Status of Soil Information in Iraq

prof.dr. Ahmad S. Muhaimeed

soil Survey and management ,expertise

soil sciences and water resources

college of Agriculture

Baghdad University

Soil Survey Works in Iraq :

Before 1965 :-

- There was no any specialized office responsible for arrangement of soil survey work in Iraq.
- Most of soil survey works had been done by foreigner staff.
- Most of the works done for specific purposes (salinity, soil texture ,nutrient levels …..etc.)
- Soil survey works have been done using an old USA system to classify the soils.
- The most common work was done by Buringh ,1960 at reconnaissance level of soil survey with map units represent soil great group level.

After 1965 : -

- The state board for land reclamation was established to take the responsibility for the soil survey works.

- Soil taxonomy was used to classify the sols.

-Most of the soil survey works were done at detail level and map of 1/ 25 000 scale.

- About 35% of Iraq area was covered by this soil survey works.

SOILS OF IRAQ

-Iraqi soils show a wide variation in the degree of development.

-Soil development increases from the south to the northern part of Iraq due to the differences in the activity of soil formation factors.

Factors of Soil Formation :-

The dominant factors controlling soil formation in Iraq are :

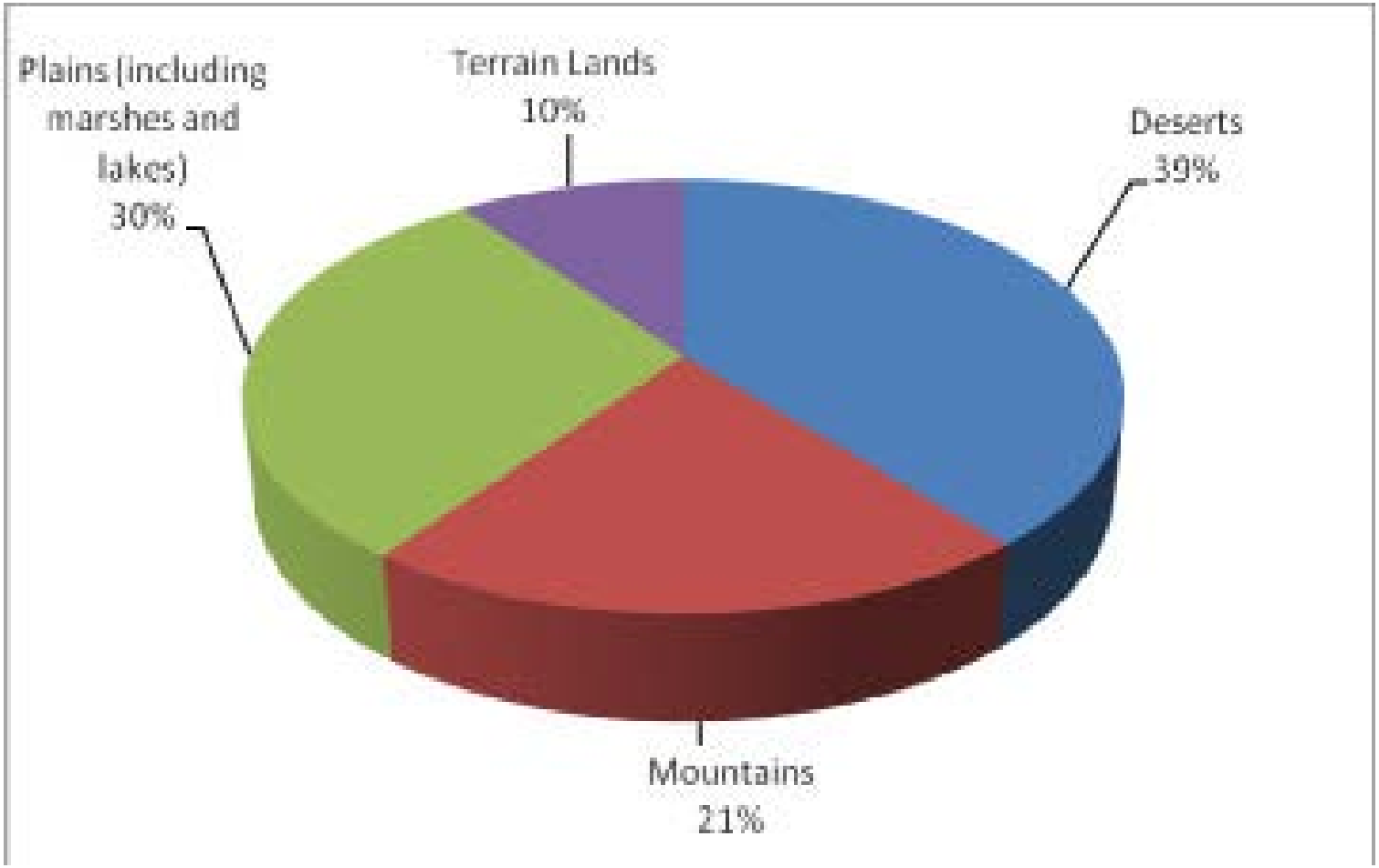
-parent materials : recent alluvium , calcareous or gypsiferrous .

- Climatic conditions ranging from dry to sub humid with mean annul precipitation of less than 100mm to more than 1000mm in northern region Iraq.

-Physiographic ranges from the Mountain in the northern to nearly flat plain in southern part.

