	3	3	3	12
521	Gb		2	3	2	2	3	35
522	Gb		2	3	2	2	2	9
523	Md		3	4	3	3	3	32
524	Md	Kp	3	4	3	3	3	78
525	Md		3	4	3	3	3	13
526	Is	Md	3	4	2	2	3	81
527	Is		5	5	5	5	5	13
528	Is		5	5	5	5	5	7
529	Is		3	4	2	2	3	13
530	Is		5	5	5	5	5	45
531	Kp		3	4	3	3	4	30
532	Kp		3	4	3	3	4	13
533	Tp	Rb	5	5	5	5	5	36
534	Md		3	4	3	3	3	12
535	Md		3	4	2	2	3	23
536	Wf		4	5	4	4	4	31
537	Rt		4	5	3	2	4	5
538	Rt		4	4	4	4	4	16
539	Rt		4	2	3	3	4	13
540	Ff		4	2	3	3	4	9
541	Rt		4	2	4	4	4	13
542	Wf		4	5	3	2	4	9
543	Wf		4	3	4	4	4	10
544	Rb	Mh, Kn	5	5	5	5	5	123
545	Ko		5	5	5	5	5	15
546	Ko		5	5	5	5	5	15
547	Ab		3	5	4	4	5	36
548	AbRv		4	5	4	4	5	5
549	Ab		5	5	5	5	5	161
550	Ff		3	2	2	2	2	21
551	Ff		3	2	2	2	2	28
552	Ff		3	2	2	2	2	44
553	Ff		3	2	2	2	2	10
554	Ff		3	2	4	4	4	9
555	Gb		3	2	2	2	2	14
556	Ff		3	2	3	3	3	21
557	Ff		3	2	2	2	2	27
558	Ff		3	2	2	2	2	21
559	Ff		3	2	2	2	2	26
560	Cl		5	5	5	5	5	35
561	Wr		2	4	3	3	4	11
562	Kp		3	4	3	3	4	14
563	Kp	Md	3	3	3	3	4	29
564	Md		3	4	2	2	3	41
565	Md		3	4	2	2	2	39
566	Md		3	4	2	2	3	33
567	Md		3	4	2	2	3	5
568	Md		3	4	2	2	3	14
569	Md		3	4	2	2	3	16
570	Md		3	4	3	3	3	25
571	Md		3	4	3	3	3	45
572	Md		3	4	3	3	3	17
573	Mh		3	5	3	3	4	18
574	Wf	Kn	4	5	5	5	5	38
575	Wf		4	3	3	2	4	5
576	Rt		4	2	3	2	4	16
577	Rt		4	2	3	2	4	7
578	Rt		4	2	3	2	4	11
579	Rt		4	2	3	3	4	17
580	Rb	Kl, Al	4	5	5	5	5	166
581	Rb		5	5	5	5	5	40
582	Rb		4	5	5	5	5	26
583	Rb		4	5	5	5	5	18
584	Kn	Wf	4	2	4	4	4	67
585	Kn	Rb, Wm	4	2	3	3	4	174
586	Kn		4	2	3	3	4	4
587	Kn		4	2	3	3	4	25
588	Th		5	5	5	5	5	39
589	Th		5	5	5	5	5	33
590	Kh	Wm	5	5	5	5	5	7
591	Mh		4	5	4	4	4	10
592	Is		3	5	3	3	3	7
593	Is		4	5	4	4	4	11
594	Is		3	4	3	3	3	17
595	Kl		4	5	5	5	5	7
596	Kl		5	5	5	5	5	12
597	Gb		3	2	3	3	3	48
598	Is		3	4	4	4	4	10
599	W		5	5	5	5	5	9
600	Av		5	5	5	5	5	19
601	Th		5	5	5	5	5	11
602	Tp	Al	4	5	4	4	5	10
603	Al		3	5	3	3	4	105
604	Kl		4	5	5	5	5	7
605	Kn	Th	4	2	3	2	4	23
606	Kp		3	3	3	3	4	8
607	Is		3	4	3	3	3	10
608	Is	Kp	3	4	3	3	3	32
609	Ff		3	2	3	3	3	5
610	Gb		3	3	2	2	2	4
611	Gb		3	3	2	2	3	16
612	Gb		3	3	2	2	2	17
613	Gb		4	3	3	2	4	9
614	Gb		3	3	2	2	2	12
615	Tp		5	5	5	5	5	44
616	Ko		5	5	5	5	5	13
617	Ko		5	5	5	5	5	22
618	Ko		4	5	5	5	5	79
619	Ko		5	5	5	5	5	28
620	Ko	Tr	3	5	4	4	5	24
621	Ko	Tr	3	5	4	4	5	47
622	KoRv		4	5	3	3	4	8
623	Tr	Ko	4	5	5	5	5	85
624	Tr	Ko	4	5	5	5	5	32
625	Tr	Ko	5	5	5	5	5	25
626	Tr	Ko	5	5	5	5	5	22
627	Tr		5	5	5	5	5	32
628	Tr		4	5	4	4	5	52
629	TrPv	Tr	5	4	5	5	5	28
630	Wl		5	5	5	5	5	82
631	W		5	5	5	5	5	9
632	W		5	5	5	5	5	23
633	Hk	Wl	3	5	4	4	5	186
634	Cl	Al	5	5	5	5	5	24
635	Ko	Tr	4	5	5	5	5	180
636	Ko	Tr	5	5	5	5	5	60
637	Tr	Ko	4	5	5	5	5	65
638	Ko	Tr	4	5	5	5	5	166
639	Ko		4	5	5	5	5	26
640	Tr	Ko	4	5	4	4	5	121
641	Tr	Ko	4	5	5	5	5	35
642	Tr		5	5	5	5	5	34
643	Tr		5	5	5	5	5	13
644	Tr		5	5	5	5	5	19

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix I (continued)

UMA	UMA	Minor	Land Suitability*					Area
No	name	soils	S	M	C	V	P	(ha)
645	Tr		5	5	5	5	5	4
646	Tr		4	5	4	4	4	4
647	Ko		5	5	5	5	5	19
648	Wt		2	3	3	3	3	4
649	Wt		2	3	3	3	3	4
650	Q		5	5	5	5	5	7
651	Q		5	5	5	5	5	15
652	Q		5	5	5	5	5	7
653	Q		5	5	5	5	5	7
654	Q		5	5	5	5	5	3
655	Wl		3	5	4	4	5	30
656	Wl		3	5	4	4	5	37
657	Wl		5	5	5	5	5	70
658	Gb		4	2	5	5	5	10
659	Ab		3	5	4	4	5	225
660	Cg		3	5	3	3	4	5
661	Cg		3	5	3	3	4	25
662	Cg		3	5	3	3	4	16
663	Ab		3	5	4	4	5	268
664	Ab		3	5	4	4	5	15
665	Ab		3	5	4	4	5	13
666	Fs	Bn	4	5	5	5	5	10
667	AvRp		5	5	5	5	5	35
668	Bn		4	5	5	5	5	12
669	Ot		2	3	2	2	3	4
670	OtSv	Kp	3	4	3	3	4	21
671	Wr		2	4	3	3	4	5
672	Cl	Br	3	4	3	3	4	16
673	Bn		4	5	3	3	4	30
674	Al	Qr	4	5	4	4	4	26
675	Bn		4	5	5	5	5	31
676	Bn		3	5	3	3	3	4
677	Bn	Bn	3	5	3	3	3	6
678	Fs		2	5	3	3	3	22
679	Fs		2	5	3	3	3	11
680	Cg		3	5	4	4	5	6
681	Wl		4	5	5	5	5	31
682	Cg		3	5	3	3	4	68
683	Cg		3	5	2	2	3	18
684	Ml		5	5	5	5	5	49
685	Ab		3	5	3	3	4	45
686	Wl		5	5	5	5	5	19
687	Ab		3	5	4	4	5	23
688	Ab		4	5	4	4	5	13
689	Ko		5	5	5	5	5	21
690	Wl		4	5	4	4	5	210
691	Ko		4	5	4	4	5	28
692	M		5	5	5	5	5	58
693	Cg		3	5	4	4	5	69
694	Cg		3	5	3	3	4	13
695	Cg		3	5	4	4	5	17
696	Ab		3	5	4	4	5	12
697	Ab		3	5	4	4	5	7
698	Ab		4	5	5	5	5	30
699	W		5	5	5	5	5	13
700	W		5	5	5	5	5	17
701	Ko	KoRv	3	5	4	4	5	91
702	Ko		5	5	5	5	5	67
703	Ko	Tr	5	5	5	5	5	102
704	Ko		4	5	5	5	5	18
705	Ko		4	5	5	5	5	24
706	Ko		5	5	5	5	5	47
707	Ko		4	5	5	5	5	12
708	Ko		4	5	5	5	5	52
709	Ko		3	5	4	4	5	69
710	Ko		5	5	5	5	5	29
711	Ko		5	5	5	5	5	25
712	Ko		4	5	4	4	5	28
713	Ko		4	5	5	5	5	71
714	Ko		4	5	5	5	5	69
715	Ko	Wt	4	5	5	5	5	56
716	Ko	Wt	4	5	5	5	5	10
717	Ko		4	5	5	5	5	102
718	Ko	Gv	5	5	5	5	5	150
719	Av	Ko	5	5	5	5	5	24
720	Tr	Ko	4	5	4	4	5	42
721	Tr		5	5	5	5	5	6
722	Tr		4	5	5	5	5	23
723	Wr	Kh	2	4	3	3	4	104
724	Av		4	5	4	4	5	12
725	Ok		2	2	3	3	3	7
726	Wt		4	4	5	5	5	17
727	WtRp		5	5	5	5	5	10
728	Ot	W Mv	3	3	4	4	4	56
729	Wr	Gb	3	4	4	4	5	73
730	Gb		5	4	5	5	5	7
731	Gb		3	3	2	2	2	7
732	U		5	5	5	5	5	130
733	U		5	5	5	5	5	231
734	Pp	Lt	4	5	4	4	5	373
735	Pp	Lt	4	5	4	4	5	58
736	PpSv		4	5	3	3	4	15
737	Pp		4	5	4	4	5	35
738	Lt		4	5	3	3	4	28
739	Lt		4	5	3	3	4	130
740	Tr		5	5	5	5	5	8
741	Gv	Tr	4	5	5	5	5	13
742	Tr		4	5	5	5	5	39
743	TrRp		5	5	5	5	5	5
744	Tr		4	5	5	5	5	30
745	Tr		4	5	5	5	5	53
746	Is		3	5	4	4	4	14
747	Is	Kp	3	4	3	3	3	7
748	Is		3	4	4	4	4	23
749	Tr		4	5	5	5	5	7
750	Gb		3	3	4	4	4	4
751	Gb	Wt, GbMv	4	3	5	5	5	110
752	Gb		3	3	3	3	3	7
753	Wt	Ot, Ff	2	3	3	3	3	144
754	Wo		4	5	5	5	5	35
755	Ko	KoRv	4	5	5	5	5	118
756	Ko		5	5	5	5	5	49
757	KoRp		5	5	5	5	5	15
758	Av	Tr	5	5	5	5	5	23
759	Av	Tr	5	5	5	5	5	24
760	W		5	5	5	5	5	12
761	W		5	5	5	5	5	4
762	PpSv		5	5	5	5	5	15
763	Pp		4	5	5	5	5	56
764	Is		4	5	5	5	5	52
765	Rb		5	5	5	5	5	13
767	Ko	Tr	5	5	5	5	5	95
768	Gb		4	3	5	5	5	7
769	AvRp		5	5	5	5	5	42
770	Cg		3	5	4	4	5	21
771	Wl		5	5	5	5	5	18
772	Ko		3	5	4	4	5	54
773	Ab	AbRv	3	5	4	4	5	66
774	Tr		4	5	5	5	5	15
775	Tr		5	5	5	5	5	13
776	Gv		5	5	5	5	5	11
777	Gv		4	5	5	5	5	6
778	Gv		4	5	4	4	5	44
779	Gv		5	5	5	5	5	22
780	Gv		4	5	4	4	5	12
781	Gv		5	5	5	5	5	35
782	Gv		3	5	4	4	5	46
783	U		5	5	5	5	5	99
784	W		5	5	5	5	5	8
785	W		5	5	5	5	5	12
786	Ko		5	5	5	5	5	24
787	Ko		5	5	5	5	5	50
788	KoRv		5	5	5	5	5	12
789	KoRv		5	5	5	5	5	8
790	Bc		4	5	5	5	5	27
791	BgRv-Tk		3	5	4	4	5	7
792	BgRv-Tk	Bg	5	5	5	5	5	59
793	Bc		5	5	5	5	5	20
794	Wt		4	3	5	5	5	36
795	Wt		2	4	3	3	3	3
796	WtMv		3	4	4	4	4	50
797	WtMv		4	5	5	5	5	27
798	Bc		5	5	5	5	5	21
799	Wl		5	5	5	5	5	62
800	Bc		3	5	4	4	5	7
801	Wt		5	4	5	5	5	5
802	Tk-Bg		5	5	5	5	5	95
803	Bc		5	5	5	5	5	33
804	Bc		5	5	5	5	5	76
805	Bc		4	5	5	5	5	42
806	Bc		5	5	5	5	5	21
807	Bc		3	5	4	4	5	34

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix I (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
808	Bc		4	5	5	5	5	37
809	Bc		4	5	5	5	5	13
810	BgRv		4	4	5	5	5	4
811	Bg		5	5	5	5	5	5
812	Bc		5	5	5	5	5	5
813	Cg		4	5	3	3	4	17
814	Ab	.	3	5	4	4	5	80
815	Ab		3	5	4	4	5	41
816	Bn		4	5	4	4	4	10
817	Bn-Fs		4	5	4	4	5	7
818	Bn-Fs		4	5	4	4	5	3
819	Rb		5	5	5	5	5	41
820	W		5	5	5	5	5	44
821	Cl		5	5	5	5	5	5
822	Bg-Tk		5	5	5	5	5	45
823	Bg-Tk		5	5	5	5	5	138
824	Ko		5	5	5	5	5	48
825	Ko		5	5	5	5	5	9
826	Fs		3	5	4	4	3	4
827	Fs		3	5	4	4	3	5
828	AbRv	AbSv	3	5	3	3	4	8
829	Kp		3	4	3	3	4	62
830	Kp		3	4	3	3	4	23
831	Kp		3	4	3	3	4	13
832	Av		5	5	5	5	5	28
833	Wt		2	3	3	3	3	74
834	Wt		2	4	3	3	4	10
835	Wt		2	4	3	3	4	4
836	Wt		2	4	3	3	3	186
837	W		5	5	5	5	5	10
838	W		5	5	5	5	5	5
839	Wt		2	4	2	2	3	26
840	WtMv		2	4	2	2	3	9
841	Wt		2	4	3	3	3	2
842	WtMv		2	4	3	3	3	19
843	WtMv		2	4	3	3	3	2
844	WtMv		2	4	3	3	3	20
845	Gb		3	3	2	2	2	13
846	Kp	Gb	3	4	3	3	4	34
847	Kp	Wr	3	4	3	3	4	68
848	Kp		3	4	4	4	5	28
849	Kp		3	5	3	3	4	14
850	Kp		3	4	3	3	4	21
851	Kp		3	4	3	3	4	26
852	Ko		5	5	5	5	5	48
853	Ko		5	5	5	5	5	10
854	Tr		4	5	4	4	5	20
855	Tr		5	5	5	5	5	21
856	AvRp		5	5	5	5	5	22
857	Av		4	5	5	5	5	19
858	Av		5	5	5	5	5	8
859	Av		3	5	4	4	5	5
860	Av		5	5	5	5	5	21
861	Av		5	5	5	5	5	76
862	Av		5	5	5	5	5	50
863	Av		4	5	4	4	5	28
864	Av-Ko		4	5	5	5	5	63
865	AvRp		5	5	5	5	5	35
866	Ot		2	4	2	2	3	32
867	AvRp-Av	Wo	4	5	4	4	5	70
868	Av	Tp	5	5	5	5	5	76
869	Av	Ko	4	5	5	5	5	11
870	Ot		2	2	3	3	3	22
871	OtSv		2	2	3	3	3	9
872	Ff		2	2	2	2	2	3
873	Ff		4	3	5	5	5	5
874	Wr		2	4	3	3	4	8
875	Md		3	4	2	2	3	12
876	Wo	Av	3	5	4	4	5	20
877	Wo-Av		3	5	4	4	5	154
878	W		5	5	5	5	5	5
879	W		5	5	5	5	5	12
880	W		5	5	5	5	5	2
881	W		5	5	5	5	5	3
882	W		5	5	5	5	5	13
883	Ff		3	5	4	4	4	6
884	Wt		2	3	3	3	3	141
885	Wt		2	5	2	2	3	11
886	Wt		3	5	3	3	3	8
887	Wt		4	3	5	5	5	5
888	Ot	Kp	2	3	3	3	3	20
889	Ot-Kp		3	5	3	3	3	12
890	Ot	Wt	3	5	3	3	4	20
891	Ko	Ot	4	5	5	5	5	5
892	Ko	Bg	5	5	5	5	5	5
893	Ko		3	5	4	4	5	7
894	Bg	Tk	4	5	5	5	5	32
895	Is		3	4	2	2	3	12
896	Kp	Gb	3	4	3	3	4	27
897	Kp	Wr	3	4	3	3	4	202
898	Kp		3	4	3	3	4	21
899	Kp		4	5	5	5	5	4
900	Kp	AvRp	3	4	3	3	4	36
901	Bg		5	5	5	5	5	19
902	Av		3	5	4	4	5	7
903	Av		4	5	4	4	5	17
904	AvRp	Av	5	5	5	5	5	23
905	Gb		3	3	3	3	3	28
906	Cl-Kh		4	5	5	5	5	38
907	Cl	Kl, Kp	3	5	5	5	5	287
908	Cl-Kh		4	5	5	5	5	25
909	Kh	Cl	4	5	5	5	5	17
910	Cl	Kh	5	5	5	5	5	52
911	Kl	Av	4	5	3	3	4	72
912	W		5	5	5	5	5	12
913	W		5	5	5	5	5	8
914	Cl		4	5	4	4	4	21
915	Cl		4	5	4	4	4	17
916	Wt		2	4	2	2	3	21
917	Kl		5	5	5	5	5	8
918	Kp		3	4	3	3	4	35
919	Wr		2	4	3	3	4	32
920	AvTv		4	5	4	4	5	30
921	Md	Ff, Is	3	5	3	3	3	446
922	Ff		2	2	2	2	2	5
923	Ok		2	2	2	2	3	5
924	Md	Kp, Kh	3	5	3	3	3	424
925	Gb		3	2	3	3	3	4
926	Kl		5	5	5	5	5	64
927	Al		5	5	5	5	5	32
928	Kp		3	5	3	3	4	113
929	Kp	Is	3	5	3	3	4	88
930	AvRp		5	5	5	5	5	33
931	Gb		2	3	2	2	2	22
932	Md		3	5	3	3	3	37
933	Md		3	4	2	2	3	76
934	Kp	Is, Cl	3	4	3	3	4	494
935	Kp		3	4	3	3	4	23
936	Cl		3	5	5	5	5	147
937	Cl		5	5	5	5	5	37
938	Gv		4	5	5	5	5	126
939	Ot	Wt	2	3	2	2	3	9
940	Wt		2	2	3	3	3	10
941	AvRp		5	5	5	5	5	23
942	AvRp		5	5	5	5	5	49
944	Tp		4	5	5	5	5	23
945	Cl		5	5	5	5	5	6
946	Md		3	4	2	2	3	24
947	Is		3	5	3	3	3	13
948	W		5	5	5	5	5	22
949	Wt		2	2	2	2	2	8
950	Kp	Cl	3	4	3	3	4	23
951	KoRp		5	5	5	5	5	25
952	Gv		5	5	5	5	5	60
953	Gv		5	5	5	5	5	66
954	Gv		3	5	4	4	5	8
955	Gv		3	5	4	4	5	8
956	Gv		3	5	4	4	5	4
957	Gv		3	5	4	4	5	7
958	Gv		4	5	5	5	5	11
959	Gv		3	5	4	4	5	16
960	Gv		5	5	5	5	5	100
961	Gv		5	5	5	5	5	96
962	Gv		3	5	4	4	5	41
963	Tp		4	5	4	4	5	22
964	Gv		4	5	5	5	5	10
965	Gv		4	5	5	5	5	33
966	Tp		5	5	5	5	5	6
967	Ko		5	5	5	5	5	27
968	Gv		5	5	5	5	5	9
969	Gv		5	5	5	5	5	25
971	Tp		4	5	5	5	5	40

