Global Forum

Shaping the Future 2022

Föreningen Global Forum

Under the High-Patronage of

الجمعية العمانية للخدمات النفطية

Oman Society for Petroleum Services

Session:

Water, Food and Energy Nexus

Water Management Challenges for Agricultural Production in Oman

Muscat, Oman, September 18th, 2022

By: Hamed Al Dhuhli (Ph.D.)

مسقط العاصمة العربية الرقمية

Muscat Arab Digital Capital 2022

WATER AND HUMANITY

Water Resources

Total water Resources

1.1 Traditional (Ground & Surface water)

1634 MCM

Total 1872 MCM

1.2 Non- traditional (Treated wastewater & Desalinized water)

238 MCM

Estimated Agricultural water Consumption

2.1 Estimated water consumption per annum

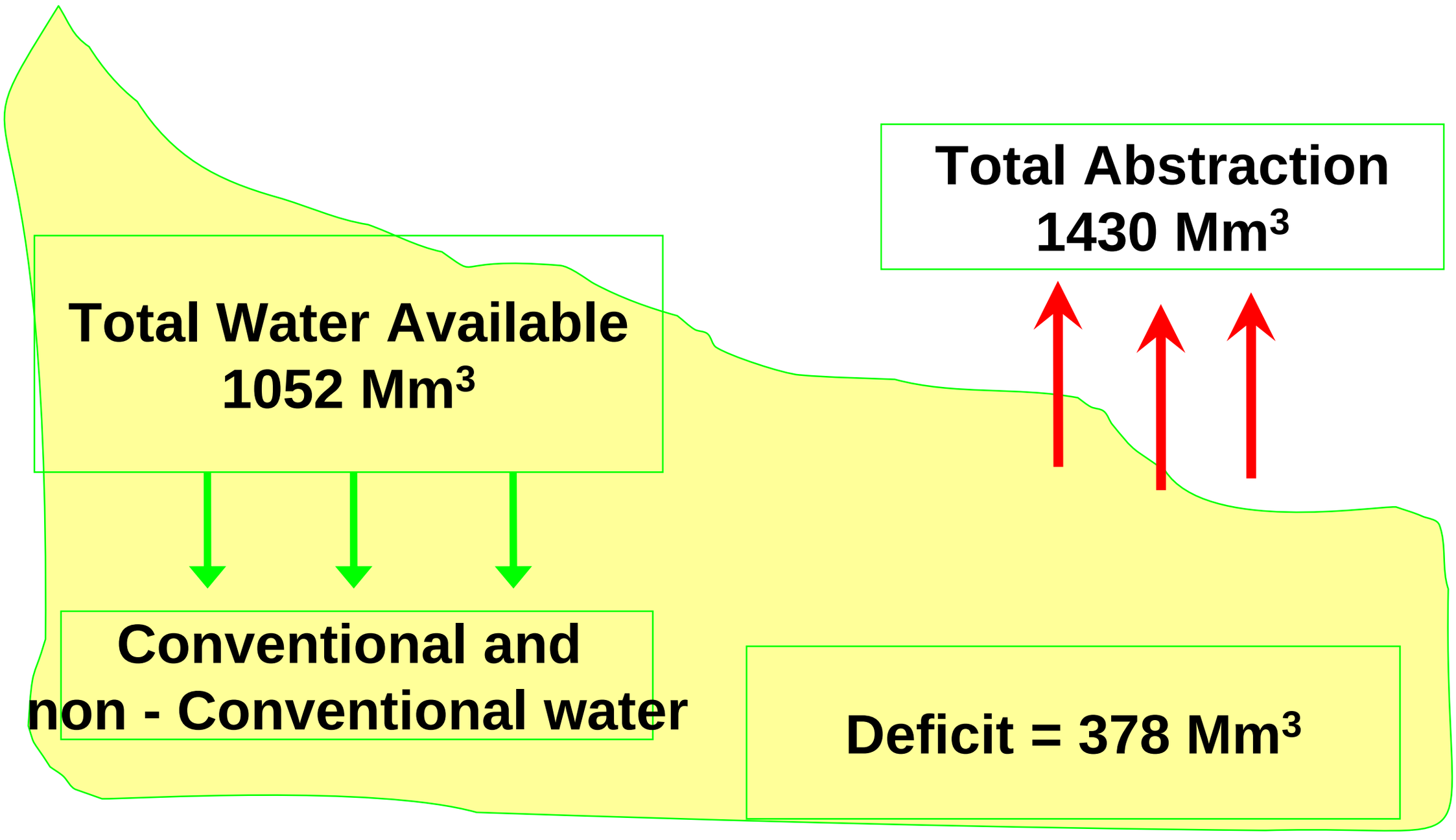
1546 MCM

% of water consumption/ Total water resources

83%

MCM - Million Cubic Meters

Water Balance



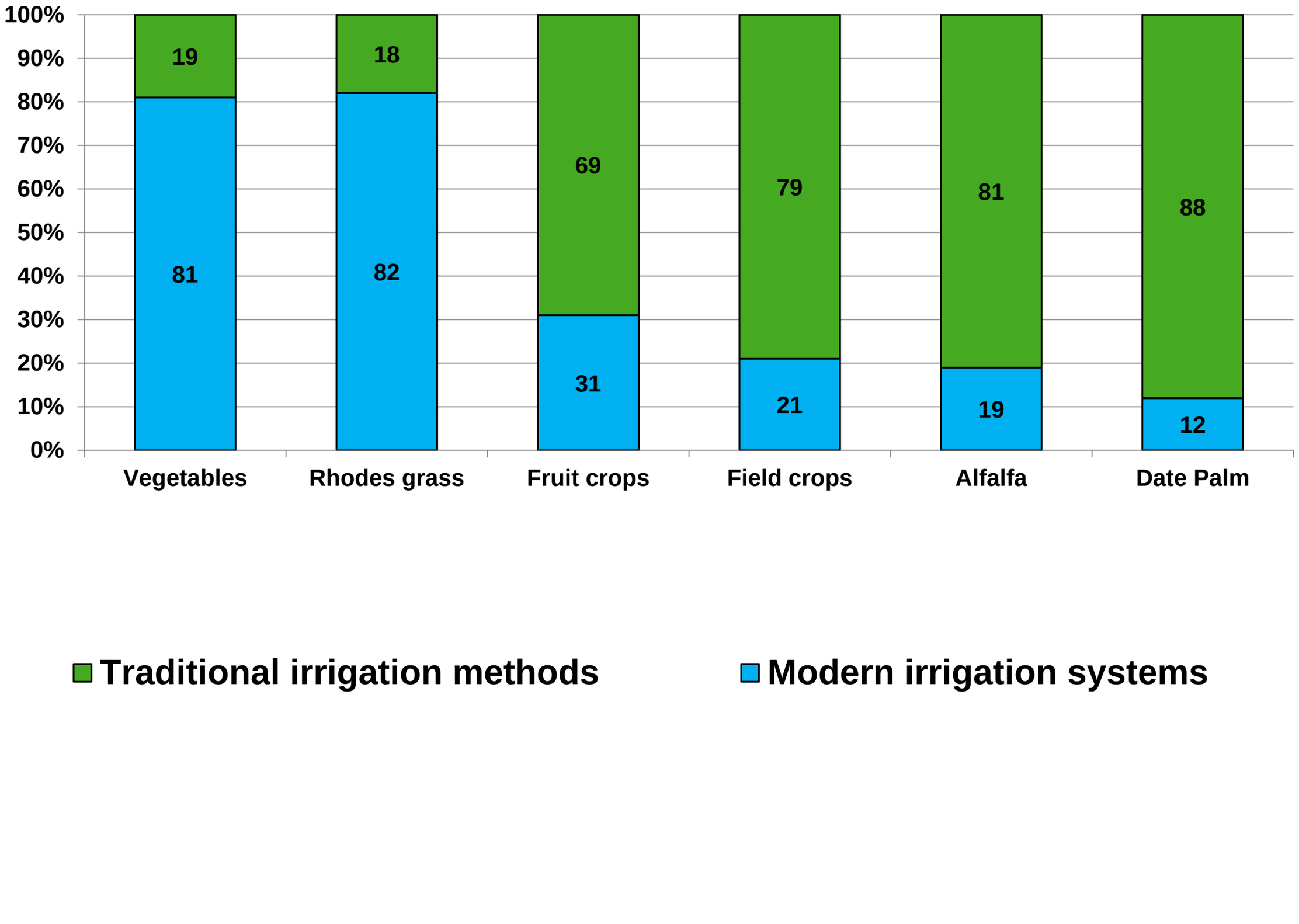
Irrigation in Oman

- More than **80%** of the agricultural lands are irrigated by traditional irrigation method (**Flood Irrigation**).

- The remaining percentage are irrigated by the modern irrigation methods.

