



UNITED ARAB EMIRATES

Irrigation Water Management In The United Arab Emirates (Policy and Development)

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“Space Systems: Protecting and Restoring Water Resources”

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Graz, Austria

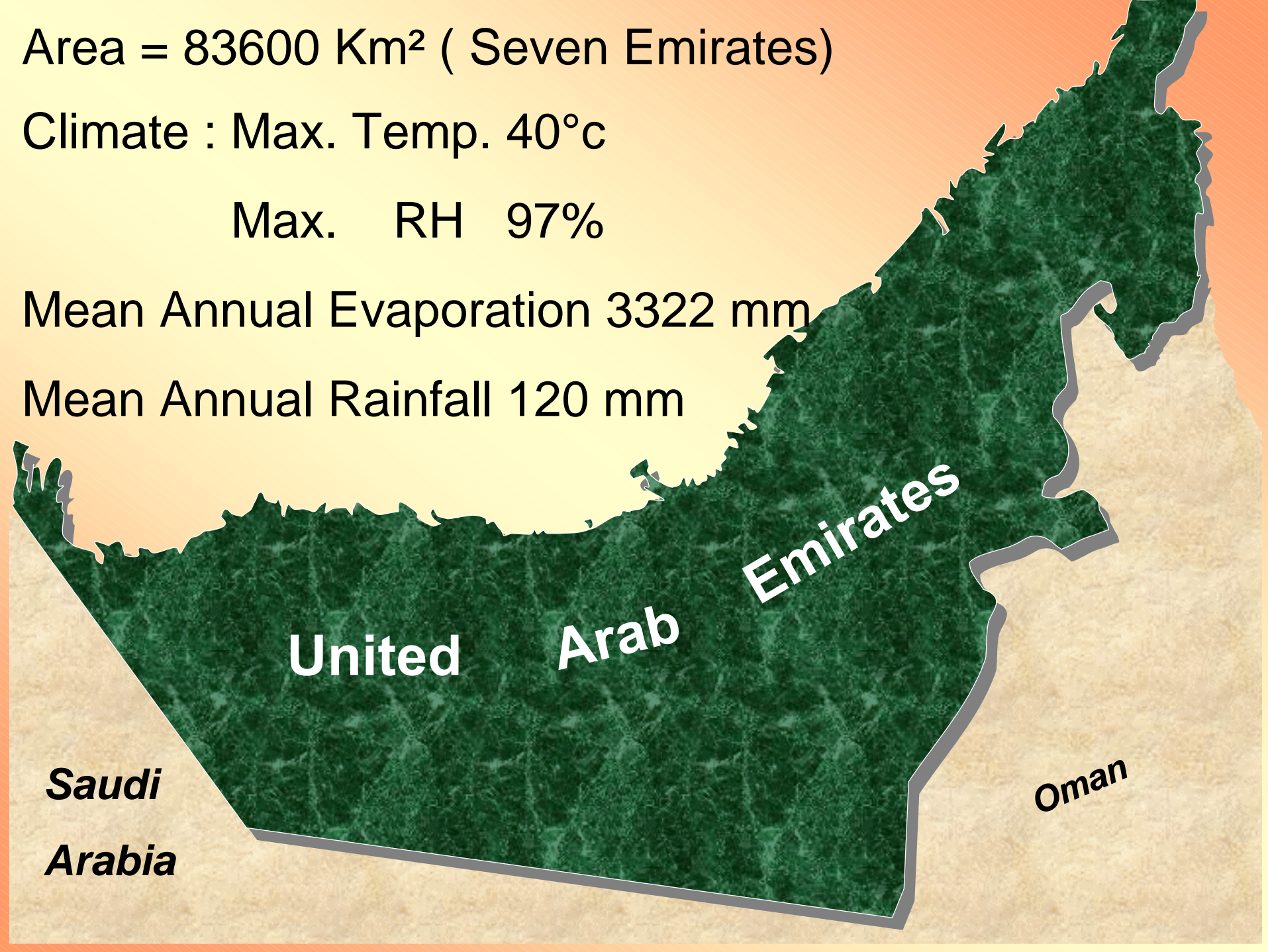
Area = 83600 Km² (Seven Emirates)

