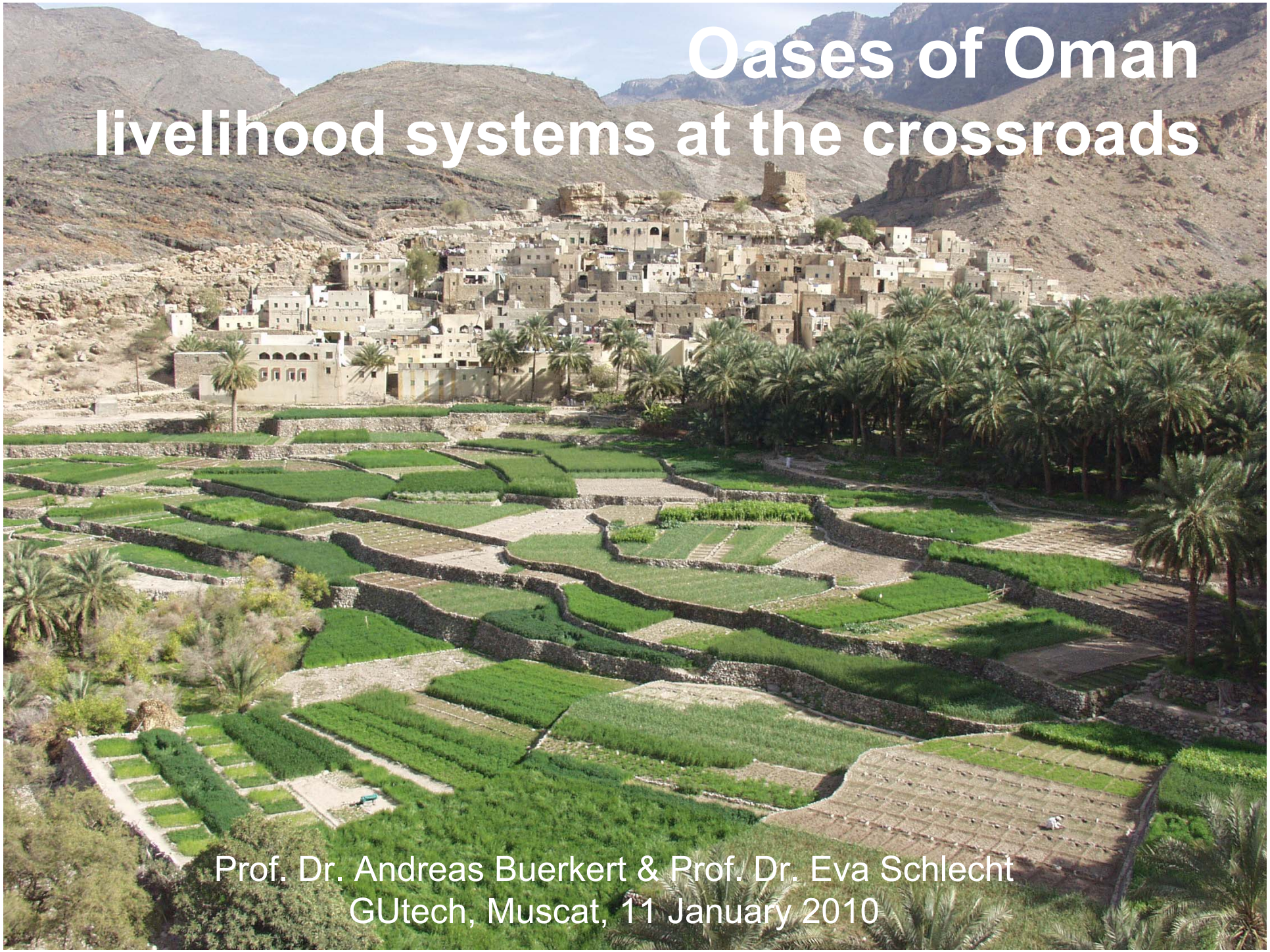
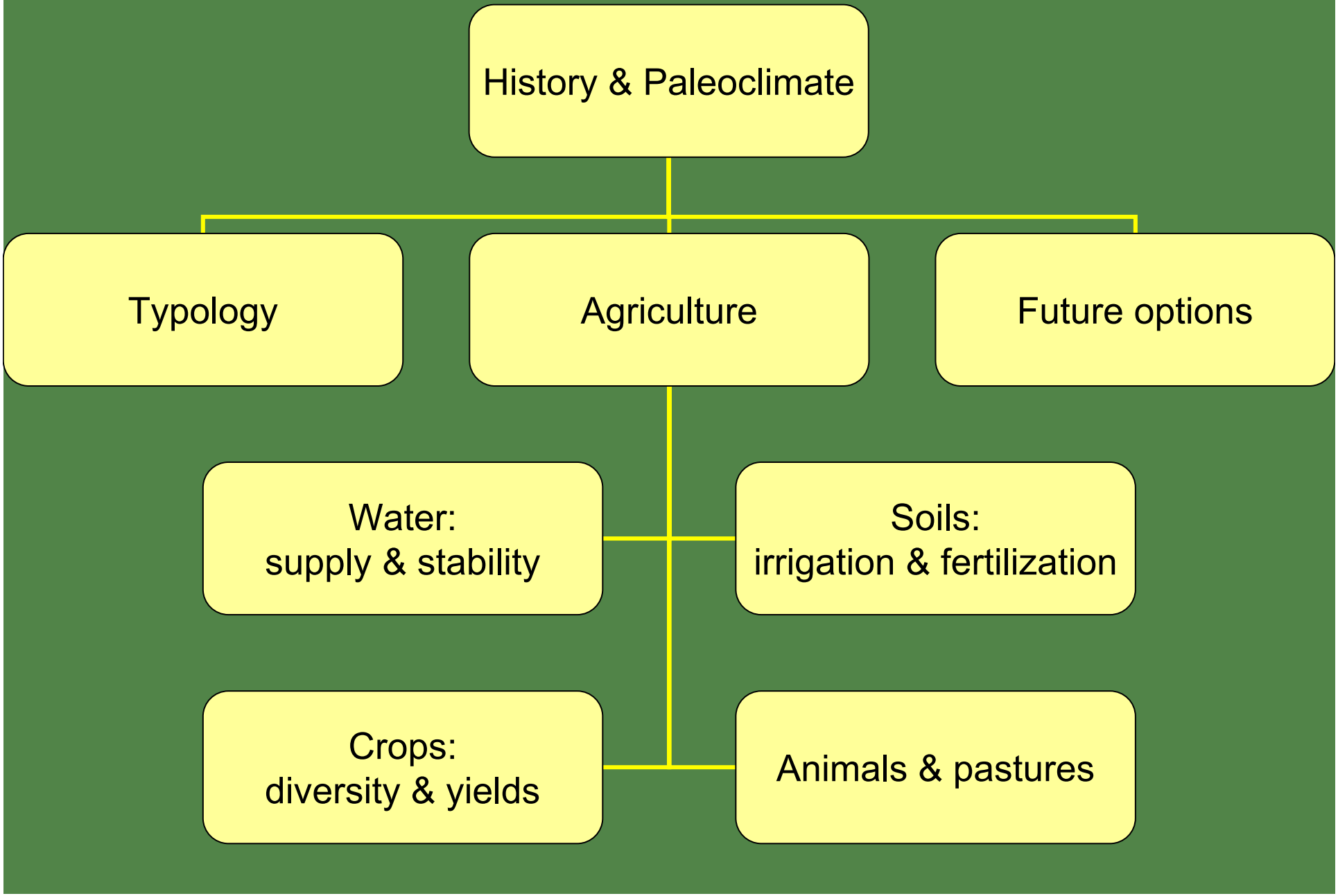


Oases of Oman
livelihood systems at the crossroads

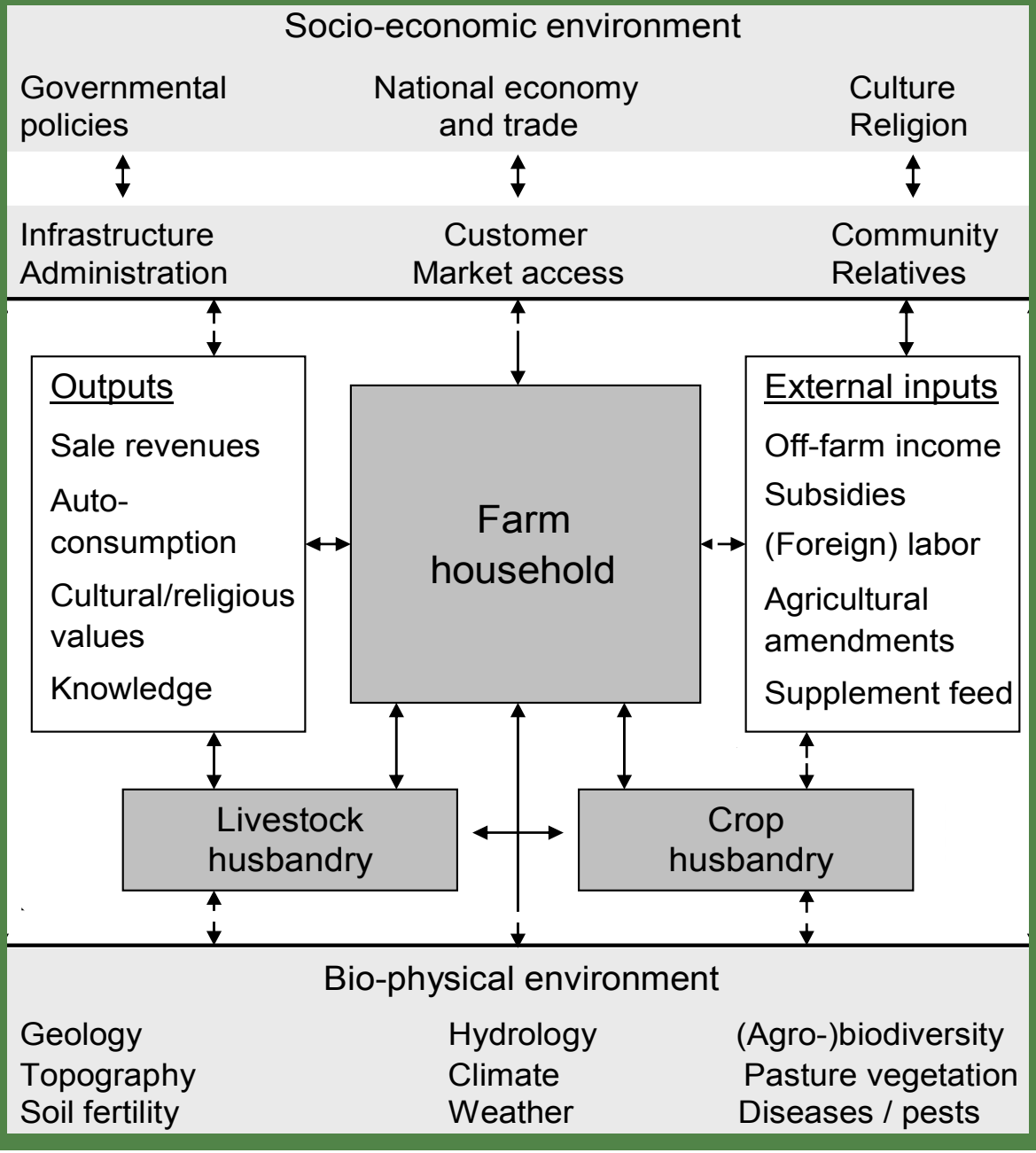
Prof. Dr. Andreas Buerkert & Prof. Dr. Eva Schlecht