- Water resources: **Oman relies on groundwater, which is recharged by rainwater.**

Area Under Modern and Traditional Irrigation System



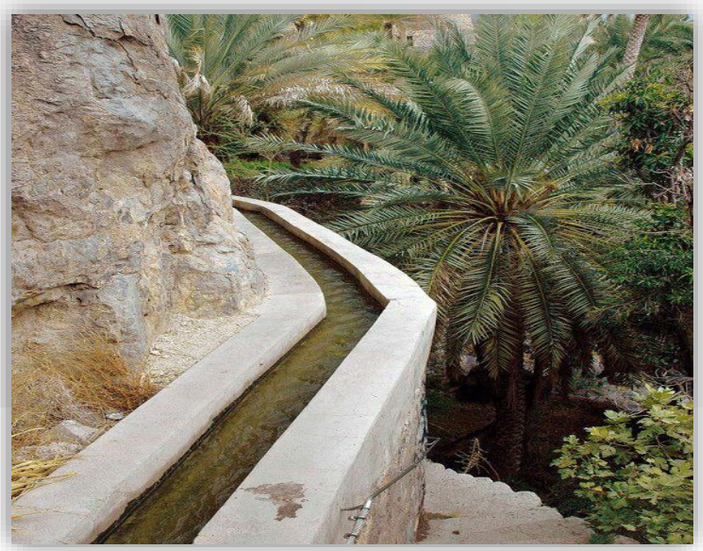
Water Resources for Agriculture

Wells:

Irrigate **70%** of agriculture land

Aflaj: (Omani Inherited Irrigation System)
(Falaj- singular; Aflaj- plural)

30% of agriculture land is irrigated by Aflaj



The main problems of irrigation water in Oman

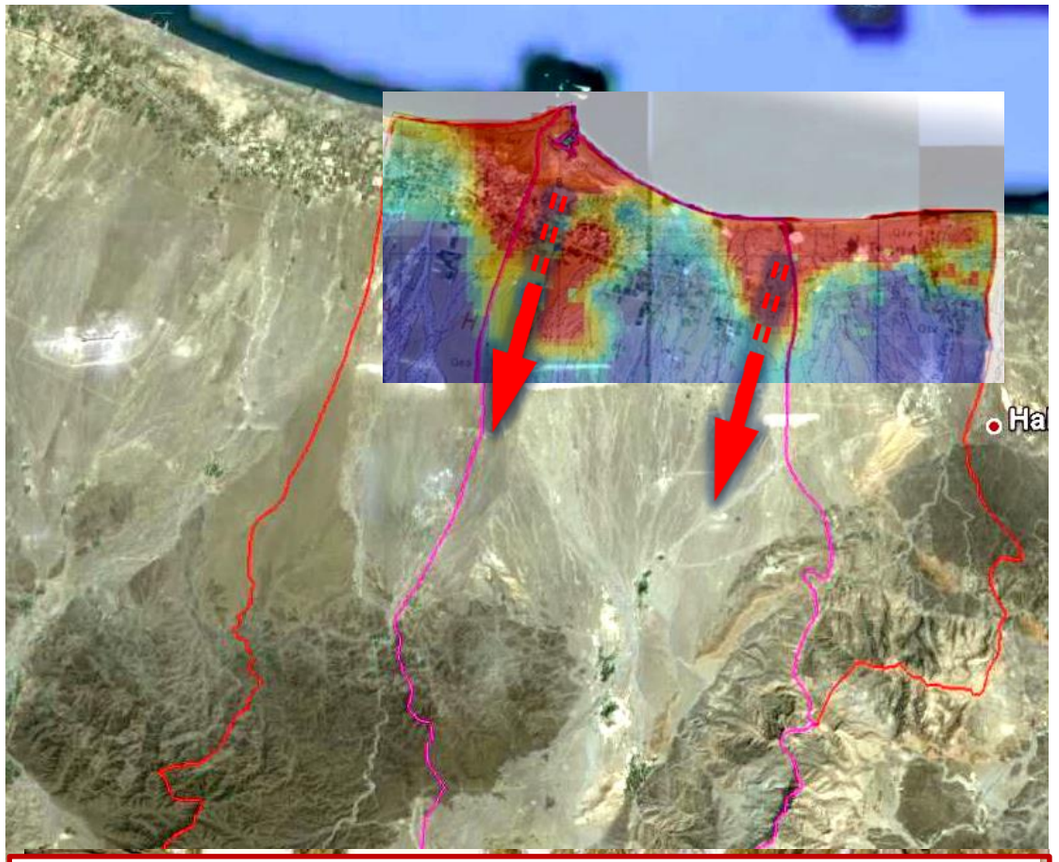
- **Agriculture depletes largest amount of water** accounting for 83% of total consumption.

- Usage of **traditional irrigation methods** (80% flooding – 20% modern irrigation).

- **Low system efficiency**

- **There is a big loss of water** transferring and distributing.