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix I (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
972	Fs		4	4	5	5	5	18
973	Fs		4	4	5	5	5	6
974	Fs		2	4	3	3	3	10
975	WtRp		5	5	5	5	5	18
976	Ab		3	5	4	4	5	48
977	Bn		3	3	4	4	4	26
978	Tp		4	5	4	4	5	7
979	Ko		5	5	5	5	5	34
980	Wt		4	3	5	5	5	6
981	Tp	Md	4	5	4	4	5	73
982	Ab		3	5	4	4	5	13
983	Wl		3	5	4	4	5	10
984	Gv		4	5	5	5	5	8
985	Ko		4	5	5	5	5	107
986	Av		5	5	5	5	5	18
987	Bn		4	5	5	5	5	2
988	Wt	Ok	2	2	2	2	2	12
989	Gv		5	5	5	5	5	38
990	Gv		4	5	5	5	5	23
991	Cl		5	5	5	5	5	3
992	Kl		5	5	5	5	5	7
993	Kl		5	5	5	5	5	24
994	W		5	5	5	5	5	3
995	W		5	5	5	5	5	7
996	W		5	5	5	5	5	10
997	W		5	5	5	5	5	7
998	W		5	5	5	5	5	4
1000	Sm		3	5	4	4	5	2
1001	W		5	5	5	5	5	16
1003	Av		5	5	5	5	5	13
1005	Av		5	5	5	5	5	2
1006	Al		5	5	5	5	5	5
1007	Al		5	5	5	5	5	11
1008	Is	Md	3	4	2	2	3	15
1009	Ff		2	2	2	2	2	12
1010	Av		5	5	5	5	5	22
1011	Al		5	5	5	5	5	25
1012	Av		5	5	5	5	5	13
1013	Kp	Av	3	5	3	3	4	43
1014	Md		3	5	3	3	3	93
1015	Al		5	5	5	5	5	6
1016	Av		5	5	5	5	5	17
1017	Av		5	5	5	5	5	8
1018	Wt		1	3	2	2	2	5
1019	Kl	Al	5	5	5	5	5	32
1020	Al		5	5	5	5	5	6
1021	Cl		4	5	5	5	5	8
1022	Al-Mh		5	5	5	5	5	52
1023	Av	Kp	5	5	5	5	5	9
1024	W		5	5	5	5	5	7
1025	Gb		3	3	3	3	3	34
1026	Av		5	5	5	5	5	3
1027	Al		5	5	5	5	5	6
1028	Av		5	5	5	5	5	15
1029	Md	Is, Kp	3	5	3	3	3	123
1030	Rb	Al	5	5	5	5	5	21
1031	Ff		2	2	2	2	2	13
1032	Ff		2	2	2	2	2	17
1033	OtSv	Gb	2	3	2	2	3	14
1034	Th		5	5	5	5	5	10
1035	Kl	Al	5	5	5	5	5	80
1036	Is		3	5	3	3	3	57
1037	Md		3	5	3	3	3	231
1038	Is		3	5	3	3	3	7
1039	Al		5	5	5	5	5	4
1040	Ff		2	2	2	2	2	13
1041	W		5	5	5	5	5	8
1042	W		5	5	5	5	5	5
1043	OtSv	Gb	2	3	2	2	3	19
1044	Kl	Al	5	5	5	5	5	10
1045	W		5	5	5	5	5	3
1046	Is		2	3	2	2	3	3
1047	Is	Md	3	5	3	3	3	5
1048	Ok		2	2	2	2	2	83
1049	Al	Th	5	5	5	5	5	28
1050	Md		3	5	3	3	3	21
1051	Al	Th	5	5	5	5	5	27
1052	Al		5	5	5	5	5	1
1053	Md		3	5	3	3	3	16
1054	Ok		2	5	3	3	2	18
1055	Av		5	5	5	5	5	11

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
1056	Ko		4	5	5	5	5	59
1057	Wt		1	3	2	2	2	5
1058	W		5	5	5	5	5	7
1059	Kl		5	5	5	5	5	8
1060	W		5	5	5	5	5	4
1061	Ok		2	2	2	2	2	112
1062	Kl		5	5	5	5	5	4
1063	Md	Av	3	5	3	3	3	43
1064	Ff		2	2	2	2	2	20
1065	MdRp		4	5	5	5	5	10
1066	Md		3	5	3	3	3	10
1067	Al		5	5	5	5	5	4
1068	W		5	5	5	5	5	5
1069	Al		5	5	5	5	5	24
1070	Md		3	5	3	3	3	11
1071	Md		3	5	3	3	3	47
1072	Is		3	5	3	3	3	35
1073	Md	Kp	3	5	3	3	3	64
1074	Al		5	5	5	5	5	14
1075	Ok		2	2	2	2	2	27
1077	Md		3	5	3	3	4	10
1078	Md	Al, Ff	3	5	3	3	3	71
1079	Rb	Th	5	5	5	5	5	136
1080	Lt		3	5	3	3	3	2
1081	Ff		2	2	2	2	2	3
1082	Ok		2	2	2	2	3	5
1083	Is	Al, Md	3	3	2	2	3	117
1084	Ff		2	2	3	3	3	9
1085	Kh	Al, Kb	4	5	5	5	5	102
1086	Md	Is	3	3	2	2	3	17
1087	Wl	Ab	3	5	4	4	5	379
1088	Al		4	5	5	5	5	18
1089	Ab		3	5	4	4	5	11
1090	Nv		4	5	5	5	5	16
1091	Fs		5	5	5	5	5	58
1092	Bn	Ab	3	5	3	3	2	20
1093	WlEp		5	5	5	5	5	46
1094	Fs	Bn	2	5	3	3	3	2
1095	Ab		3	5	4	4	5	9
1096	Ab		3	5	4	4	5	13
1097	Fs	Bn	2	5	3	3	4	94
1098	Bn	Bb	2	5	3	3	2	23
1099	Bb-Bn	Fs	4	5	4	4	5	11
1100	Ot		2	3	3	3	4	5
1101	Bn		3	5	3	3	3	4
1103	Wl		4	5	4	4	5	18
1104	Ok		2	2	2	2	3	48
1105	Kh		4	5	4	4	4	141
1106	Wl	Ab	3	5	4	4	5	16
1107	Wt		2	2	2	2	3	3
1108	Ff		2	2	3	3	3	5
1109	Wl		5	5	5	5	5	11
1110	Is		3	3	2	2	3	8
1111	Wm		5	5	5	5	5	26
1112	WmSp		5	5	5	5	5	12
1113	Ab		3	5	4	4	5	11
1114	Ml	Ab	3	5	4	4	5	12
1115	Qr	Ok	2	3	3	3	3	30
1116	Kl	Mh	5	5	5	5	5	17
1117	Al	Kl, Kh	4	5	5	5	5	21
1118	Ok	Ff	2	2	2	2	3	29
1119	Md	Ff	3	3	2	2	3	10
1120	Al	Th	4	5	5	5	5	12
1121	Th	Al	5	5	5	5	5	31
1122	Wf	Wm	4	5	3	3	4	16
1123	TpRp		5	4	5	5	5	8
1124	WtRp		5	4	5	5	5	1
1125	Ff	Ok	2	2	3	3	3	165
1126	Cl	Kh, Is	3	5	3	3	4	9
1127	Al		4	5	5	5	5	24
1128	Rb-Kn		5	5	5	5	5	54
1129	Pp		4	5	5	5	5	145
1130	Md	Is	3	4	3	3	4	34
1131	Cl	Al	3	5	3	3	4	31
1132	Cl	Al	3	5	3	3	4	42
1133	FfGv		4	2	5	5	5	4
1134	W		5	5	5	5	5	5
1135	Rb	Al	5	5	5	5	5	40
1136	Al		4	5	5	5	5	11
1137	Ok	Ff	2	2	2	2	3	39
1138	Cl		4	5	4	4	4	2

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix I (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
1139	Md	Al	3	3	2	2	3	17
1140	Al		4	5	5	5	5	25
1141	Is	Al	3	3	3	3	3	21
1142	Ff	Ok, Md	2	2	3	3	3	39
1143	MdGv		3	3	4	4	5	9
1144	Al		4	5	5	5	5	21
1145	Is	Al	2	3	3	3	3	11
1146	Kh	Al, Rb	5	5	5	5	5	16
1147	Al		4	5	5	5	5	42
1148	Rb	Kl, Al	5	5	5	5	5	17
1149	Is	Md	3	3	2	2	3	32
1150	Md	Is	3	3	3	3	3	26
1151	Ff		3	2	4	4	4	30
1152	Cl	Kl	4	5	4	4	4	5
1153	Md	Is	3	3	3	3	3	257
1154	Kn	Kl, Mh	5	5	5	5	5	20
1155	W		5	5	5	5	5	15
1156	Ff		3	2	4	4	4	10
1157	Al	Rb	4	5	5	5	5	24
1158	W		5	5	5	5	5	7
1159	Ok	Ff	2	2	3	3	3	16
1160	Al		4	5	5	5	5	5
1161	Al	Md	5	5	5	5	5	16
1162	Th	Kl	5	5	5	5	5	71
1163	Md	Al, Th	3	3	2	2	3	27
1164	Is	Ot	3	3	2	2	3	42
1165	Kp	Ok	3	3	3	3	3	6
1166	Gv		4	5	5	5	5	5
1168	Kl	Th, Al	5	5	5	5	5	61
1169	Al	Is	4	5	5	5	5	149
1170	Cl	Al, Kl	4	5	4	4	4	27
1171	Av		4	5	5	5	5	10
1172	Al		4	5	5	5	5	4
1173	Kp		3	5	3	3	4	48
1174	W		5	5	5	5	5	11
1175	Al	Kh, Th	4	5	5	5	5	59
1176	Rb	Th, Al	5	5	5	5	5	34
1177	Is	Al, Kp	3	3	3	3	3	27
1178	Kp	Al	3	4	3	3	4	28
1179	Al	Th	4	5	5	5	5	29
1180	Ff		2	2	3	3	3	7
1181	Ff		2	2	3	3	3	21
1182	Al	Md	4	5	5	5	5	63
1183	Md	Al	3	4	3	3	3	8
1184	Kl		5	5	5	5	5	9
1185	Kh	Al	5	5	5	5	5	27
1186	Md	Al	3	4	2	2	3	43
1187	Al		4	5	5	5	5	16
1188	Cl		4	5	5	5	5	11
1189	Al		4	5	5	5	5	12
1190	Is	Md	3	3	2	2	3	34
1191	W		5	5	5	5	5	10
1192	Kl		5	5	5	5	5	40
1193	Md		3	4	2	2	3	28
1194	Ok		2	2	2	2	3	89
1195	Al	Kn	4	5	5	5	5	9
1196	Is	Al	3	3	3	3	3	38
1197	Al		4	5	5	5	5	37
1198	Th	Rb	5	5	5	5	5	25
1199	Ff		2	2	3	3	3	11
1200	TpRp		5	4	5	5	5	5
1201	Tp		4	5	5	5	5	13
1202	Tp		5	5	5	5	5	17
1203	Al		4	5	5	5	5	11
1204	TpRp		5	4	5	5	5	6
1205	Gv	Av	5	5	5	5	5	16
1206	Tp		5	5	5	5	5	9
1207	Gb		5	3	5	5	5	16
1208	Gb		3	2	3	3	3	7
1209	Is	Al	3	5	4	4	5	15
1210	Al		4	5	5	5	5	5
1211	TpRp		5	5	5	5	5	6
1212	Ab	Wl	3	5	4	4	5	101
1213	By	Ab	3	2	4	4	4	4
1214	Ab		4	5	5	5	5	5
1215	Fs	Bn, Ab	2	5	3	3	4	10
1216	Fs	Bn	5	5	5	5	5	16
1217	Ml		3	5	4	4	5	4
1218	Bn	Bb	3	5	3	3	2	1
1219	Bn-Fs		2	5	3	3	3	8
1220	Kh	Al	5	5	5	5	5	9
1221	Tp	Al	5	5	5	5	5	9
1222	IsRp	Al	4	3	3	3	4	8
1223	Ff	Ok	4	3	5	5	5	8
1224	Ff	Ok	2	2	3	3	3	9
1225	Gs		2	2	2	2	3	326
1226	Gb	Ff	2	2	3	3	3	4
1227	Tp	Is	4	5	5	5	5	15
1228	Tp		4	5	3	3	4	43
1229	Ab		5	5	5	5	5	21
1230	Ab		3	5	4	4	5	2
1231	Fs	Bn	3	5	3	3	4	51
1232	Ab		5	5	5	5	5	15
1233	Gh	Bn, Fs	2	5	3	3	3	14
1234	Bb	Bn	4	5	4	4	4	8
1235	Gh	Fs, Bn	2	5	3	3	3	4
1236	Fs	Gh	3	5	3	3	4	8
1237	Ab		3	5	4	4	5	41
1238	Tp		5	5	5	5	5	10
1239	Tp		4	5	4	4	5	21
1240	Tp		5	5	5	5	5	7
1241	Tp		4	5	4	4	5	8
1242	IsRp		4	2	4	4	4	7
1243	Gv		5	5	5	5	5	7
1244	GvRp		3	5	4	4	5	38
1245	Gv		3	5	4	4	5	19
1246	GvRp		4	5	5	5	5	14
1247	WtRp		5	3	5	5	5	4
1248	Gv		4	5	5	5	5	5
1249	Gv		5	5	5	5	5	46
1250	Ab		5	5	5	5	5	10
1251	Gv		4	5	5	5	5	7
1252	GvRp		4	5	5	5	5	5
1253	Is	Al, Ff	3	3	3	3	3	25
1254	W		5	5	5	5	5	10
1255	Ko		5	5	5	5	5	171
1256	Gs		3	5	3	3	3	20
1257	Br		5	5	5	5	5	72
1258	Br		5	5	5	5	5	17
1259	Gv		4	4	5	5	5	38
1260	Q		5	5	5	5	5	7
1261	He		5	4	5	5	5	29
1262	Gv		5	5	5	5	5	20
1263	Gv		4	5	5	5	5	22
1264	Gv		5	5	5	5	5	29
1265	Gv		5	5	5	5	5	24
1266	Gv		4	5	5	5	5	56
1267	Gv		5	5	5	5	5	12
1268	W		5	5	5	5	5	8
1269	Gv		5	5	5	5	5	86
1270	He		5	4	5	5	5	16
1271	He		3	4	4	4	5	6
1272	Gv		5	5	5	5	5	54
1273	Gv		2	5	3	3	4	19
1274	Gv		3	5	4	4	5	5
1275	Gv		4	5	5	5	5	15
1276	Gv		5	5	5	5	5	17
1277	Gv		3	5	4	4	5	35
1278	Fs-Bn		3	5	3	3	4	4
1279	Ab		4	5	5	5	5	10
1280	Fs	Bn	3	5	3	3	4	10
1281	AbRv	Ab, Fs	5	5	5	5	5	114
1282	Bn-Fs	Gh	2	5	3	3	3	48
1283	Ab	AbRv	3	5	4	4	5	68
1284	Ab	AbRv, Fs	4	5	5	5	5	18
1285	Ab	AbRv	4	5	5	5	5	15
1286	Fs-Ab		3	5	4	4	5	34
1287	Bn	Bb	4	5	3	3	4	25
1288	Ab		3	5	4	4	5	25
1289	WtRp		4	2	5	5	5	4
1290	KoRv		4	5	4	4	5	16
1291	AbEp		5	5	5	5	5	35
1292	Ab	Cg	3	5	4	4	5	272
1293	AbEp		5	5	5	5	5	61
1294	Bn-Gh		3	5	3	3	2	37
1295	Gh-Fs	Bn	3	5	3	3	3	33
1296	Pk		4	5	3	3	4	3
1297	Pk		4	5	3	3	4	5
1298	Fs	Ab	3	5	4	4	4	15
1299	Ab		3	5	4	4	5	27
1300	TpRp		5	5	5	5	5	9
1301	Tp	Dg	4	5	4	4	5	13

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix I (continued)