Climate : Max. Temp. 40°C

Max. RH 97%

Mean Annual Evaporation 3322 mm

Mean Annual Rainfall 120 mm



United

Arab

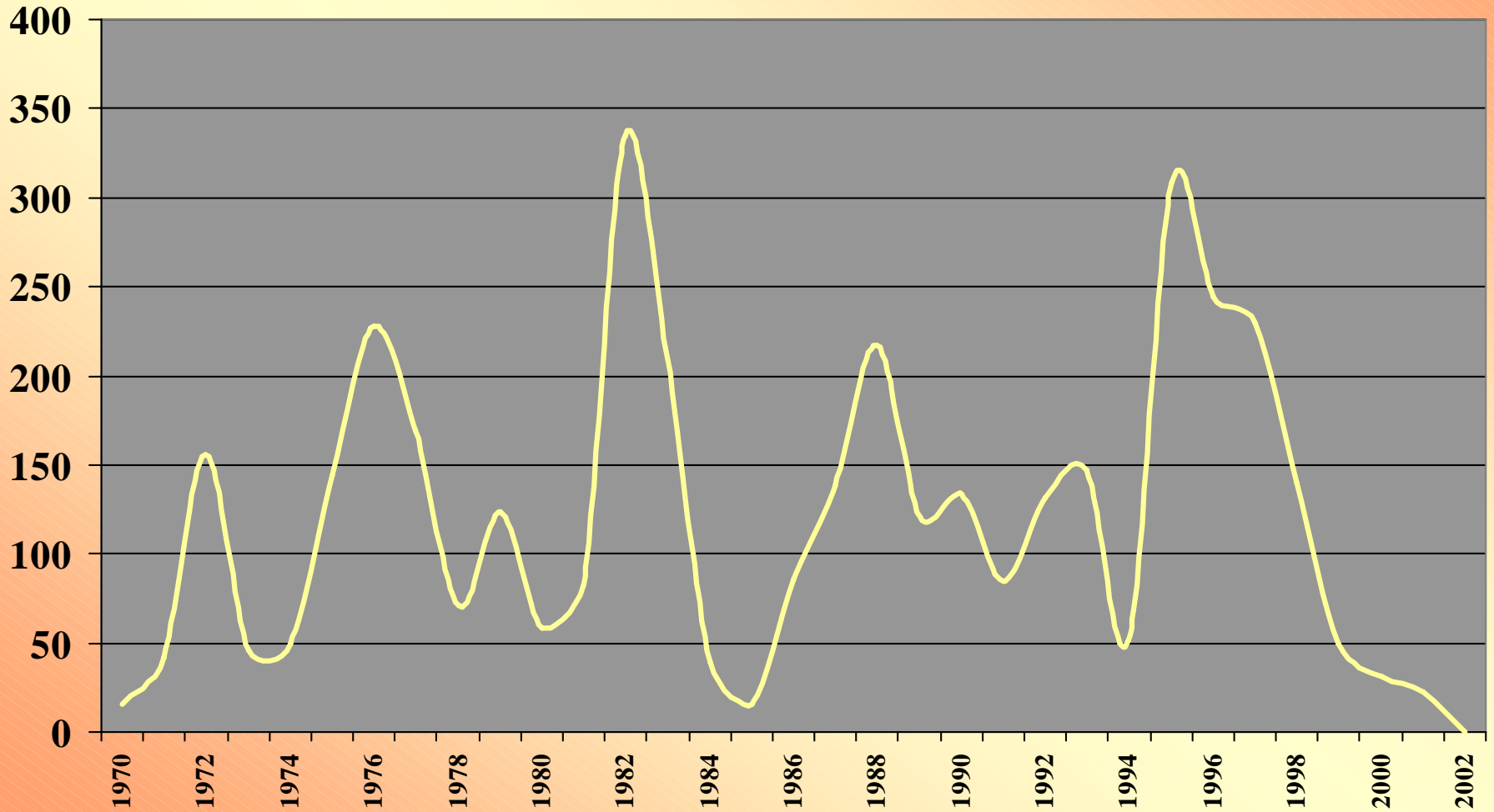
Emirates

Saudi

Arabia

Oman

Mean Annual Rainfall



Soil



loamy sand -sandy

**contains gravel in
wadi fans and plains**

highly permeable

Low organic matter

Water Resources

A- Unconventional ..

- 1- Desalinated water
- 2- Sewage treated water

B- Conventional ..