- In many areas water demand exceeds supply and this draws **saline water** into aquifers



Saline intrusion in coastal areas

Key Challenges

- Natural and environmental challenges
- Economic challenges
- Social challenges
- Institutional and administrative challenges

Natural and environmental challenges

- **The limitation of water resources**
- **Climatic conditions**
- **High variation in soils , crops and weather conditions**
- Decline in groundwater levels
- Saline intrusion

Climate

Mean Rainfall

50-300 mm/year.

Summer temp

Hot & dry in interior

Hot & humid in costal.

Winter temp

moderate.

Evaporation

High (2100-3000) mm/year.

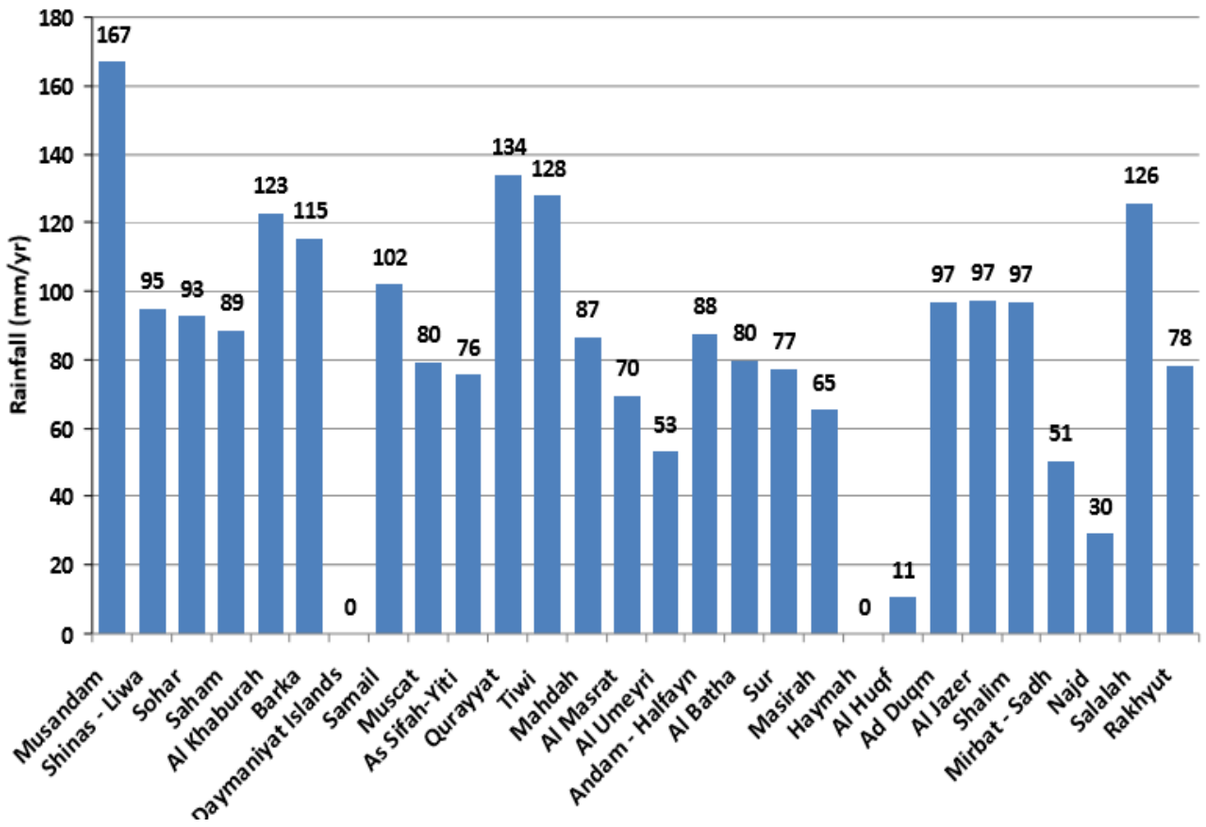
Mean sunshine 10 hr

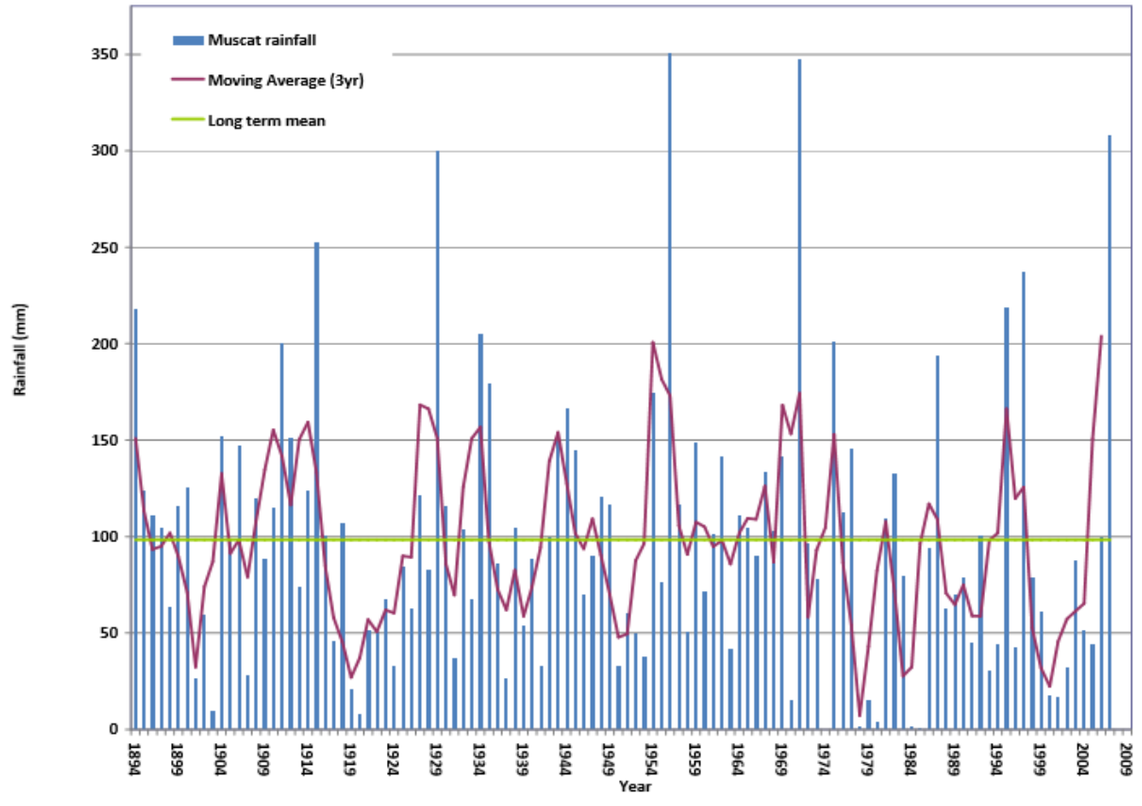
monsoon

Strong southwest summer monsoon (June to September)