UMA	UMA	Minor	Land Suitability*					Area
No	name	soils	S	M	C	V	P	(ha)
1302	TpRp	Tp	5	5	5	5	5	13
1303	Tp	TpRp	4	5	5	5	5	18
1304	TpRp	AvRp	5	4	5	5	5	24
1305	Wt	GbMv	3	2	4	4	4	53
1306	Tp		5	5	5	5	5	9
1307	TpRp	Tp	5	5	5	5	5	14
1308	Is		3	3	4	4	4	10
1309	WtRp		5	4	5	5	5	6
1310	Rt		5	3	5	5	5	3
1311	Wt		2	2	3	3	3	1
1312	WtRp		5	4	5	5	5	5
1313	Mh-Al		5	5	5	5	5	18
1314	Tp		5	5	5	5	5	14
1315	Rt		4	2	4	4	4	10
1316	RtRp		5	5	5	5	5	3
1317	Wf		4	3	5	5	5	7
1318	Rt		4	2	4	4	4	6
1319	Is	Rt	3	3	4	4	4	7
1320	Wt	Hs	2	2	3	3	3	11
1321	Kp		3	3	4	4	4	22
1323	Kp		3	5	4	4	4	5
1324	Cr		4	4	5	5	5	39
1325	Br		4	5	5	5	5	10
1326	Kh	Al, Kp	4	5	4	4	4	18
1327	Hs		2	2	2	2	3	11
1328	Kp	Al	3	4	3	3	4	13
1329	Cl		5	5	5	5	5	20
1330	Kh	Kp	3	5	3	3	4	5
1331	Br	Gs	2	4	3	3	4	16
1332	Bn-Gh		4	5	4	4	5	50
1333	U		5	5	5	5	5	332
1334	U		5	5	5	5	5	600
1335	U		5	5	5	5	5	558
1336	Al	Kh	4	5	4	4	4	10
1340	Md		3	3	3	3	3	8
1346	Tr		3	4	4	4	5	15
1349	Kp		3	3	2	2	3	29
1350	Av		5	5	5	5	5	4
1352	Kl		5	5	5	5	5	9
1356	Cg		3	5	4	4	5	81
1359	Br		3	4	3	3	4	81
1360	Hs		2	2	2	2	3	412
1361	Hs		4	3	5	5	5	28
1362	Gv		4	4	5	5	5	53
1363	W		5	5	5	5	5	54
2197	Fs	Gh	1	3	2	2	3	120
2198	Fs	Gh	2	5	2	2	3	9
2199	Fs		1	3	2	2	3	5
2200	Fs		1	4	2	2	3	11
2201	Fd	Fs	4	5	5	5	5	33
2202	Bn	Fs	3	2	2	2	2	52
2203	Wl	Ab	3	5	4	4	5	74
2204	Ab		3	5	4	4	5	25
2205	Ab	Wl	3	5	4	4	5	19
2206	Ab	Wl	3	5	4	4	5	8
2207	U		5	5	5	5	5	88
2208	Ff	Is	3	2	3	3	3	11
2209	Is		3	4	3	3	3	7
2210	Is	Tr	4	4	5	5	5	6
2211	Is	Tr	3	4	4	4	4	28
2212	Is	Tr	3	4	3	3	3	30
2213	Is		3	4	2	2	3	18
2214	Is	Tr	3	4	3	3	3	20
2215	Is	Tr	3	4	3	3	3	8
2216	Tr	Ko	4	5	5	5	5	33
2217	Tr	Ko	4	5	5	5	5	360
2218	Tr	Ko	4	5	5	5	5	197
2219	Tr	Ko	4	5	4	4	5	45
2220	Tr	Ko	5	5	5	5	5	6
2221	Tr	Ko	4	5	4	4	5	23
2222	Tr	Ko, Is	4	5	4	4	5	36
2223	Tr	Ko	4	5	4	4	5	21
2224	W		5	5	5	5	5	8
2225	W		5	5	5	5	5	9
2226	Ko	Tr	5	5	5	5	5	59
2227	Ko	Tr	5	5	5	5	5	81
2228	Ko	Tr	5	5	5	5	5	121
2229	Ko		5	5	5	5	5	29
2230	Ko	Tr, Wt	5	5	5	5	5	455
2231	Ko	Tr	4	5	5	5	5	144
2232	Ko		3	5	4	4	5	45
2233	Ko	Tr	5	5	5	5	5	23
2234	Ko		3	5	4	4	5	12
2235	Ko	Tr	4	5	5	5	5	12
2236	Ko	Tr, Wt	5	5	5	5	5	48
2237	Ko	Tr, Gv	4	5	5	5	5	59
2238	Ko	Tr	3	5	4	4	5	23
2239	Tp		4	5	4	4	5	12
2240	Tp	Tr, Av	4	5	4	4	5	61
2241	Tp	Wt, Tr	4	5	5	5	5	127
2242	Fm		4	5	5	5	5	7
2243	Ab		3	5	4	4	5	3
2244	Pp	Lt	3	5	4	4	5	128
2245	Lt		4	5	3	3	4	18
2246	Wt		2	2	2	2	3	3
2247	Wt	Is	2	2	2	2	3	12
2248	Wt	Is	2	2	2	2	3	11
2249	Wt		2	2	3	3	3	22
2250	Wt	Kp	2	2	2	2	3	8
2251	Wt	Is	2	2	2	2	3	3
2252	Wt		2	2	2	2	3	13
2253	Wt		3	2	4	4	4	9
2254	WtRp	Ko	5	5	5	5	5	19
2255	Wt		2	2	3	3	3	8
2256	Gb	Is	3	2	4	4	4	5
2257	Gb		2	2	3	3	3	12
2258	Gb		2	2	3	3	3	7
2259	Gb	Is	2	3	3	3	3	7
2260	Gb	Is	2	2	3	3	3	15
2261	Gb		2	2	3	3	3	11
2262	Gb	Is	4	3	5	5	5	13
2263	Ff	Gb	3	2	4	4	4	16
2264	Ff	Gb	2	2	3	3	3	22
2265	Ff		3	2	2	2	2	30
2266	Ff		3	2	4	4	4	5
2267	Ff	Qr	2	2	2	2	2	19
2268	Ff	Qr	2	2	3	3	3	56
2269	Ff	Is	2	2	3	3	3	12
2270	Ff	Gb, Qr	2	2	2	2	2	19
2271	Ff	Qr	2	2	2	2	2	3
2272	Ff	Qr	2	2	2	2	2	9
2273	Qr	Wf	3	2	2	2	2	12
2274	Qr	Wf	3	2	2	2	2	13
2275	Qr	Wf	3	3	4	4	4	56
2276	Rt	Kn, Qr	4	2	3	2	4	7
2277	Rt	Kn, Qr	4	2	3	2	4	54
2278	Kn	Wf	4	3	4	4	5	6
2279	Kn	Wf	4	5	3	3	4	21
2280	Kn	Wf	4	3	3	3	4	106
2281	Rb	Kn, Tr	5	5	5	5	5	6
2282	Is	Tr	3	4	2	2	2	4
2283	Is	Md, Tr	3	4	2	2	2	9
2284	Is	Kn, Ff	3	4	4	4	4	9
2285	Is	Tr	3	4	4	4	4	10
2286	Is	Ff, Tr	3	4	4	4	4	52
2287	Is	Tr	3	4	3	3	3	52
2288	Is	Tr	3	4	4	4	4	4
2289	Is	Tr	3	4	4	4	4	6
2290	Is	Tr	3	4	4	4	4	24
2291	Is	Tr	3	4	3	3	3	10
2292	Is	Tr	3	4	3	3	3	54
2293	Kn		4	5	4	4	5	7
2294	Tr	Ko, Rb	4	5	5	5	5	56
2295	Tr	Ko	5	5	5	5	5	21
2296	Rt	Qr	4	3	3	3	4	9
2297	Mh		3	4	3	3	4	12
2298	Mh	Rb	4	5	4	4	5	9
2299	Kp	Tp	4	4	5	5	5	5
2300	Is	Tr, Kp	3	4	4	4	4	9
2301	Fs	Bn, Gh	2	5	3	3	3	219
2302	Bn	Fs, Gh	3	5	3	3	2	271
2303	Bn	Fs, Gh	3	5	3	3	2	5
2304	Gh	Bn, Fs	3	5	3	3	3	16
2305	Gh	Bn, Fs	3	5	3	3	3	43
2306	Bb	Bn	5	5	5	5	5	16
2307	Bb	Bn	4	5	5	5	5	60
2308	Ab		3	5	4	4	5	17
2309	Ab		3	5	4	4	5	12
2310	Ab	Wl	3	5	4	4	5	53
2311	Ab	Wl	3	5	4	4	5	205
2312	Ab		3	5	4	4	5	10
2313	Ab	Wl	3	5	4	4	5	28

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix I (continued)

UMA	UMA	Minor	Land Suitability*					Area
No	name	soils	S	M	C	V	P	(ha)
2314	Ab	Wl	3	5	4	4	5	12
2315	Ab		5	5	5	5	5	21
2316	Ab-Wl		3	5	4	4	5	14
2317	Ab-Wl		3	5	4	4	5	14
2318	Cg		3	5	4	4	5	48
2319	Cg		3	5	4	4	5	3
2320	Cg	Ab	3	5	3	3	4	28
2321	Wl	Ab	3	5	4	4	5	153
2322	Wl		4	5	5	5	5	98
2323	Wl	Ab	3	5	4	4	5	6
2324	Wl	Ab	3	5	4	4	5	116
2325	Tr	Is	5	5	5	5	5	17
2326	Tr		4	5	5	5	5	25
2327	Ko	Gv, Tr	4	5	5	5	5	1070
2328	Ko	Tr	5	5	5	5	5	239
2329	Ko		5	5	5	5	5	22
2330	Ko	Gv	5	5	5	5	5	21
2331	Ko	Wtrp	5	5	5	5	5	10
2332	Ko		5	5	5	5	5	10
2333	Ko		3	5	4	4	5	32
2334	Ko	Gv, Tr	3	5	4	4	5	99
2335	Ko	Gv	3	5	4	4	5	43
2336	Ko		5	5	5	5	5	5
2337	Ko		3	5	4	4	5	22
2338	Gv	Ko	3	5	4	4	5	15
2339	Gv	Ko	4	5	5	5	5	45
2340	Gv	Ko	4	5	5	5	5	10
2341	Tr		4	5	4	4	5	7
2342	Tr	Ko	4	5	5	5	5	6
2343	Tr	Is	4	5	5	5	5	22
2344	Tr	Ko	4	5	5	5	5	67
2345	Av	Ko, Tp	4	5	4	4	5	28
2346	Av	Wt	4	5	4	4	5	25
2347	AvRp	Tp	5	5	5	5	5	42
2348	TpRp	Gb, Ko	5	5	5	5	5	31
2349	WtRp	Gb	5	5	5	5	5	39
2350	Pp		5	5	4	4	5	12
2351	Wt		5	3	4	4	5	35
2352	Wt		5	3	5	5	5	4
2353	Wt		4	2	4	4	5	2
2354	Wt		5	3	5	5	5	3
2355	Wt		3	2	4	4	5	5
2356	Wt	Ko	4	3	5	5	5	9
2357	Wt	Kp	3	2	4	4	4	23
2358	Wt		3	2	4	4	4	5
2359	Wt		3	2	4	4	5	19
2360	Wt		2	2	3	3	3	28
2361	Wt	Bg	2	2	3	3	3	2
2362	Bc	Wt	5	5	5	5	5	30
2363	Bc	Ko, Wt	3	5	4	4	5	43
2364	Kp	Wt	3	4	3	3	4	19
2365	Is	Tr	3	4	3	3	4	11
2366	Is	Gb, Tr	3	3	3	3	3	14
2367	Is	Tr, Kp	3	4	2	2	3	7
2368	Tr	Ko	4	5	5	5	5	8
2369	Tr	Is	4	5	5	5	5	16
2370	Tr		5	5	5	5	5	53
2371	Tr		5	5	5	5	5	25
2372	Bg		5	5	5	5	5	67
2373	Bg		4	4	5	5	5	33
2374	Bc	BcRv, Ko	5	5	5	5	5	113
2375	Ko	AvRv	5	5	5	5	5	16
2376	Bc	Ko, Gv	3	5	4	4	5	53
2377	Ko		3	5	4	4	5	21
2378	Ko	Tr	5	5	5	5	5	26
2379	Ko	Ab	5	5	5	5	5	23
2380	Bc	Ko	5	5	5	5	5	12
2381	Bc	Ko	5	5	5	5	5	50
2382	Ko		5	5	5	5	5	50
2383	Ko		5	5	5	5	5	7
2384	Ko	Bg	5	5	5	5	5	32
2385	Ab		3	5	4	4	5	13
2386	Ab	Ko	3	5	4	4	5	6
2387	Ab	AbRv	3	5	4	4	5	22
2388	Ab		3	5	4	4	5	8
2389	Ab	AbRv, Ml	3	5	4	4	5	52
2390	Ab		3	5	4	4	5	3
2391	Ab	Cg, Wl	3	5	4	4	5	164
2392	Ab		3	5	4	4	5	306
2393	Ab		5	5	4	4	5	4
2394	Ab		5	5	5	5	5	46
2395	Ab		5	5	5	5	5	15
2396	Ab		5	5	5	5	5	98
2397	Ab		5	5	5	5	5	166
2398	Cg	Ab	3	5	4	4	5	10
2399	Cg	Ab	3	5	4	4	5	22
2400	Cg	Ab	3	5	4	4	5	109
2401	Cg	Ko	3	5	4	4	5	70
2402	Wl		3	5	4	4	5	19
2403	Wl	Ab	3	5	4	4	5	146
2404	Wl-Ab		3	5	3	3	4	13
2405	Wl	Ab	3	5	4	4	5	63
2406	Wl		3	5	4	4	5	32
2407	Wl		5	5	5	5	5	49
2408	Fs	Bn	2	5	3	3	3	54
2409	Fs	Bn	2	5	3	3	3	9
2410	Fs	Bn	3	5	4	4	3	14
2411	Bn	Gh	3	5	3	3	3	31
2412	Bn	Gh	3	5	3	3	3	34
2413	Bn	Gh	3	5	3	3	2	17
2414	Bn	Gh	3	5	4	4	3	32
2415	Bn	Gh	3	5	4	4	3	11
2416	Gh	Fs, Bn	2	5	3	3	3	44
2417	Gh	Fs	2	5	3	3	3	17
2418	Bb		4	5	3	2	4	15
2419	Bn-Fs		2	3	2	2	3	199
2420	Fs		1	3	2	2	3	7
2421	Fm	Fd	3	5	5	5	5	31
2422	Fs	Gh	1	5	2	2	3	31
2423	Bn	Fs	3	2	2	2	2	57
2424	M		5	5	5	5	5	121
2425	Bb		4	5	3	2	4	53
2428	Ab		3	5	4	4	5	1
2429	Ab		3	5	4	4	5	27
2430	Ab	Wl	3	5	4	4	5	41
2431	Ab		3	5	4	4	5	4
2432	Ab	Cg, Bn	3	5	4	4	5	17
2433	Ab	Wl, Ml	3	5	4	4	5	118
2434	Cg		4	5	3	3	4	1
2435	Ab		3	5	4	4	5	18
2436	Ab		5	5	5	5	5	23
2437	Ab-Wl		3	5	4	4	5	16
2438	Ab		3	5	4	4	5	6
2439	Ab	Bn	4	5	4	4	5	22
2440	Bn		4	5	4	4	5	4
2441	Bn		4	5	4	4	5	4
2442	Bn		4	5	4	4	5	6
2443	Ab		4	5	4	4	5	4
2444	Wl	Ab	3	5	4	4	5	5
2445	Wl	Ab	3	5	4	4	5	40
2446	Wl	Ab	3	5	4	4	5	13
2447	Bw		4	5	5	5	5	85
2448	Bw		4	5	5	5	5	46
2449	Bw		4	5	5	5	5	4
2450	Bw		4	5	5	5	5	1
2451	Bw		4	5	5	5	5	7
2452	Bw		4	5	5	5	5	12
2453	Bw		4	5	4	4	5	12
2454	Bw		5	5	5	5	5	33
2455	Bw		5	5	5	5	5	269
2456	Bw		5	5	5	5	5	20
2457	Bw		5	5	5	5	5	29
2458	Bw		5	5	5	5	5	86
2459	Gl		5	5	5	5	5	32
2460	Gl		5	5	5	5	5	133
2461	Gl		5	5	5	5	5	1
2462	Gl		5	5	5	5	5	4
2463	Gl		5	5	5	5	5	5
2464	Gl		5	5	5	5	5	4
2465	Gl		5	5	5	5	5	12
2466	Gl	Bw, Tr	5	5	5	5	5	306
2467	Bw		4	5	5	5	5	32
2468	Bw		4	5	5	5	5	226
2469	Bw		5	5	5	5	5	76
2470	Bw	Cf	4	5	4	4	5	26
2471	Bw	Ko	5	5	5	5	5	180
2472	Bw	Cf	5	5	5	5	5	33
2473	Bw		5	5	5	5	5	40
2474	Ko		5	5	5	5	5	18
2475	KoRp	Ko, Bw	4	5	5	5	5	38
2476	KoRp		5	5	5	5	5	111
2477	KoRp		5	5	5	5	5	4

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix I (continued)

UMA No	UMA name	Minor soils	Land Suitability*					Area (ha)
			S	M	C	V	P	
2478	KoRp		5	5	5	5	5	2
2479	KoRp		5	5	5	5	5	21
2480	KoRp		5	5	5	5	5	20
2481	Ko	KoRv	5	5	5	5	5	17
2482	KoRp		5	5	5	5	5	189
2483	KoRp	Wt	5	5	5	5	5	56
2484	KoRp	Tr	5	5	5	5	5	20
2485	KoRp		5	5	5	5	5	7
2486	Cg		4	5	3	3	4	5
2487	Cg		4	5	3	3	4	3
2488	Wh		5	5	5	5	5	9
2489	Pp		5	5	5	5	5	21
2490	Mh	Is	4	3	4	4	5	14
2491	Tr	Ko	4	5	5	5	5	8
2492	Tr	Ko	4	5	5	5	5	51
2493	Tr	Ko	4	5	5	5	5	18
2494	Tr	Ko	5	5	5	5	5	19
2495	Tr	Ko	5	5	5	5	5	26
2496	Tr	Ko	5	5	5	5	5	52
2497	Tr	Ko	5	5	5	5	5	32
2498	Ko	Tr	3	5	4	4	5	11
2499	Gb	Is	3	2	2	2	2	20
2500	Gb	Tr	3	2	3	3	3	5
2501	Gb	Tr	3	2	3	3	3	3
2502	Cf	Bw	2	5	3	3	3	14
2503	Cf	Bw	3	5	4	4	4	28
2504	Cf	Bw	4	5	5	5	5	43
2505	Bw	Cf	3	5	4	4	5	2
2506	Be		5	4	5	5	5	26
2507	Cd		2	2	2	2	2	26
2508	Cd		2	2	2	2	2	4
2509	Cd		2	2	2	2	2	22
2510	Cd		2	2	2	2	3	23
2511	Cd	Ch	4	2	5	5	5	13
2512	Ch	Cd	5	5	5	5	5	45
2513	Ch	Cd, Tr	5	5	5	5	5	19
2514	Ch	Cd	3	5	4	4	5	48
2515	Wt		2	2	2	2	3	10
2516	Wt		2	2	2	2	3	46
2517	Wt	Ko	2	2	2	2	3	11
2518	Wt	Ko	2	2	3	3	3	5
2519	Wt		2	2	2	2	3	5
2520	Wt		2	2	2	2	3	43
2521	WtRp	Ko, Mr	5	5	5	5	5	6
2522	WtRp	Ko, Mr	5	5	5	5	5	2
2523	WtRp	Mr, Ko	5	5	5	5	5	37
2524	U		5	5	5	5	5	261
2525	W		5	5	5	5	5	3
2526	Mr	MrGv, MrSp	3	5	3	3	4	104
2527	Mr	MrGv, MrSp	3	5	3	3	4	37
2528	Mr	MrGv, MrSp	3	5	3	3	4	19
2529	Mr	MrSp, MrGv	3	5	4	4	4	571
2530	Mr	MrSp, MrGv	3	5	4	4	4	44
2531	Mr	MrSp, MrGv	3	5	4	4	4	176
2532	Mr	MrSp, MrGv	3	5	4	4	4	17
2533	Mr	MrSp	4	5	5	5	5	38
2534	Mr	MrSp	4	5	5	5	5	12
2535	Mr	MrSp	4	5	5	5	5	10
2536	Mr	MrSp	5	5	5	5	5	16
2537	Mr	Tr	3	5	4	4	4	41
2538	Mr		3	5	4	4	4	15
2539	Mr	MrSp, MrGv	3	5	4	4	4	17
2540	WtRp	Mr, Ko	5	5	5	5	5	6
2541	Mr		3	5	3	3	4	35
2542	Mr		3	5	3	3	4	38
2543	Ko	Mr	4	5	5	5	5	6
2544	Bw	Mr	4	5	5	5	5	3
2545	Bw	Tr, Ko	5	5	5	5	5	13
2546	Bw	Mr	4	5	5	5	5	29
2547	Tr	Bw, TrRp	5	5	5	5	5	106
2548	Tr	Mr, TrPv	5	5	5	5	5	89
2549	Tr	Mr, TrPv	5	5	5	5	5	54
2550	Tr		4	5	4	4	5	9
2551	Tr	Mr	4	5	4	4	5	7
2552	Tr	Mr	4	5	5	5	5	12
2553	Tr	Mr	4	5	5	5	5	2
2554	Ko	KoRv, KoRp	5	5	5	5	5	159
2555	AvRp	Ko	5	5	5	5	5	6
2556	Tr	Ko	4	5	5	5	5	158
2557	Ko		3	5	4	4	5	5
2558	Ml	Ab	3	5	3	3	4	5
2559	Tk	Bg, Ko	5	5	5	5	5	11
2560	Tk	Bg, Ko	5	5	5	5	5	1
2561	Tk	Bg, Ko	5	5	5	5	5	1
2562	Tk	Bg, Ko	5	5	5	5	5	1
2563	Tk	Bg, Ko	5	5	5	5	5	2
2564	Tk	Bg, Ko	5	5	5	5	5	1
2565	Tk	Bg, Ko	5	5	5	5	5	3
2566	Tk	Bg, Ko	5	5	5	5	5	12
2567	Bg	Tk, Ko	5	5	5	5	5	8
2568	Bg	Tk, Ko	5	5	5	5	5	17
2569	Bg	Tk, Ko	5	5	5	5	5	2
2570	Bg	Tk, Ko	5	5	5	5	5	2
2571	Bg	Tk, Ko	5	5	5	5	5	14
2572	Ko		5	5	5	5	5	58
2573	Ko	Gv	5	5	5	5	5	42
2574	Ko	Gv	5	5	5	5	5	115
2575	Ko		5	5	5	5	5	23
2576	Ko	Gv	5	5	5	5	5	14
2577	KoRp	WtRp	5	5	5	5	5	10
2578	KoRp		5	5	5	5	5	2
2579	KoRp	WtRp	5	5	5	5	5	11
2580	Gv	Ko	4	5	5	5	5	14
2581	Gv	Ko	5	5	5	5	5	160
2582	Gv	Ko	5	5	5	5	5	9
2583	Gv	Dg	4	5	5	5	5	33
2584	Gv	Dg	4	5	5	5	5	23
2585	Gv	Dg	4	5	5	5	5	46
2586	Gv	Ko	4	5	5	5	5	17
2587	Gv	Ko	4	5	5	5	5	50
2588	Gv	Ko	3	5	4	4	5	37
2589	Gv	Ko	4	5	5	5	5	13
2590	Gv	Dg, Wl	5	5	5	5	5	169
2591	Gv	Ko	5	5	5	5	5	53
2592	Gv	Tr, Ko	5	5	5	5	5	17
2593	Ko	Tr	4	5	5	5	5	20
2594	Ko		4	5	4	4	5	16
2595	Ab	Wl	3	5	4	4	5	12
2596	Ab		3	5	4	4	5	21
2597	Ab		4	5	4	4	5	16
2598	Wl	Ab	3	5	4	4	5	21
2599	Gh	Fs	3	5	3	3	5	5
2600	Gh	Fs, Bn	2	5	3	3	3	23
2601	Wl		3	5	4	4	5	24
2602	Pp		5	5	4	4	5	67
2603	TpRp	Ko	5	4	5	5	5	7
2604	Wt	Kp	3	3	4	4	5	12
2605	Is	Ff	3	4	2	2	3	5
2606	Ch	Cd	5	3	5	5	5	6
2607	Tr	Mr	4	5	4	4	5	7
3685		Tr	3	5	4	4	4	4

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix II.

