

SUITABILITY OF THE SOILS FOR VARIOUS IRRIGATED CROPS

The soil have been classified into soil types[†] and other mapping units. Full descriptions of all of the mapping units can be found in a later section, "Description of Soil Types and Miscellaneous Units"; the present section deals with their suitability for various irrigated crops. As used in this publication, the term "crop" includes pastures.

The soil types have been allotted to six groups, each group having particular disabilities which might be unfavourable for the irrigation of certain crops. The common *irrigated crops* that normally could be grown satisfactorily are listed at the head of each group, followed by the summarised profile features of the soil types and the names of all the soil types and mapping units in the group. Crops that might be grown under dry-land farming have not been included in the crops listed.

Table 1 is provided to enable the crop suit-ability group of any soil type or other mapping unit to be found readily. All the soil types are listed alphabetically in the table.

Table 1 .- Crop Suitability Groups of the Soil Types and other Mapping Units.

Soil Types.	Crop Suitability Group.	Soil Types and Mapping Units.	Crop Suitability Group
Barraport sandy clay loam	III	Terricks sandy loam	I
Boort clay	VA	Terricks sandy clay loam	II
Catumnal loam	II	Towangurr clay loam	VB
Catumnal clay loam	II	Towangurr clay	VI
Coombatook sandy loam	II	Tragowel clay	VA
Coombatook sandy clay loam	II	Tumnal clay	III
Fernihurst clay loam	IV	Wandella clay	VB
Fernihurst friable clay	IV	Woolappee clay loam	III
Janiember clay	VB	Woolshed sandy loam	I
Kerang clay	IV	Woolshed loam	I
Kinypanial clay loam	IV	Wychitella loam	II
Kinypanial friable clay	IV	Wychitella clay loam	II
Loddon silty clay loam	VI	Yando clay	VA
Loga clay loam	III	Yarrowalla fine sandy loam	I
Loga friable clay	VA	Yarrowalla loam	I
Lyndger fine sandy loam	II	Type A	I
Lyndger loam	III	Types B, C, D, E, F, G, H	II
Macorna clay	IV	Type J	IV
Marmal loam	II	Types K, L	III
Marmal clay loam	II	Soils of Prior Stream Beds	
Minmindie clay	VA	Type 1	Vc
Mologa loam	III	Type 2	VI
Myella loam	III	Swamp Soils	
Mysia fine sandy loam	II	Units 1, 2, 3, 5	VB
Mysia loam	II	Unit 4	VI
Pompapeil sandy loam	I	Skeletal Soils	VI
Sylvaterre sandy clay loam	II	River Frontage	VI
Terrappee clay loam	III		

Readers are asked to be cautious about accepting the crop suitability grouping as a rating of the soil types in order of merit, although it does suggest a general order in that high return crops are likely to be grown less successfully in descending order from Group I to Group VI. However, if the factors limiting the irrigation of certain soil types are removed or ameliorated, such soil types may prove equal to or better than others with fewer natural disabilities. For example, well laid out irrigated pastures on the structured clay soils of Group VA may be more productive than on the lighter textured soils of Group I.

The area has salinity hazards; reference is made to these in this and later sections of the bulletin, and they are dealt with particularly in the section, "Soil Features and Irrigation". Landholders should give consideration to salinity aspects when planning the land use of specific areas, particularly if salt-sensitive crops are contemplated.

Group I

Soils with no serious disabilities for irrigation except, in some cases, situation above gravity supply level. Suitable for irrigation of horticultural crops, vegetables, tomatoes, cereals, summer fodder crops, lucerne and perennial and annual pastures.

Brown sandy soils 4 to 12 in. thick, overlying moderately permeable, red-brown clay subsoils.

- (i) Sandy deep subsoils:
POMPAPPEIL SANDY LOAM.

[†] Refer to Appendix III for explanation of technical terms

YARROWALLA FINE SANDY LOAM.
YARROWALLA LOAM.

- (ii) Clayey deep subsoils:
TERRICKS SANDY LOAM.
WOOLSHED SANDY LOAM.
WOOLSHED LOAM.
TYPE A.