GUtech, Muscat, 11 January 2010

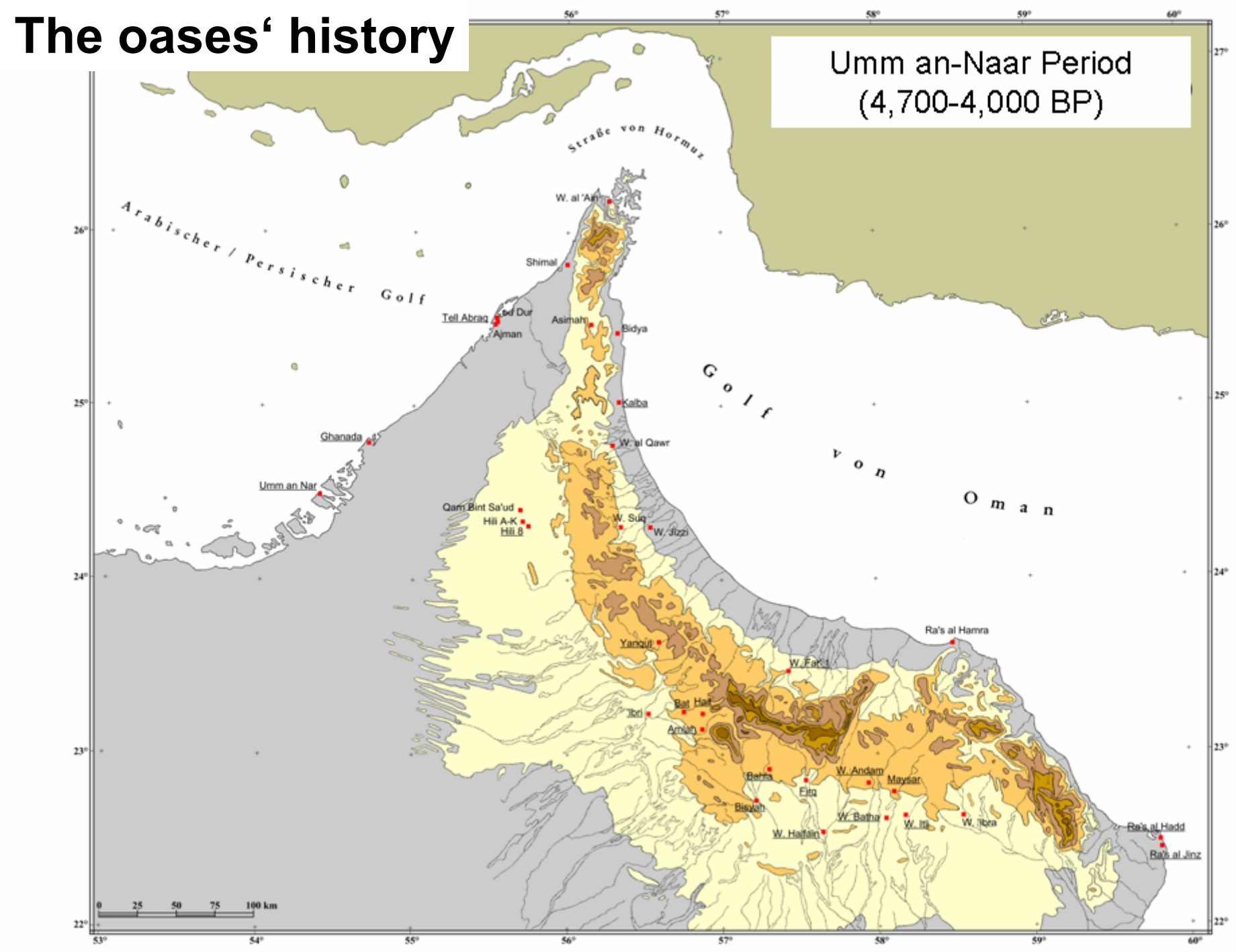
Livelihood systems at the crossroads



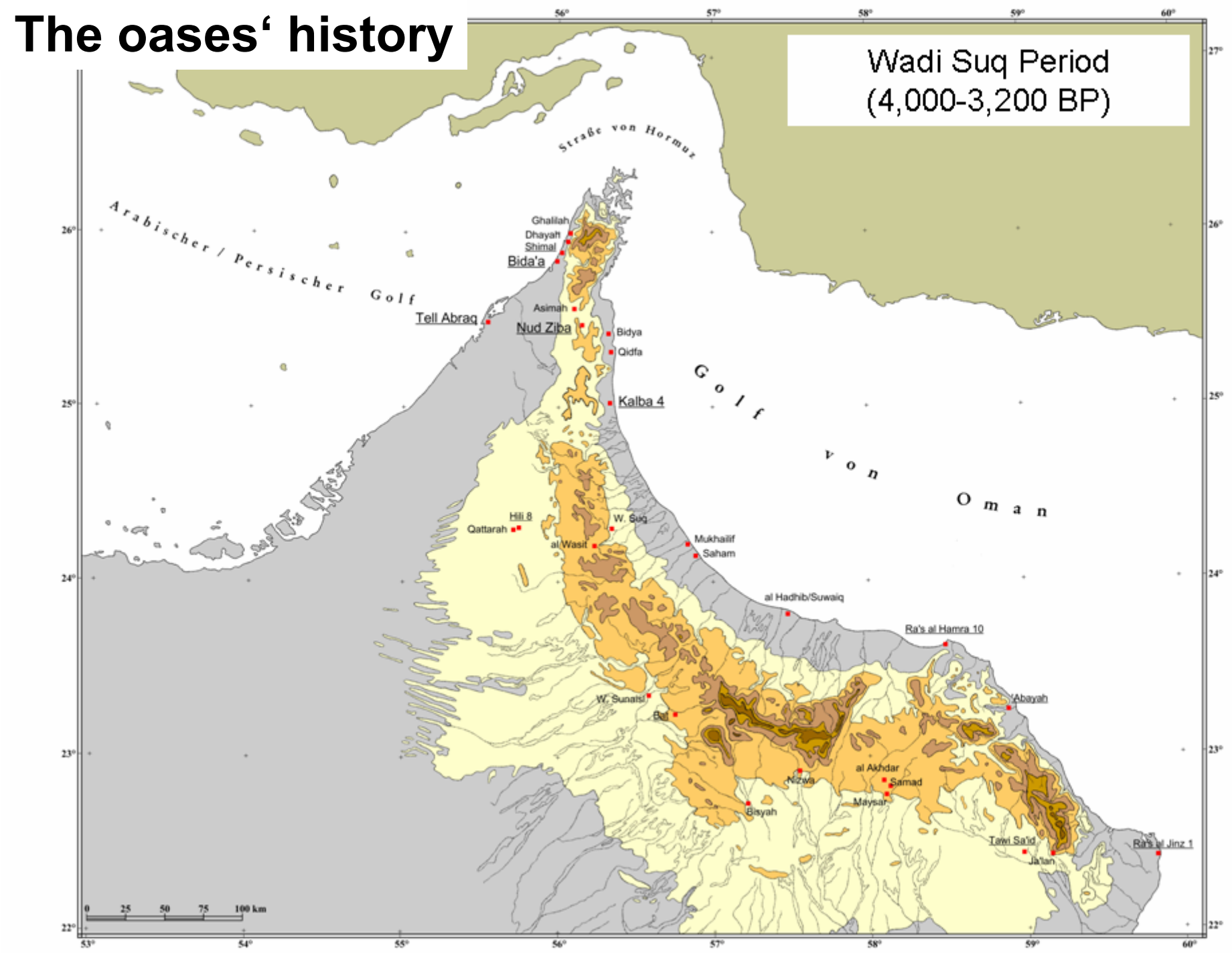
Oases are livelihood systems



The oases‘ history



The oases‘ history



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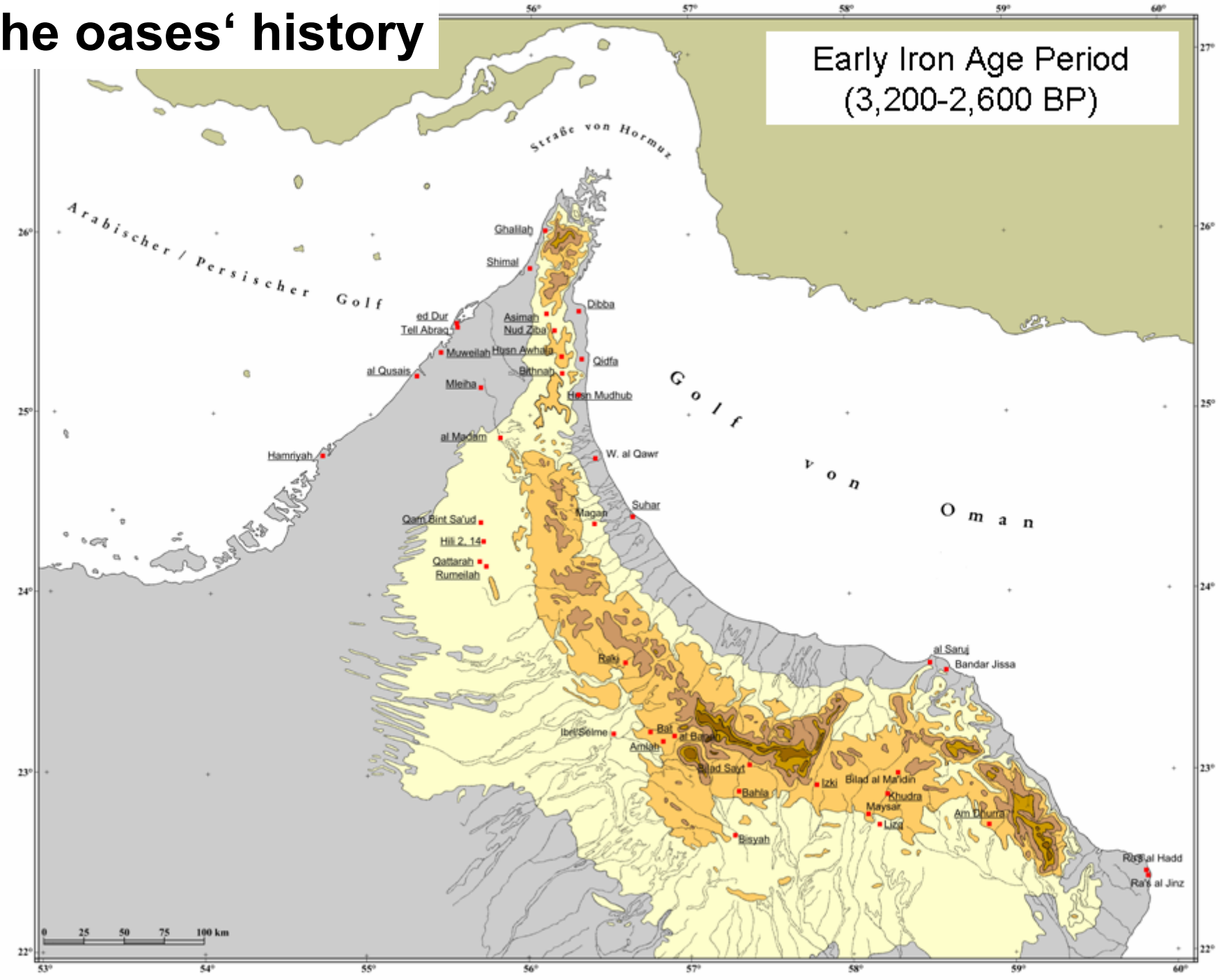
