

## 5. Soils of the Arabian Peninsula

### 5.1. General soil pattern

The soils of the Arabian Peninsula reflect the aridity of the climate. Most are poorly developed, shallow, or are enriched in lime, gypsum, or salts. In addition, transported materials, such as sand dunes and sheets, cover large areas. The soils are mostly formed by the physical breakdown of geological materials and their subsequent removal, sorting and deposition by wind and water.

The distribution of the soils of the Arabian Peninsula is represented in the Map of Soil Associations (Figure 31). Soil association maps show *patterns* of soil occurrence, instead of the location of individual soils. Individual soils cannot be located at the scale of a subcontinent. Soil associations are characterized by the recurrence of a limited number of specific soil types within particular landforms, but in different proportions. The main associations of the Arabian Peninsula are listed in Table 8.

As shown in the example of Figure 32, the name of the soil association is determined by the dominant soil type, the textural class, and the broad landform type.

The association is further described by its full soil composition, which lists each soil type and its proportion (in percent) within the soil association (Table 8).

The main soil types that occur in the Arabian Peninsula, classified according to the FAO Soil Map of the World (FAO, 1974), are listed in Table 9. Three textural classes are distinguished:

- 1: Coarse (predominantly sandy)
- 2: Medium (predominantly silty)
- 3: Fine (predominantly clayey)

These distinctions are further defined in the discussion on soil management properties (Section 5.2.).

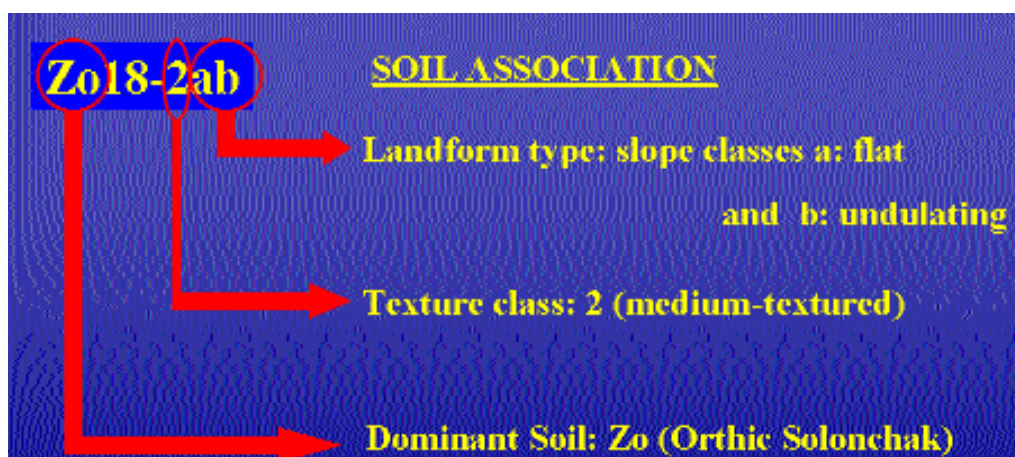
In addition, the soil associations do consider three broad landform classes: a: flat topography; b: undulating topography; c: hilly topography

Looking only at the dominant soils within the different soil associations, the soil association map can be simplified, as shown in the map of dominant soils (Figure 33).