The soil types in this Group have in common a reasonable depth of surface soil, moderately permeable soil profiles, and inherently low or moderate salinity in the deep subsoils. Since these are desirable characteristics for the irrigation of most crops, factors other than those relating to soil properties are likely to determine the land use. These factors could be climatic, economic, topographic or availability of irrigation water. In fact, inaccessibility to gravitational water-supply limits irrigation of the Terricks sandy loam and probably most of the Woolshed series. These soil types are located on relatively high land away from the main channel system. On the other hand, gravitational water-supply is accessible to the Yarrowalla and Pompapeil series and much is under irrigated pastures.

Whilst horticulture and vegetable-growing are not recognised pursuits within the surveyed area, the soil types of Group I would merit consideration for some such crops should the occasion arise. Probably the Terricks sandy loam, Woolshed sandy loam, and Pompapeil sandy loam have the best possibilities. Yarrowalla fine sandy loam and Yarrowalla loam have lower potential since the surface soils tend to be rather shallow in some occurrences; also, protection against rising watertables and salinity would be required.

Group II

Soils with few disabilities for irrigation. Generally suitable for irrigation of vegetables, tomatoes, cereals, summer fodder crops and perennial and annual pastures; some situations suitable for horticultural crops and lucerne.

Mainly brown loams and clay loams 4 to 9 in. thick, overlying moderately permeable red-brown and brown clay subsoils.

- (i) Calcareous deep subsoils:
COOMBATOOK SANDY LOAM.
COOMBATOOK SANDY CLAY LOAM.
MARMAL LOAM.
MARMAL CLAY LOAM.
TYPES B, C, D, E, F.
- (ii) Red-brown subsoils, clayey deep sub-soils:
CATUMNAL LOAM.
CATUMNAL CLAY LOAM.
LYNDGER FINE SANDY LOAM.
MYSIA FINE SANDY LOAM.
MYSIA LOAM.
SYLVATERRE SANDY CLAY LOAM.
TERRICKS SANDY CLAY LOAM.
TYPES G, H.
- (iii) Ironstone gravelly surface and sand-stone in the deep subsoil:
WYCHITELLA LOAM.
WYCHITELLA CLAY LOAM.

For the most part the soil types in this group are outside the recognised irrigation areas. Terricks sandy clay loam and Sylvaterre sandy clay loam are situated on high land beyond present irrigation supply level, while the remaining soil types are all in areas receiving limited irrigation water. Only on the Coombatook series and a few of the unnamed soil types in the northern part of the Boort Irrigation Area have irrigated pastures been established.

The Catumnal, Marmal, and Mysia series and the Lyndger fine sandy loam are all favourably situated for irrigation in that they occupy well-drained positions in the landscape. Furthermore, the profiles of these soils have affinities with Lemnos loam (Skene and Poutsma 1962) and Wanalta loam (Skene 1963, Skene and Harford 1964), soil types successfully supporting irrigated pastures and crops in the Goulburn Valley, Deakin and Rochester areas. Thus the depth of surface soil is satisfactory for pastures and cultivated crops, the subsoils are presumed to be moderately permeable, although fairly heavy-textured, while salt levels do not constitute a special hazard.

The Wychitella series is well placed for irrigation, but soil properties due to a high iron oxide component are different from those of the other soil types in Group II. In the absence of irrigation experience with soils of this kind, the potential

of the Wychitella series can only be estimated as being satisfactory for a range of crops, including lucerne and some horticultural species.

Group III.

Soils with several disabilities for irrigation, namely, low permeability, shallow surface, and sometimes moderate salinity. Suitable, given appropriate management, for irrigation of cereals, summer fodder crops, and perennial and annual pastures.

Shallow, brown and grey-brown loams and clay loams, mainly 2 to 4 in. thick, overlying moderately or slowly permeable red-brown or yellowish brown heavy clay subsoils.