- 1- Ground water
- 2- Falajes and springs

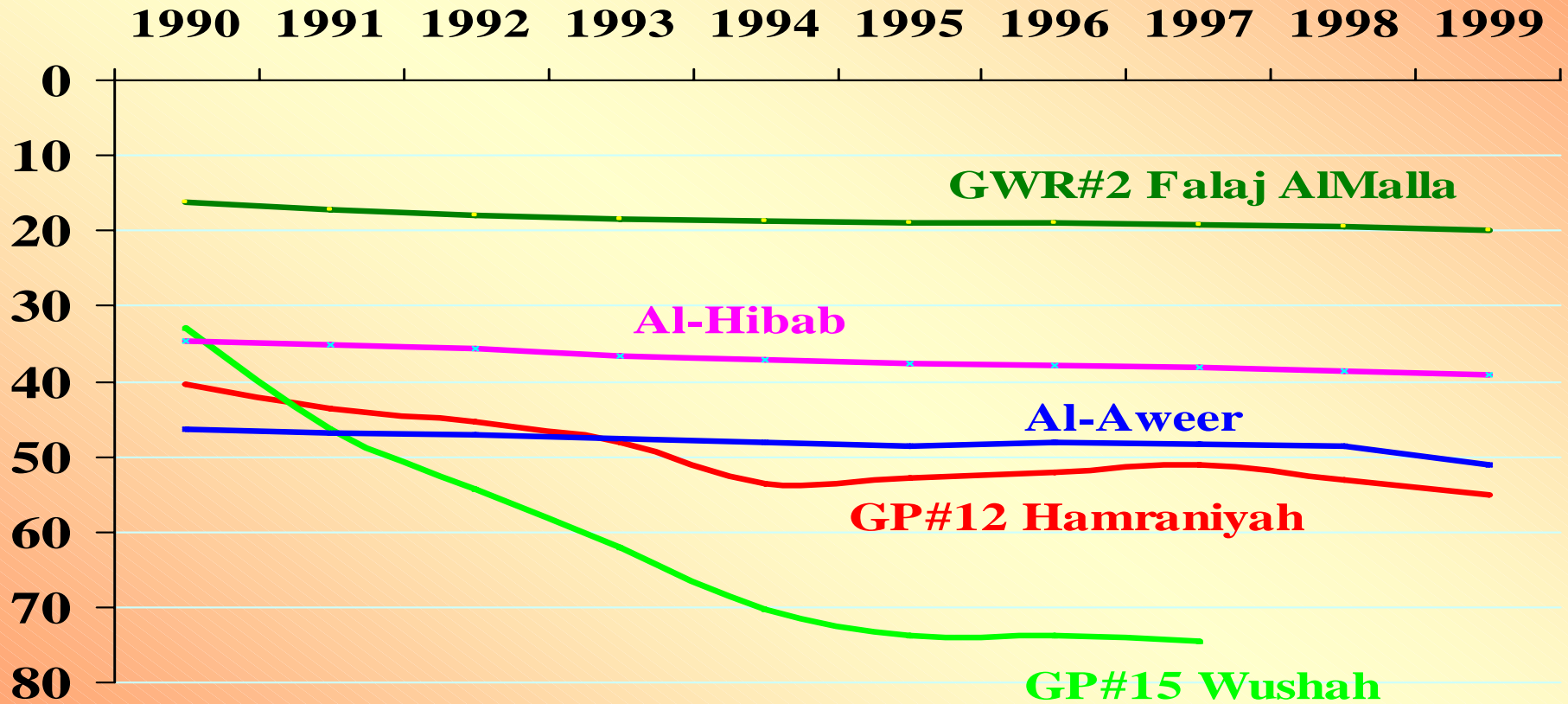


Available Water Resources in UAE

Surface water (Mm ³)	Ground water Extraction (Mm ³)	Ground water Recharge (Mm ³)	Desalination water (Mm ³)	Recycled water (Mm ³)
185	880	120	710	200

- Falaj water (a renewable resource) contributes annually about 9 Mm³ (included in the surface water).
- Groundwater withdrawal exceeds discharge.