Areas of land suitability for the irrigated land uses for sugarcane, macadamia, cucurbits (pumpkin, cucumber, melon), vegetables (tomato, capsicum) and peanuts for the South Section, Bundaberg area

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
2001	M		5	5	5	5	5	49
2002	M		5	5	5	5	5	34
2003	Wd		3	5	5	5	5	18
2004	Wd		3	5	5	5	5	109
2005	Wd		3	5	5	5	5	18
2006	Wd	Kl	3	5	5	5	5	35
2007	Wd		3	5	5	5	5	42
2008	Cn		4	2	3	2	4	58
2009	Cn		4	2	3	2	4	258
2010	Cn		4	2	3	2	4	46
2011	Cn		4	2	3	2	4	206
2012	Cn		4	2	3	2	4	3
2013	To		4	3	3	2	4	150
2014	To		4	3	3	2	4	14
2015	Cn		4	2	3	2	4	10
2016	M		5	5	5	5	5	113
2017	Kn		4	3	3	2	4	11
2018	Kn	Kl, Wm	4	5	3	2	4	24
2019	Kn	Wm	4	3	3	2	4	24
2020	Kn	Wm	4	3	3	2	4	96
2021	Kn	Th, Rb	4	5	3	3	4	104
2022	Kn	Wm	4	5	3	3	4	26
2023	Kn	Mh	4	5	3	3	4	60
2024	Kn	Wm	4	3	3	2	4	3
2025	Kn	Wm, Rb	4	3	3	2	4	51
2026	Kn	Wm	4	3	3	3	4	15
2027	Kn	Wm	4	3	3	2	4	48
2028	Kn	Al	4	3	3	2	4	617
2029	Wm	Mh, Kn	4	5	3	2	4	20
2030	Wm	Mh, Kn	4	5	3	2	4	42
2031	Wm	Rb	4	5	3	2	4	6
2032	Wm	Kn	4	3	3	2	4	6
2033	Wm	Rb, Rb	4	5	5	5	5	87
2034	Wm	Mh, Al	4	5	3	2	4	4
2035	Wm	Mh, Al	4	5	3	2	4	61
2036	Wm	Mh, Al	4	5	3	2	4	144
2037	Wm	Mh, Al	4	5	3	2	4	55
2038	Th	Kl, Rb	4	5	4	4	4	3
2039	Th	Kl, Rb	4	5	4	4	4	53
2040	Th	Kl, Rb	4	5	4	4	4	92
2041	Th	Kl, Rb	4	5	4	4	4	68
2042	Is	Al	3	4	3	3	4	26
2043	Is	Md	3	4	3	3	4	15
2044	Is	Md	3	4	3	3	4	7
2045	Is	Cl, Md	3	4	3	3	4	21
2046	Is	Al, Md	3	4	3	3	4	22
2047	Is	Rb	3	4	3	3	4	16
2048	Is	Rb	3	4	3	3	4	29
2049	Is	Rb	3	4	3	3	4	16
2050	Kl	Kn	5	5	5	5	5	99
2051	Kl	Kh	5	5	5	5	5	96
2052	Kl	Kh, Rb	5	5	5	5	5	475
2053	Kl	Is	3	5	2	2	3	10
2054	Rb	Kl	3	5	5	5	5	73
2055	Rb	Kh, Kl	5	5	5	5	5	20
2056	Rb	Al	5	5	5	5	5	6
2057	Rb	Mh	5	5	5	5	5	7
2058	Rb	Al	5	5	5	5	5	38
2059	Rb	Wm	5	5	5	5	5	23
2060	Rb	Al	5	5	5	5	5	21
2061	Rb	Wm	5	5	5	5	5	42
2062	Rb	Wm	5	5	5	5	5	8
2063	Rb	Al	5	5	5	5	5	15
2064	Mh	Wm, Qr	3	5	3	3	4	113
2065	Mh	Al	3	5	3	3	4	4
2066	Mh	Rb	3	5	3	3	4	6
2067	Mh	Wm	3	5	3	3	4	13
2068	Mh	Qr, Al	3	5	3	3	4	93
2069	Mh	Qr, Al	3	5	3	3	4	49
2070	Mh	Wm, Al	3	5	3	3	4	18
2071	Mh	Al, Rb	3	5	3	3	4	69
2072	Al	Mh, Cl	3	5	3	3	4	66
2073	Al	Wm	3	5	3	3	4	13
2074	Al	Rb	3	5	3	3	4	43
2075	U		5	5	5	5	5	61
2076	U		5	5	5	5	5	74
2077	Kh	Rb	4	5	4	4	4	44
2078	Al	Mh	3	5	3	3	4	6
2079	Kl		3	5	3	3	4	5
2080	Qr	Mh	3	4	2	2	3	211
2081	Qr	Mh	3	3	2	2	3	4
2082	Qr	Mh	3	3	2	2	3	7
2083	Gb	Is	2	2	3	3	3	4
2084	Qr	Mh	3	4	2	2	3	9
2085	Qr	Md, Mh	3	4	3	3	3	8
2086	Qr	Md, Mh	3	4	3	3	3	11
2087	Cl	Kh, Al	3	5	3	3	4	105
2088	By		3	2	3	3	3	7
2089	Mh	Qr, Al	3	5	3	3	3	2
2090	Md	Is, Qr	3	5	3	3	3	17
2091	Md	Qr	3	4	3	3	3	7
2092	Md	Rb	3	3	3	3	3	16
2093	Md	Gb	3	4	2	2	3	51
2094	Md	Gb, Is	3	4	3	3	3	23
2095	Md	Is, Al	3	4	2	2	3	31
2096	Md	Is, Al	3	4	2	2	3	53
2097	Md	Is, Al	3	4	2	2	3	12
2098	Md	Al, Rb	3	4	3	3	3	19
2099	Md	Al, Rb	3	4	3	3	3	7
2100	Md	Is, Rb	3	4	2	2	3	11
2101	Md	Al	3	4	2	2	3	27
2102	Md	Al	3	4	2	2	3	9
2103	Md	Al	3	4	2	2	3	1
2104	Pp		4	5	4	4	5	21
2105	Pp		4	5	4	4	5	13
2106	Pp	Lt	4	5	4	4	5	14
2107	Pp	Lt	4	5	4	4	5	33
2108	Pp	Lt	4	5	4	4	5	14
2109	Ff-Gb	Qr	2	3	2	2	2	140
2110	Is	Al, Md	3	4	3	3	4	7
2111	Rb	Al, Md	5	5	5	5	5	51
2112	Mh	Qr, Al	3	5	3	3	4	4
2113	Al	Is, Rb	3	5	3	3	4	14
2114	Al	Rb	3	5	3	3	4	20
2115	Al	Mh, Wm	3	5	3	3	4	4
2116	Al	Wm, Rb	3	5	3	3	4	86
2117	Al	Wm, Rb	3	5	3	3	4	6
2118	Al	Wm, Rb	3	5	3	3	4	3
2119	Al	Wm, Is	3	5	3	3	4	24
2120	Al	Wm	3	5	3	3	4	48
2121	W		5	5	5	5	5	0
2122	Md	Al, Kn	3	4	2	2	3	9
2123	Mh	Qr, Al	3	5	3	3	4	7
2124	Mh	Al, Is	3	4	3	3	4	29
2125	Tp	Av, Rb	4	5	5	5	5	19
2126	Tp	Av, Rb	5	5	5	5	5	61
2127	Av	Tp	4	5	5	5	5	20
2128	Tp	Rb	5	5	5	5	5	20
2129	AvRp	Ko	5	5	5	5	5	5
2130	AvRp	Ko	5	5	5	5	5	17
2131	AvRp	Ko	5	5	5	5	5	10
2132	AvRp	Ko	5	5	5	5	5	1
2133	Gv	Ko, AvRp	5	5	5	5	5	40
2134	Gv	Ko, AvRp	5	5	5	5	5	4
2135	Gv	Ko	5	5	5	5	5	2
2136	Gv	Ko	5	5	5	5	5	18
2137	Gv	Ko, AvRp	5	5	5	5	5	91
2138	Gv	Ko, Ok	5	5	5	5	5	32
2139	Gv	Ko	5	5	5	5	5	141
2140	Gv	Ko	4	5	5	5	5	18
2141	Gv	Ko	4	5	5	5	5	30
2142	Gv	Ko	4	5	4	4	5	43
2143	Gv	Ko, AvRp	4	5	5	5	5	13
2144	Ko	Gv	4	5	4	4	5	14

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix II (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
2145	Ko	Gv	4	5	4	4	5	35
2146	Ko	Gv	4	5	5	5	5	37
2147	KoRp	Gv	4	5	5	5	5	22
2148	KoRp	Tr, Gv	5	5	5	5	5	124
2149	Tr	Rb	5	5	5	5	5	16
2150	Tr	Rb	5	5	5	5	5	29
2151	Tr	Rb	5	5	5	5	5	14
2152	TrRp	Ko	4	5	5	5	5	46
2153	Tr	TrPv	4	5	5	5	5	38
2154	Tr		4	5	3	3	4	56
2155	Ok	Ff, Qr	2	2	3	3	3	195
2156	Ok	Ff, Qr	2	2	3	3	3	13
2157	Ff	Is	2	2	3	3	3	18
2158	Ff	Is	2	2	3	3	3	9
2159	Ok	Gv	5	4	5	5	5	15
2161	Gb	Is	4	2	4	4	4	20
2162	Gb		4	2	4	4	4	4
2163	Gb	Is	4	2	4	4	4	11
2164	Kp	Av, Gb	5	4	5	5	5	32
2165	Is	Gb	3	4	3	3	4	23
2166	IsRp	TrpV, Ff	4	4	5	5	5	10
2167	IsRp	TrpV	4	4	5	5	5	12
2168	IsRp	Ff, Tr	4	4	5	5	5	8
2169	IsRp	TrpV, Gb	4	4	5	5	5	12
2170	IsRp	TrpV, Gb	4	4	5	5	5	8
2171	IsRp	AvRp	5	5	5	5	5	12
2172	Is	Ff	3	4	3	3	4	5
2173	Qr	Ff	3	4	3	3	3	10
2174	Fs	Wl	2	5	3	3	3	44
2175	Fs	Bn	3	5	4	4	4	56
2176	Fs	Bn	2	5	3	3	4	4
2177	Fs	Bn	2	5	3	3	2	11
2178	Fs	Bn	3	5	4	4	4	13
2179	Fs	Bn	3	5	4	4	4	23
2180	Fs	Bn	4	5	3	3	5	27
2181	Fs	Wl	4	5	3	3	5	24
2182	Ab		3	5	4	4	5	6
2183	Ab		3	5	4	4	5	59
2184	Ab		3	5	4	4	5	18
2185	Ab		3	5	4	4	5	5
2186	Ab	Wl	3	5	4	4	5	152
2187	Ab		5	5	5	5	5	35
2188	Ab	Wl	5	5	5	5	5	158
2189	Ab	By	3	5	4	4	5	26
2190	Ab	Fs, Wl	5	5	5	5	5	83
2191	Cg		3	5	4	4	5	20
2192	Bn	Ab	3	5	3	3	2	41
2193	Bn	Fs	3	5	3	3	3	28
2194	Wl	Ab	3	5	4	4	5	18
2195	Cl	Kl	3	5	3	3	4	70
2196	Kh	Kl, Rb	4	5	5	5	5	68
2426	Kp-Av	Gb	5	4	5	5	5	9
2427	Kp-Av	Gb	5	4	5	5	5	1
2608	Ko	Wt, AvRp	5	5	5	5	5	169
2609	Ko	Wt	5	5	5	5	5	11
2610	Ko	Gv	5	5	5	5	5	16
2611	KoRv	Wt	5	5	5	5	5	11
2612	Ko	Gv	5	5	5	5	5	47
2613	Ko	Gv	5	5	5	5	5	33
2614	Ko	Gv	4	5	5	5	5	169
2615	Gv	Ko	5	5	5	5	5	62
2616	Gv	Ko	5	5	5	5	5	9
2617	Gv	Ko	4	5	5	5	5	90
2618	Ab		5	5	5	5	5	11
2619	Ab		3	5	4	4	5	36
2620	Ab		3	5	4	4	5	35
2621	Ml	Ab	3	5	3	3	4	8
2622	Gh	Fs, Ab	2	5	3	3	2	10
2623	Fs	Bn	2	5	3	3	3	64
2624	Bb	Bn	4	5	4	4	4	18
2625	Fs	Wl	5	5	4	4	5	38
2626	Wt	Kp	2	2	2	2	3	18
2627	Wr	Wt	2	4	2	2	3	1
2628	Wr	Av	2	4	2	2	3	7
2629	Wr	Av	2	4	2	2	3	6
2630	Wr	Av	2	4	2	2	3	36
2631	Wr	Av	2	4	2	2	3	23
2632	Wr	Wt	2	4	2	2	3	13
2633	Wr	Av, Md	2	4	2	2	3	54
2634	Wr		2	4	2	2	3	4
2635	Wr		2	4	2	2	3	7
2636	Wr	Md	2	4	2	2	3	11
2637	Wr		2	4	2	2	3	5
2638	Wr	Md	2	4	2	2	3	9
2639	Wr	Md	2	4	2	2	3	6
2640	Wr	Wt	2	4	2	2	3	25
2641	Av	Wr	4	5	4	4	5	35
2642	Av	Wr	3	5	4	4	5	30
2643	Av	Tp	5	5	5	5	5	40
2644	Av	Tp	5	5	5	5	5	117
2645	Av	Tp	5	5	5	5	5	32
2646	Av		5	5	5	5	5	2
2647	Mh	Wm	4	4	5	5	5	12
2648	Wm	Mh	4	3	3	2	4	5
2649	Al		3	5	2	2	3	8
2650	Al		3	5	3	3	4	9
2651	Al	Is, Wt	3	5	2	2	3	12
2652	Al	Is	3	5	2	2	3	11
2653	Al	Tp, Is	3	5	3	3	4	16
2654	Av	Tp	4	5	5	5	5	16
2655	Tp		5	5	5	5	5	21
2656	Tp		5	5	5	5	5	269
2657	Tp		4	5	4	4	5	7
2658	Tp	Rb	4	5	4	4	5	10
2659	Tp		4	5	4	4	5	18
2660	Tp	Al	4	5	4	4	5	21
2661	Tp	Rb	4	3	4	4	5	8
2662	Tp	Rb	4	5	4	4	5	4
2663	Wr	Md	2	4	2	2	3	3
2664	Is	Md	3	4	3	3	4	24
2665	Is	Tp	3	4	3	3	4	7
2666	Pp	Lt	3	5	4	4	5	17
2667	Pp	Lt	3	5	4	4	5	14
2668	Md	GbMv	3	4	2	2	3	21
2669	Md		3	4	2	2	3	4
2670	Md	Is	3	4	2	2	3	15
2671	Md		3	4	3	3	3	4
2672	Md	Al, Is	3	4	2	2	3	11
2673	Tp		5	5	5	5	5	54
2674	Tp		5	5	5	5	5	29
2675	Tp	Rb	4	5	5	5	5	52
2676	Tp		4	5	4	4	5	12
2677	Tp	Rb	5	5	5	5	5	24
2678	Tp	Rb	5	5	5	5	5	7
2679	Tp	Rb	5	5	5	5	5	11
2680	Al		3	5	2	2	3	92
2681	Al		3	5	2	2	3	80
2682	Al		3	5	2	2	3	9
2683	Al		3	5	2	2	3	11
2684	Mh	Al, Rb	3	5	2	2	3	18
2685	Mh	Al, Rb	3	5	3	3	4	102
2686	Pp	Lt, W	5	5	4	4	5	460
2687	Rb	Al	5	5	5	5	5	7
2688	Rb	Al	5	5	5	5	5	68
2689	Gb	Md	2	2	2	2	2	5
2690	Qr	Ff, Mh	3	4	2	2	3	45
2691	Mh	Rb, Qr	4	4	3	3	4	10
2692	U		5	5	5	5	5	98
2693	Ko	Gv, AvRp	5	5	5	5	5	97
2694	Gv	Ko	5	5	5	5	5	50
2695	Gv	Ko	5	5	5	5	5	25
2696	Gv	Q, Ko	5	5	5	5	5	6
2697	Gv	Ko	4	5	5	5	5	577
2698	Gb		2	5	3	3	3	26
2699	Is	Tr, Ko	3	5	4	4	4	16
2700	Bn		3	5	3	3	4	13
2701	Bn		3	5	3	3	4	8
2702	Bn		5	5	4	4	5	4
2703	Bn		4	5	3	3	5	5
2704	Bn		3	5	3	3	5	7
2705	Bn	Gh	5	5	4	4	5	65
2706	Ab		3	5	4	4	5	90
2707	Ab		4	5	5	5	5	28
2708	Gh	Fs	3	5	4	4	4	30
2709	Fs		3	5	4	4	4	8
2710	Fs		3	5	3	3	3	24
2711	Wm		4	2	3	2	4	4
2712	Al	Is	3	5	3	3	4	19
2713	Kp	Cl	3	4	3	3	4	9
2714	Kp	Cl	3	5	3	3	4	11
2715	Kp	Cl	3	5	3	3	4	19
2716	Cl	Kh, Kp	3	5	3	3	4	711