BARRAPORT SANDY CLAY LOAM.
LOGA CLAY LOAM.
LYNDGER LOAM.
MOLOGA LOAM.
MYELLA LOAM.
TERRAPPEE CLAY LOAM.
TUNMAL CLAY LOAM.
WOOLAPPEE CLAY LOAM.
TYPES K, L

Apart from Types K and L which are beyond irrigation supply, all of the soil types in this group have a common limitation in having a shallow surface soil. In addition, Loga clay loam, Myella loam, Terraptee clay loam, Tunmal clay loam and Woolaptee clay loam have indifferent surface drainage.

There is irrigation experience with sown pastures only on Loga clay loam, Lyndger loam and Mologa loam. Some problems of slow water intake have been experienced leading to moisture stress in pastures during the summer period. For this reason, perennial pastures are less likely to be successful than annual pastures.

Group IV.

Heavy-textured soils liable to salinity problems. According to the effectiveness of measures to control salinity, suitable for irrigation of cereals, summer fodder crops, annual and perennial pastures.

Brown and grey cracking clays on treeless, gilgai plains.

- (i) Dense and slowly permeable.
FERNIHURST CLAY LOAM.
KERANG CLAY.
KINYPANIAL CLAY LOAM.
MACORNA CLAY.
TYPE J
- (ii) Well-structured and moderately permeable.
FERNIHURST FRIABLE CLAY.
KINYPANIAL FRIABLE CLAY.

The salt situation in the subsoil should be assessed from soil analyses before contemplating irrigation of the soil types in Group IV for the first time. Most occurrences naturally contain appreciable salt in the subsoil below 24 in. This is particularly the case in Macorna clay and Kerang clay. Fernihurst clay loam and Kinypanial clay loam are inherently somewhat less saline, but salt is often present in sufficient amount to constitute a hazard should the soils be irrigated. Fernihurst friable clay and Kinypanial friable clay, although only moderately saline, are usually intermingled with these two soil types and do not merit separate consideration.

The establishment and maintenance of pastures on Macorna clay and Kerang clay under saline soil conditions have been the subject of much study in the Kerang Irrigation Area.

Group V.

Low-lying soils, including strongly gilgaied, permeable clays (Sub-group A) and less permeable clays (Sub-group B). Effectiveness of drainage and grading measures determine suit-ability for irrigation of cereals, summer fodder crops, annual and perennial pastures and, on Sub-group A soils, lucerne.

Sub-group A. Well-structured, moderately permeable, grey and dull brown clays.

BOORT CLAY.
LOGA FRIABLE CLAY.
MINMINDIE CLAY.
TRAGOWEL CLAY.
YANDO CLAY.

Sub-group B. Slowly permeable, grey, heavy-textured soils.

JANIEMBER CLAY.
TOWANGURR CLAY LOAM.
WANDELLA CLAY.
SWAMP SOILS ; UNITS 1, 2, 3, 5.

Sub-group C. Brown soils with permeable subsoils in depressions.

SOILS OF PRIOR STREAM BEDS: TYPE 1.

Experience has shown that, with good grading and provision for effective surface drainage, Sub-group A soil types such as Boort clay and Tragowel clay are capable of supporting good pastures, including perennial species. However, satisfactory grading may not be achieved for several seasons because of the gilgai microrelief. Although lucerne is suggested as a possibility on soils in this Sub-group, surface drainage must be made particularly good if it is to succeed.

The soils in Sub-group B, except possibly Janiember clay, are particularly liable to seasonal inundation as they tend to convey or receive district drainage. Utilisation for irrigation depends on the individual situation. This also applies to Sub-group C, although, in this case, the internal drainage of the soils is good.

Group VI.

Soils generally not recommended for irrigation because of swampiness or surface features making layout for irrigation difficult.

Dense, grey, heavy-textured soils in depressions.

LODDON SILTY CLAY LOAM. TOWANGURR CLAY.
SWAMP SOIL: UNIT 4.
SOILS OF PRIOR STREAM BEDS: TYPE 2.
RIVER FRONTAGE.

Shallow sandy loams intermingled with granite rock.

SKELETAL SOIL.

Whilst the soil types and mapping units in Group VI are, in general, not recommended for irrigation, individual situations might support irrigated pastures where the disabilities of swampiness and heavy, uneven surface are not pronounced or can be alleviated.