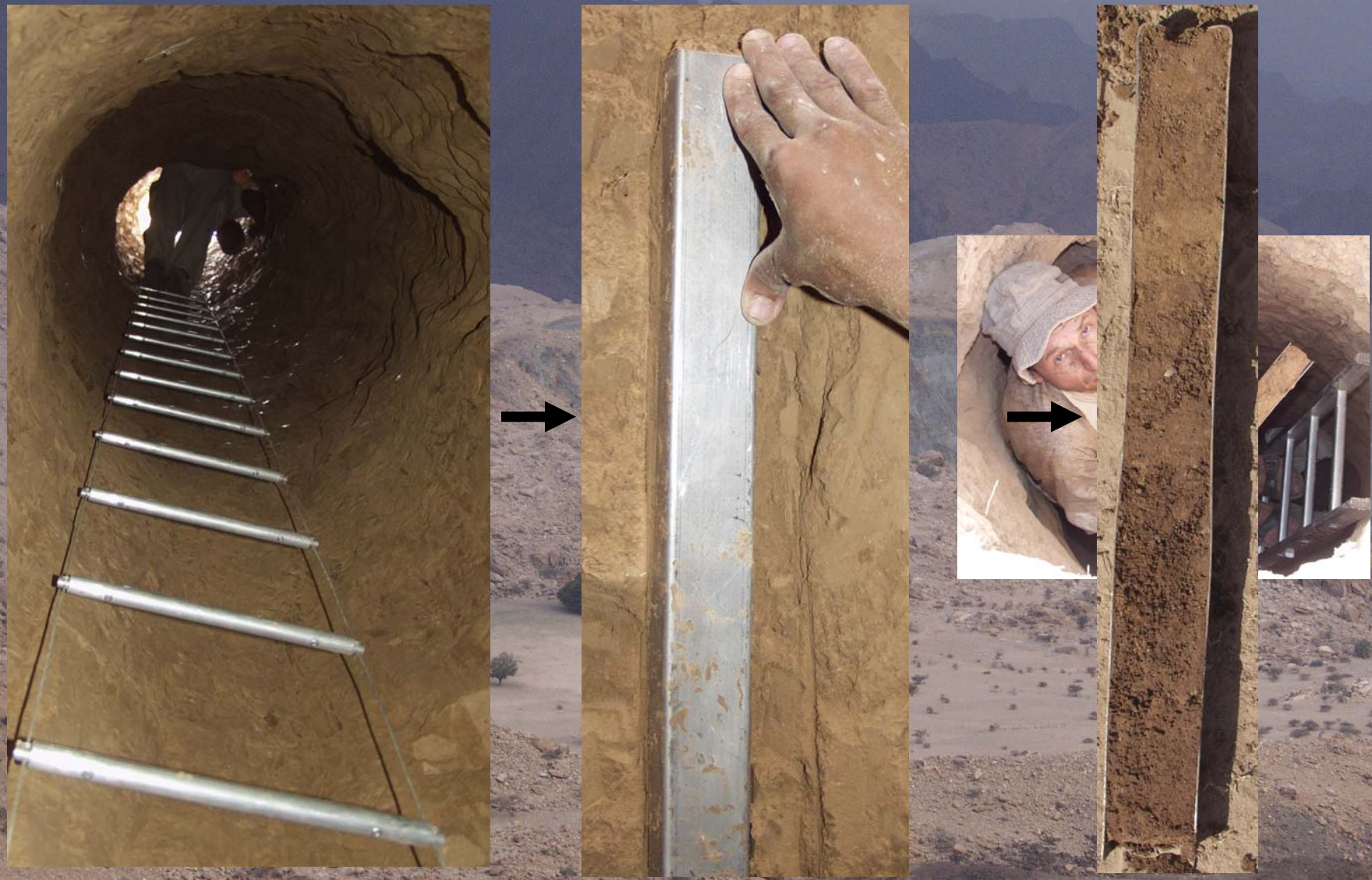
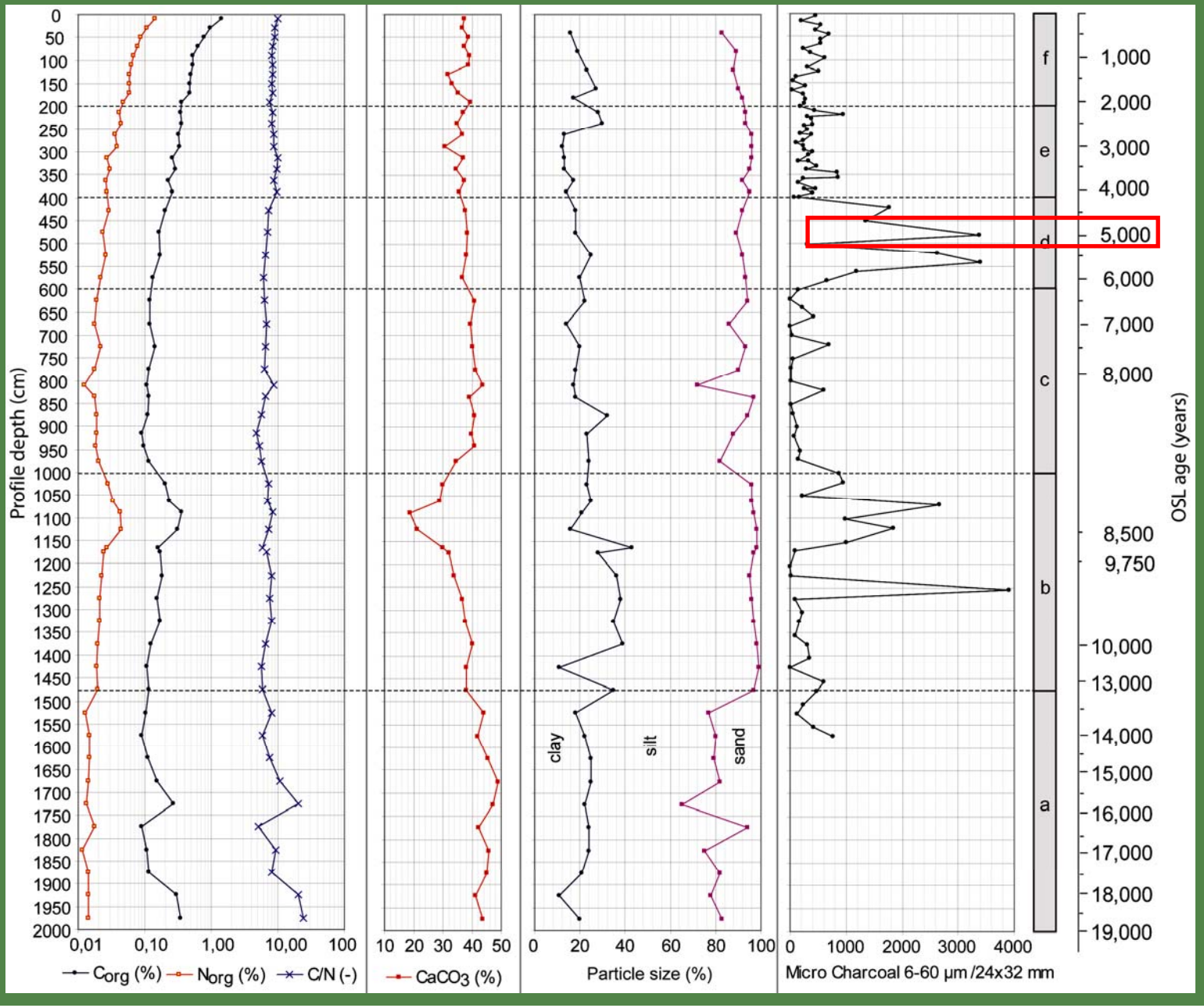


Are todays‘ oases remains of more moist conditions in the past?

Palaeoclimate reconstruction
(until 11,000 years ago)



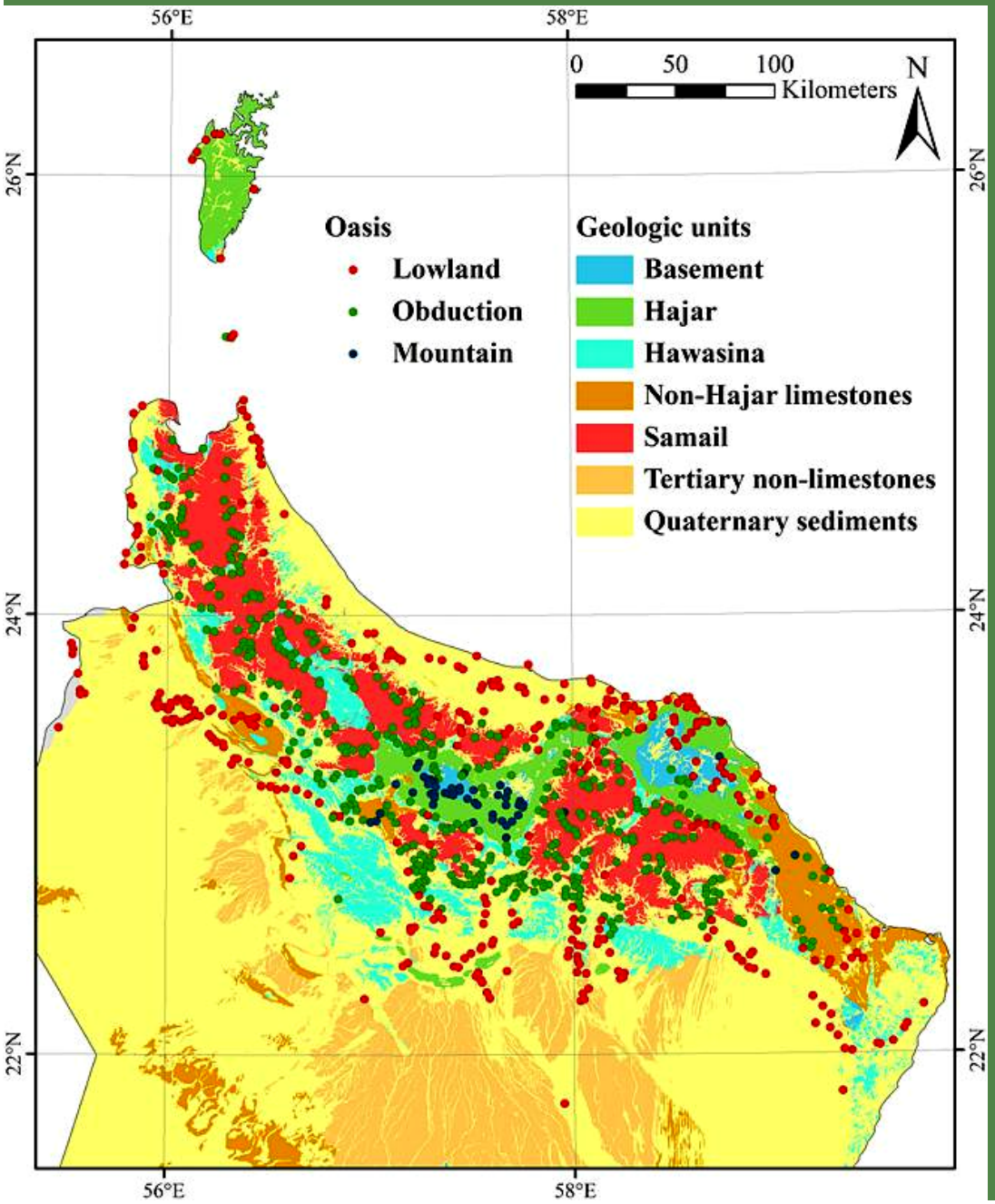
Organic C, mineral N, $CaCO_3$, particle size & micro charcoal distribution in the sediment profile