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix II (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
2717	Cl	Kh	3	5	3	3	4	80
2718	Cl	Kh	3	5	3	3	4	98
2719	Kh		4	5	5	5	5	30
2720	Is	Al	3	4	3	3	4	168
2721	Is	Al	3	4	3	3	4	29
2722	Is	Al	3	5	3	3	4	11
2723	Is	Al	3	5	3	3	4	4
2724	Kp	Cl, Is	3	5	3	3	4	22
2725	Is	Al, Rb	3	4	3	3	4	15
2726	Al	Is	3	5	3	3	4	68
2727	Al	Is	3	5	3	3	4	13
2728	Al	Rb, Cl	3	5	3	3	4	1085
2729	Al		3	5	3	3	4	38
2730	Al	Cl	3	5	3	3	4	10
2731	Rb	Al	4	5	4	4	4	167
2732	Rb		5	5	5	5	5	3
2733	Rb	Al	5	5	5	5	5	29
2734	Rb		5	5	5	5	5	7
2735	Rb		5	5	5	5	5	23
2736	Rb		5	5	5	5	5	21
2737	Mh	Al	4	5	3	3	4	17
2738	Mh	Is, Wm	3	5	2	2	3	14
2739	Mh	Al	3	5	3	3	3	8
2740	Mh	Al	3	5	2	2	3	19
2741	Mh	Al	3	5	2	2	3	23
2742	Mh	Al	3	5	2	2	3	3
2743	Mh	Al	3	5	3	3	3	6
2744	Kl		5	5	5	5	5	51
2745	W		5	5	5	5	5	26
2746	W		5	5	5	5	5	48
2747	W		5	5	5	5	5	75
2748	Wm	Mh, Rb	4	5	3	2	4	23
2749	Wm	Mh, Rb	4	5	3	2	4	2
2750	Wm	Mh, Rb	4	5	3	2	4	2
2751	Wm	Mh, Rb	4	5	3	2	4	3
2752	Wm	Mh, Rb	4	5	3	2	4	5
2753	Qr	Mh	3	4	2	2	3	33
2754	Qr	Is, Mh	3	4	2	2	3	11
2755	Kp		3	4	3	3	4	69
2756	Wo	Av, Kp	5	5	5	5	5	36
2757	Wo	Av, Kp	4	5	5	5	5	8
2758	Tp	Rb	4	5	5	5	5	10
2759	Pp	Lt	3	5	4	4	5	11
2760	Tp	Rb	5	4	5	5	5	13
2761	Tp	Av, Wo	5	5	5	5	5	21
2762	Tp	Kp	5	5	5	5	5	33
2763	Wo	Av, Tp	5	5	5	5	5	13
2764	W		5	5	5	5	5	26
2765	W		5	5	5	5	5	10
2766	Wr	Md, Is	3	4	2	2	3	15
2767	Kp	Is	3	4	3	3	4	86
2768	Is	Tp	3	4	4	4	4	4
2769	Is		3	4	3	3	4	27
2770	Is	Al	3	4	3	3	4	10
2771	Is	Al	3	4	3	3	4	3
2772	Is	Al	3	4	3	3	4	3
2773	Is	Gb	3	4	3	3	4	54
2774	Is	Al	3	4	3	3	4	74
2775	Is	Al	3	4	3	3	4	13
2776	Pp	Lt	4	5	4	4	5	17
2777	Pp	Lt	4	5	4	4	5	15
2778	Rb	Tp	5	5	5	5	5	10
2779	Rb		5	5	5	5	5	9
2780	Rb	Is	5	5	5	5	5	4
2781	Al	Is	3	5	3	3	4	135
2782	Al	Is	3	5	3	3	4	22
2783	Mh	Al	3	5	3	3	4	29
2784	Mh	Al	3	5	3	3	4	13
2785	Mh	Al, Qr	3	5	3	3	4	68
2786	Mh	Rb	4	4	4	4	5	11
2787	Qr		3	4	4	4	4	15
2788	Kn		4	3	3	2	4	14
2789	W		5	5	5	5	5	5
2790	W		5	5	5	5	5	5
2791	W		5	5	5	5	5	10
2792	Rb	Kh	5	5	5	5	5	13
2793	Kn		4	5	3	3	4	3
2794	Th	Rb	5	5	5	5	5	13
2795	Mh	Al	3	5	3	3	4	14
2796	Al		5	5	5	5	5	6
2797	Al	Mh	3	5	3	3	4	16
2798	Qr	Is, Al	3	4	3	3	4	8
2799	Ff-Qr		3	2	2	2	2	23
2800	Is	Al	3	4	3	3	4	14
2801	Is	Al	3	4	3	3	4	5
2802	Kp	Cl, Ot	3	4	3	3	4	1154
2803	Kp	Cl	5	5	5	5	5	15
2804	Ot	Kp	1	4	2	2	3	14
2805	Ot	Kp	2	4	2	2	3	37
2806	Cl	Kp	3	5	3	3	4	48
2807	Ok		1	2	2	1	2	9
2808	Cl	Kp	3	5	3	3	4	65
2809	Kp	Cl	3	4	3	3	4	9
2810	Kp	Wr	3	4	3	3	4	57
2811	Kp	Is	3	4	3	3	4	66
2812	U		5	5	5	5	5	70
2813	U		5	5	5	5	5	394
2814	U		5	5	5	5	5	7
2815	U		5	5	5	5	5	65
2816	U		5	5	5	5	5	16
2817	U		5	5	5	5	5	22
2818	U		5	5	5	5	5	37
2819	U		5	5	5	5	5	79
2820	U		5	5	5	5	5	23
2821	U		5	5	5	5	5	4
2822	U		5	5	5	5	5	20
2823	Q		5	5	5	5	5	6
2824	Q		5	5	5	5	5	5
2825	Q		5	5	5	5	5	11
2826	Q		5	5	5	5	5	70
2827	W		5	5	5	5	5	75
2828	Ff	Qr	3	3	4	4	5	2
2829	Ff	Qr	3	2	2	2	2	11
2830	Ff		3	2	2	2	2	10
2831	Ff		3	2	2	2	2	7
2832	Ff	Qr	3	2	4	4	4	40
2833	Ff	Qr	3	2	4	4	4	16
2834	Ff		2	2	3	3	3	35
2835	Ff		2	2	3	3	3	13
2836	Ff		3	2	4	4	4	5
2837	Wr	Kp	2	4	3	3	3	7
2838	Wr	Kp	2	4	3	3	3	2
2839	Wr		2	4	3	3	3	33
2840	Wr		2	4	3	3	3	12
2841	Wm	Rb, Kn	5	5	5	5	5	40
2842	Wm	Rb, Kn	4	5	4	4	5	22
2843	Wm	Rb, Kn	4	5	4	4	5	37
2844	Wm	Mh	4	4	3	3	4	15
2845	Wm	Kn	4	4	3	3	4	30
2846	Wm	Rb, Mh	5	5	5	5	5	10
2847	Wm	Rb	4	5	3	3	4	3
2848	Rb	Wm	5	5	5	5	5	6
2849	Rb	Tp	5	5	5	5	5	9
2850	Rb		5	5	5	5	5	22
2851	Rb	Kh, Al	5	5	5	5	5	15
2852	Rb		5	5	5	5	5	8
2853	Rb		5	5	5	5	5	31
2854	Rb	Al, Qr	4	5	5	5	5	5
2855	Rb	Al	5	5	5	5	5	13
2856	Rb	Ff	5	5	5	5	5	10
2857	Rb	Wm, Ab	5	5	5	5	5	31
2858	Rb	Tr	5	5	5	5	5	18
2859	Rb	Is	4	5	3	3	4	6
2860	Rb		4	5	3	3	4	3
2861	Rb		4	5	3	3	4	3
2862	Rb		5	5	5	5	5	6
2863	Tp	Is, Kl	5	5	5	5	5	28
2864	Tp	Rb	4	5	4	4	5	8
2865	Kl	Rb, Av	5	5	5	5	5	66
2866	Kl	Wm	5	5	5	5	5	29
2867	Kn	Wm	4	3	3	2	4	8
2868	Kn	Wm	4	4	3	2	4	26
2869	Kn	Wm, Rb	4	5	3	3	4	22
2870	Rt	Wm	4	3	3	2	4	16
2871	Gb	Qr	3	2	2	2	2	5
2872	Ff	Qr	3	2	4	4	4	4
2873	Ok	Ff, Qr	2	2	3	3	3	17
2874	Qr	Ff, Mh	3	4	4	4	4	9
2875	Qr	Rb, Wm	3	4	4	4	4	4
2876	Qr	Rb, Ff	3	4	4	4	4	9
2877	Al	Rb	3	5	3	3	4	13
2878	Md	Is	3	4	3	3	3	17

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix II (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
2879	Is	Al, Kp	3	4	3	3	4	52
2880	Is	Ff, Al	3	4	3	3	4	22
2881	Is	Md	3	4	3	3	4	19
2882	Is	Ff	3	4	3	3	4	13
2883	Is	Md, Rb	3	4	4	4	4	5
2884	Is	Rb, Md	3	4	4	4	4	3
2885	Is	Rb	3	4	3	3	4	2
2886	Gh	Fs, Bn	2	5	3	3	3	16
2887	Gh	Fs, Bn	2	5	2	2	3	36
2888	Gh	Fs	2	4	2	2	3	12
2889	Bn	Gh, Fs	3	2	2	2	2	30
2890	Bn	Gh, Fs	3	2	2	2	2	36
2891	Bn	Gh, Fs	3	2	2	2	2	11
2892	Bn	Gh, Fs	4	2	4	4	5	49
2893	Fs	Bn	2	3	3	3	3	23
2894	Fs		1	3	2	2	3	9
2895	Fs		1	3	2	2	3	3
2896	Fs		2	3	3	3	3	9
2897	Fs	Gh	1	3	2	2	3	142
2898	Fs	Gh, Bn	3	3	4	4	4	5
2899	Fs	Bn	1	3	2	2	3	19
2900	Cg	Ab, MlSv	4	5	4	4	5	115
2901	Cg	Ab	4	5	4	4	5	74
2902	Cg	Ab	4	5	4	4	5	7
2903	Ab	Wl	3	5	4	4	5	59
2904	Ab		3	5	4	4	5	15
2905	Ab	Cg	3	5	4	4	5	31
2906	Ab		5	5	5	5	5	51
2907	Ab		3	5	4	4	5	11
2908	Ab		3	5	4	4	5	19
2909	Ab		5	5	5	5	5	24
2910	Ab		3	5	4	4	5	4
2911	Ab		5	5	4	4	5	11
2912	Wl	Ab	3	5	4	4	5	93
2913	Wl	Ab	3	5	4	4	5	12
2914	Wl	Fs	3	5	4	4	5	6
2915	Wl	Ab	5	5	5	5	5	5
2916	Wl		5	5	5	5	5	9
2917	Wl	Ab	5	5	5	5	5	19
2918	Sm	Fs	2	5	2	2	3	9
2919	Wl		3	5	4	4	5	11
2920	M		5	5	5	5	5	8
2921	Is	Al	3	4	3	3	4	21
2922	Al	Is, Rb	3	5	3	3	4	4
2923	Wt	Ot	1	3	2	1	2	19
2924	W		5	5	5	5	5	17
2925	Kp		3	4	3	3	4	15
2926	Ok		1	2	2	1	2	5
2927	Cl	Kp	2	5	3	3	4	130
2928	Ot		2	3	2	2	3	12
2929	Ok		1	2	2	1	2	19
2930	Ff		2	2	2	2	2	2
2931	Ot	Kp	2	4	2	2	3	10
3000	M		5	5	5	5	5	56
3001	O		5	5	5	5	5	60
3002	U		5	5	5	5	5	109
3003	U		5	5	5	5	5	282
3004	U		5	5	5	5	5	8
3005	Fm		5	5	5	5	5	52
3006	Fd		5	5	5	5	5	10
3007	O		5	5	5	5	5	45
3008	Mp		4	2	3	2	4	13
3009	Bi		4	5	3	2	4	45
3010	Sv		5	5	5	5	5	29
3011	Cv		4	5	3	2	4	4
3012	Sv		4	5	3	3	4	99
3013	Sv		5	5	5	5	5	17
3014	Sv		4	5	4	4	5	10
3015	Sv		4	5	5	5	5	7
3016	Ag		3	5	5	5	5	9
3017	Ag	Ra	3	5	5	5	5	36
3018	Ag		3	5	5	5	5	9
3019	Ag		5	5	5	5	5	3
3020	Ag		3	5	4	4	5	14
3021	Sw		5	4	5	5	5	3
3022	Tg	Ag	2	5	2	2	3	11
3023	Tg	Ag	2	5	2	2	3	7
3024	Wg		2	2	2	2	2	29
3025	Wg		2	2	2	2	3	3
3026	Wg	Tg	2	3	2	2	3	6
3027	Ra		4	5	5	5	5	46
3028	Wg		2	2	2	2	2	2
3029	Ag		3	5	5	5	5	36
3030	Ag		3	5	5	5	5	4
3031	Ag		5	5	5	5	5	10
3032	Ag		5	5	5	5	5	4
3033	Ag		3	5	5	5	5	32
3034	Ra		4	5	5	5	5	7
3035	Sw		5	5	5	5	5	22
3036	Sw		5	5	5	5	5	9
3037	Sw		4	4	5	5	5	66
3038	Sw		5	5	5	5	5	15
3039	Sw		5	5	5	5	5	11
3040	Sw		4	4	5	5	5	24
3041	Sw		3	4	4	4	5	6
3042	Sw		5	5	5	5	5	31
3043	Sw		5	5	5	5	5	17
3044	Sw		5	5	5	5	5	23
3045	Sw		4	5	5	5	5	5
3046	Bi		4	2	3	2	4	6
3047	Bi		4	2	3	2	4	15
3048	Bi		4	3	3	2	4	21
3049	Bi		4	2	3	2	4	8
3050	Bi	Sw	4	2	3	2	4	26
3051	Bi		4	3	3	2	4	23
3052	Bi		4	2	3	2	4	103
3053	Bi		4	3	3	2	4	8
3054	Qb		5	5	5	5	5	3
3055	Qb		5	4	5	5	5	27
3056	Fm	Qb	5	5	5	5	5	19
3057	Qb		3	5	4	4	5	36
3058	W		5	5	5	5	5	2
3059	Qb		5	4	5	5	5	7
3060	Qb	SwSv, Ra	5	5	5	5	5	13
3061	M		5	5	5	5	5	27
3062	Tg		2	4	3	3	4	88
3063	Tg	Ag	4	4	5	5	5	54
3064	Wg		2	2	2	2	2	5
3065	W		5	5	5	5	5	3
3066	Q		5	5	5	5	5	11
3067	Tg		2	4	2	2	3	6
3068	Ra		4	5	5	5	5	38
3069	Ra		4	5	5	5	5	3
3070	Ra		4	5	5	5	5	87
3071	Ag	Ra	3	5	4	4	5	28
3072	Ra		4	5	5	5	5	38
3073	Qb		4	5	5	5	5	15
3074	Qb		3	5	2	2	2	30
3075	Qb		3	5	2	2	2	20
3076	Wg	Tg, Ag	2	2	2	2	2	302
3077	Wg	Tg	2	2	2	2	3	15
3078	Wg		2	3	2	2	3	4
3079	Wg	Tg	3	3	4	4	5	9
3080	Wg	Tg, Ag	2	2	2	2	3	611
3081	Tg	Wg	2	4	3	3	4	17
3082	Wg	Tg	2	2	2	2	3	52
3083	Tg	Wg	2	4	2	2	3	20
3084	Tg	Wg	2	4	3	3	4	79
3085	Tg	Ag	2	4	2	2	3	97
3086	Tg		2	4	2	2	3	5
3087	Tg		2	4	2	2	3	10
3088	Tg	Wg, Ag	2	4	2	2	3	38
3089	Tg	Wg	2	4	3	3	4	45
3090	Tg	Wg	2	4	2	2	3	15
3091	Ra		4	5	5	5	5	47
3092	Ra	Sw	4	5	5	5	5	33
3093	Wl	Ab	4	5	5	5	5	55
3094	Ab-Wl		5	5	5	5	5	31
3095	Ra		4	5	5	5	5	37
3096	Ra	Sw	4	5	5	5	5	37
3097	Ra		4	5	5	5	5	5
3098	Ra	Ag	4	5	5	5	5	30
3099	Ag		5	5	5	5	5	8
3100	Ag		5	5	5	5	5	7
3101	Ag		5	5	5	5	5	16
3102	Ag		5	5	5	5	5	8
3103	Sw		5	5	5	5	5	5
3104	Sw		5	5	5	5	5	6
3105	Sw		4	4	5	5	5	4
3106	Sw	Sv	4	4	5	5	5	6
3107	Sw	Ag	5	5	5	5	5	21
3108	Sw		4	4	5	5	5	4

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix II (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
3109	Sw		5	5	5	5	5	9
3110	Sw	Bb	5	5	5	5	5	7
3111	Sw		4	4	5	5	5	20
3112	Sw		5	4	5	5	5	23
3113	W		5	5	5	5	5	4
3114	Cv	Ra	4	2	3	2	4	69
3115	Sw		5	5	5	5	5	68
3116	Sv		4	5	3	3	4	7
3117	Sv	Cv	3	5	3	3	3	63
3118	Bb		4	5	3	2	5	4
3119	Bb		4	5	3	2	5	5
3120	Bb		4	2	3	2	4	15
3121	Ab	Sv	4	5	4	4	5	26
3122	Wl		3	5	4	4	5	16
3123	Fs		2	5	2	2	3	8
3124	RaSv		3	5	3	3	4	5
3125	Sw-Ra		4	5	5	5	5	25
3127	Bb		4	2	3	2	4	32
3128	Bn		3	5	2	2	3	45
3129	Gh		5	5	5	5	5	6
3130	Gh		5	5	5	5	5	73
3131	Sm		2	5	3	3	4	34
3132	Fs		2	5	2	2	3	203
3133	M		5	5	5	5	5	97
3134	Fm		5	5	5	5	5	34
3135	W		5	5	5	5	5	6
3136	Fm		5	5	5	5	5	2
3137	Fm	Fd	5	5	5	5	5	22
3138	Bn	Gh	4	5	3	2	4	16
3139	Sm		5	5	5	5	5	23
3140	Ra		4	5	5	5	5	8
3141	Ra	Sw	4	5	5	5	5	9
3142	Ra-Sw	Ag	5	5	5	5	5	14
3143	Ra		4	5	5	5	5	19
3144	Ra	Sw	5	5	5	5	5	12
3145	Wg	Tg	2	2	2	2	2	10
3146	Wg	Tg	2	2	2	2	3	16
3147	Tg	Wg	2	4	2	2	3	7
3148	Tg	Ag	2	4	2	2	3	8
3149	Tg	Wg, Ag	2	4	2	2	3	37
3150	Sw		5	5	5	5	5	13
3151	Sw		5	5	5	5	5	3
3152	Tg	Wg	2	4	2	2	3	3
3153	Ag	Tg	4	5	5	5	5	20
3154	Ag		3	5	4	4	5	4
3155	Ag	Sw	5	5	5	5	5	22
3156	Tg	Sw	2	4	3	3	4	4
3157	Sw		5	4	5	5	5	7
3159	Sw		5	5	5	5	5	11
3160	Sw		5	5	5	5	5	8
3161	Sw		5	4	5	5	5	23
3162	Sw		5	4	5	5	5	15
3165	Sw-Tg	Wg	5	4	5	5	5	17
3166	Sw		5	5	5	5	5	4
3167	Sw		5	5	5	5	5	10
3168	Sw		5	4	5	5	5	13
3169	Sw		5	5	5	5	5	7
3170	Sw		4	4	5	5	5	13
3171	Sw		5	5	5	5	5	8
3172	Sw-Ra		5	4	5	5	5	23
3174	Ra		5	5	5	5	5	11
3175	Ra		5	5	5	5	5	31
3176	Ra		4	5	5	5	5	13
3177	Ra		4	5	5	5	5	25
3178	Ra		4	5	5	5	5	7
3179	Ra		4	5	5	5	5	19
3180	Tg		3	4	4	4	5	7
3181	Tg		2	4	2	2	3	104
3182	Tg		2	4	3	3	4	4
3183	Tg		2	4	3	3	4	12
3184	Tg		4	4	5	5	5	4
3185	Tg		2	4	3	3	4	32
3186	Tg		2	4	2	2	3	4
3187	Tg		2	4	2	2	3	32
3188	Tg		2	4	3	3	4	37
3189	Tg		2	4	2	2	3	12
3190	Tg		2	4	2	2	3	13
3191	Ag		5	5	5	5	5	26
3192	Ag	Ra	5	5	5	5	5	77
3193	Q		5	5	5	5	5	13
3194	Ag		4	5	5	5	5	19
3195	Ag	Ra	5	5	5	5	5	6
3196	Ag		4	5	5	5	5	2
3197	Sw		4	5	5	5	5	5
3198	Wg		3	2	4	4	5	8
3199	Wg		2	2	2	2	2	169
3200	Wg		2	2	2	2	2	5
3201	Wg		2	2	2	2	3	2
3202	Wg		2	2	3	3	4	32
3203	Ag	Tg	5	5	5	5	5	4
3204	Tg		2	4	3	3	4	8
3205	U		5	5	5	5	5	54
3206	Ag	Sw, Ra	5	4	5	5	5	11
3207	Wg		3	2	4	4	5	110
3208	Tg	Ag	3	4	4	4	5	10
3209	Hm		5	5	5	5	5	6
3210	Wg	Tg	2	2	2	2	2	128
3211	Wg		4	2	5	5	5	108
3212	Wg	Tg	2	2	2	2	2	52
3213	Wg		2	2	2	2	2	6
3214	Wg	Tg	2	2	2	2	3	24
3215	Wg		2	2	2	2	2	94
3216	Wg	Tg	2	2	2	2	2	125
3217	Wg	Tg	2	2	3	3	4	20
3218	Wg		2	2	2	2	2	2
3219	Tg-Wg		2	4	3	3	4	6
3220	Qb		4	5	5	5	5	4
3221	Ra		4	5	5	5	5	4
3222	Ra		5	5	5	5	5	15
3223	Ra		4	5	5	5	5	5
3224	Wi	SwRp	5	5	5	5	5	54
3225	Ag		4	4	5	5	5	20
3226	Tg		2	4	2	2	3	21
3227	Tg		3	5	4	4	5	5
3228	Tg	Ag	3	5	4	4	5	43
3229	Tg	Ag	2	4	2	2	3	16
3230	Tg	Wg	2	5	2	2	3	6
3231	Tg	Ag	2	4	2	2	3	32
3232	Tg	Ag	2	5	2	2	3	17
3233	Tg		2	4	3	3	4	4
3234	Tg		2	4	3	3	4	7
3235	Tg		2	4	2	2	3	68
3236	Tg		2	4	2	2	3	47
3237	Tg		2	4	2	2	3	9
3238	Ag		4	5	5	5	5	16
3239	Ag		5	5	5	5	5	67
3240	Ag		4	5	5	5	5	8
3241	Ag		3	5	5	5	5	4
3242	Ag		3	5	5	5	5	4
3243	Ag		3	5	3	3	4	6
3244	Wg	Tg, Ag	5	5	5	5	5	15
3245	Sw		5	5	5	5	5	4
3246	Sw		5	5	5	5	5	4
3247	Sw		5	4	5	5	5	10
3248	Sw		5	4	5	5	5	16
3249	Sw	Qb	5	5	5	5	5	10
3250	Sw		5	4	5	5	5	51
3251	Sw		5	5	5	5	5	19
3252	Sw		5	5	5	5	5	3
3253	Sw	Ra	5	5	5	5	5	51
3254	Sw		5	5	5	5	5	4
3255	Sw	Ra	5	5	5	5	5	7
3256	Sw		5	5	5	5	5	5
3257	Sw		5	5	5	5	5	10
3258	Sw		5	5	5	5	5	6
3259	Sw		5	5	5	5	5	21
3260	Sw		5	5	5	5	5	11
3261	Sw		5	4	5	5	5	35
3262	Sw		5	5	5	5	5	5
3263	Sw		5	5	5	5	5	4
3264	Sw	Tg	5	4	5	5	5	22
3265	Sw		3	4	3	3	4	13
3266	Bi	Qb	4	3	4	4	5	39
3267	Bi		4	3	3	2	4	4
3268	Bi-Qb		4	3	3	2	4	10
3269	Qb	Sw	5	5	5	5	5	7
3270	Sw-Qb		5	5	5	5	5	14
3271	Ra		5	5	5	5	5	3
3272	U		5	5	5	5	5	538
3273	U		5	5	5	5	5	149
3274	Q		5	5	5	5	5	67
3275	Sw		5	4	5	5	5	50