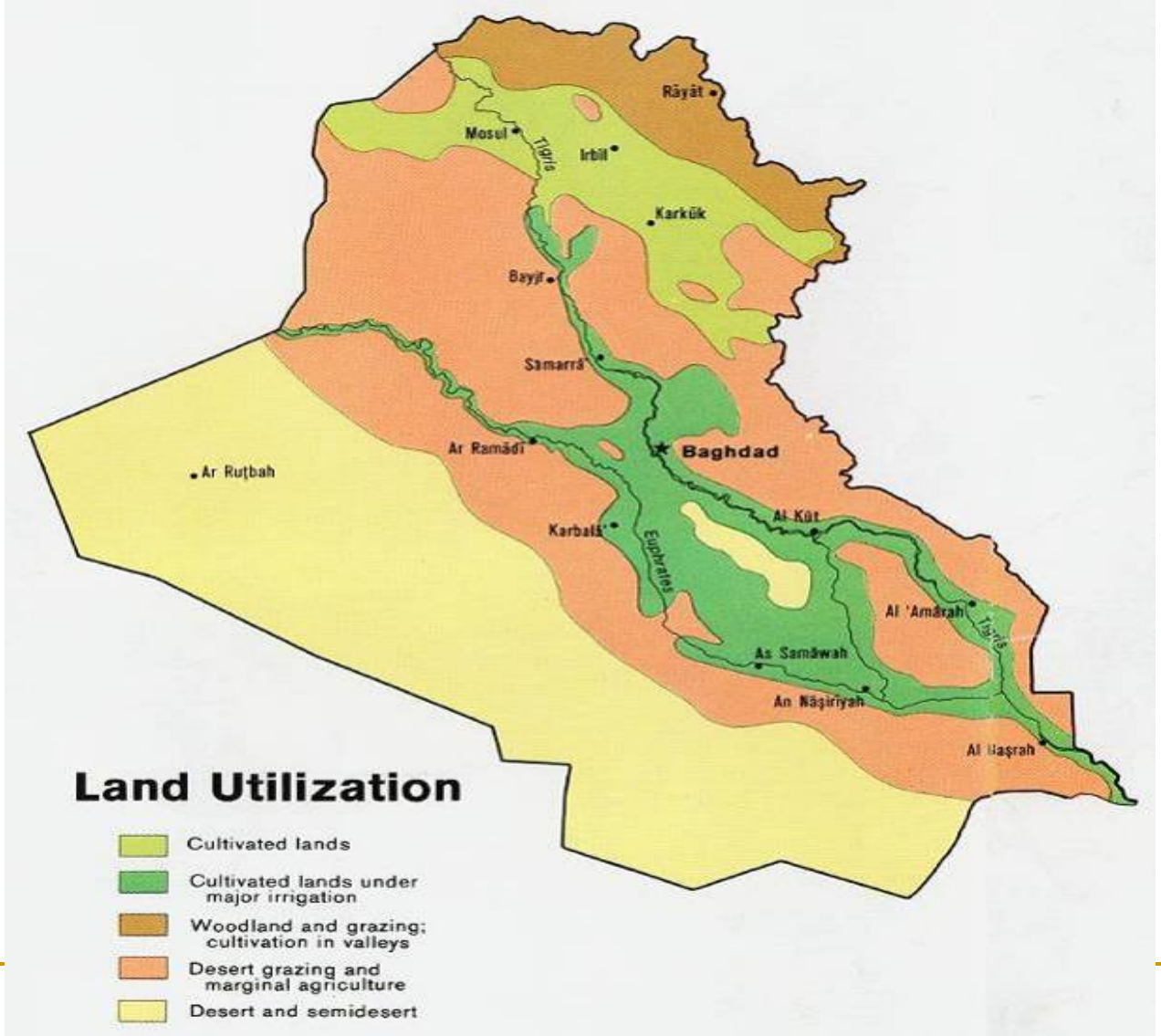
- Low density of natural vegetation.

Physiographic Units



Total Iraqi Area : 438 317 sq. km
Agriculture land : 94 500 sq.km
Forest land : 8 230 sq. km

Land Utilization



Land Degradation :

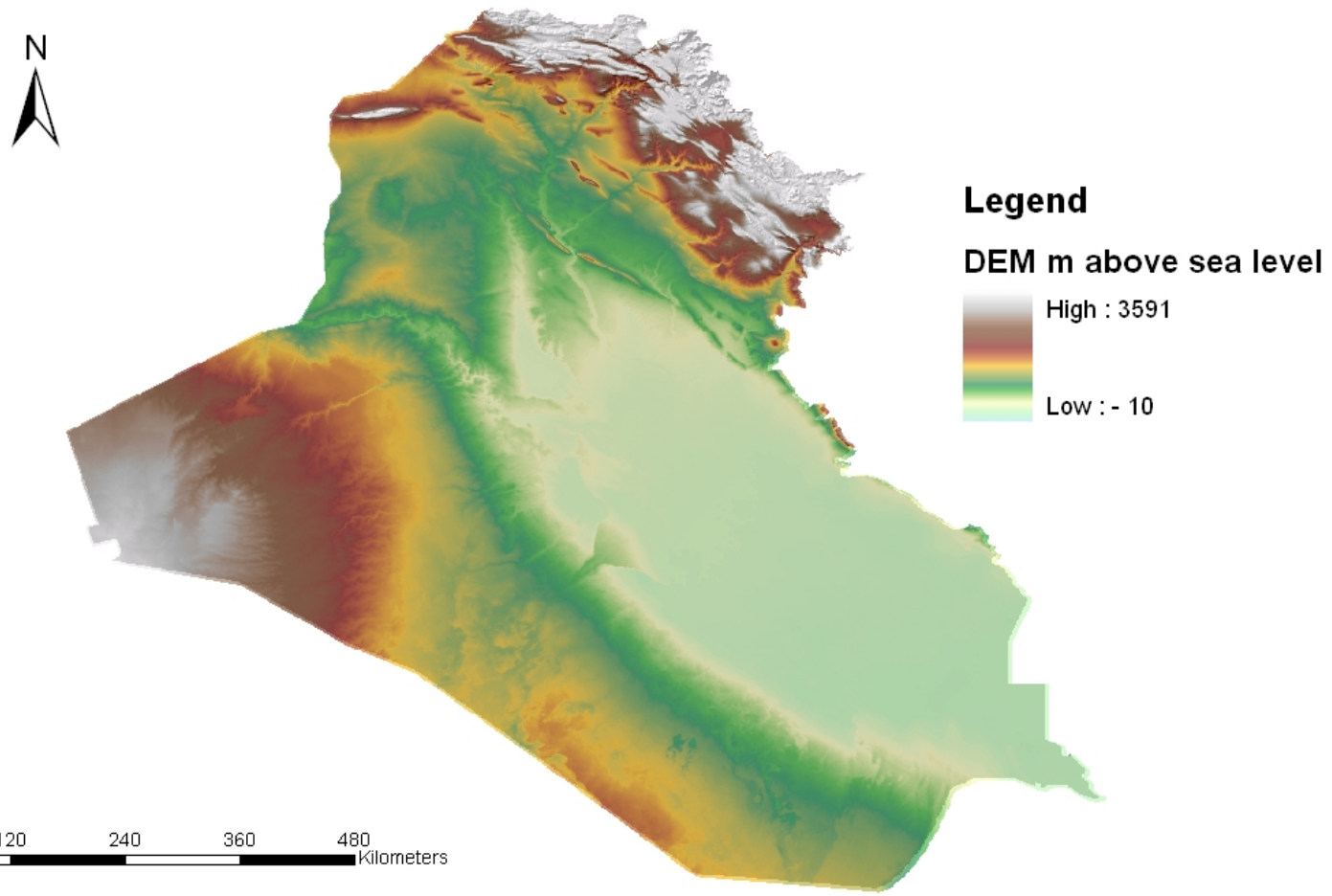
1- Salinity

2- Soil Erosion : wind and Water.