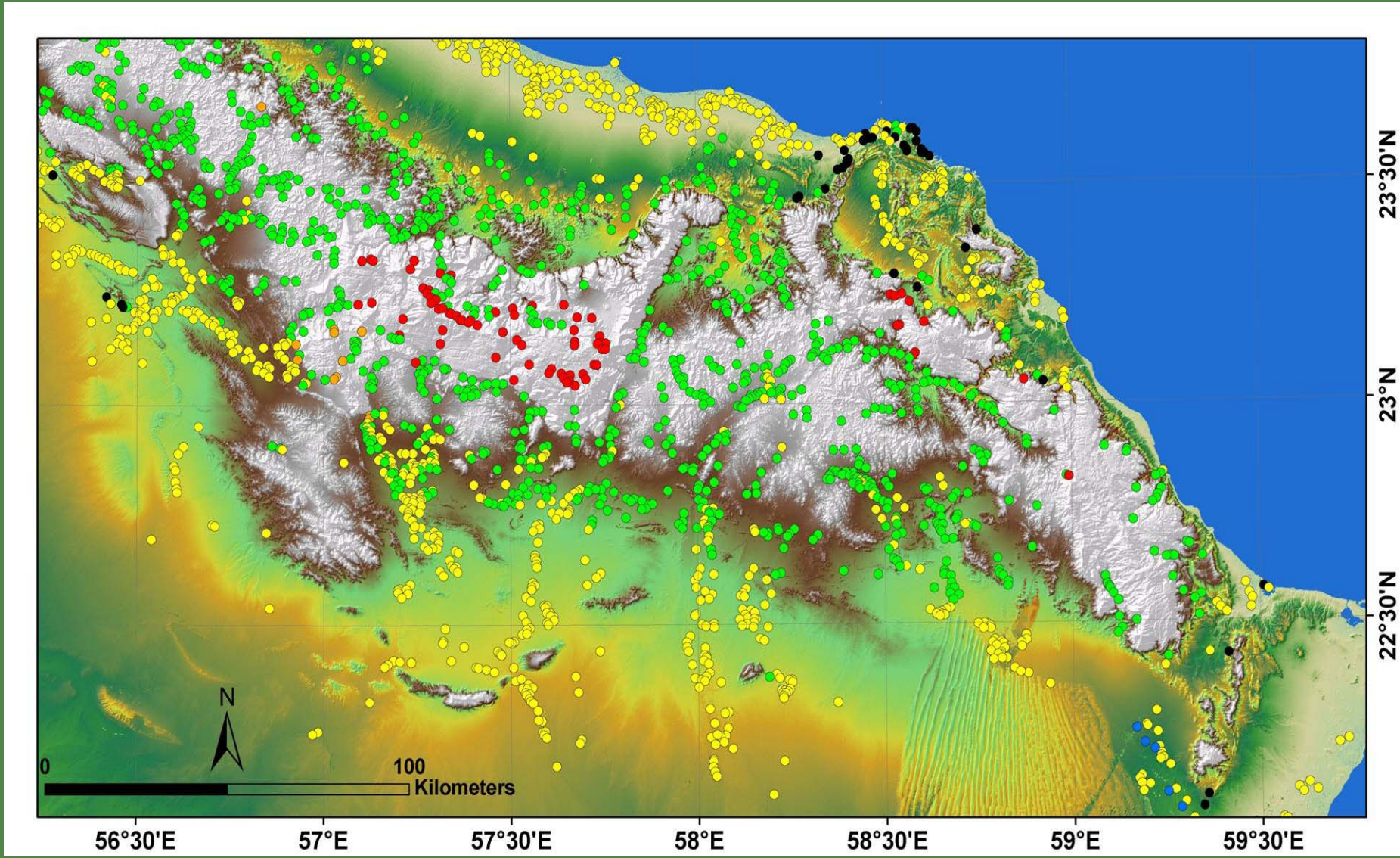
Hafit period

Types of Omani oases according to altitude & geological formation

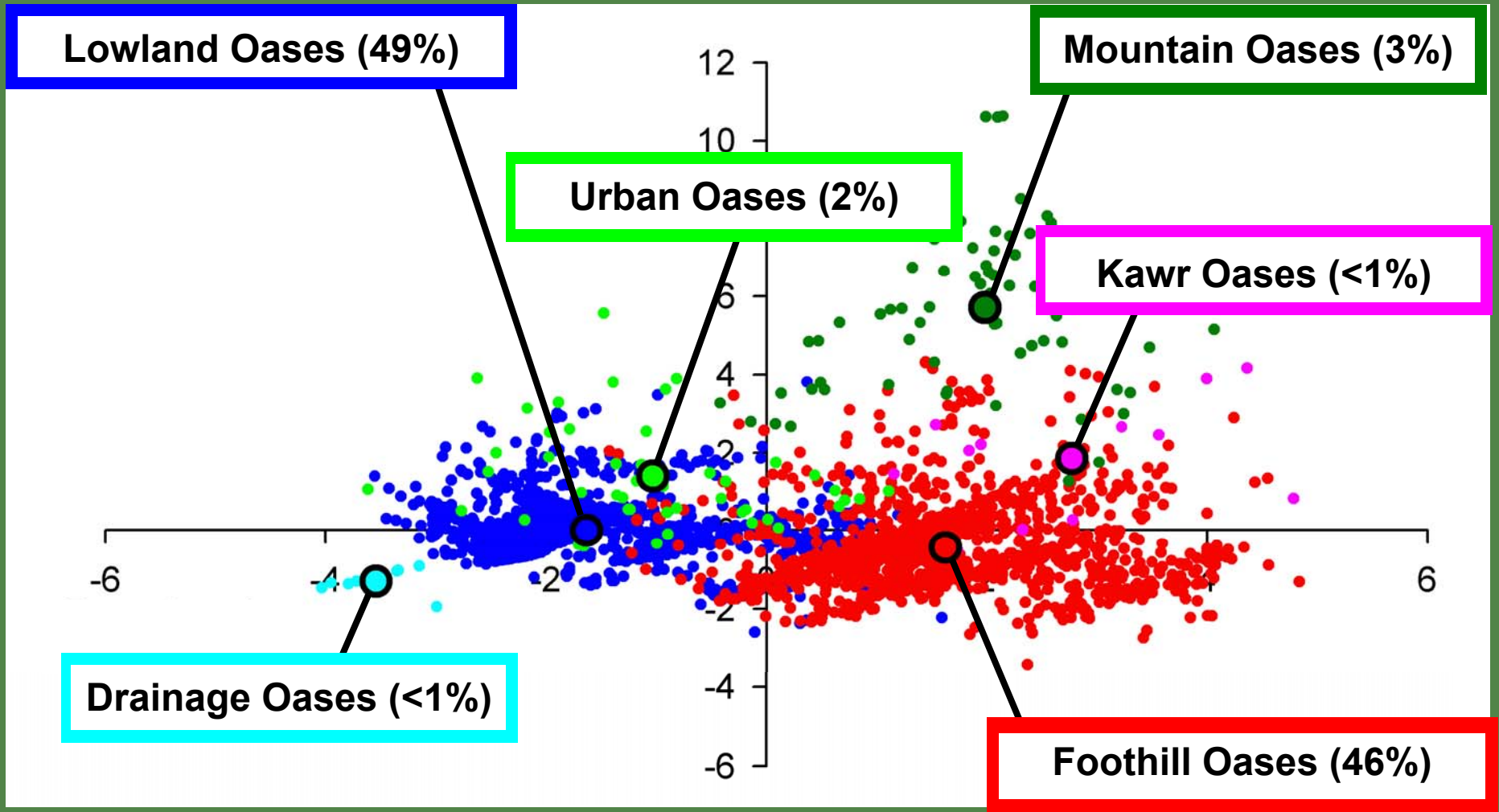
Luedeling & Buerkert. 2008. Remote Sensing of Environment (in press).