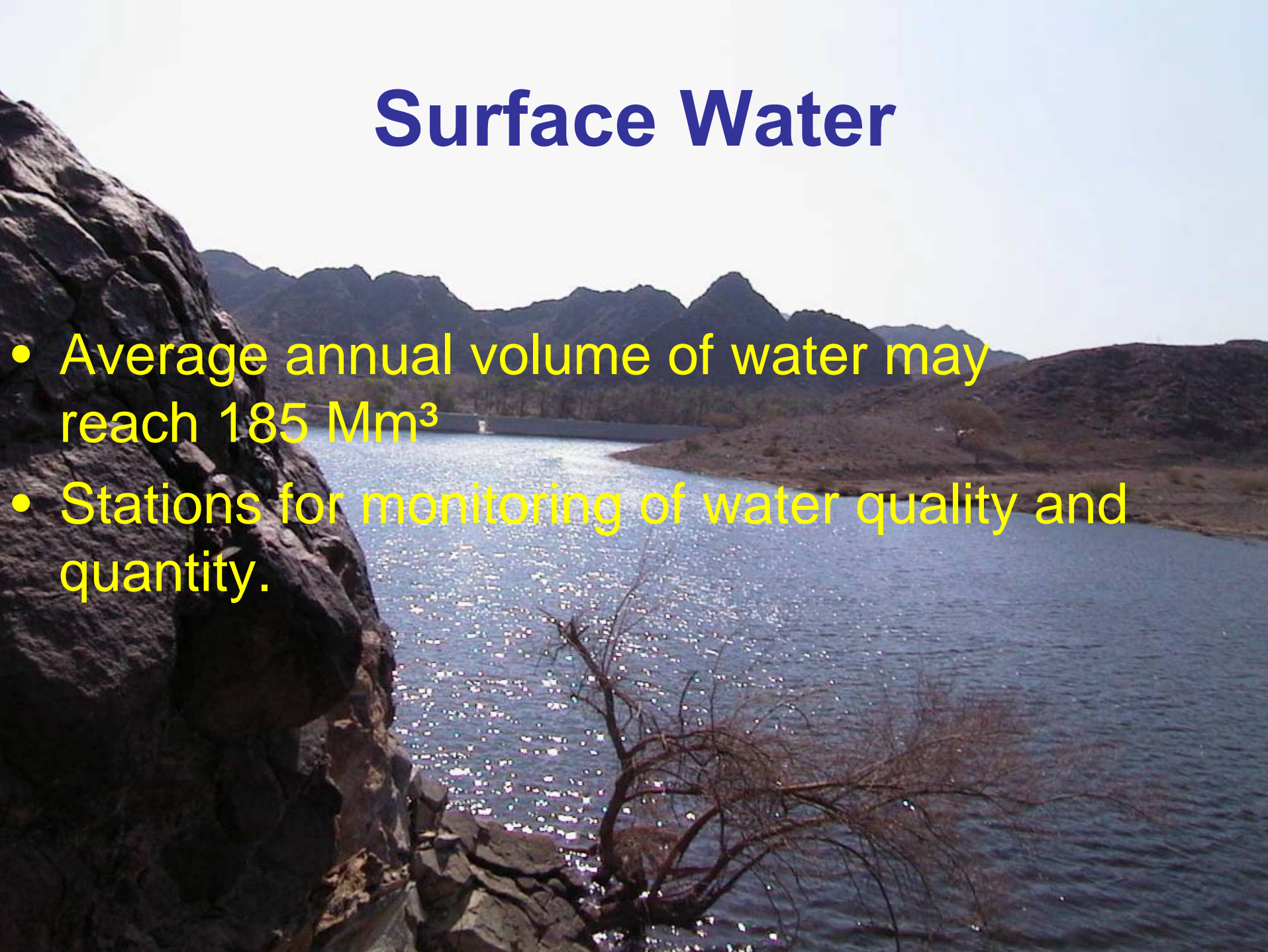
The current rate of withdrawal of ground water greatly exceeds natural rate of recharge