Climate

- **Rainfall**

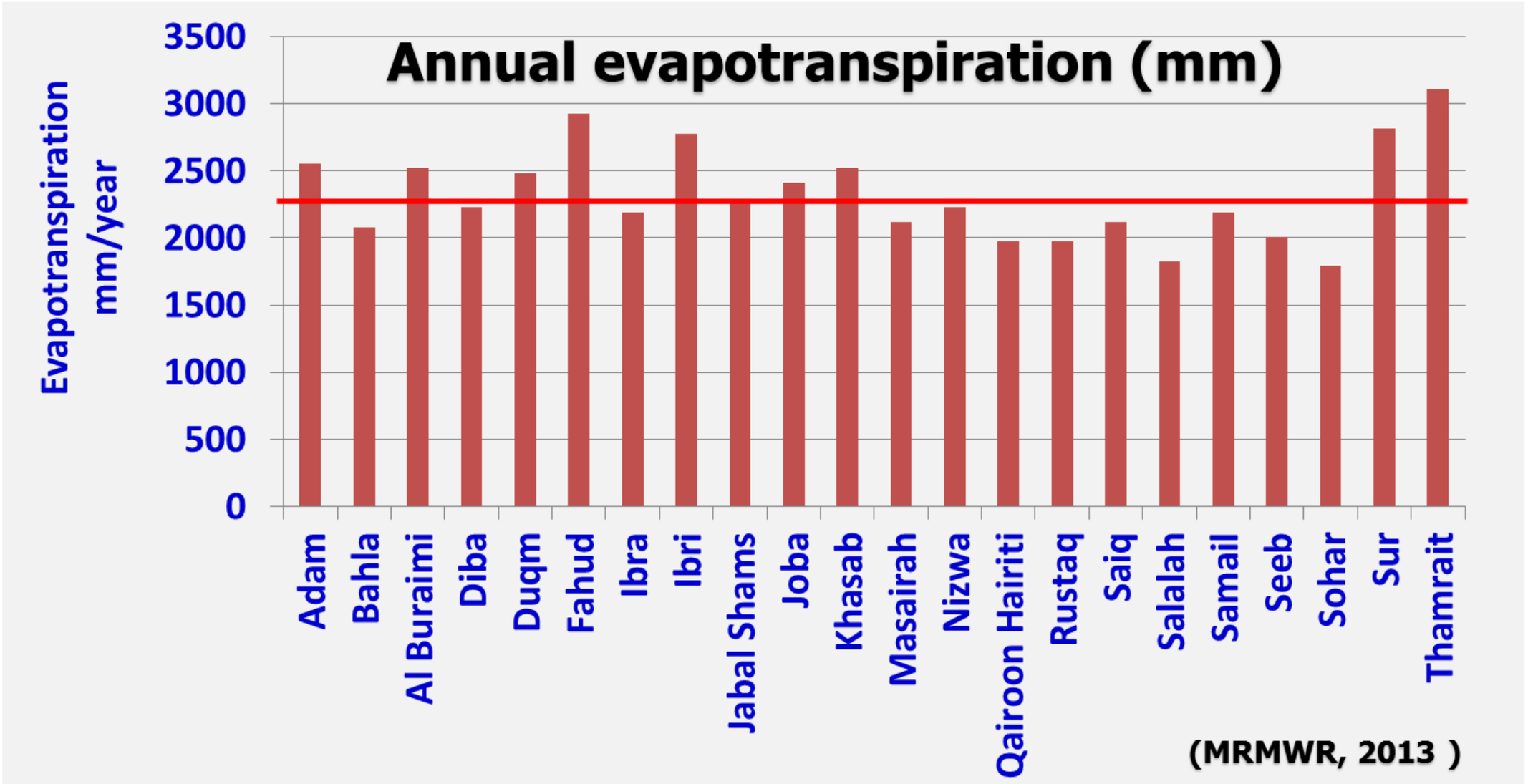




(MRMMWR,2013)