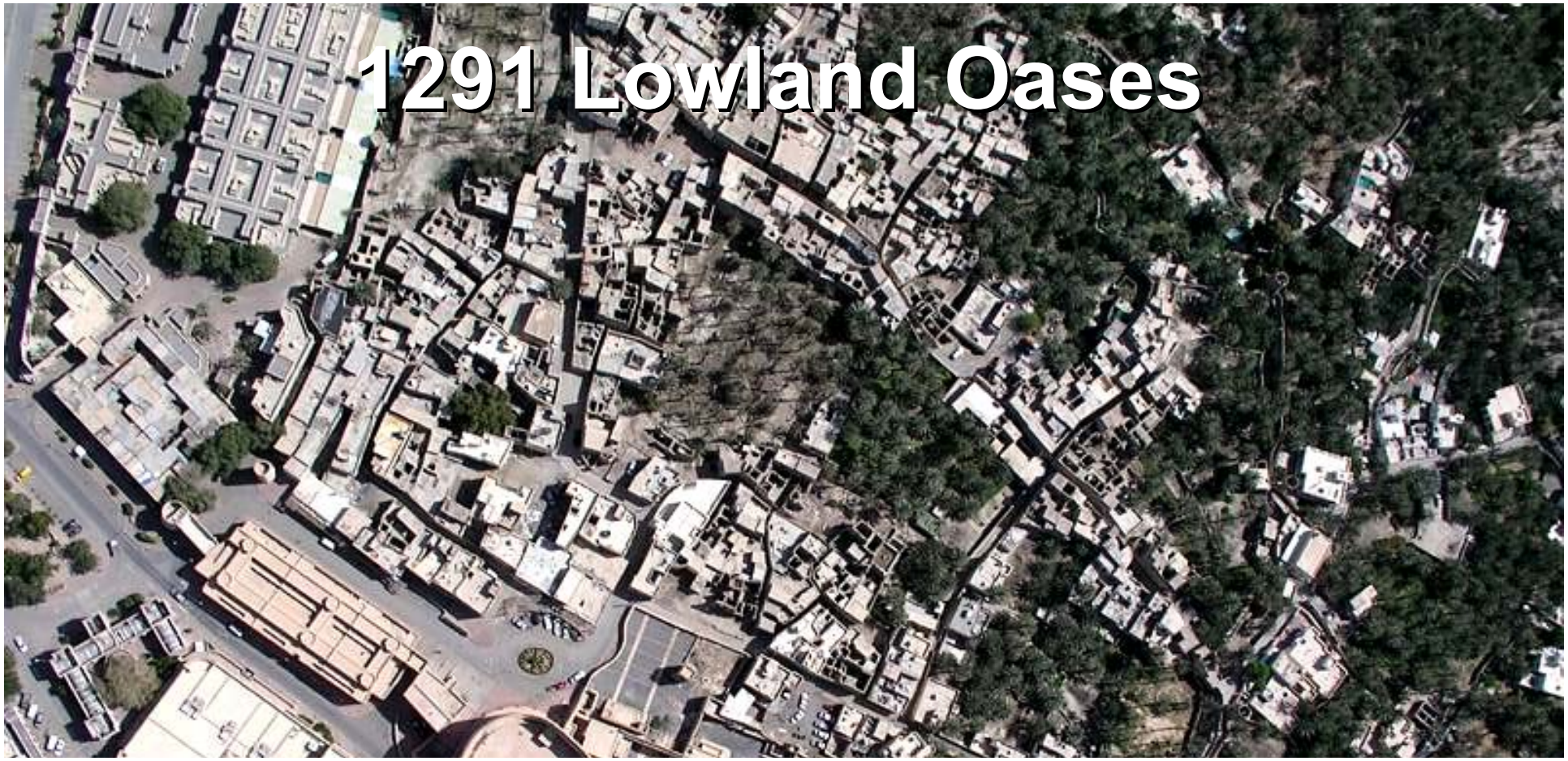
Six oases clusters

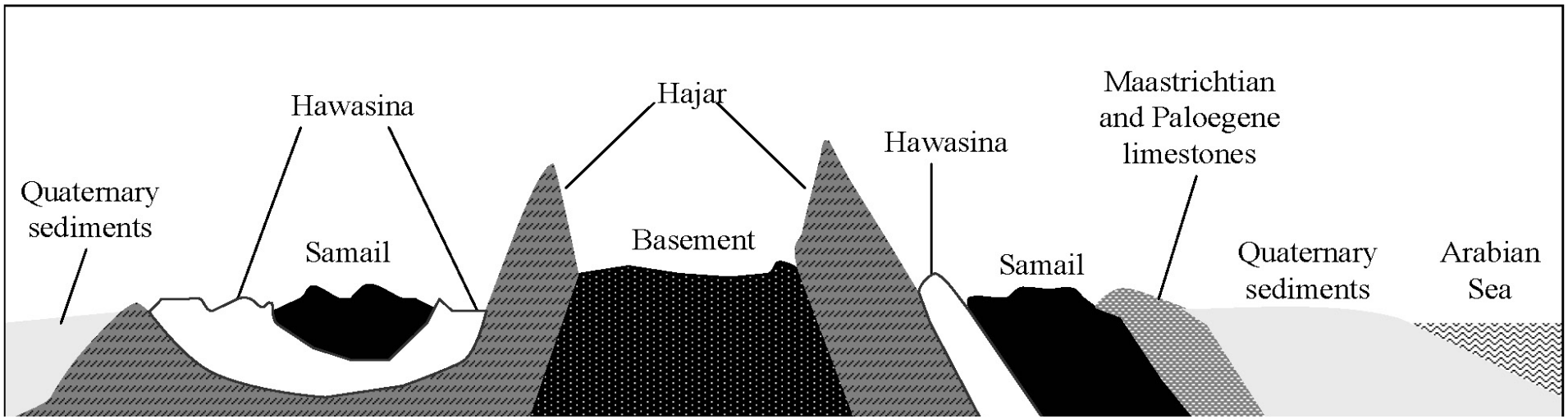


Six oases clusters

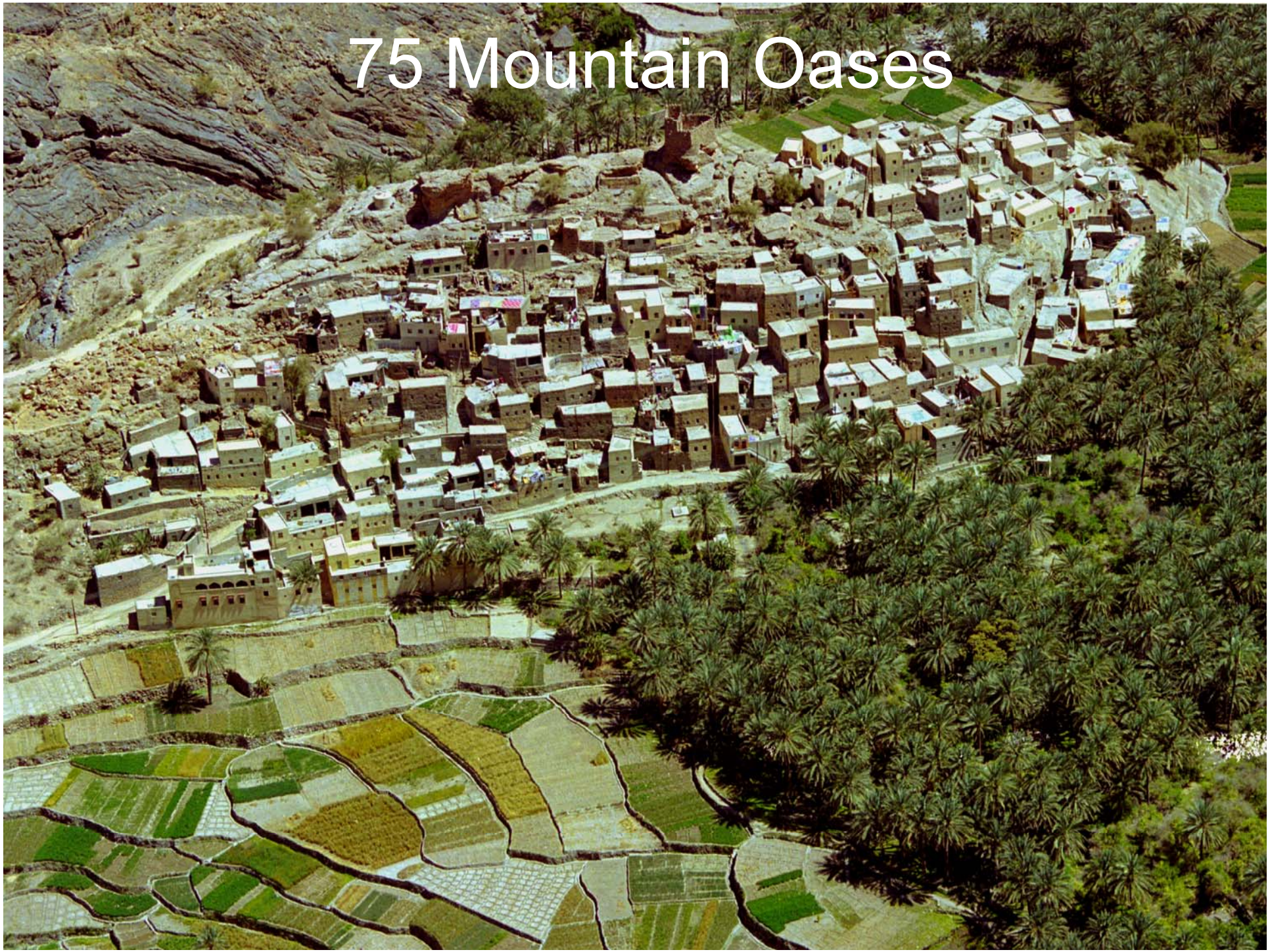


1291 Lowland Oases

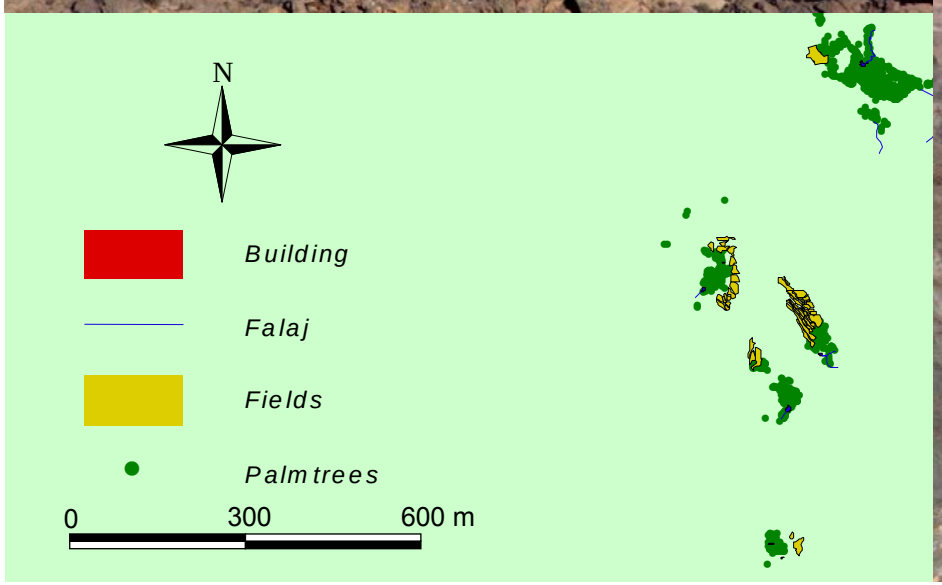




1231 Foothill Oases