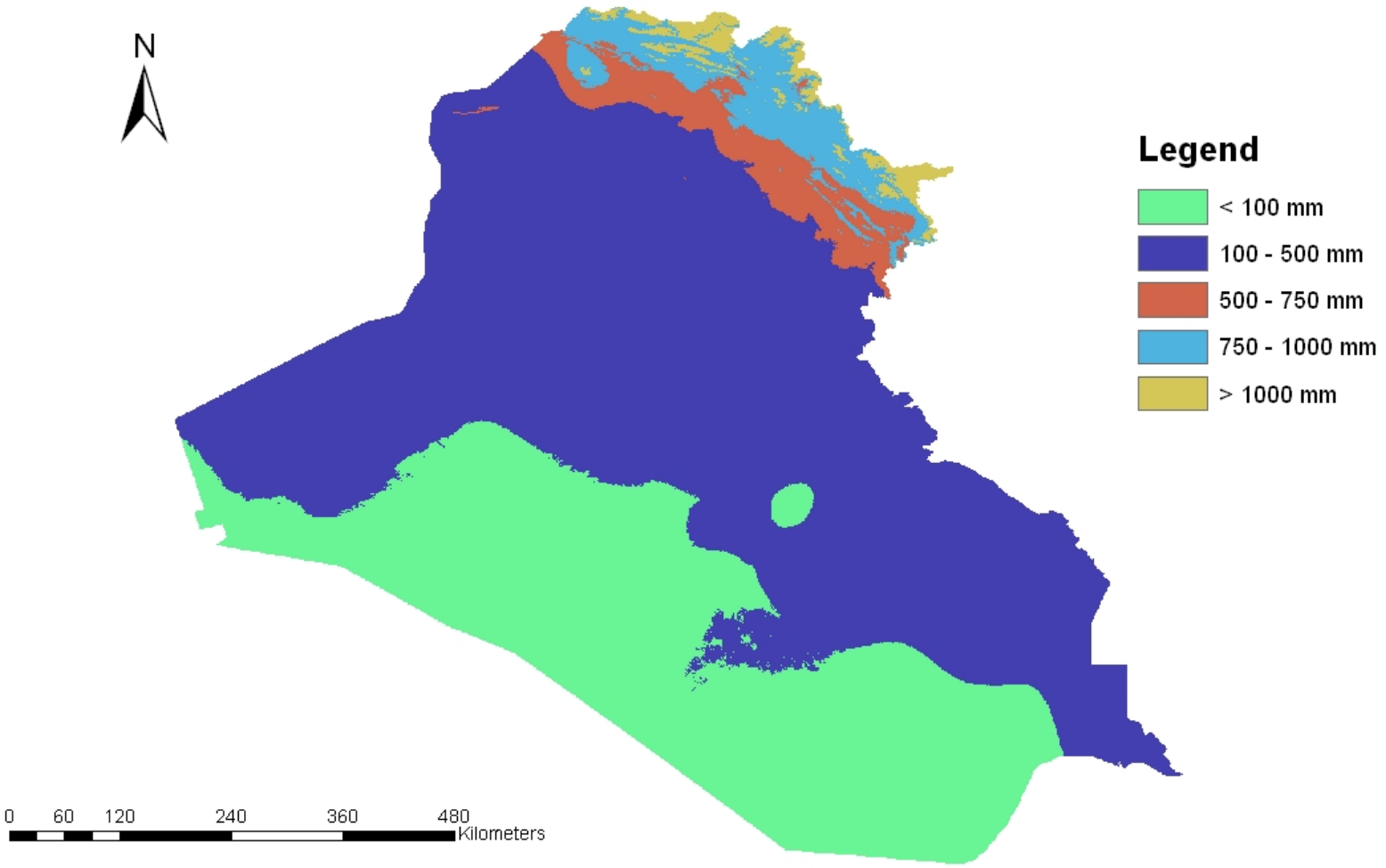
3- Biological

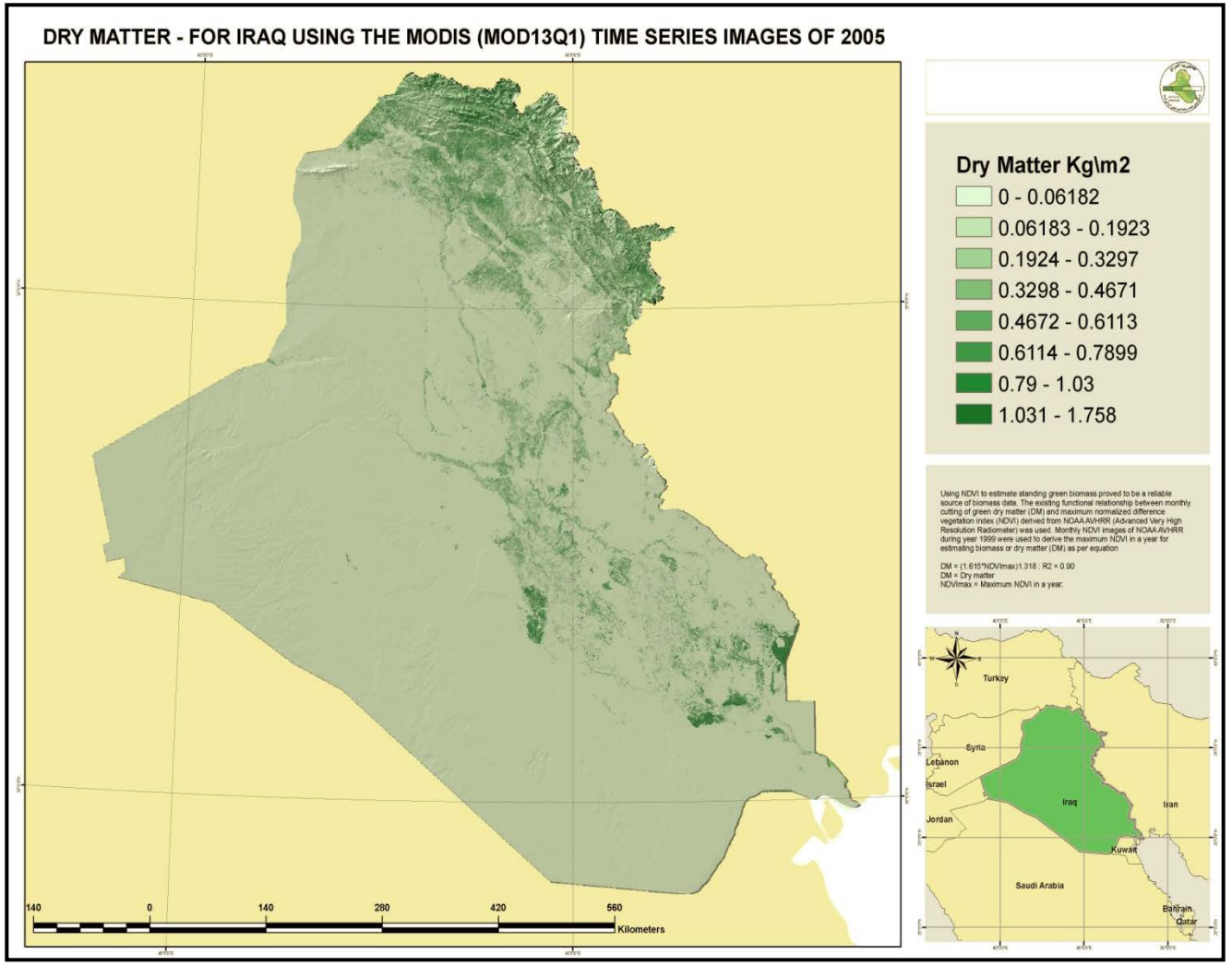
4- Physical .