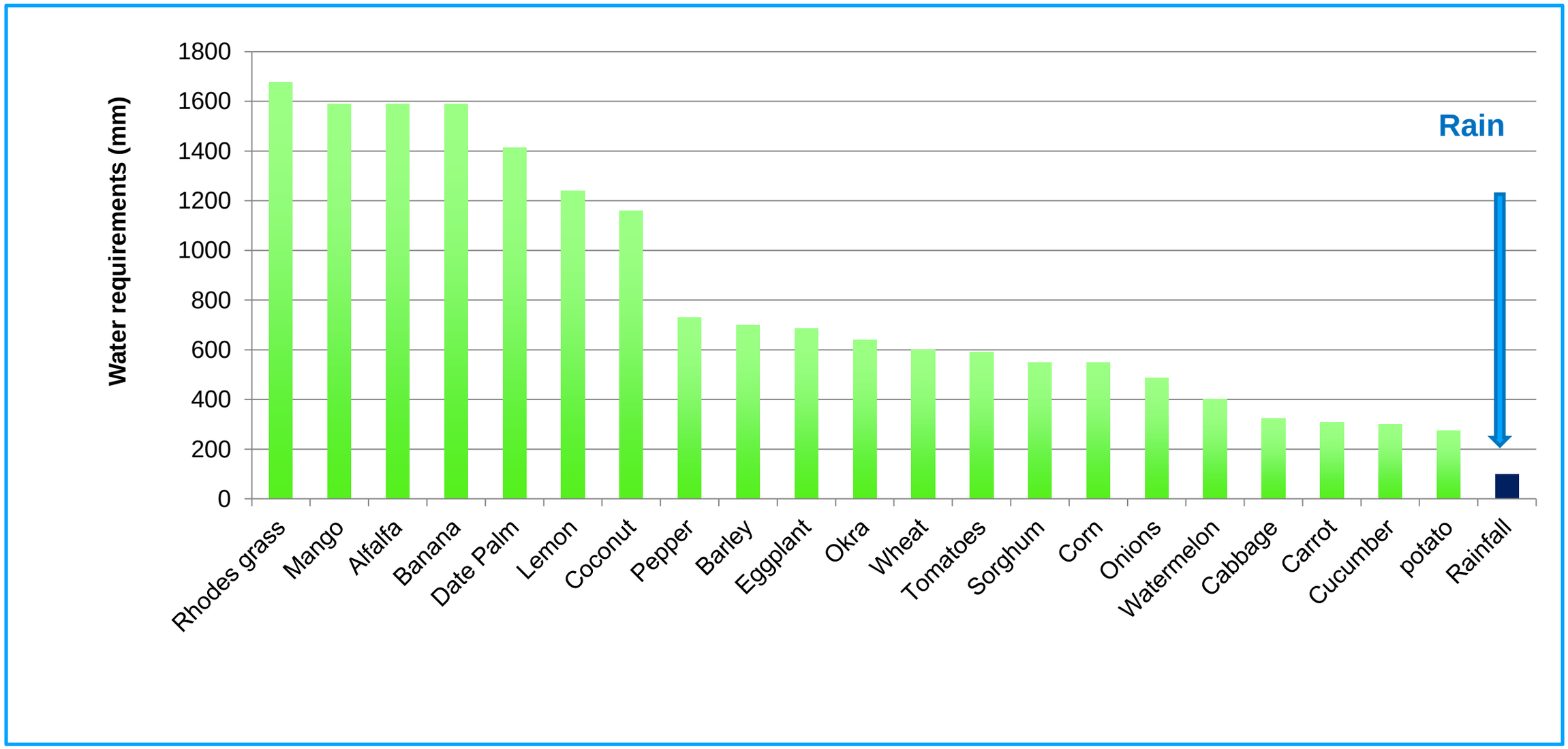
Climate

- **Evapotranspiration**

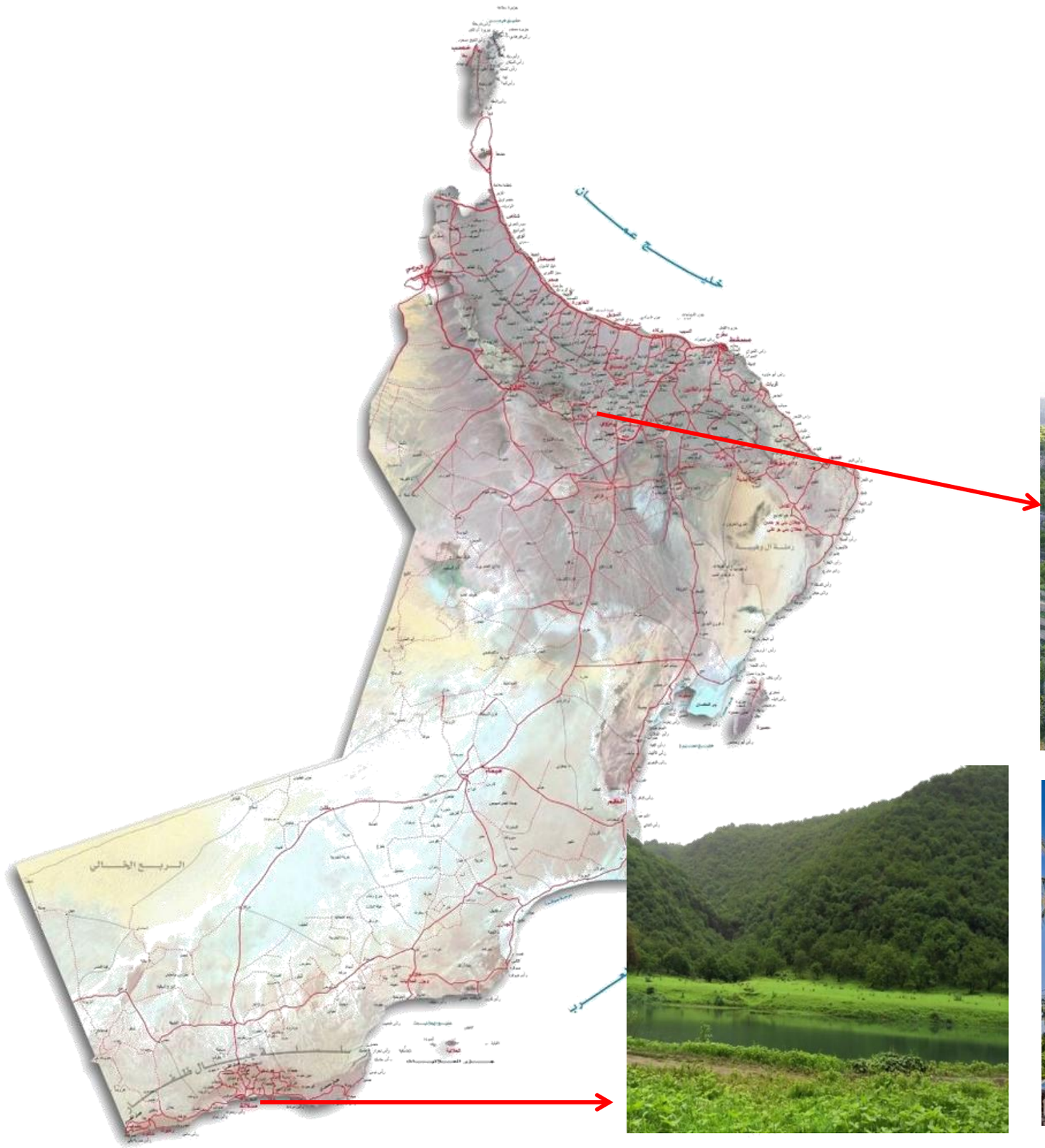


Climate and Agriculture

- **Not rainfed Agriculture /not -supplementary**
- **Agriculture production depends on irrigation form groundwater / Aflaj**
- **Crop water requirement is very high**