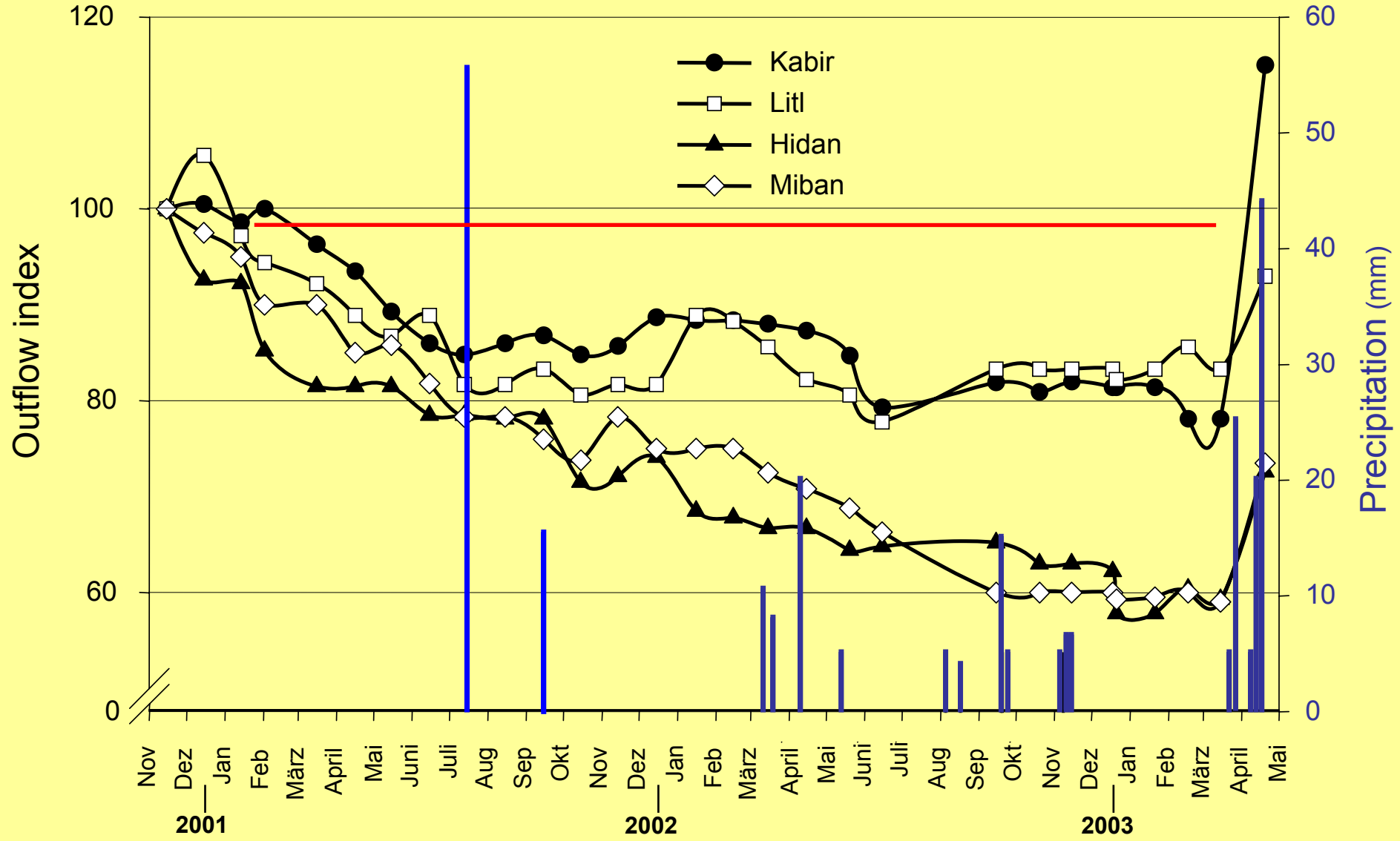

75 Mountain Oases

Structural typology of mountain oases

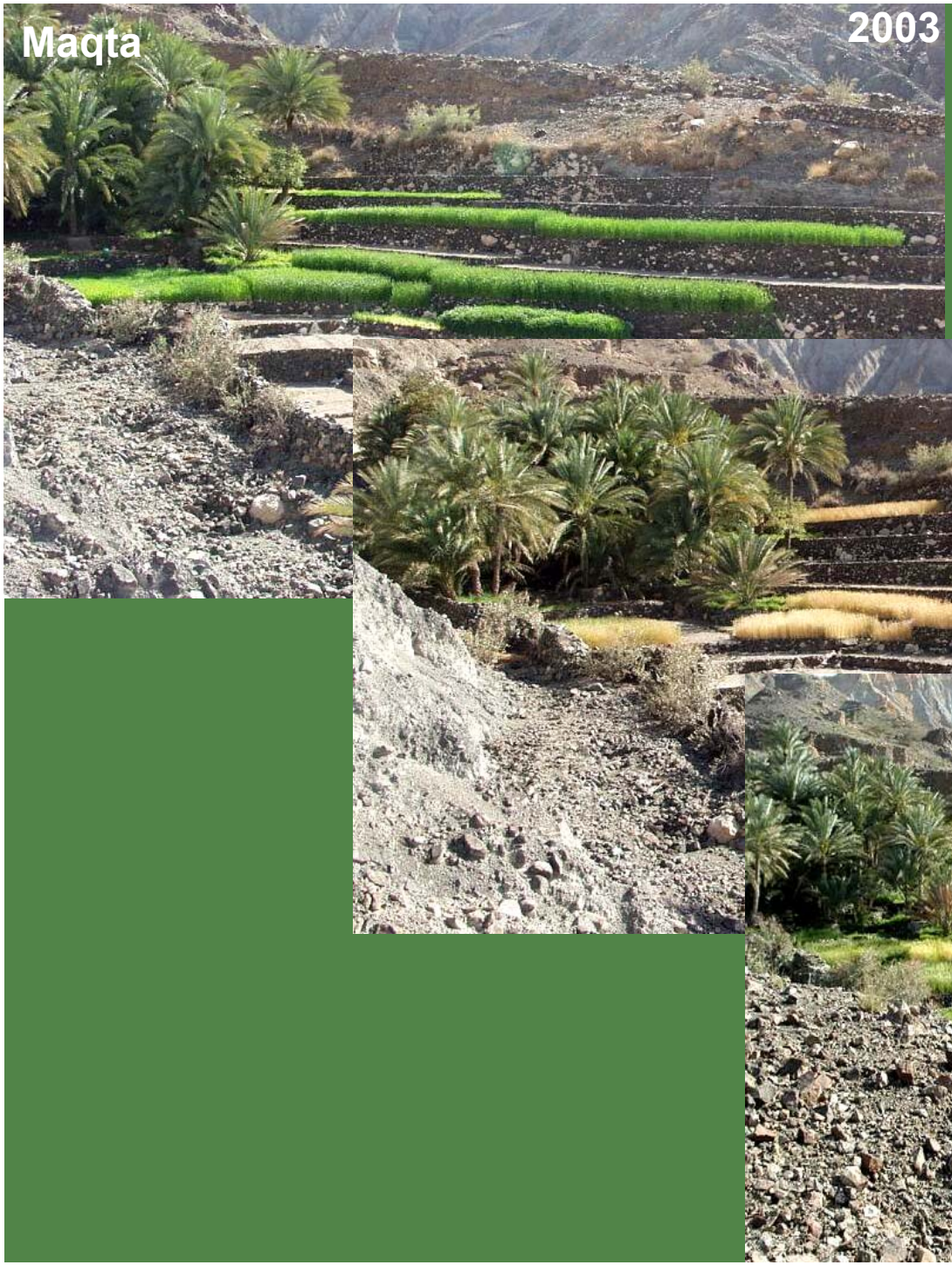


Preconditions for oases agriculture: water

Precipitation & outflow of the main *aflaj* at Balad Seet during a pronounced drought period