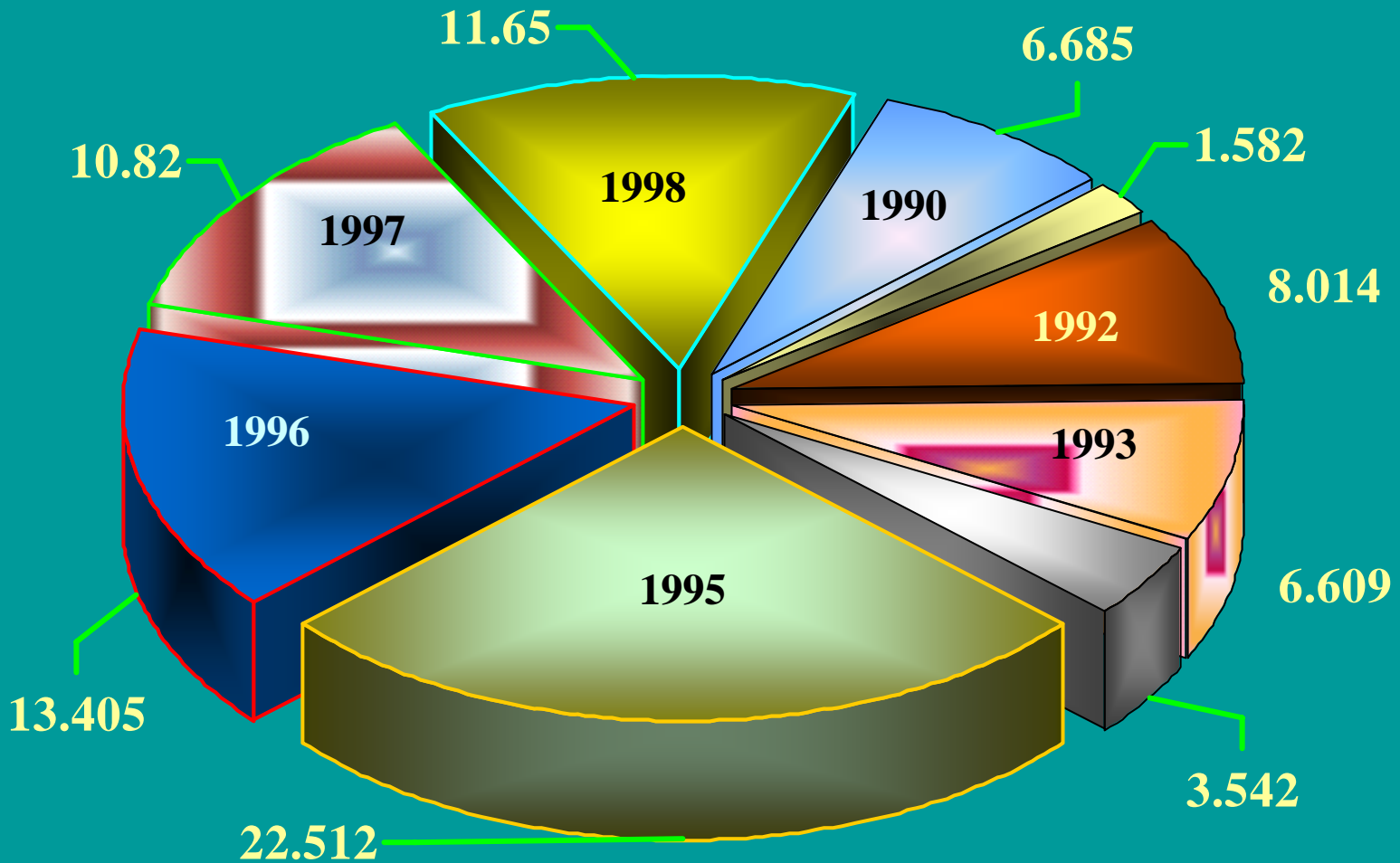
Ground Water Level Fluctuation in Monitoring Wells

Surface Water

- Average annual volume of water may reach 185 Mm³
- Stations for monitoring of water quality and quantity.