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix II (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
3276	Ra		4	5	5	5	5	12
3277	Sw		5	5	5	5	5	8
3278	Bi		4	2	3	3	4	5
3279	Sw		4	4	5	5	5	6
3280	Tg		2	4	2	2	3	12
3281	Ag	Ra	5	5	5	5	5	13
3282	Wi		4	5	5	5	5	8
3283	Ag	Ag	3	5	3	3	4	6
3284	Ra		3	5	3	3	4	7
3285	Ra		3	5	3	3	4	16
3286	Ra		3	5	3	3	4	9
3287	Ra-Sw		3	5	3	3	4	19
3288	Ra		3	5	4	4	5	5
3289	Ra		4	5	5	5	5	4
3290	Wi	Ra	3	5	3	3	4	19
3291	Ra		3	5	3	3	4	10
3292	Ra		4	5	5	5	5	66
3294	Sw		5	5	5	5	5	7
3295	Sw		5	4	5	5	5	26
3296	Sw		5	5	5	5	5	3
3297	Sw		5	4	5	5	5	20
3298	Sw		5	5	5	5	5	27
3299	Sw	Tg	5	5	5	5	5	18
3300	Tg	Wi	2	4	3	3	4	9
3301	Sw		5	5	5	5	5	6
3302	Sw		5	5	5	5	5	8
3303	Sw		5	5	5	5	5	13
3304	Sw-Wi		5	5	5	5	5	9
3305	Sw		5	5	5	5	5	86
3306	Sw		5	5	5	5	5	4
3307	Sw		4	4	5	5	5	4
3308	Sw		5	5	5	5	5	57
3309	Sw		5	5	5	5	5	9
3310	Sw		4	4	5	5	5	7
3311	Sw		5	4	5	5	5	32
3312	Sw		5	5	5	5	5	29
3313	Sw		5	5	5	5	5	15
3314	Sw	Wi	4	5	5	5	5	17
3315	Sw		5	5	5	5	5	13
3316	Sw		4	4	5	5	5	5
3317	Sw		5	5	5	5	5	5
3318	Sw	Wi	5	5	5	5	5	7
3319	Sw		5	5	5	5	5	33
3320	Sw		5	4	5	5	5	4
3321	Sw		3	4	3	3	4	15
3322	Sw		4	4	5	5	5	29
3323	Sw		5	4	5	5	5	12
3324	Ag		3	5	4	4	5	3
3325	Ag		3	5	3	3	4	4
3326	Ag		3	5	3	3	4	16
3327	Ag		3	5	3	3	4	13
3328	Ag		3	5	3	3	4	4
3329	Tg		2	5	3	3	4	24
3330	Wg	Tg	2	2	2	2	2	7
3331	Wg		2	2	2	2	2	25
3332	Wg		2	2	2	2	2	6
3333	Wg		2	2	2	2	3	24
3334	Wg		2	2	2	2	3	5
3335	Wg		2	2	2	2	3	4
3336	Ra		5	5	5	5	5	8
3337	Wi		4	5	5	5	5	57
3338	Wi		5	5	5	5	5	26
3339	Wi		4	5	5	5	5	8
3340	Wi		5	5	5	5	5	7
3341	Wi	Sw	5	5	5	5	5	51
3342	Ra	Wi	3	5	4	4	5	33
3343	Sw		5	5	5	5	5	13
3344	Tg		2	4	2	2	3	6
3345	Tg	Wg	2	4	2	2	3	132
3346	Ra	Sw	3	5	3	3	4	23
3347	Wg		2	2	2	2	3	9
3348	Q		5	5	5	5	5	39
3349	Q		5	5	5	5	5	16
3350	U		5	5	5	5	5	216
3351	M		5	5	5	5	5	19
3352	Bi		4	2	3	2	4	27
3353	Sw		5	5	5	5	5	45
3355	Sw		5	4	5	5	5	37
3356	Sw-Wi		5	4	5	5	5	14
3357	Tg		2	4	3	3	4	10
3358	Tg	Wg, Ag	2	4	3	3	4	19
3359	Wg	Tg	2	2	2	2	2	2
3360	Wi		3	5	4	4	5	16
3361	Ra		4	5	5	5	5	5
3362	Wg		2	2	2	2	2	6
3363	Ra	Sw	3	5	4	4	5	13
3364	Ra		3	5	4	4	5	17
3365	Ra	Ag	3	5	4	4	5	23
3366	Ra		3	5	4	4	5	10
3367	Wi		4	5	5	5	5	33
3368	Ra		4	5	5	5	5	21
3369	Ra		3	5	4	4	5	10
3370	Wi		3	5	4	4	5	5
3371	Wi	Wi	5	5	5	5	5	11
3372	Ag		3	5	4	4	5	12
3373	Sw		5	5	5	5	5	32
3374	Sw	Ra	5	5	5	5	5	23
3375	Sw		5	5	5	5	5	99
3376	Sw		5	5	5	5	5	5
3377	Sw		5	5	5	5	5	5
3378	Sw		5	5	5	5	5	8
3379	Wi	Sw	5	5	5	5	5	28
3380	Sw		5	4	5	5	5	7
3381	Sw		5	5	5	5	5	29
3382	Sw		5	5	5	5	5	10
3383	Sw	Wi	5	5	5	5	5	27
3384	Sw		5	5	5	5	5	8
3385	Sw		5	5	5	5	5	5
3386	Sw		5	5	5	5	5	4
3387	Sw	Wi	3	4	3	3	4	13
3388	Sw		5	5	5	5	5	7
3389	Sw	Ag	3	4	4	4	5	7
3390	Sw		5	5	5	5	5	15
3391	Sw		5	4	5	5	5	10
3392	Sw		5	5	5	5	5	15
3393	Sw		5	5	5	5	5	8
3394	Wi		4	5	5	5	5	4
3395	Ag		4	5	5	5	5	11
3396	Sw		4	4	5	5	5	5
3397	Sw		5	4	5	5	5	11
3398	Sw		4	4	5	5	5	8
3399	Sw		5	4	5	5	5	7
3400	Tg	Ag	2	4	2	2	3	21
3401	Tg		2	4	3	3	4	24
3402	Tg		2	4	2	2	3	6
3403	Tg	Sw	2	5	3	3	4	31
3404	Tg		4	4	5	5	5	30
3405	Tg	Wg	2	4	2	2	3	17
3406	Tg	Wi	2	4	2	2	3	17
3407	Tg	Ag	2	4	3	3	4	36
3408	Wg	Tg	2	2	2	2	2	7
3409	Wg		2	2	2	2	2	6
3410	Wg		2	2	2	2	2	24
3411	Wg		2	2	2	2	3	4
3412	Wi		4	5	5	5	5	44
3413	Wi		3	5	4	4	5	42
3414	Wi	Sw	5	5	5	5	5	89
3415	Ag		3	4	4	4	5	14
3416	Ag		4	5	5	5	5	9
3417	Ag		3	5	3	3	4	16
3418	Ag		3	5	3	3	4	4
3419	U		5	5	5	5	5	32
3420	Wg		2	2	2	2	3	3
3421	Wi		3	5	4	4	5	9
3422	Wi	Sw	3	5	4	4	5	46
3423	Wi	Sw, Wg	3	5	4	4	5	9
3424	U		5	5	5	5	5	117
3425	Sw		5	5	5	5	5	16
3426	Sw		5	4	5	5	5	28
3427	Sw		5	4	5	5	5	7
3428	Sw		5	5	5	5	5	7
3429	Sw	Tg	5	4	5	5	5	14
3430	Sw		5	4	5	5	5	7
3431	Sw		5	5	5	5	5	7
3432	Wi		4	5	5	5	5	5
3433	WiSv		5	5	5	5	5	6
3434	Wg		2	2	2	2	2	9
3435	Wg	Tg	2	2	2	2	2	18
3436	Wg		2	2	2	2	3	27
3437	Bi		4	2	3	3	4	22
3438	WiSv		4	5	5	5	5	18
3439	Sw		5	5	5	5	5	300

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix II (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
3440	Sw		5	4	5	5	5	5
3441	Sw		5	5	5	5	5	14
3442	Sw		5	5	5	5	5	7
3443	Sw		5	5	5	5	5	8
3444	Sw		5	5	5	5	5	15
3445	Sw		5	5	5	5	5	34
3446	Sw		5	5	5	5	5	26
3447	Sw		4	4	5	5	5	11
3448	Sw		5	5	5	5	5	5
3449	Sw	Wi	5	5	5	5	5	104
3450	Sw		5	5	5	5	5	11
3451	Sw		5	5	5	5	5	122
3452	Sw		5	4	5	5	5	19
3453	Sw		5	5	5	5	5	4
3454	Sw		5	5	5	5	5	11
3455	Sw		5	5	5	5	5	120
3456	Ra		3	5	4	4	5	12
3457	Ra		3	5	4	4	5	20
3458	Wi		3	5	4	4	5	104
3459	Ra		3	5	4	4	5	33
3460	Wi		3	5	4	4	5	40
3461	Sw		5	5	5	5	5	9
3462	Wg	Tg, Sw	2	2	2	2	3	17
3463	Wg		2	2	2	2	2	4
3464	Wi		4	5	5	5	5	18
3465	Wi		5	5	5	5	5	9
3466	Wi		3	5	3	3	4	37
3467	Wi		3	5	3	3	4	8
3468	Wi		3	5	4	4	5	14
3469	Wi		3	5	4	4	5	19
3470	Wi		3	5	4	4	5	67
3471	Wi		3	5	4	4	5	9
3472	Wi		4	5	4	4	5	13
3473	Wi		5	5	5	5	5	6
3474	Wi		3	5	4	4	5	17
3475	Sw		5	4	5	5	5	11
3476	W		5	5	5	5	5	3
3477	Sw		3	5	4	4	5	16
3478	Tg		2	4	2	2	3	6
3479	Ag	Tg	3	5	5	5	5	8
3480	Ra		3	5	4	4	5	8
3481	Sw		3	5	4	4	5	7
3482	Wg	Ag	2	2	2	2	2	702
3483	Tg	Wg, Ag	2	4	2	2	3	21
3484	W		5	5	5	5	5	6
3486	Ok	Ff	2	2	2	2	3	64
3487	Ff	Ok	2	2	2	2	2	19
3488	Is	Al	3	4	3	3	4	26
3489	Kp	Cl	3	4	3	3	4	30
3490	Ot	Kp	2	4	3	3	4	27
3491	Q		5	5	5	5	5	3
3492	Wi		3	5	4	4	5	5
3493	Wi		3	5	4	4	5	5
3494	Ot		5	5	5	5	5	6
3495	Wi		3	5	3	3	4	17
3496	Ot	Ok	2	4	3	3	4	47
3497	Ot		2	4	3	3	4	15
3498	Tg		2	4	3	3	4	11
3499	Wi		3	5	4	4	5	25
3500	Wg	Tg	2	2	2	2	3	17
3501	Ff		2	2	2	2	2	21
3502	Ot	Kp	2	4	3	3	4	45
3503	Kp	Ot	3	4	3	3	4	75
3504	Qr	Md	3	4	3	3	4	40
3505	Kn	Qr	4	3	3	2	4	56
3506	U		5	5	5	5	5	20
3507	Wm	Kn	4	5	3	3	4	39
3508	Pp		5	5	5	5	5	32
3509	Wi	Sw	3	5	4	4	5	38
3510	Qr	Mh	3	4	3	3	4	61
3511	Kp	Ot, Qr	3	4	3	3	4	47
3512	F		5	5	5	5	5	57
3513	Rb		5	5	5	5	5	11
3514	Kh	Kp	3	5	3	3	4	29
3515	Ok	Ot	2	2	2	2	3	15
3516	Ff		2	2	2	2	2	1
3517	Ot	Ff	2	4	3	3	4	28
3518	Ff		2	2	2	2	2	6
3519	Al		4	5	4	4	4	20
3520	Ff		2	2	3	3	3	3
3521	Pp		5	5	5	5	5	13
3522	Rb		5	5	5	5	5	60
3523	Pp		5	5	5	5	5	48
3524	Ff		2	2	2	2	2	10
3525	Cl		5	5	5	5	5	43
3526	Rb		4	5	5	5	5	20
3527	Ff		2	2	3	3	3	7
3528	Ff		3	2	4	4	4	6
3529	Is		2	4	3	3	4	42
3530	Wm-Kn		4	5	3	3	4	90
3531	Cl	Kp	4	5	5	5	5	33
3532	Kl		4	5	4	4	4	53
3533	Kp	Kh	3	4	3	3	4	190
3534	Al		5	5	5	5	5	32
3535	Pp		4	5	5	5	5	33
3536	Sm	Fm	3	5	3	3	3	35
3537	Lt	Pp	3	5	3	3	4	45
3538	Is		3	4	4	4	4	12
3539	Is	Md, Kp	3	4	3	3	4	254
3540	Kn		4	3	3	3	4	18
3541	Qr		4	3	3	2	4	7
3542	Ok	Ff	2	2	2	2	3	50
3543	Rt	Qr	4	3	3	2	4	10
3544	Qr	Ff	4	3	4	4	4	7
3545	Gb	Ff	2	2	3	3	3	28
3546	Kp		3	4	3	3	3	42
3547	Wt	Q	4	4	5	5	5	11
3548	Pp		4	5	4	4	4	15
3549	Lt	Kn	3	5	3	3	4	22
3550	Ca	Kp, Ff	2	4	3	3	4	20
3551	Ff	Qr, Ok	2	2	2	2	2	23
3552	Md	Ff, Qr	3	4	4	4	4	27
3553	Is	Kp	3	4	3	3	4	17
3554	Qr		3	4	2	2	3	2
3555	Pp-Lt		4	5	4	4	5	247
3556	Kp	Qr	3	5	3	3	5	221
3557	Qr	Mh	3	4	2	2	3	39
3558	WtMv	Kp	2	2	2	2	2	7
3559	Qr	Kn	4	5	4	4	4	7
3560	Rb	Kn	5	5	5	5	5	122
3561	Qr	Al	3	3	3	3	3	29
3562	Qr	Gi, Is	3	3	2	2	3	56
3563	Kh	Al	5	5	5	5	5	21
3564	Mh	Qr	4	5	4	4	4	126
3565	Qr	Gi	3	3	2	2	3	436
3566	Wt	Ok	2	2	2	2	3	48
3567	Ff	Ok, Qr	2	2	2	2	2	21
3568	Ok	Ff, Qr	2	2	2	2	2	88
3569	Ff		2	2	2	2	2	23
3570	Ot	Kp	2	3	2	2	3	16
3571	Wt	Ok, Ff	2	2	2	2	3	84
3572	Mh	Qr	3	4	3	3	4	22
3573	Qr		3	4	3	3	4	24
3574	Cl	Kp	3	5	5	5	5	14
3575	Ff	Qr	2	2	2	2	2	30
3576	Ok	Ff	2	2	2	2	3	21
3577	Qr	Ff	3	3	2	2	3	8
3578	Is	Qr	2	4	3	3	4	11
3579	Gi	Qr	2	3	2	2	3	27
3580	Ok	Gb, Ff	2	2	2	2	3	71
3581	Qr-Ff		2	3	2	2	3	11
3582	Ff	Qr	2	2	2	2	2	7
3583	Gi	Qr	2	3	2	2	3	63
3584	Kp	Qr	3	4	3	3	4	13
3585	Ff		2	2	2	2	2	2
3586	Gi	Mh	2	4	3	3	4	15
3587	Ok	Ff	2	2	2	2	3	20
3588	Ff	Ok	2	2	2	2	2	13
3589	Ff	Qr	2	2	2	2	2	4
3590	Ff	Qr	2	2	2	2	2	11
3591	Ff-Qr		3	3	2	2	3	24
3592	Ok	Ff	3	2	3	3	3	206
3593	Ff	Ok	3	2	2	2	2	195
3594	Qr	Ff	3	3	2	2	3	116
3595	Ff	Qr	2	2	2	2	2	56
3596	Rt	Qr	4	2	3	2	4	23
3597	Cl	Qr, Kp	2	5	3	3	4	19
3598	Kp		3	4	3	3	4	4
3599	Qr	Is, Mh	3	3	2	2	3	328
3600	Kh-Kp	Is	3	5	3	3	4	222
3601	Gi	Qr, Md	3	4	3	3	4	178
3602	Gb	Qr	2	2	2	2	3	22

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix II (continued)