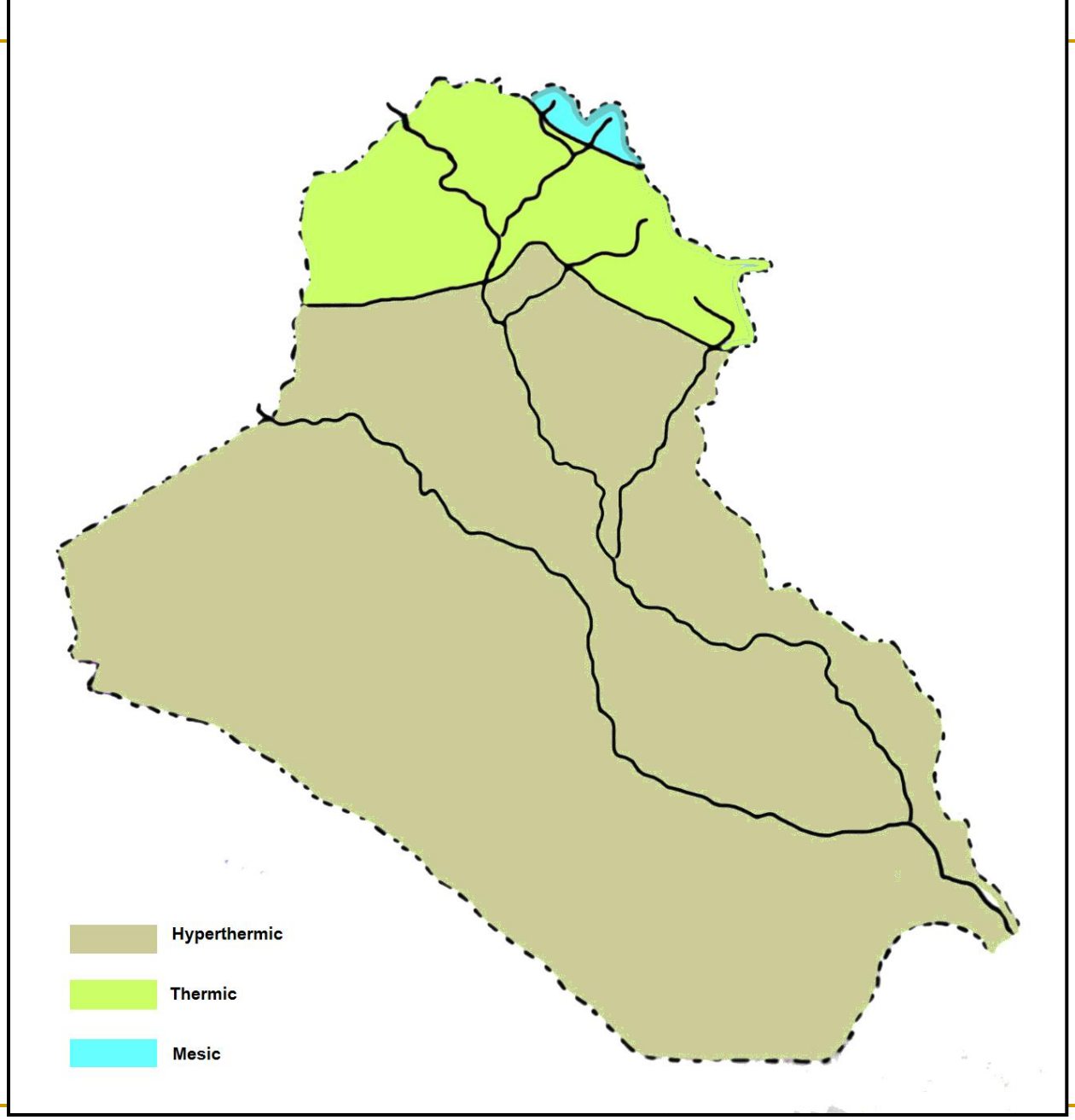
Digital Elevation Model for Iraq

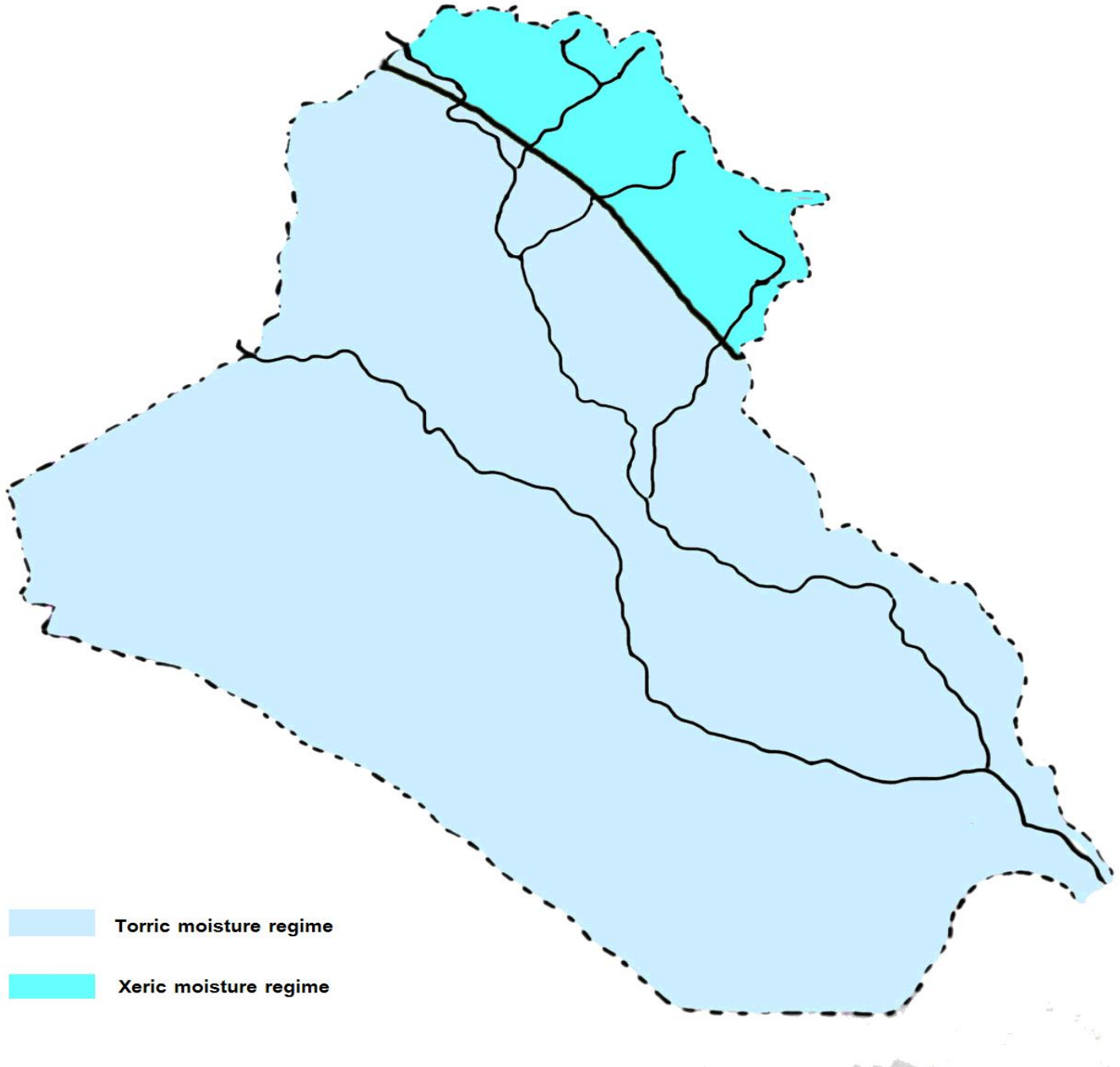


Mean annual ppt for Iraq



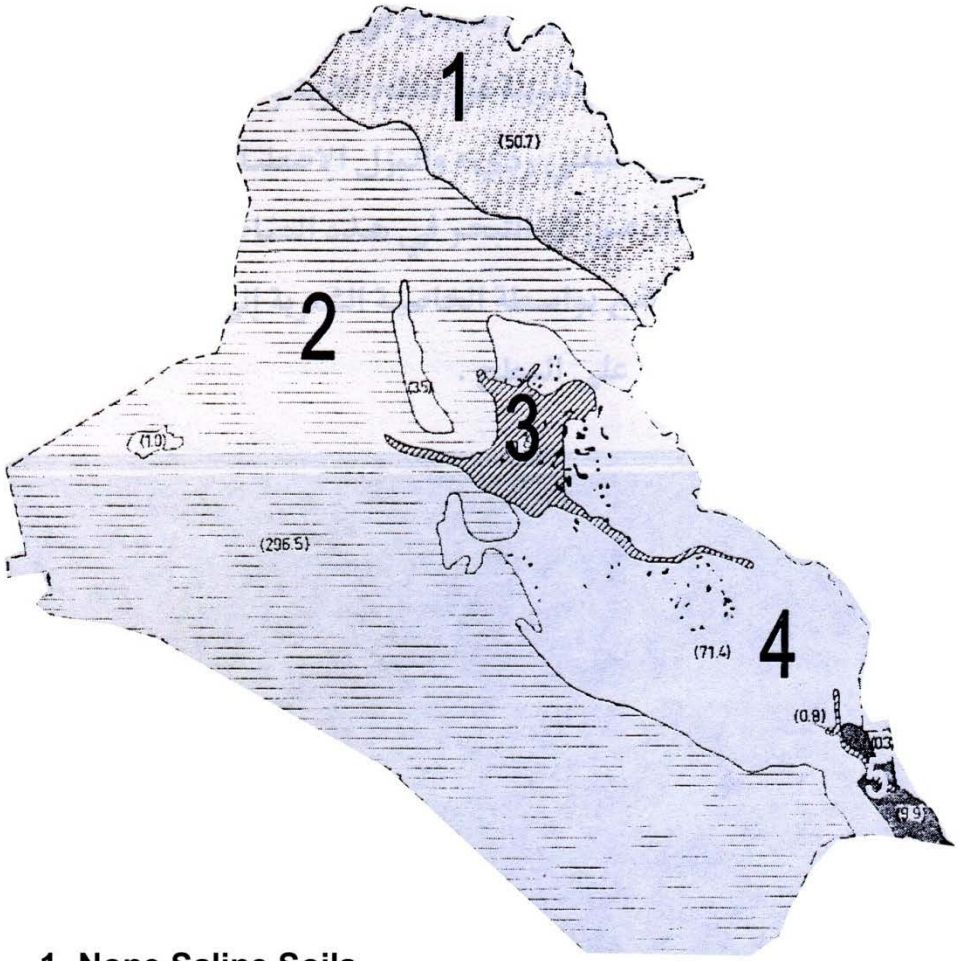

DRY MATTER - FOR IRAQ USING THE MODIS (MOD13Q1) TIME SERIES IMAGES OF 2005
Dry Matter Kg\m2
0 - 0.06182
0.06183 - 0.1923
0.1924 - 0.3297
0.3298 - 0.4671
0.4672 - 0.6113
0.6114 - 0.7899
0.79 - 1.03
1.031 - 1.758
Using NDVI to estimate standing green biomass proved to be a reliable source of biomass data. The existing functional relationship between monthly cutting of green dry matter (DM) and maximum normalized difference vegetation index (NDVI) derived from NOAA AVHRR (Advanced Very High Resolution Radiometer) was used. Monthly NDVI images of NOAA AVHRR during year 1999 were used to derive the maximum NDVI in a year for estimating biomass or dry matter (DM) as per equation
DM = (1.615*NDVImax)1.318 ; R2 = 0.90
DM = Dry matter
NDVImax = Maximum NDVI in a year.
140 0 140 280 420 560
Kilometers
Turkey
Syria
Lebanon
Israel
Jordan
Iraq
Iran
Kuwait
Saudi Arabia
Bahrain
Qatar


Hyperthermic
Thermic
Mesic


Torric moisture regime
Xeric moisture regime

Soil Classification :

Iraqi Soils were classified according to the dominant chemical composition as following :



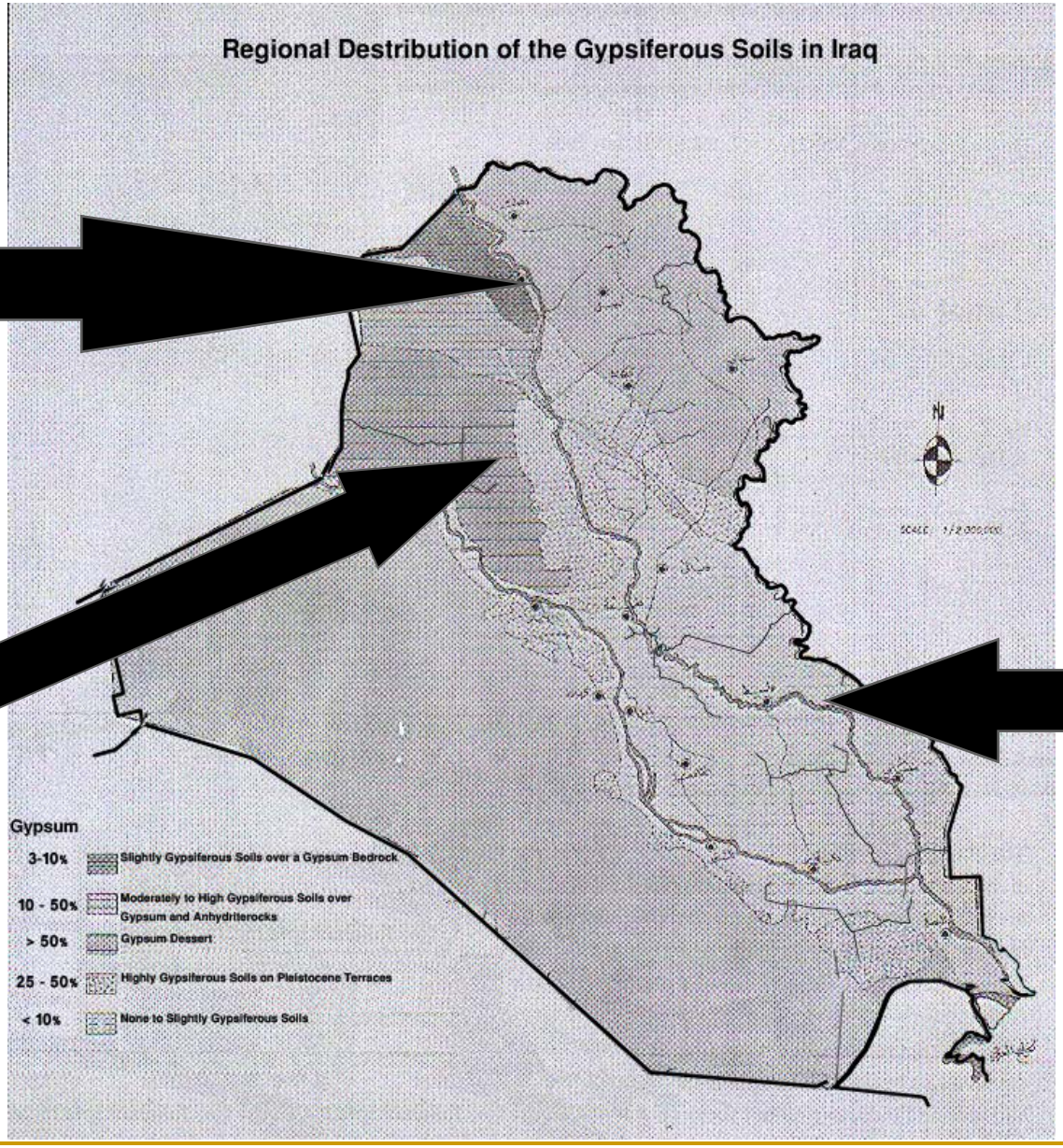
1- None Saline Soils
2- Desert - with Low Saline Soils
3- Moderate Soil Salinity
4- Saline Soils
5- High Salinity Soils

Distribution of Saline Soils in Iraq, (Buringh, 1960)

Figure 3: Distribution of Salt- Affected Soils in Iraq.

- Tel Abta1

	Gypsum %
Ap	0.5
B_{tR}	0.6
C_y	43



3- Debnui

	Gypsum %
Ap	1.3
C1	0.4
C 2	0.2

2- Al-Tharthar

	Gypsum %
Ap	33
B_{tR}	40
C_y	34

re 2: Distribution of Gypsiferous Soils in Iraq.