Total Volume of Water Stored (Mm³) in Different Dams Up to 1998

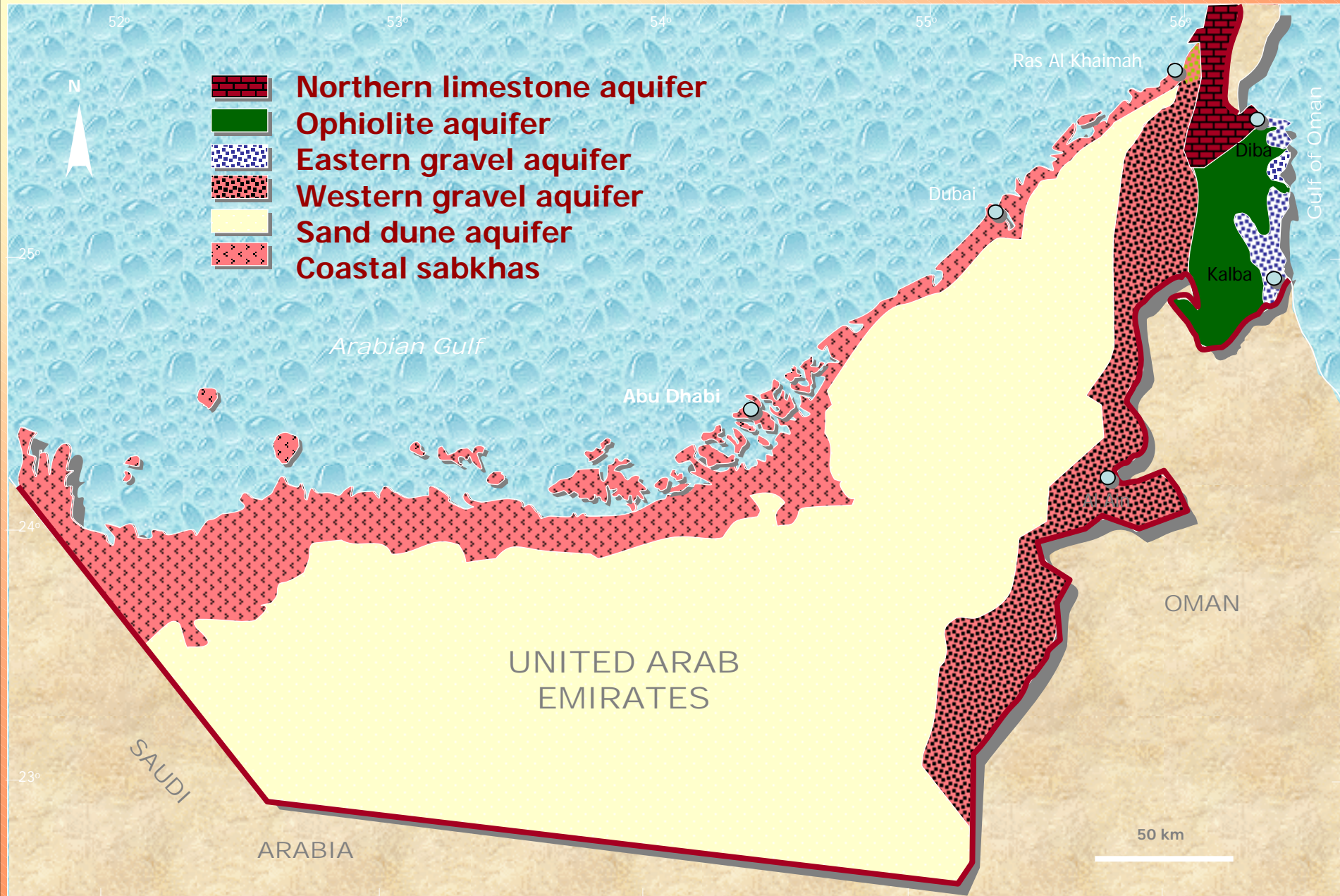


GROUND WATER RESOURCES IN U.A.E

Classification

- 1. Shallow alluvial aquifers along the main wadi channels and in the gravel plains (Bahada)**
Fresh water (300-3000 PPM) renewable
- 2. Fossil ground water in the deep sedimentary aquifers (limestone, dolomite mud stone, chalk, marl)**
Vary widely in quality (western desert Damam and Umm Al-Radhuma - Highly saline)
- 3. East Cost (weathered and fractured ophiolite rock series) Good quality in general**

Main Recharge Aquifers



Ground Water Management

- **Assessment & monitoring of ground water by using state of the art technology**
- **Shifting to unconventional resources (desalination - recycled) for municipal, industrial and landscape needs.**
- **Using fresh ground water for rural domestic needs and for cultivation of high value crops**
- **Using brackish water for other crops and forestation project**
- **Building recharge dams on wadies to recharge ground water aquifers**

DATA OF PLANT SECTOR 2003

بيانات القطاع النباتي عام 2003

Plant Sector		القطاع النباتي			
Item	Unit	Number	الرقم	الوحدة	البيان
No. of Farms	farm	38548		مزرعة	عدد المزارع
Total Area	Don.	2607324		دونم	المساحة الكلية
Plant Production Area	Don.	2285903		دونم	جملة مساحة الإنتاج النباتي
Plant Production	Ton	4091439		طن	جملة الإنتاج النباتي
Veg - Area	Don.	80831		دونم	مساحة الخضار
Veg - Production	Ton.	289808		طن	إنتاج الخضار
Fruit Area Except Data Palm	Don.	20832		دونم	مساحة الفاكهة عدا النخيل

(Cont.)