Coping with water scarcity




Increased water use
outside agriculture

Preconditions for oases agriculture: crops

The agricultural crops

Discovery of 6 new *T. aestivum* & 4 new T. *durum varieties*

T. aestivum var. *baladsetense*

T. aestivum var. *maqtaense*

T. aestivum var. *sedabense*

T. aestivum convar. *rigid-compactum* var. *omanense*

T. aestivum var. *sedayriense*

T. aestivum var. *ibreense*

T. durum var. *mahsinense*

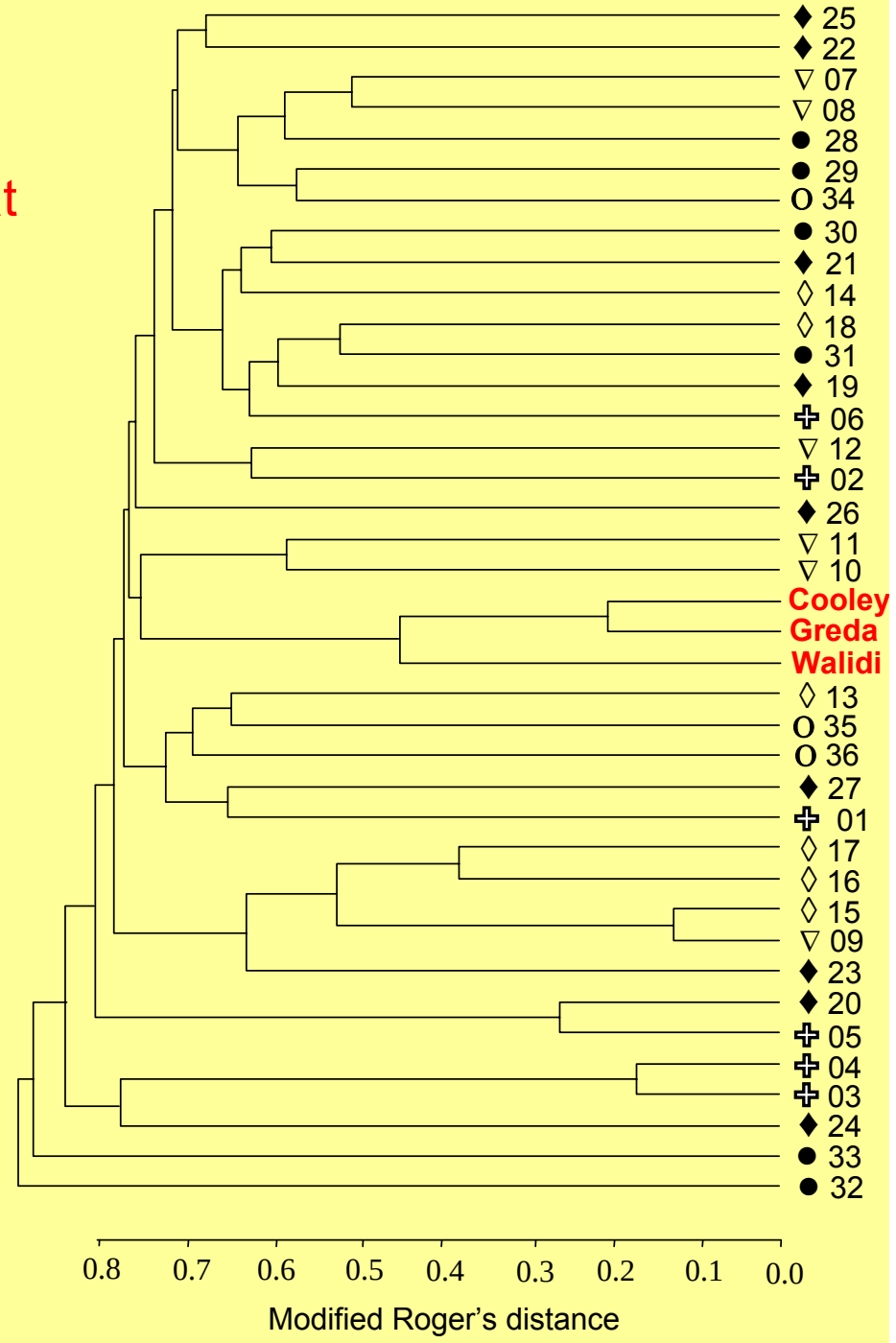
T. aethiopicum var. *hajirense*

T. durum var. *dense-menelikii (sedarenense)*

T. var. nov.

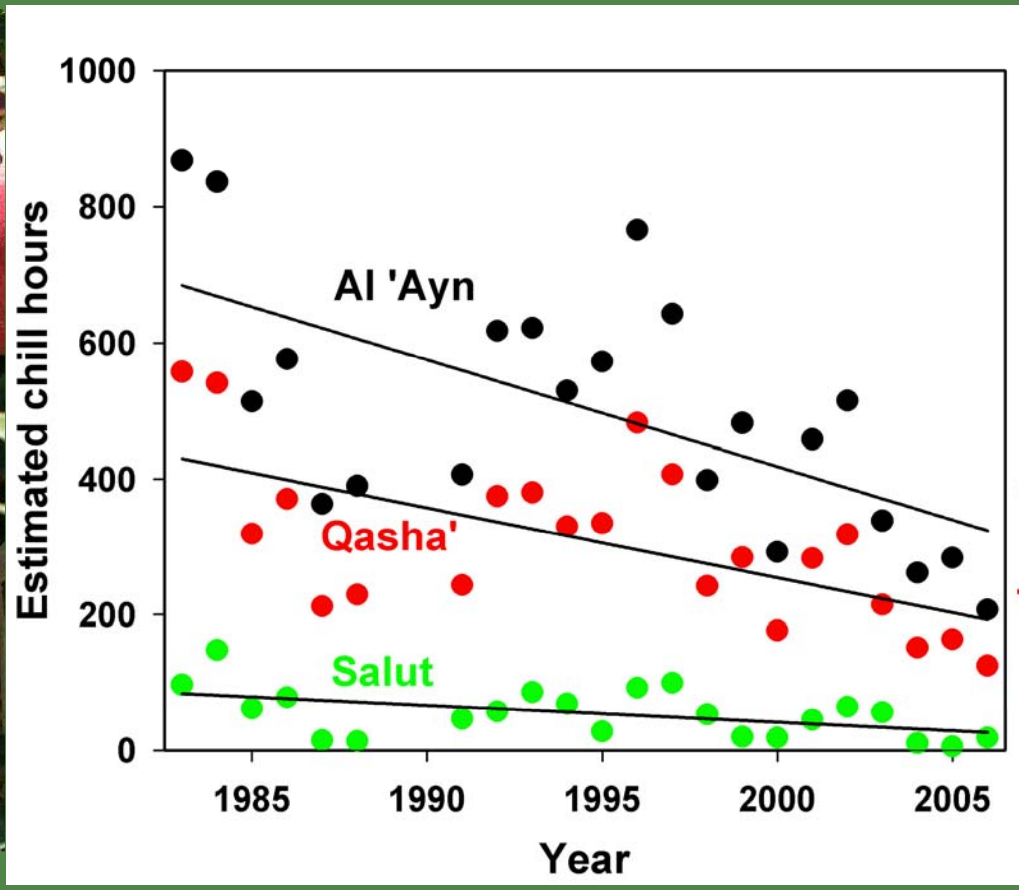
Molecular genetics of Omani wheat

Dendrogram of three Omani bread wheat landraces and 36 other landraces from West Europe (◊), Turkey (♦), Africa (✙), Central America (●), South America (O) and Asia (∇)




typical ABB type
AAA type
December 2003
January 2007

Climate change affects high altitude fruit crops



Pomegranates, apricots, peaches, walnuts

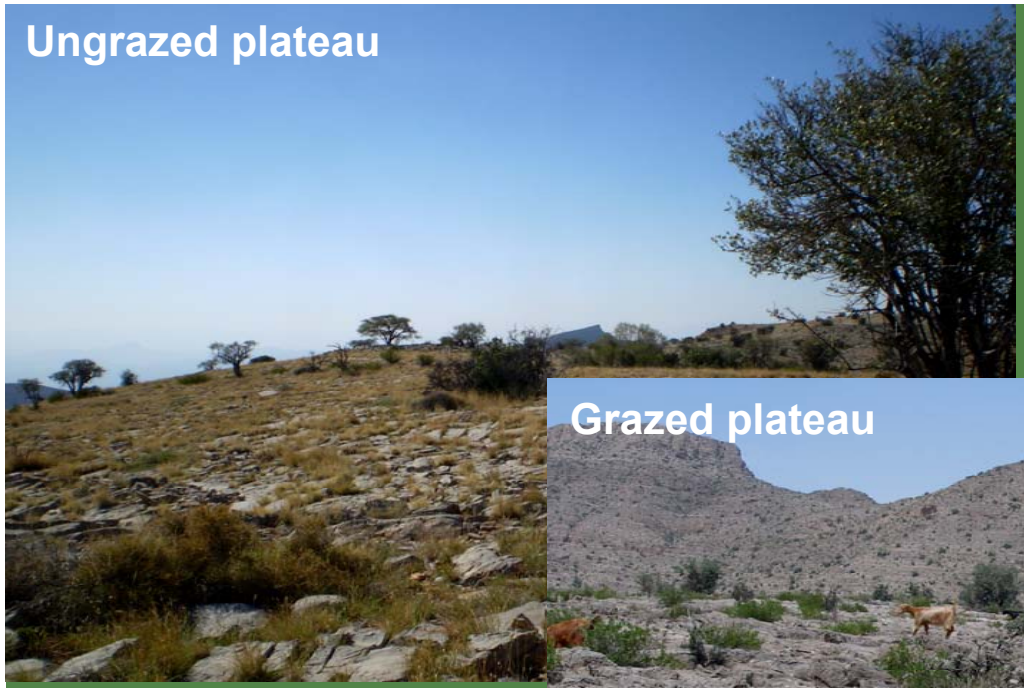

m
0.2
0.4
0.6
0.8
1.0
1.2
1.4

Partial oasis nutrient balance at Balad Seet

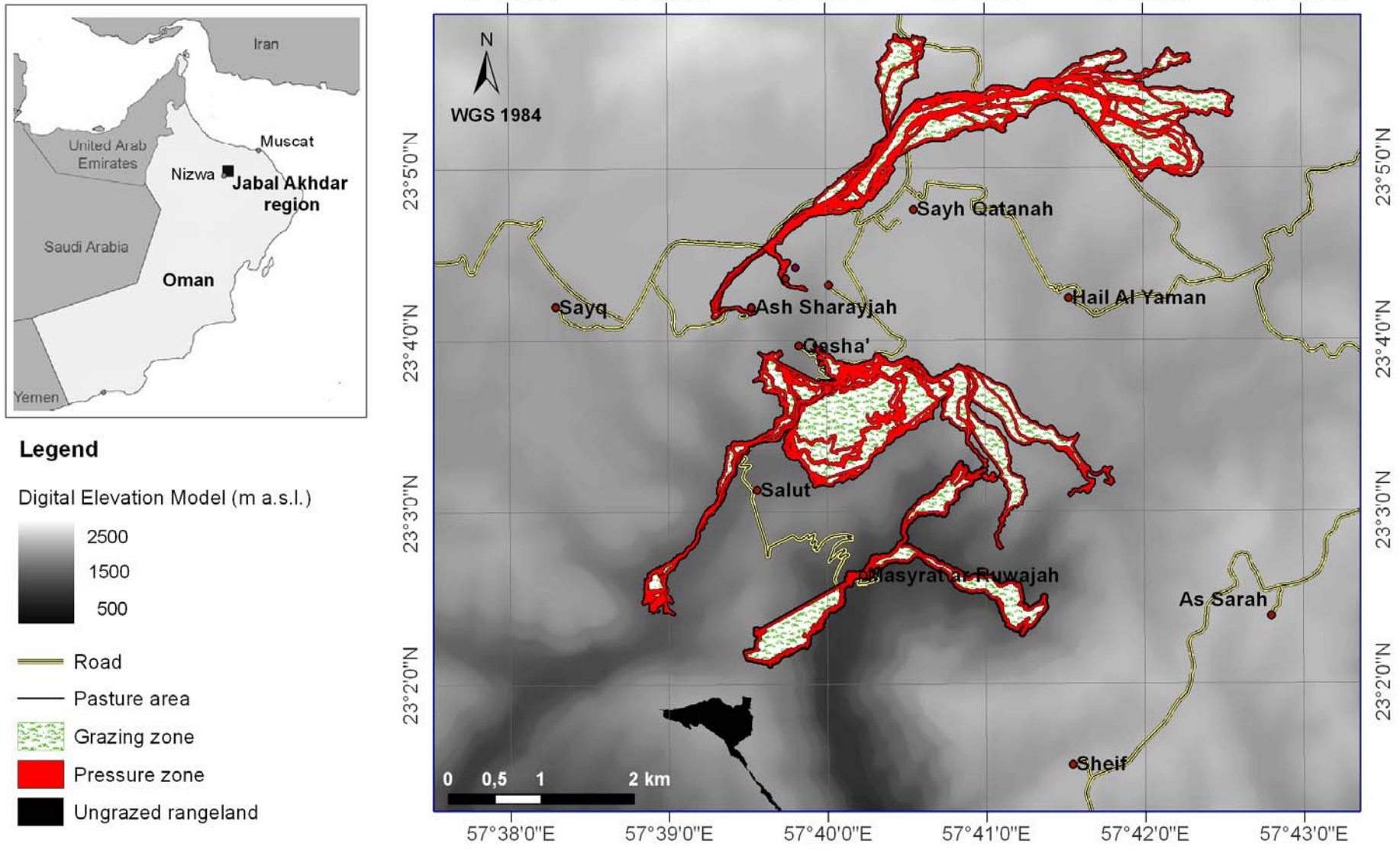
Landuse System	Source / Process	Amount (kg ha^{-1} yr^{-1})†			Balance (kg yr^{-1})†		
	Balance	N	P	K	N	P	K
Palm groves (8.8 ha)	Synthetic fertilizer	59	1.8	4	519	15.8	35
	Animal manure + ashes	141	8.0	289	1241	70.4	2543
	Irrigation water	10	5.2	17	88	45.8	150
	Human faeces	170	37.0	50	1496	325.6	440
	Date palm harvest (dates+stems+leaves)	-63	-12.7	-176	-554	-111.8	-1549
	Harvested understory fodder	-14	-1.5	-11	-123	-15.8	-97
	Balance	**303**	**37.8**	**173**	**2632**	**324.1**	**1469**
Oasis (13.4 ha)	**Total balance**	**244**	**37.4**	**142**	**3235**	**501.9**	**1855**