**Table 8. Main soil associations of the Arabian Peninsula (FAO, 1995)**

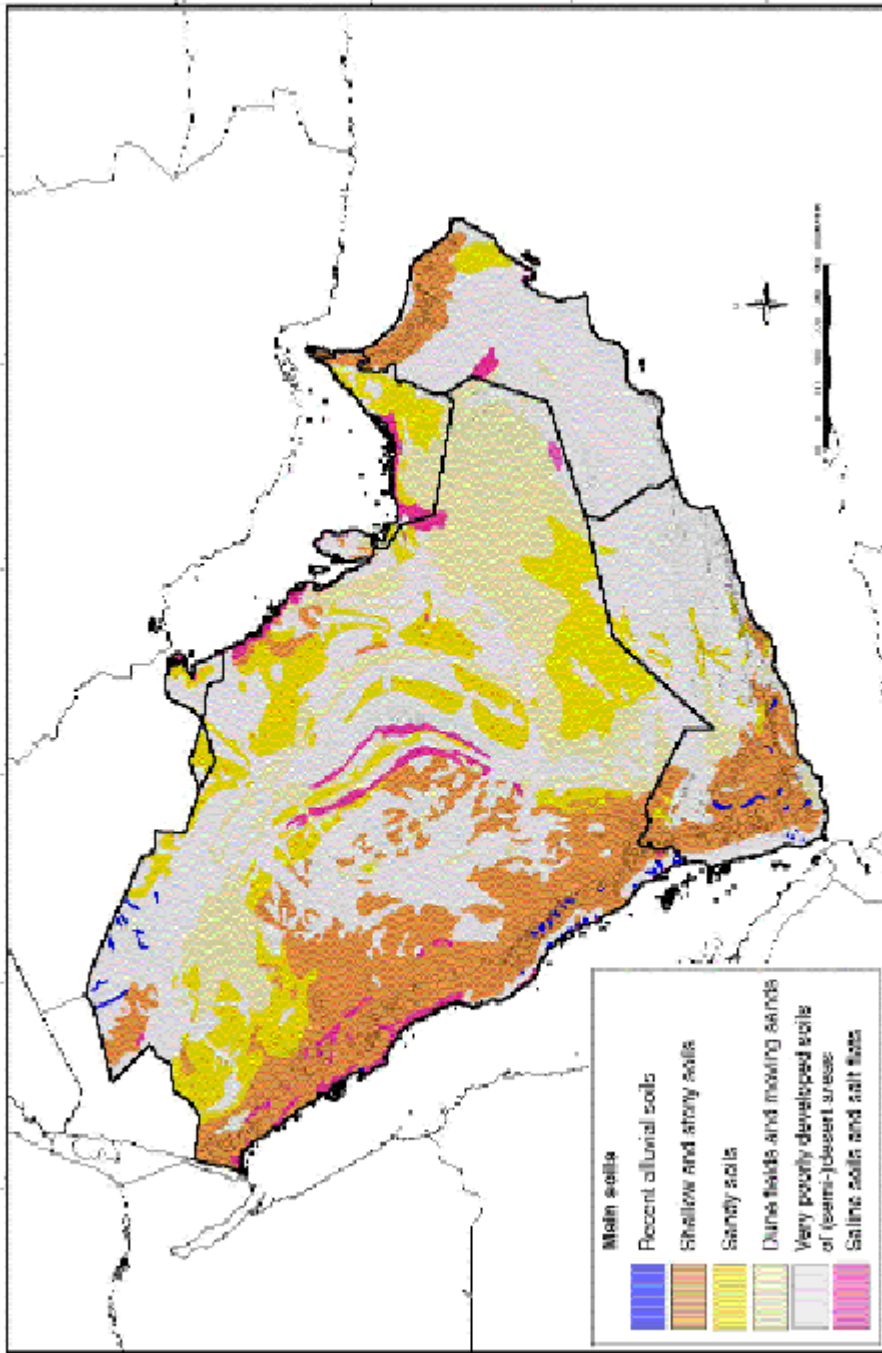
Soil Association	% of the Peninsula	Soil Types and Proportions					
		%1	%2	%3	%4	%5	%6
D/SS	5.80 DS	100	0	0	0	0	0
I-Y-bc	20.28 I	50 Y	50	0	0	0	0
I-Yh-Yk-1/2b	4.00 I	34 Yh	33 Yk	33	0	0	0
I-Yk	0.04 I	50 Yk	50	0	0	0	0
I-Yk-1/2a	0.26 I	50 Yk	50	0	0	0	0
I-Yk-2ab	2.41 I	50 Yk	50	0	0	0	0
Je61-2a	0.32 Je	90 Zo	10	0	0	0	0
Qa9-1a	0.48 Qa	100	0	0	0	0	0
Qc46-1/2ab	6.51 Qc	50 I	20 Y	20 R	10	0	0
Rc30-1ab	9.33 Rc	50 Qc	20 Yk	20 Z	10	0	0
Rc31-1/2ab	1.23 Rc	70 Z	30	0	0	0	0
Re1-1/2a	0.00 Re	100	0	0	0	0	0
SALT	0.05 ST	100	0	0	0	0	0
Yh22-1ab	4.96 Yh	30 Qc	20 Yk	20 Jc	10 Rc	10 Z	10
Yh3-1/2a	3.74 Yh	70 I	30	0	0	0	0
Yk25-1/2a	10.94 Yk	40 I	20 Yl	20 Jc	10 Z	10	0
Yk26-1ab	3.39 Yk	70 Qc	30	0	0	0	0
Yk27-2a	0.09 Yk	60 Z	30 I	10	0	0	0
Yk28-1a	6.40 Yk	60 Rc	30 I	10	0	0	0
Yk29-1/2a	0.25 Yk	60 Rc	30 Z	10	0	0	0
Yk32-a	8.12 Yk	60 I	20 Yl	20	0	0	0
Yl19-3ab	2.68 Yl	50 I	20 Yk	20 Rc	10		
Yy10-2ab	3.79 Yy	60 I	20 Yk	20	0	0	0
Yy10-2ab	0.37 Yy	60 I	20 Yk	20	0	0	0
Yy12-a	0.54 Yy	60 I	30 Yk	10	0	0	0
Yy7-2/3a	0.05 Yy	50 Yk	20 Zo	20 Jc	10	0	0
Zg3-2/3a	1.18 Zg	70 Zo	30	0	0	0	0
Zo18-2ab	0.51 Zo	60 I	30 Yk	10	0	0	0
Zo19-1/2ac	1.35 Zo	50 I	30 Qc	10 Rc	10	0	0
Zo20-1/2a	0.19 Zo	60 Yh	30 Rc	10	0	0	0
Zo21-3a	0.03 Zo	Composition unspecified					
Zo22-2/3a	0.21 Zo						
Zo27-3a	0.37 Zo						
Zo28-3a	0.11 Zo	50 Zt	30 Jc	10 Zg	10	0	0