DATA OF PLANT SECTOR 2003

بيانات القطاع النباتي عام 2003

Fruit Production Except Data	Don.	25997	طن	إنتاج الفاكهة عدا التمور
Area of Date palm Trees	Don.	1853295	دونم	مساحة أشجار النخيل
Dates Production	Ton.	757601	طن	إنتاج التمور
No. of Palm Trees	No.	40700000	عدد	عدد أشجار النخيل
Marked Dates from 98-2003	Ton.	175620	طن	التمور المسوقة من 98 - 2003
Area of Crops & Fodders	Don.	330945	دونم	مساحة المحاصيل والأعلاف
Crops Fodders Production	Ton.	3018033	طن	إنتاج المحاصيل والأعلاف
Area of forests	Hectar	310971	هكتار	مساحة الغابات

WATER & SOIL DATA FOR 2003

بيانات المياه و التربة عام 2003

Water & Soil		المياه و التربة			
Item	Unit	Number	الرقم	الوحدة	البيان
No. of Dams	Dam	114		سد	عدد السدود
Volume of Water Stored	M.cu. M.	12.3		مليون متر مكعب	كميات المياه المتجمعة
No. of Wells	Well	76556		بئر	عدد الآبار
No. of modern irr.Farms	Farm	23421		مزرعة	عدد مزارع الري الحديث
modern irr.Area	Don.	1994139		فونم	مساحة الري الحديث
% To Watering Area	%	86.4		%	نسبته إلى المساحة المروية

Research And Extension

Local & Federal Research

Biosaline Agriculture Center

ICARDA

(Arabian Peninsula Regional Program)

On farm water use and irrigation management

Rangeland, shrubs, irrigated forages and livestock

Protected Agriculture

Water saving practices

Adaptation of Soilless systems and techniques
(Hydroponics)



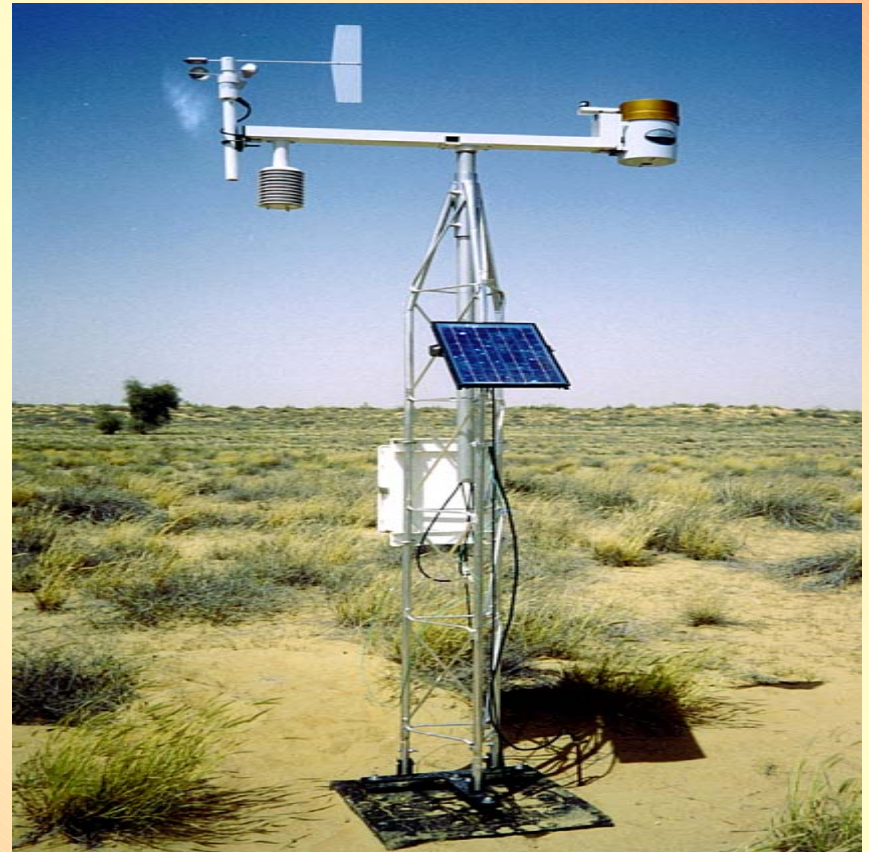
The use of plastic mulch and soil amendment to reduce evaporation and retain water in the soil