† Positive values indicate gains and negative ones losses

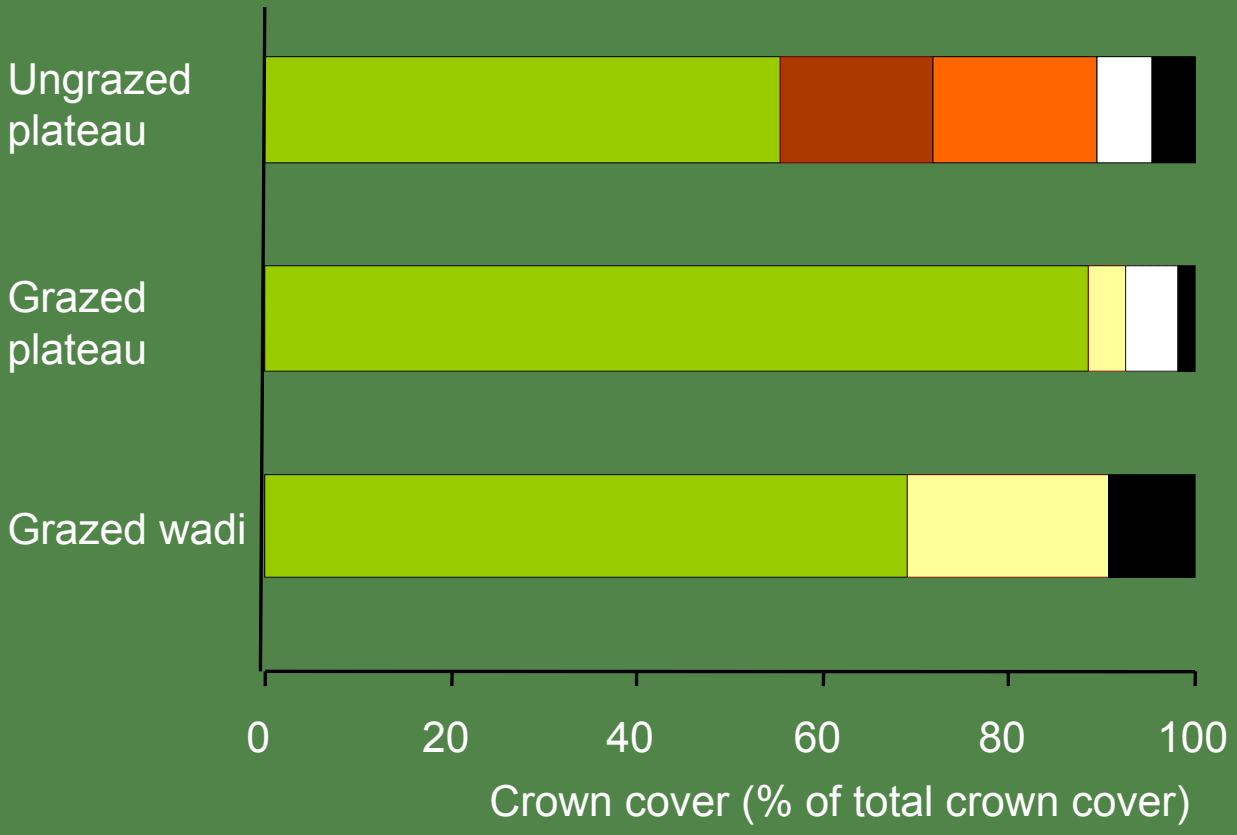
Preconditions for oases agriculture: pastures & animals



Goats' grazing itineraries



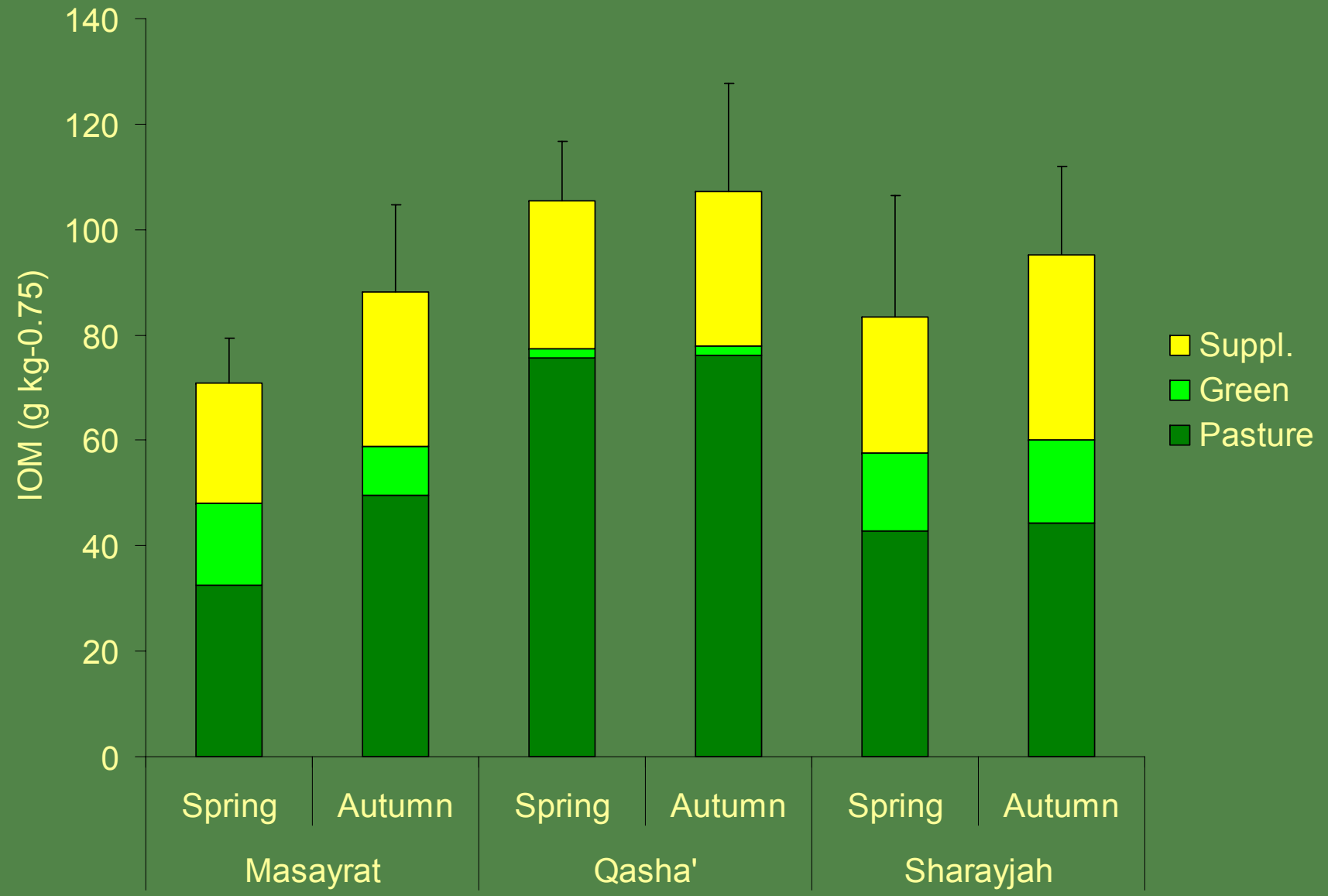
Relative crown cover of shrubs



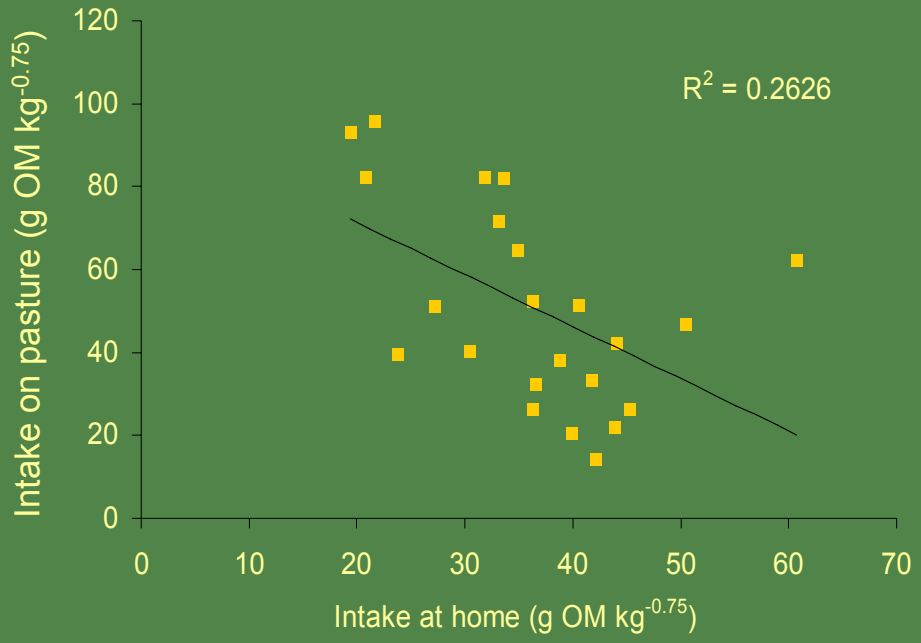
Biomass yield of grasses & dicots

		Ungrazed plateau	Grazed plateau	Grazed wadi
Observations	n	5	10	5
Bare ground	%	19	45	36
Herbaceous biomass	kg DM ha^{-1}	573	26	64

Goats' feed intake at pasture & home

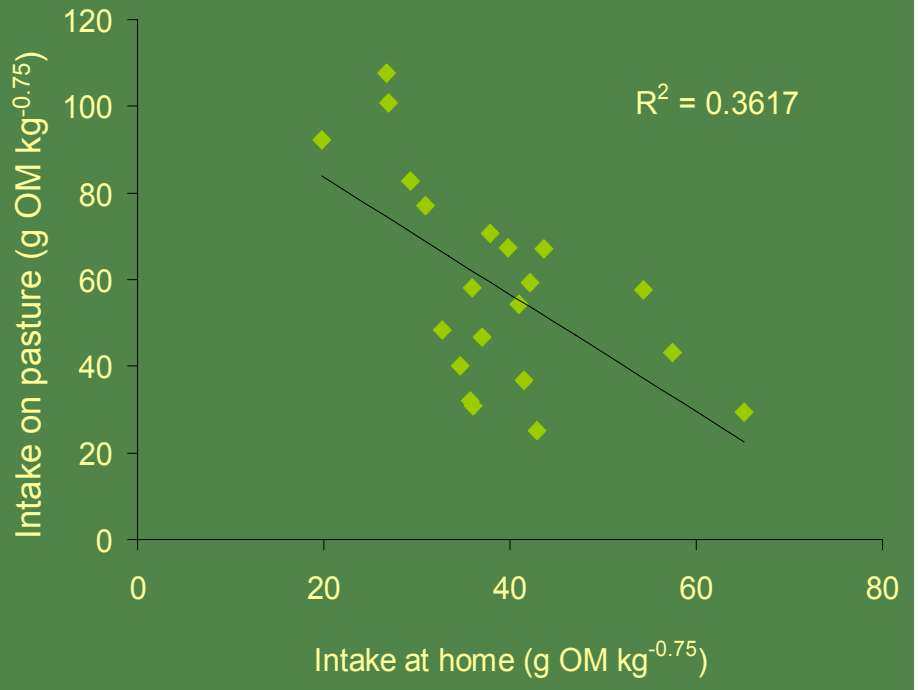


Correlation between intake at pasture & home



Spring

Autumn



The animals

Oases at the crossroads:
1. Settlement planning & adapted constructions


Oases at the crossroads:
2. Ecotourism

Oases at the crossroads: 3. Certification and branding of agricultural products