UMA No	UMA name	Minor soils	Land Suitability* S	M	C	V	P	Area (ha)
3603	Kp	Gi, Ff	3	4	3	3	4	638
3604	W		5	5	5	5	5	7
3605	Cl	Kh, Kp	5	5	5	5	5	27
3606	Gb	Ff	2	2	2	2	2	95
3607	Qr		3	3	2	2	3	13
3608	OtSv	Is	2	4	3	3	4	16
3609	Ca	Qr	2	4	3	3	4	30
3610	Cl		3	5	5	5	5	6
3611	Ok	Ff	2	2	2	2	3	9
3612	Ok	Wt, Ot	2	2	2	2	3	94
3613	Kp		3	4	3	3	4	276
3614	Ff		2	2	2	2	2	77
3615	Kp	Ok	3	4	3	3	4	6
3616	Gb	Ff	2	2	2	2	2	20
3617	Wm	Wf, Kn	4	3	3	2	4	55
3618	Rt	Kn	4	3	3	2	4	16
3619	Ff	Gb	2	2	2	2	2	63
3620	Kp	Is, Qr	3	3	2	2	3	96
3621	Tp	Is, Kh	4	5	4	4	4	25
3622	Is	Md, Al	3	4	2	2	3	69
3623	Mh	Al	4	5	5	5	5	11
3624	Cl	Kp, Al	4	5	5	5	5	14
3625	Rb-Kn	W	5	5	5	5	5	23
3626	Kn		4	4	3	2	4	103
3627	Mh		4	4	3	3	4	18
3628	Rt	Kn, Mh	4	3	3	2	4	30
3629	Ca	Qr	2	3	2	2	3	23
3630	Ff		2	2	2	2	3	9
3631	Kh	Kp, Is	3	5	3	3	4	22
3632	Kl	Mh	5	5	5	5	5	22
3633	Wm	Kn	4	5	3	3	4	9
3634	Lt		3	4	3	3	4	3
3635	Rb	W	5	5	5	5	5	99
3636	Mh		3	4	4	4	5	6
3637	Kp	Cl	3	4	3	3	4	28
3638	Cl	Kp	3	5	5	5	5	89
3639	Mh	Cl	3	4	3	3	4	84
3640	Ff	Ok	2	2	2	2	2	28
3641	Ok	Ff	2	2	2	2	3	31
3642	Ok	Wt	2	2	2	2	3	99
3643	Kp	Cl, Is	3	4	3	3	4	671
3644	Ot	Wg	2	4	3	3	4	72
3645	Ff		2	2	2	2	2	8
3646	Gi	Qr, Ok	2	4	3	3	4	34
3647	Ok	Wt, Ff	2	2	2	2	3	790
3648	Ot	Kp, Ok	2	3	2	2	3	59
3649	Gi	Kp, Qr	2	4	3	3	4	23
3650	Kp	Cl, Qr	3	4	3	3	4	34
3651	Kp		3	4	3	3	4	4
3652	Ot		2	4	3	3	4	32
3653	Ot		3	4	4	4	4	13
3654	Ot		5	5	5	5	5	21
3655	Ot		2	4	3	3	4	56
3656	Tg		2	4	3	3	4	34
3657	Ra		3	5	4	4	5	4
3658	Ot		2	4	3	3	4	16
3659	Cl	Kp	3	5	5	5	5	32
3660	Ff	Gb, Kp	2	2	2	2	2	60
3661	Ff		2	2	2	2	2	13
3662	Qr	Kp	3	4	3	3	4	6
3663	Ot	Kp	2	4	3	3	4	14
3664	Ff		2	2	2	2	2	4
3665	Cl	Kh	5	5	5	5	5	31
3666	Cl	Kh	3	5	5	5	5	28
3667	Cl		3	5	5	5	5	6
3668	U		5	5	5	5	5	3887
3669	U		5	5	5	5	5	85
3670	U		5	5	5	5	5	27
3671	Is		3	4	3	3	4	51
3672	Sw		4	4	5	5	5	3
3673	Fs		4	3	3	3	5	2
3674	Fm		4	5	5	5	5	3
3675	Wm	Kn, Mh	4	5	4	4	5	4
3676	Wm	Kn, Mh	4	5	5	5	5	49
3677	M		5	5	5	5	5	178
3678	Ra		4	5	5	5	5	12
3679	Ag	Ra, Tg	3	5	4	4	5	29
3680	Ag	Tg, Ra	4	5	5	5	5	35
3681	W		5	5	5	5	5	14
3682	M		5	5	5	5	5	108
3683	M		5	5	5	5	5	22
3684	Ra		4	5	5	5	5	19
3686	M		5	5	5	5	5	98
3687	W		5	5	5	5	5	5

*S = sugarcane, M = macadamia; C = cucurbits; V = vegetables; P = peanuts

Appendix III.

Results of chemical analyses at depths of 0–0.1 m, 0.5–0.6 m and 1.1–1.2 m for the sampled soil profile classes (SPCs)

SPC	Depth (m)	PH	EC ds/m	Cl %	Clay %	ECEC	Ca	Mg	K	Ca/Mg	Sodicity ESP
						m. equiv 100 g					
Alloway	0-0.1	4.6-5.6	.03-.07	.001-.003	6-10	1-4	.1-2.4	.2-1.1	.06-.16	1-2.2	2-8
(5)+			vl*	vl			vl-h	vl-l	L		ns-s
	0.5-0.6	4.9-7.2	.01-.07	.001-.008	8-29	1-3	.2-.31	.2-1.9	.01-.04	.16-1.2	4-19
			vl	vl			vl	vl-l	l		ns-ss
	1.1-1.2	5.6-6.3	.04-.14	.002-.019	25-44	3-5	.07-.5	2.8-4.7	.01-.04	.02-.16	5-17
			vl	vl			vl	h	l		ns-ss
Ashgrove	0-0.1	6.0-6.5	.08-.16	.004-.016	32-54	14-21	7.2-11	4.8-7.4	.35-.66	1.2-1.6	3-5
(3)			vl-l	vl			h	h	m-h		ns
	0.5-0.6	5.3-6.8	.13-.17	.004-.013	30-53	11-18	4.5-8.7	4.3-11	.1-.16	.41-1.3	6-12
			vl-l	vl			h	h	l		ns-s
	1.1-1.2	5.4-6.1	.57	.015-.075	47-60	21-27	4.8-7.6	9.3-17	.08-.1	.28-.81	19-20
			m	vl-m			h	h	h		ss
Auburn **(4)**	0-0.1	5.4-5.9	.04-.1	.002-.004	7-17	3-11	.5-6	.8-1.1	.15-.46	.28-5.5	3-4
			vl	vl			l-h	l	l-m		ns
	0.5-0.6	5.9-9.1	.77-.78	.04-.099	31-42	14-21	.3-6.3	8.7-13	.1-.5	.03-.48	10-36
			h	vl-m			vl-h	h	l-m		s-ss
	1.1-1.2	8.6		.13	37	17	4.9	10	.2	.49	40
				h			h	h	l		ss
Avondale	0-0.1	5.2-5.6	.01-.03	.001-.004	4-12	1-5	.2-2.2	.44-1.7	.05-.15	.25-.1.3	5-20
(5)			vl	vl			vl-h	vl-l	l		ns-ss
	0.5-0.6	5.0-5.5	.05-.27	.004-.077	34-54	5-19	.1-1.3	2.7-10.4	.02-.2	.02-.20	16-43
			vl-l	vl-m			vl-l	h	l		ss
	1.1-1.2	5.0-5.2	.4	.044-.075	37	10-23	.2-1.5	5.5-12.1	.1	02-.27	43
			m	l-m			vl-l	h	l		ss
Beelbi **(1)**	0-0.1	8.4	.08	.001	5	8	6.7	.9	.12	7.4	2
			vl	vl			h	l	l		ns
	0.5-0.6	5.8	.03	.002	6	4	2.3	1.1	.09	2.1	2
			vl	vl			h	l	l		ns
	1.1-1.2	9.1	.09	.004	3	26	25	.57	.01	44	1
			vl	vl			h	l	l		ns
Bingera **(1)**	0-0.1	6.6	.38	.044	28	13	7.6	3.6	.27	2.1	10
			m	l			h	h	m		s
	0.5-0.6	6.7	.23	.031	31	5	2.6	1.4	.04	1 9	16
			l	l			h	l	l		ss
	1.1-1.2	6.6	.12	.014	49	6	2.9	2	.1	1 5	9
			vl	vl			h	h	l		s
Bucca **(2)**	0-0.1	4.7-5.0	.14	.006-.011	53-70	7-23	1.3-8	3.4-5.1	.3-.43	.38-1.6	6-14
			vl	vl			l-h	h	m		s
	0.5-0.6	4.4-5.2	.1	.008	66-70	7-22	.7-1.2	3.3-3.7	.1-.22	21-.32	9-28
			vl	vl			l	h	l-m		s-ss
	1.1-1.2	4.5-5.4	.10	.008-.051	72-80	20-46	.47-1.8	7.7-17	.35-.52	.02- 23	13-47
			vl	vl-m			vl-l	h	m		s-ss
Burnett **(1)**	0-0.1	6.2	.03	.002	9	5	2.4	1.8	.33	1 3	3
			vl	vl			h	l	m		ns
	0.5-0.6	6.7	.01	.001	2	3	2.1	.9	.11	2 3	6
			vl	vl			h	l	l		s
	1.1-1.2	7.1	.01	.001	2	4	2.5	1.0	.12	2 5	4
			vl	vl			h	l	l		ns
Childers **(8)**	0-0.1	4.5-6.9	.03-.23	.001-.008	43-73	1-19	.3-13	.23-5.6	.32-1.4	1-3.4	1-4
			vl-l	v .l			vl-h	vl-h	m-h		ns
	0.5-0.6	4.5-6.2	.02-.07	.001-.005	63-81	1-6	.49-3.7	.16-3.7	.03-.71	.18-3.1	1-6
			vl	vl			vl-h	vl-h	l-m		ns-s
	1.1-1.2	4.6-6.6	.02-.08	.001-.008	65-76	2-7	.13-2.8	.11-3.9	.02-.33	.04-5.7	2-9
			vl	vl			vl-h	vl-h	l-m		ns-s
Clayton **(2)**	0-0.1	4.6-5.9	.02-.06	.001	3-19	1-2	.3-.83	.3-.83	.07-.15	1	3-5
			vl	vl			vl-l	vl-l	l		ns
	0.5-0.6	5.5-6.3	.01-.02	.001	15-33	1-3	.1-1.7	.9-1.4	.01-.03	.07-1.9	1
			vl	vl			vl-l	l	l		ns
	1.1-1.2	5.8-6.9	.03-.04	.004	31-39	4	.1-1.3	2.1-3.7	.01- 02	.03-.62	4-6
			vl	vl			vl-l	h	l		ns

+(5) number of analysed profiles.
* vl - very low; l-low; m-medium; h-high; ns-non sodic; s-sodic; ss-strongly sodic

Appendix III (continued)

SPC	Depth	PH	EC	Cl	Clay	ECEC	Ca	Mg	K	Ca/Mg	Sodicity
	(m)		ds/m	%	%	m. equiv 100 g					ESP
Corfield **(2)**	0-0.1	5.8-6.0	.03	.001-.004	22-25	15-23	11-12	5.2-9.2	.45-.64	1.3-2.1	1-2
			vl	vl			h	h	m-h		ns
	0.5-0.6	6.5		.003	40	27	7.8	20	.1	.39	2
				vl			h	h	l		ns
Crossing **(1)**	0-0.1	5.6		.005	7	4	2.5	1	.3	2.5	10
				l			h	l	m		s
	0.5-0.6	7.7		.01	28	13	3.4	6.6	.15	.52	20
				vl			h	h	l		ss
	1.1-1.2	9.2		.053	17	11	1.4	4.3	.1	.32	48
				m			l	h	l		ss
Fairydale **(2)**	0-0.1	4.6-4.7	.12	.006	36-41	10	1.4	1.6	1.2	.88	6
			vl	vl			l	l	h		s
	0.5-0.6	4.1-4.3	.15-.2	.01-.017	38-51	5-10	.42-1.2	.47-2.6	.15-.43	.46-.89	3-16
			vl-lo	vl			vl-l	vl-h	l-m		ns-ss
	1.1-1.2	4.3	.17	.011	16	6	.22	.74	.16	.3	13
			l	vl			vl	l	l		s
Fairymead **(1)**	0-0.1	4.8	.36	.031	48	11	6.3	3.3	36	1.9	11
			m	l			h	h	m		s
	0.5-0.6	4.4	.36	.015	52	7	2.5	2.6	.24	1	30
			m	vl			h	h	m		ss
	1.1-1.2	4.2	.48	.027	45	7	.41	3.5	.38	.12	40
			m	l			vl	h	m		ss
Farnsfield **(7)**	0-0.1	5.2-6.0	.02-.09	.001-.003	4-15	1-7	.6-4.5	.25-1.6	.13-.63	1.2-3.5	1-5
			vl	vl			l-h	vl-l	l-h		ns
	0.5-0.6	5.0-6.2	.02-.03	.001-.003	14-40	1-4	.51-2.5	.17-1.7	02-.16	.76-5.9	2-10
			vl	vl			l-h	vl-l	l		ns-s
	1.1-1.2	5.2-6.2	.03-.06	.003-.008	31-50	3-4	.36-2	1.6-2.1	03-.10	.21-1.4	3-8
			vl	vl			vl-l	l-h	l		ns-s
Flagstone **(3)**	0-0.1	6.7-7.3	.04-.11	.002-.011	23-34	15-23	8.8-15	4.8-7.3	32-.84	1.7-2.1	3-4
			vl	vl			h	h	m-h		ns
	0.5-0.6	6.7-7.5	.05-.12	.003-.017	23-36	15-25	9.6-18	3.4-7.3	.15-.24	2.2-3.9	4
			vl	vl			h	h	l-m		ns
	1.1-1.2	7.6-7.7	.06-.01	.004-.005	19-33	13-19	8.3-14	4.1-4.2	.19-.24	2-3.3	4-5
			vl	vl			h	h	l-m		ns
Gibson **(1)**	0-0.1	7.4	.08	.005	46	12	6.5	4.8	.5	1.6	4
			vl	vl			h	h	m		ns
	0.5-0.6	7.7	.04	.004	51	5	2.8	2.2	.06	1.3	5
			vl	vl			h	h	l		ns
	1.1-1.2	7.4	.06	.007	63	6	3.2	2.1	.06	1.5	6
			vl	vl			h	h	l		s
Givelda **(2)**	0-0.1	6.3-6.4	.03-.07	.001-.006	11-17	6	3.1-3.2	2.5-2.7	33-.36	1.2	3
			vl	vl			h	h	m		ns
	0.5-0.6	5.2-6.4	.56-.72	.063-.126	43	22-31	1.3-3.2	12-19	2-.23	.11-.17	28-35
			m-h	m-h			l-h	h	m		ss
	1.1-1.2	5.0	.56	.077	28	17	.47	8.8	.18	.05	38
			m	m			vl	h	l		ss
Gooburrum **(4)**	0-0.1	5.6-5.9	.04	.002	8-15	2-4	1.3-2.3	.6-1.2	.1-.25	1.5-3.6	4-8
			vl	vl			l-h	l	l-m		ns-s
	0.5-0.6	4.6-5.9	.04	.002	10-31	1-2	0.14-.7	.3-1.2	01-.1	.22-2	6-10
			vl	vl			vl-l	vl-l	l		s
	1.1-1.2	5.5-5.7	.07	.002-.006	42-65	3-6	0.2-1.8	1.9-2.1	01-.15	.09-.7	4-16
			vl	vl			vl-l	l-h	l		ns-ss
Gooburrum, Mottled variant **(2)**	0-0.1	5.5-5.9		.002-.003	10	5	1.6-3.7	.8-1.5	.1-.15	2-2.5	4
				vl			l-h	l	l		ns
	0.5-0.6	5.3-6.0		.002	12-34	1-4	.2-1.0	.2-2.1	.1	.5-1	5-20
				vl			vl-l	vl-h	l		ns-ss
	1.1-1.2	5.9-6.0		.002-.003	52-60	4-8	.9-1.8	3.4-4.2	.1	.2-.5	5-10
				vl			l	h	l		ns-sod
Hillend **(1)**	0-0.1	5.6		.003	20	7	3.6	3.3	.15	1.1	6
				vl			h	h	l		s
	0.5-0.6	5.5		.007	52	20	5.2	13.9	.15	.23	13
				vl			h	h	l		s

+(5) number of analysed profiles.
* vl - very low; l-low; m-medium; h-high; ns-non sodic; s-sodic; ss-strongly sodic

Appendix III (continued)

SPC	Depth (m)	pH	EC ds/m	Cl %	Clay %	ECEC	Ca	Mg	K	Ca/Mg	Sodicity ESP
							m. equiv 100 g				
Howes **(2)**	0-0.1	6.1-6.9	.1	.002-.003	39-48	12-14	6.2-8.2	3.8-5.5	.75-1.3	1.5-1.6	2-3
			vl	vl			h	h	h		ns
	0.5-0.6	5.7-6.4	.03	.002-.003	50-60	6-8	2.2-4.0	1.4-3.1	.14-.3	1.3-1.6	5
			vl	vl			h	l-h	l-m		ns
	1.1-1.2	5.0-6.7	.06	.003-.008	55-58	5	.3-2.3	1.3-2.6	.1-.63	.23-.9	6-10
			vl	vl			vl-h	l-h	l-h		s
Isis **(1)**	0-0.1	5.8	.03	.001	7	3	1.4	.68	.05	2.1	5
			vl	vl			l	l	l		ns
	0.5-0.6	5.9	.01	.001	10	2	.73	1	.02	.7	12
			vl	vl			l	l	l		s
	1.1-1.2	5.5	.02	.001	35	4	.24	2.9	.02	.08	10
			vl	vl			vl	h	l		s
Kalah **(5)**	0-0.1	4.7-5.7	.02-1.5	.001-.336	3-11	1	.5-.6	.42-.48	08-.4	1-1.4	1-16
			vl-vh	vl-v h			l	vl	l-m		ns-ss
	0.5-0.6	5.0-7.5	.07-1.02	.005-.185	6-43	1-7	.05-.54	.5-5.1	03-.09	.02	20-33
			vl-h	vl-v h			vl-l	l-h	l		ss
	1.1-1.2	4.9-8.9	.12-.89	.028-.15	21-45	6-9	.05-.1	3.3-5.9	05-.08	.01-.03	25-39
			vl-h	l-h			vl	h	l		ss
Kepnock **(9)**	0-0.1	4.6-6.6	.02-.14	.001-.003	6-21	1-5	.19-3.2	.2-2.4	06-.43	.54-2.9	3-7
			vl	vl			vl-h	vl-h	l-m		ns-s
	0.5-0.6	5.0-5.9	.02-.48	.001-.069	6-64	1-8	.1-1.2	.26-5.2	01-.06	.03-2.3	4-31
			vl-m	vl-m			vl-l	vl-h	l		ns-ss
	1.1-1.2	4.9-5.9	.05-.07	.005-.01	51-58	4-7	.09-.8	3.6-5.0	03-.06	.02-.19	7-27
			vl	vl			vl-l	h	l		s-ss
Kinkuna **(4)**	0-0.1	4.6-6.2	.02-.03	.002	1-6	1-3	.25-.75	.5-1.86	05-.12	.13-2.3	1-9
			vl	vl			vl-l	l	l		ns-s
	0.5-0.6	4.8-6.0	.01-.02	.001	3-5	1	.03-.4	.02-.4	02-.05	.23-3	3-13
			vl	vl			vl	vl	l		ns-s
	1.1-1.2	5.1-6.3	.01	.001	4-9	1	.04-.4	.09-.46	01-.05	.09-2	5-17
			vl	vl			vl	vl	l		ns-ss
Kolan **(4)**	0-0.1	5.2-6.2	.03-.14	.001-.011	6-27	5-9	2.2-2.9	1.9-4.4	22-.48	.66-1.16	7-12
			vl	vl			h	l-h	m		s
	0.5-0.6	4.8-5.6	.26-.74	.026-.098	39-61	15-22	.10-.21	7.4-13	.15-.3	.01-.02	19-41
			l-h	l-m			vl	h	l-m		ss
	1.1-1.2	4.9	.48	.063-.085	31-63	12-34	.2-.27	4.9-18	.13-.45	.01-.06	29-40
			m	m			vl	h	l-m		ss
Kolan Red Variant **(1)**	0-0.	5.8	.04	.006	15	9	3.8	4.4	.8	86	3
			vl	vl			h	h	h		ns
	0.5-0.6	5.4	.46	.026	49	18	.05	11	31	.004	28
			m	l			vl	h	m		ss
	1.1-1.2	4.9	.48	.033	43	23	.06	13	31	.005	30
			m	l			vl	h	m		ss
Kolbore **(1)**	0-0.1	5.1	.27	.037	3	2	.22	.42	.07	.52	55
			l	l			vl	vl	l		ss
	0.5-0.6	5.0	.46	.06	18	4	.1	1.7	.05	.06	65
			m	m			vl	l	l		ss
Mahogany **(16)**	0-0.1	4.2-7.7	.01-.24	.001-.009	3-9	1-4	.12-1.79	.09-2.32	03-.23	.19-3.7	2-17
			vl-l	vl			vl-l	vl-h	l-m		ns-ss
	0.5-0.6	4.6-6.3	.01-.06	.001-.004	3-26	1-2	.04-1.3	.08-1.5	01-.07	.04-.27	2-12
			vl	vl			vl-l	vl-l	l		ns-s
	1.1-1.2	5.1-6.3	.01-.05	.001-.004	17-36	1-4	.03-1.9	.3-2.95	01-.06	.02-2.1	2-18
			vl	vl			vl-l	vl-h	l		ns-ss
Maroondan **(3)**	0-0.1	6.4-6.6	.03-.06	.001-.003	49-63	60-61	28-31	22-26	37-.8	1.19-1.27	1
			vl	vl			h	h	m-h		ns
	0.5-0.6	6.7-7.6	.09-.14	.008-.012	44	62	32	28	.1	1.1	3
			vl	vl			h	h	l		ns
Meadowvale **(6)**	0-0.1	4.8-5.9	.02-.05	.001-.004	4-10	1-4	.18-3.7	.33-1.5	07-.11	.28-2.47	2-26
			vl	vl			vl-h	vl-l	l		ns-ss
	0.5-0.6	4.6-5.7	.01-.02	.001-.004	4-20	1-3	.04-.2	.2-2.1	01-.1	.02-1	2-20
			vl	vl			vl	vl-h	l		ns-ss
	1.1-1.2	4.8-5.9	.01-.06	.002-.007	30-60	1-6	.03-1.8	.76-5.55	02-.1	.01-.5	5-16
			vl	vl			vl-l	l-h	l		ns-ss