**The use of modern irrigation systems (drip- bubbler- sprinkler).
More than 80% of cultivated land 100% of landscape & forest**



- **Introduction of computerized irrigation scheduling in new projects.**
- **Use of telemetric soil moisture monitoring.**



Evaluate salt-tolerant crops

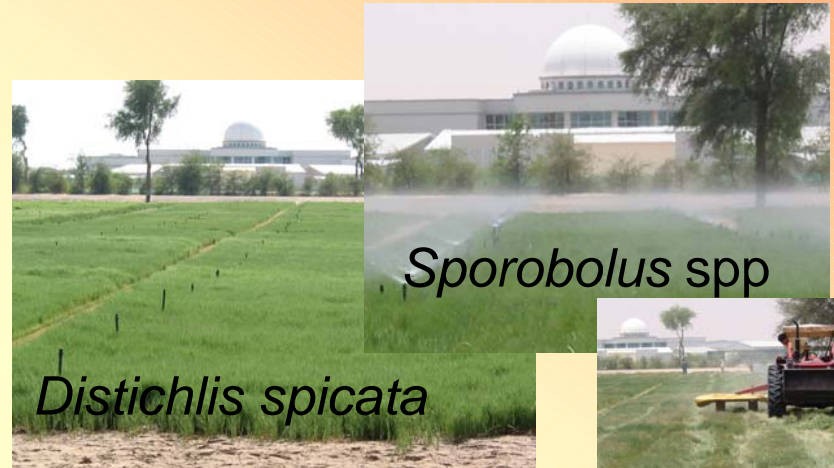
Non-conventional crops:
Atriplex, *Salicornia*

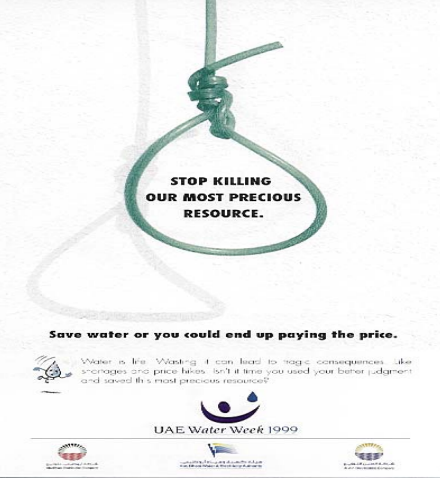
Conventional crops:
barley, millet



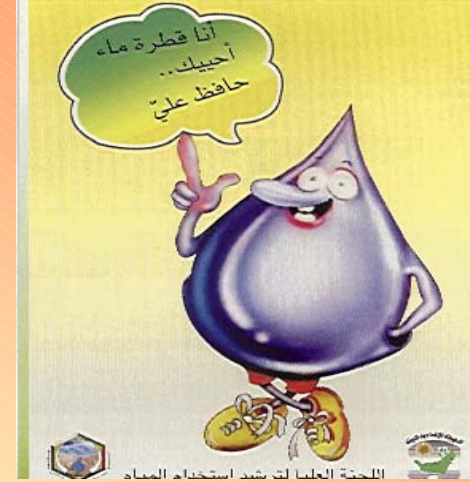
Salt-tolerant forage grass production system

- Selected for
 - Salt-tolerance
 - Nutritional value
 - Suitability for mechanical harvesting
- 10-30 dS/m
- *Distichlis* and *Sporobolus*
 - 37-40 tonnes per hectare per year





Public Education and Awareness



- Establishment of the Higher Committee for Awareness of Water Conservation
- Celebration of Gulf Water Week and World Water Day every year.
- Water conservation campaigns for the general public and farmers in particular through the extension services, media, exhibitions and seminars
- Organizing exhibitions to introduce latest worldwide developments in water saving technologies

Laws and Regulations



- Ground water in UAE is governed and protected at national and local levels.
- General Water Resources Authority was established under Federal Law no. 21/1981. This Authority mainly controls the activities of drilling companies and registers and classifies them.
- Federal Law no. 24/1999 for the protection and development of the environment chapter 2 is related to protection of water environment and protection of ground water.



Research



Water saving practices

**Thank
you**



Irrigation

Legislation



Public Education and Awareness