Agro-climatic zone in Oman



Economic challenges

- Increasing global and regional insecurity
- Instability in international markets
- Depletion of oil and gas reserves
- 80% of the farmers are not depending on farm income.
- 84% of the holdings are small (less than 0.84 ha) with Low income and represent 11.7% of the total agriculture area.
- Land use change
- In addition to incentive (subsidy and loan)

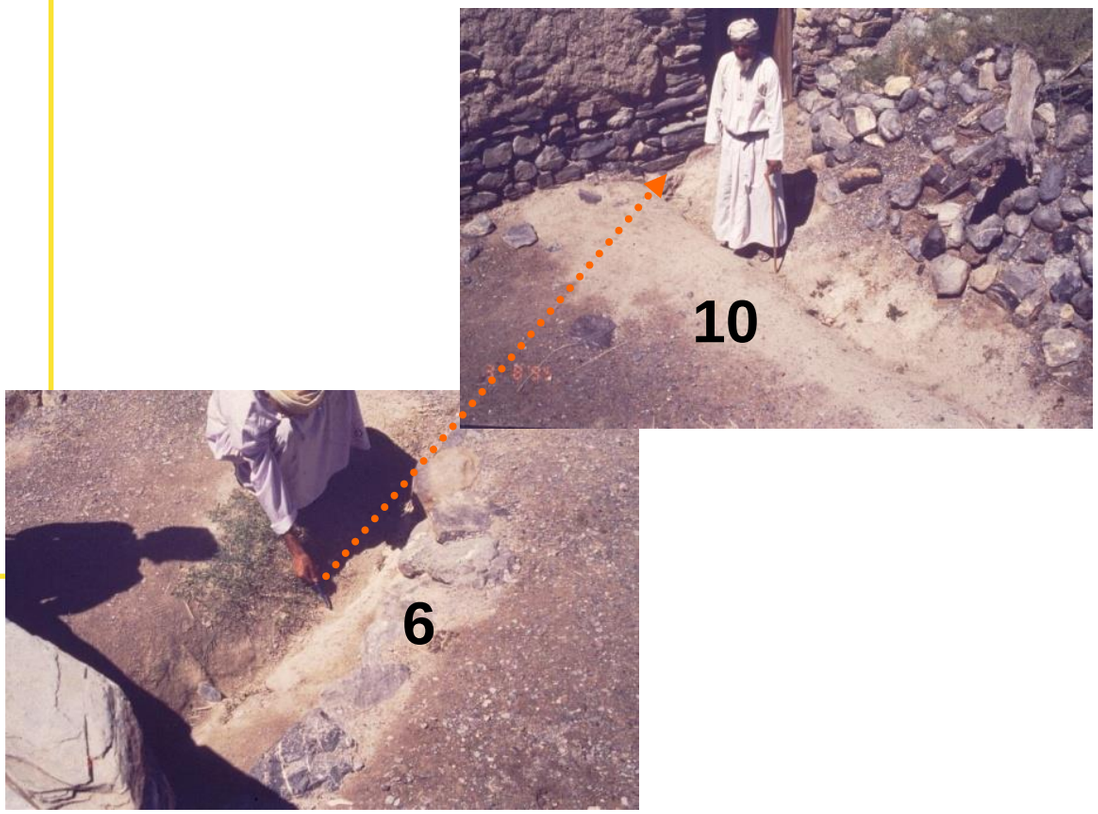
Social challenges

- 30% of the Omani population are traditional farmers
- Immigration from village to town and from farming to other sort of living
- Weekend farms, relaxation, or rented to expatriates
- 90 % of the hands on farm work is done by inexperienced expatriate work force.
- The most of them can not read or write.
- No training for labourers

Problems with tradition system for irrigation scheduling

- The variation in the water share according to the rainy or dry season, day or night shift, and the traditional distribution system, reducing the certainty of the available water.

- **Society prospective to replace the tradition system with a new innovation system.**



Institutional and administrative challenges

- A number of Royal Decrees and Ministerial Decisions were issued to inaugurate and specify the duties of councils and authorities responsible for water resources sector.
- In order to protect and conserve water resources in the sultanate, number of Royal Decrees and Ministerial Decisions were issued with the aim of controlling the drilling of wells and the rate of water use as well as impeding the intrusion of saline water resulting from over abstraction.

Global Forum

Shaping the Future 2022

Föreningen Global Forum

Under the High-Patronage of

الجمعية العمانية للخدمات النفطية

Oman Society for Petroleum Services

THANK YOU!

بوصلة

العاصمة العربية الرقمية

Muscat Arab Digital Capital

2022

WATER AND HUMANITY