+(5) number of analysed profiles.
* vl - very low; l-low; m-medium; h-high; ns-non sodic; s-sodic; ss-strongly sodic

Appendix III (continued)

SPC	Depth (m)	pH	EC ds/m	Cl %	Clay %	ECEC	Ca	Mg	K	Ca/Mg	Sodicity ESP
						m. equiv 100 g					
Moore Park	0-0.1	6.2	.28	.019	10	4	2.4	1.3	36	1.8	2
(1)			l	vl			h	l	m		ns
	0.5-0.6	8.0	.1	.004	15	5	3.1	1.3	.05	2.4	10
			vl	vl			h	l	l		s
	1.1-1.2	7.9	.08	.003	15	5	1.1	3.1	.12	.35	15
			vl	vl			l	h	l		s
Oakwood	0-0.1	5.5-5.9		.002	20-48	5-9	2.9-7.2	1.3-2.1	.1-.5	1.7-4.8	2-6
(6)				vl			h	l-h	l-m		ns-s
	0.5-0.6	5.0-5.7		.002	29-53	3-5	1.3-3.2	0.9-1.8	.1- 33	.8-2	4-10
				vl			l-h	l	l-m		ns-s
	1.1-1.2	4.8-6.1		.002-.003	42-68	2-6	0.4-3.5	.9-2.5	.1- 2	.2-1.4	4-10
				vl			l-h	l-h	l		ns-s
Otoo **(3)**	0-0.1	4.7-5.5		.002-.003	16-36	3-2	.6-.7	.6-1.1	.1-.75	.54-1.2	6-10
				vl			l	l	l-h		s
	0.5-0.6	4.6-5.6		.002-.005	40-46	2-3	.2-.9	.4-3.4	.1	.1-2.2	8-10
				vl			vl-l	vl-h	l		s
	1.1-1.2	4.2-5.7		.003-.005	57-72	2-5	.2-.4	.6-4.6	.1	.05-.70	8-11
				vl			vl	l-h	l		s
Peep **(3)**	0-0.1	4.8-6.1	.04-.07	.003-.007	6-12	2	.53-2.0	.97	07-.2	1.13	5-13
			vl	vl			l	l	l		ns-s
	0.5-0.6	5.0-7.4	.07-.28	.008-.12	17-35	4-9	.1-.34	.4-8.0	01-.15	.05-.85	28-55
			vl-l	vl-h			vl	vl-h	l		ss
	1.1-1.2	4.8-7.4	.14-.38	.047-.1	25-34	10-14	.1-.75	.9-5.4	03-.2	.02-.83	43-47
			vl-m	l-m			vl-l	l-h	l		ss
Quart **(6)**	0-0.1	5.2-6.3	.01-.06	.001-.003	1-12	2	.88-1.5	.17-.77	05-.41	1.4-8.8	2-3
			vl	vl			l	vl-l	l-m		ns
	0.5-0.6	5.1-6.4	.01-.03	.001	3-40	1-4	.25-2.3	.19-1.9	03-.2	.75-1.8	3-14
			vl	vl			vl-h	vl-l	l		ns-s
	1.1-1.2	4.8-6.1	.01-.06	.001-.01	20-42	2-4	.48-1.9	.59-2.3	01-.26	.48-.83	2-3
			vl	vl			vl-l	l-h	l-m		ns
Robur **(9)**	0-0.1	4.4-6.0	.01-.05	.001-.002	1-8	1-2	.1-.98	.2-.8	01-.08	.2-1.85	1-14
			vl	vl			vl-l	vl-l	l		ns-s
	0.5-0.6	5.5-6.4	.01	.001	1-14	1-2	.03-.16	.09-1.4	01-.06	.02-1.33	1-15
			vl	vl			vl	vl-l	l		ns-s
	1.1-1.2	4.6-6.7	.03-.16	.004-.024	25-56	4-11	.04-.17	3.7-7.9	01-.08	.02-.04	9-36
			vl-l	vl			vl	h	l		s-ss
Rubyanna	0-0.1	5.9	.15	.008	41	25	11	11	2	1	2
(1)			l	vl			h	h	h		ns
	0.5-0.6	4.7	.38	.05	56	23	4.4	12	3	.37	12
			m	m			h	h	m		s
	1.1-1.2	4.6	1.2	.219	68	37	6.0	20	.15	.3	25
			h	v h			h	h	l		ss
Seaview **(3)**	0-0.1	5.8-6.0	.03-.1	.001-.005	25-50	15-27	11-13	5.2-12.6	3-.64	1-2.1	2-4
			vl	vl			h	h	m-h		ns
	0.5-0.6	4.6	.17	.012	53	4	.91	1.7	.03	.54	20
			l	vl			l	l	l		ss
Telegraph	0-0.1	6.2-6.5	.04-.07	.001-.002	64-67	8-10	4.3-5.9	3.4-3.7	.17-.29	1.3-1.6	2-3
(2)			vl	vl			h	h	l-m		ns
	0.5-0.6	6.9-7	.06-.1	.003-.004	68-73	6-7	3.6-5.3	1.1-1.8	03	2-4.8	6-9
			vl	vl			h	l	l		s
	1.1-1.2	5.1-5.8	.13-.27	.017-.026	54-71	5-8	1.7-2.7	2.4-3.2	02	.7-.84	9-17
			vl-l	vl-l			l-h	h	l		s-ss
Theodolite	0-0.1	5.4	.02		5	1	.06	.16	03	.38	13
(1)			vl				vl	vl	l		s
	0.5-0.6	5.3	.01		4	1	.04	.11	.01	.36	11
			vl				vl	vl	l		s
	1.1-1.2	5.1	.02		31	1	.04	1.09	.03	.04	19
			vl				vl	l	l		s

+(5) number of analysed profiles.
* vl - very low; l-low; m-medium; h-high; ns-non sodic; s-sodic; ss-strongly sodic

Appendix III (continued)

SPC	Depth (m)	pH	EC ds/m	Cl %	Clay %	ECEC	Ca	Mg	K	Ca/Mg	Sodicity ESP
						m. equiv 100 g					
Tirroan **(1)**	0-0.1	5.7		.003	10	2	.5	.5	.1	1	10
				l			l	l	l		s
	0.5-0.6	5.8		.002	6	1	.2	.3	.1	.66	20
				vl			vl	vl	l		ss
	1.1-1.2	5.6		.005	41	5	.2	3.9	.1	.05	18
				vl			vl	h	l		ss
Turpin **(3)**	0-0.1	5.4-5.7	.01-.03	.001-.002	6-7	1-2	.26-.96	.47-1.1	05-.1	.39-1.5	1-2
			vl	vl			vl-l	vl-l	l		ns
	0.5-0.6	5.1-5.4	.04-.22	.022	42-49	7-10	.07-.25	4.7-4.9	08-.13	.01-.05	19-51
			vl-l	vl			vl	h	l		ss
Walla **(2)**	0-0.1	5.4-6.2	.07-.09	.004-.009	24-29	11-17	4.7-7.8	5.5-7.6	.46-1.0	.85-1	3
			vl	vl			h	h	m-h		ns
	0.5-0.6	5.1-5.9	.25-.57	.039-.073	44-47	18-21	2.9-4.3	9.3-13	21-.27	.22-.46	14-25
			l-m	l-m			h	h	m		s-ss
	1.1-1.2	5.5-5.9	.50-1.21	.081-.178	57-58	30-31	3.0-7.7	17	3-.38	.18-.45	19-32
			m-vh	m-h			h	h	m		ss
Watalgan **(2)**	0-0.1	6.2-6.4	.03-.04	.001	20-37	10	3.8	5	23	.76	3
			vl	vl			h	h	m		ns
	0.5-0.6	4.7-6.1	.02-0.5	.001-.003	55-68	2-5	.43-.89	1.2-3.9	03-.13	.11-.74	7-10
			vl	vl			vl-l	l-h	l		s
	1.1-1.2	6.1	.03	.005	61	4	.1	3.7	.03	.03	10
			vl	vl			vl	h	l		s
Windemere **(2)**	0-0.1	6.0-6.2	.03-.08	.004-.006	39	14-21	4.6-7.3	6.7-12	.53-1.5	.61-.69	3-4
			vl	vl			h	h	m-h		ns
	0.5-0.6	5.9-6.4	.06-.15	.005-.035	60-65	11-15	1.9-2.3	7.3-8.9	03-.04	.26	9-23
			vl-l	vl-l			l-h	h	l		s-ss
	1.1-1.2	5.3-7.6	.08-.62	.007-.065	62-65	16-43	.16-5.9	9.0-20	05-.07	.02-.3	15-37
			vl-m	vl-m			vl-h	h	l		s-ss
Woco **(2)**	0-0.1	5.8-6.5	.03	.001-.003	6-12	3	.93-1.9	.98-1.6	06-.12	.58-1.94	5-9
			vl	vl			l	l	l		nsoc-s
	0.5-0.6	4.6-5.3	.18-.59	.026-.083	66-75	10	.1-.14	6.7-7.2	04-.06	.01-.02	24-33
			l-m	l-m			vl	h	l		ss
Woongarra **(11)**	0-0.1	5.6-6.9	.05-.14	.001-.005	42-76	4-21	1.9-14	1.6-6.9	.25-1.9	.54-2.8	1-13
			vl	vl			l-h	l-h	m-h		ns-s
	0.5-0.6	6.4-7.1	.06-.14	.001-.009	48-74	6-12	2.8-8.8	1.2-6.8	0.2-1.5	.52-3.3	2-23
			vl	vl			h	l-h	l-h		ns-ss
	1.1-1.2	6.6-7.6	.07-.16	.003-.02	56-79	6-9	3.1-5.0	1.3-5.5	01-1.0	.58-3.5	3-11
			vl-lo	vl			h	l-h	l-h		ns-s
Woolmer **(3)**	0-0.1	5.0-6.2	.02-.06	.001	7-13	1-3	.1-2.5	.23-.48	.04-.22	.23-.48	3-9
			vl	vl			vl-h	vl	l-m		ns-s
	0.5-0.6	5.5-5.8	.03-.04	.002-.004	23-47	2-5	.07-.26	1.9-4.3	02-.05	.02-.1	3-8
			vl	vl			vl	l-h	l		ns-s
	1.1-1.2	5.2-5.6	.04-.06	.003-.007	56-57	4-5	.04-.27	3.5-4.6	01-.05	.01-.08	7-9
			vl	vl			vl	h	l		s

+(5) number of analysed profiles.
* vl - very low; l-low; m-medium; h-high; ns-non sodic; s-sodic; ss-strongly sodic

Appendix IV

- Results of chemical analyses for the surface 0–0.1 m for the sampled soil Profile classes (SPCs)

SPC	Depth (m)	OC %	Total N %	Acid P (μg/g)	Bicarb P (μg/g)	Cu (μug/g)	Zn (μ/g/g)
Alloway **(5)+**	0-0.1	.6-1.8	.03-.06 vl-l*	<5-6 vl (64-84) h	4 vl (45-67) h	.06-.8 vl-m	.3-.6 l
Ashgrove **(3)**	0-0.1	2.7-2.8	25-.29 h	23-46 m-h	76 h	4.4 m	8.8 h
Auburn **(4)**	0-0.1	1.1-2.0	07-.16 l-m	7-39 vl-m	29 m	.7 m	3.3 m
Avondale **(5)**	0-0.1	.66-1.3	.03-.07 vl-l	3-15 vl-l	3 vl	.1-.2 l	.2-.4 l
Beelbi **(1)**	0-0.1	.2	.02 vl	74 h	43 h	.24 l	.2 vl
Bingera **(1)**	0-0.1	3.4	24 m	15 l	40 m	3.4 m	4.2 m
Bucca **(2)**	0-0.1	1.8-3	.17-.2 m	20-23 m	34 m	.12 l	.29 l
Burnett **(1)**	0-0.1	0.6	03 vl		43 h	.7 m	1.5 m
Chlders **(8)**	0-0.1	1.1-4.6	.09-.46 l-h	5-100 vl-vh	6-93 vl-vh	.06-4.6 vl-m	.3-4.7 l-m
Clayton **(2)**	0-0.1	1.1-1.4	05 l	(97) h	3 vl	.05-.4 vl-m	.1-.3 vl-l
Corfield **(2)**	0-0.1	2.2-3.5	.19-.2 m	8-30 vl-m	7 vl	1.7 m	2 m
Crossing **(1)**		2	.14 m	5 vl			
Fairydale **(2)**	0-0.1	2.1-2.2	.16 m	26 m	26 m	.35 m	1.0 m
Fairymead **(1)**	0-0.1	1.5	.12 m	25 m	41 h	.91 m	.85 m
Farnsfield **(7)**	0-0.1	.7-2.0	.02-.09 vl-l	5-22 vl-m (45-64) h	15 l (27-33) m	.1-2.3 l-m	.1-1.0 vl-m
Flagstone **(3)**	0-0.1	1.1-1.5	.07-.11 l-m	156-186 vh	65-130 h-vh	1.9-3 m	1.5-2.3 m
Gibson **(1)**	0-0.1	1.7	.12 m	210 vh	170 vh	1.9 m	2.5 m
Givelda **(2)**	0-0.1	1.8-2.2	.1-.15 m	15 l	4-12 vl-l	.33-.37 m	1.6-3.8 m
Gooburrum **(4)**	0-0.1	1.1-2	05-.08 l	5-7 vl	7 vl	.09 vl	.31 l
Gooburrum, Mottled variant **(2)**	0-0.1	2.3-2.4	.08-.09 l	5-8 vl			

+(5) number of analysed profiles.
* vl - very low; l-low; m-medium; h-high; ns-non sodic; s-sodic; ss-strongly sodic

Appendix IV (continued)

SPC	Depth (m)	OC %	Total N %	Acid P (µg/g)	Bicarb P (µg/g)	Cu (µug/g)	Zn (µ/g/g)
Hllend **(1)**	0-0.1	1.8	.16 m				
Howes **(2)**	0-0.1	2.6-3.3	.18-.3 m-h	9-32 vl-m	10 l	1.2 m	1.7 m
Isis **(1)**	0-0.1	1.3	05 l	8 vl	2 vl	.1 l	.2 l
Kalah **(5)**	0-0.1	.8-1.91	.02-.1 vl-m	2-9 vl	1-12 vl-l	.05-.3 vl-l	.2 l
Kepnock **(9)**	0-0.1	.9-2.2	.04-.09 vl-l	5 vl (33-95) m-h	5 vl (34-81) m-h	.07-4.7 vl-m	.3-3.5 l-m
Kinkuna **(4)**	0-0.1	.3-4.1	0.1-.13 m	4-8 vl	4 vl	.1-.15 l	.1-.4 vl-l
Kolan **(4)**	0-0.1	1.1-3.5	.1-.19 m	10 l (156) vh	2-10 vl-l	.18-.4 l-m	.77-1.8 m
Kolan Red Variant **(1)**	0-0.1	2.3	.12 m	10 l	10 l	.32 m	3.7 m
Kolbore **(1)**	0-0.1	.9	.03 vl		1 vl	.05 vl	.2 l
Mahogany **(16)**	0-0.1	.6-3.4	02-.11 vl-m	2-12 vl-l (26-216) m-vh	2-5 vl (18-81) m-h	.1-.3 l	.1-.51 vl-m
Maroondan **(3)**	0-0.1	2.2-3	21-.25 m	35-53 m-h	9-50 vl-h	5.2 h	2.4-3.9 m
Meadowvale **(6)**	0-0.1	.6-2.47	.04-.09 vl-l	2-10 vl	6 vl	.1-.5 l-m	.25-.59 l-m
Moore Park **(1)**	0-0.1	.8	04 vl	(178) vh	(180) vh	.61 m	1.6 m
Oakwood **(6)**	0-0.1	2.0-2.7	.12-.18 m	5-18 vl-l			
Otoo **(3)**	0-0.1	2.4-2.9	.09-.21 l-m	5-36 vl-m			
Peep **(3)**	0-0.1	1.1-2.3	.06-.12 l-m	5-7 vl	3 vl	.1-.21 l	.3-.35 l
Quart **(6)**	0-0.1	.6-1.3	.03-.05 vl	2-4 vl (31-104) m-vh	2 vl (22-72) m-h	.1-.3 l	.1-.34 vl-l
Robur **(9)**	0-0.1	.39-1.5	.01-.07 vl-l	4-27 vl-m	1-2 vl	.05-.1 vl	.1-.3 vl-l
Rubyanna **(1)**	0-0.1	5	31 h	67 h	140 vh	1.4 m	6.7 h
Seaview **(3)**	0-0.1	2.2-4.7	.19-.33 m-h	5-8 vl	7 vl	1.7 m	2.0 m

+(5) number of analysed profiles.
* vl - very low; l-low; m-medium; h-high; ns-non sodic; s-sodic; ss-strongly sodic

Appendix IV (continued)

SPC	Depth (m)	OC %	Total N %	Acid P (µg/g)	Bicarb P (µg/g)	Cu (µug/g)	Zn (µ/g/g)
Telegraph **(2)**	0-0.1	1.6	.17 m	20-30 m	46-61 h	4.3-5.3 m-h	5.8-6.2 h
Theodolite **(1)**	0-0.1	.66	.03 vl				
Tirroan **(1)**	0-0.1	.8					
Turpin **(3)**	0-0.1	.54-1.4	.03-.04 vl	3-5 vl	1-2 vl	.05-.18 vl-l	.17-.4 vl-l
Walla **(2)**	0-0.1	2.2-2.8	.12-.21 m	5 vl	9-18 vl-l	1.9-2.7 m	1.1-1.4 m
Watalgan **(2)**	0-0.1	1.7-2.8	.15 m	3 vl	4 vl	1.4 m	.05 vl
Windemere **(2)**	0-0.1	2.7-5.3	.19-.34 m-h	8-50 vl-h	10-59 l-h	2-2.4 m	1.7-5.5 m-h
Woco **(2)**	0-0.1	1-1.9	04-.08 vl-l		1 vl	.1 l	.2-.4 l
Woongarra **(11)**	0-0.1	1.4-5.5	.16-.4 m-h	26-160 m-vh	42-104 h-vh	5.6-19 h-vh	7.3-9.7 h
Woolmer **(3)**	0-0.1	.5-.7	03-.04 vl	3 vl (30) m	1 vl (18-25) l-m	.1-.8 l-m	.05-.4 vl-l

+(5) number of analysed profiles.
* vl - very low; l-low; m-medium; h-high; ns-non sodic; s-sodic; ss-strongly sodic