*Fig. 32: Soil associations: explanation of legend*

**Table 9. Main soil types of the Arabian Peninsula**

Symbol	Name	Summary description
I	Lithosols	Undifferentiated very shallow soils; unsuitable for agriculture
Je	Eutric Fluvisols	Alluvial soils with good fertility status; the best soils for agriculture
Qa	Albic Arenosols	Strongly leached sandy soils, do not retain soil moisture; unsuitable for agriculture
Qc	Cambic Arenosols	Slightly matured sandy soils, retain soil moisture better; suitable for agriculture under sprinkler irrigation
Rc	Calcaric Regosols	Calcareous poorly developed soils, poor physical properties for agriculture
Re	Eutric Regosols	Poorly developed soils with moderate fertility; poor physical properties for agriculture
Yh	Haplic Yermosols	Undifferentiated very poorly developed soils of (semi-) deserts; management properties vary considerably; full irrigation is needed for all agricultural uses
Yk	Calcic Yermosols	Very poorly developed soils of (semi-) deserts with calcium-enriched subsoil; unsuitable for agriculture
Yl	Luvic Yermosols	Very poorly developed soils of (semi-) deserts with clay-enriched subsoil; can be made suitable for agriculture if full irrigation is available
Yy	Gypsic Yermosols	Very poorly developed soils of (semi-) deserts with gypsum-enriched subsoil; unsuitable for agriculture due to poor physical properties and need for full irrigation
Zg	Gleyic Solonchaks	Saline soils with insufficient drainage; unsuitable for agriculture
Zo	Orthic Solonchaks	Undifferentiated saline soils; unsuitable for agriculture



*Fig. 3.3: Simplified soil map (dominant soils)*