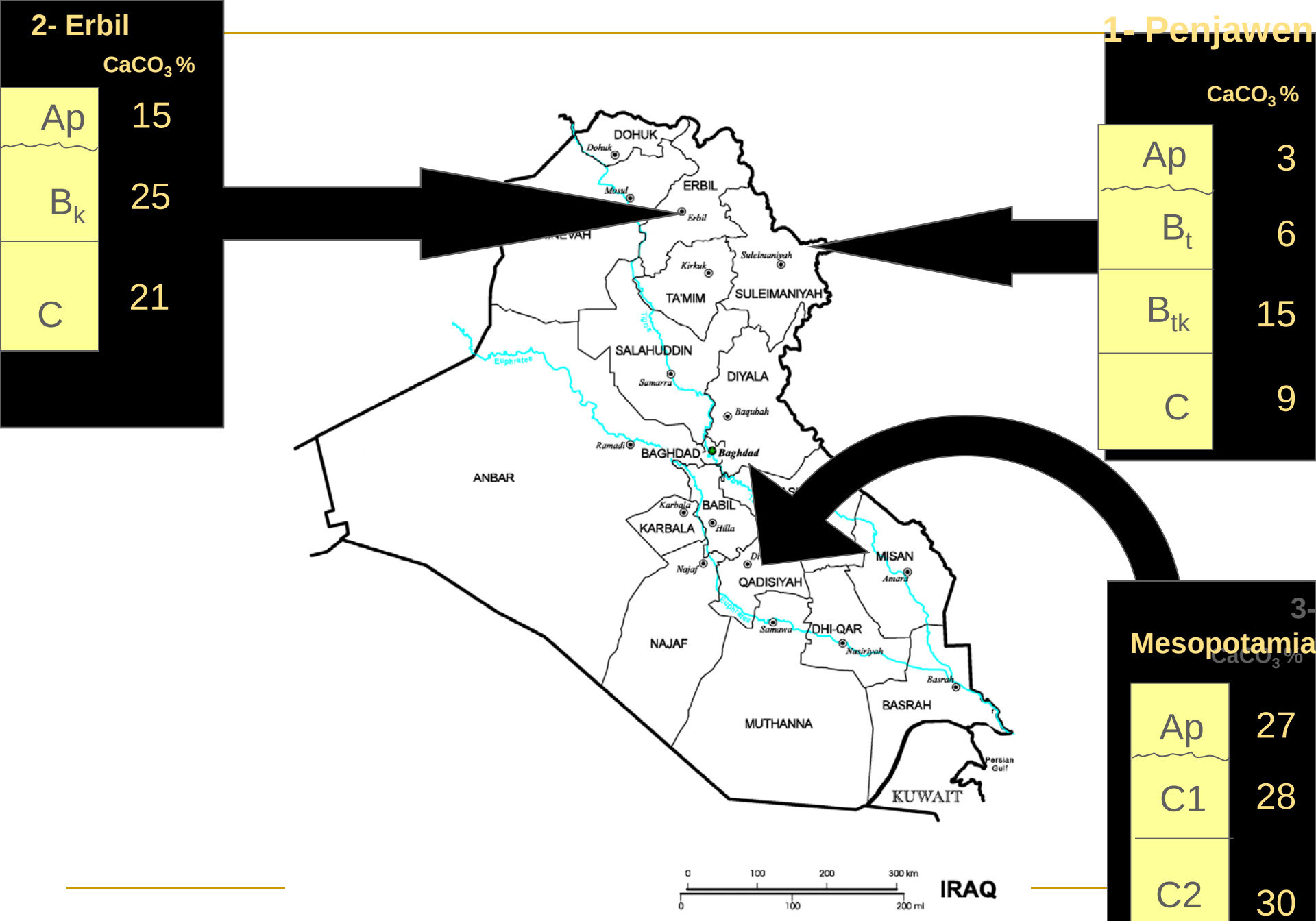


Figure 1: Distribution of Calcareous Soils in Iraq.

The dominant soil orders in Iraq

The results of soil survey works on
Iraqi Soils ,indicate the presence of the following soil orders :-

1- Aridisols including the following great groups:

- Aquisalids
- Haplosalids
- Petrogypsids
- Calcigypsids
- Haplogypsids
- Paleargids
- Gypsiargids
- Calciargids
- Haplargids
- Petrocalcids
- Halocalcids
- Haplocambids

2- Entisols with the following great groups :

-Psammaquents	- Xerarent	-Xerofluvents
- Fluvaquents	- Torriarents	- Torrifluvents

- Torripsamments
- Xeropsamments
- Torriorthents
- Xerorthents

3- Inceptisols :

- Haplaquepts
- Calcixerpts
- Haploxerepts

4- Mollisols including the following great groups:

-Calciaquolls - Calcixerolls - Argiaquolls
-Argixerolls - Haploxerolls

5- Vertisols including the following great groups:

- Calcixererts
- Haploxererts
- Gypsitorrerts
- Calcitorrerts
- Haplotorrerts

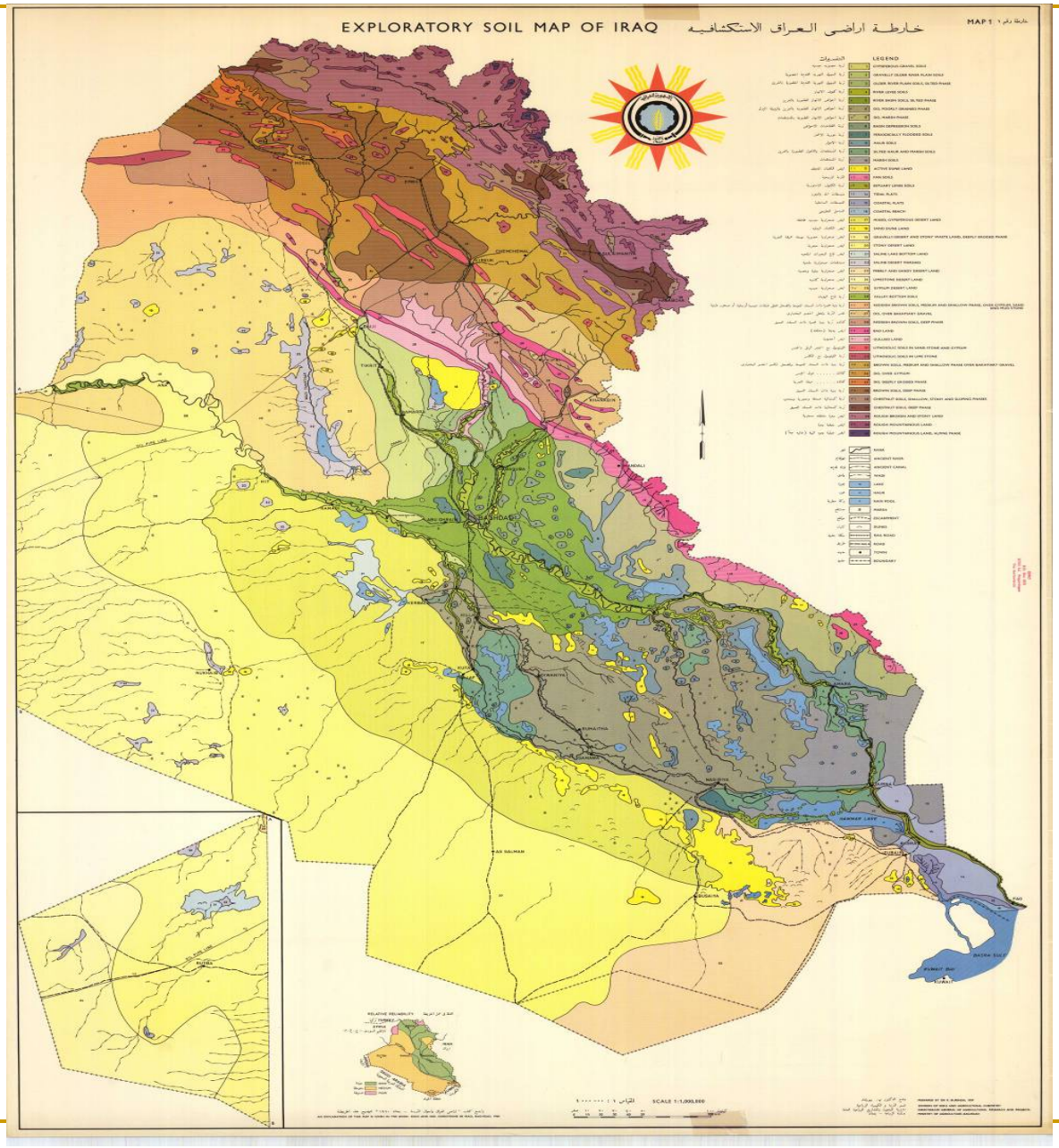
Iraqi Soil Maps

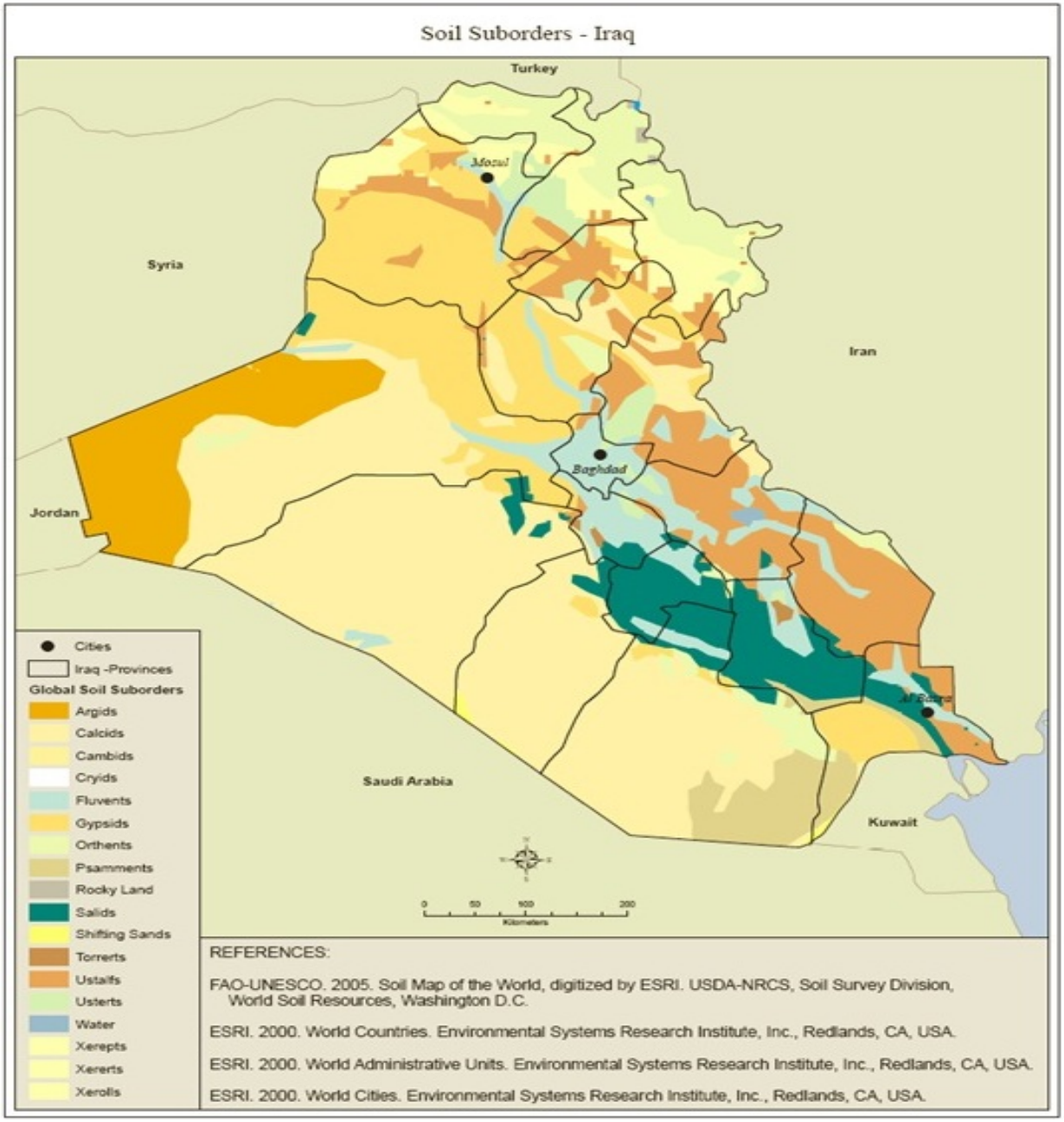
-There is no detail soil map done yet at the regional scale .

But, at district, there are a detail studies (more than 35%):

- Soil map at 1/25 000 scale
- salinity map
- land use map
- soil texture map

- There are two general maps done using RS and GIS .


EXPLORATORY SOIL MAP OF IRAQ
خارطة اراضي العراق الاستكشافيه
MAP 1 خارطة رقم ١
LEGEND
SCALE 1:1,000,000

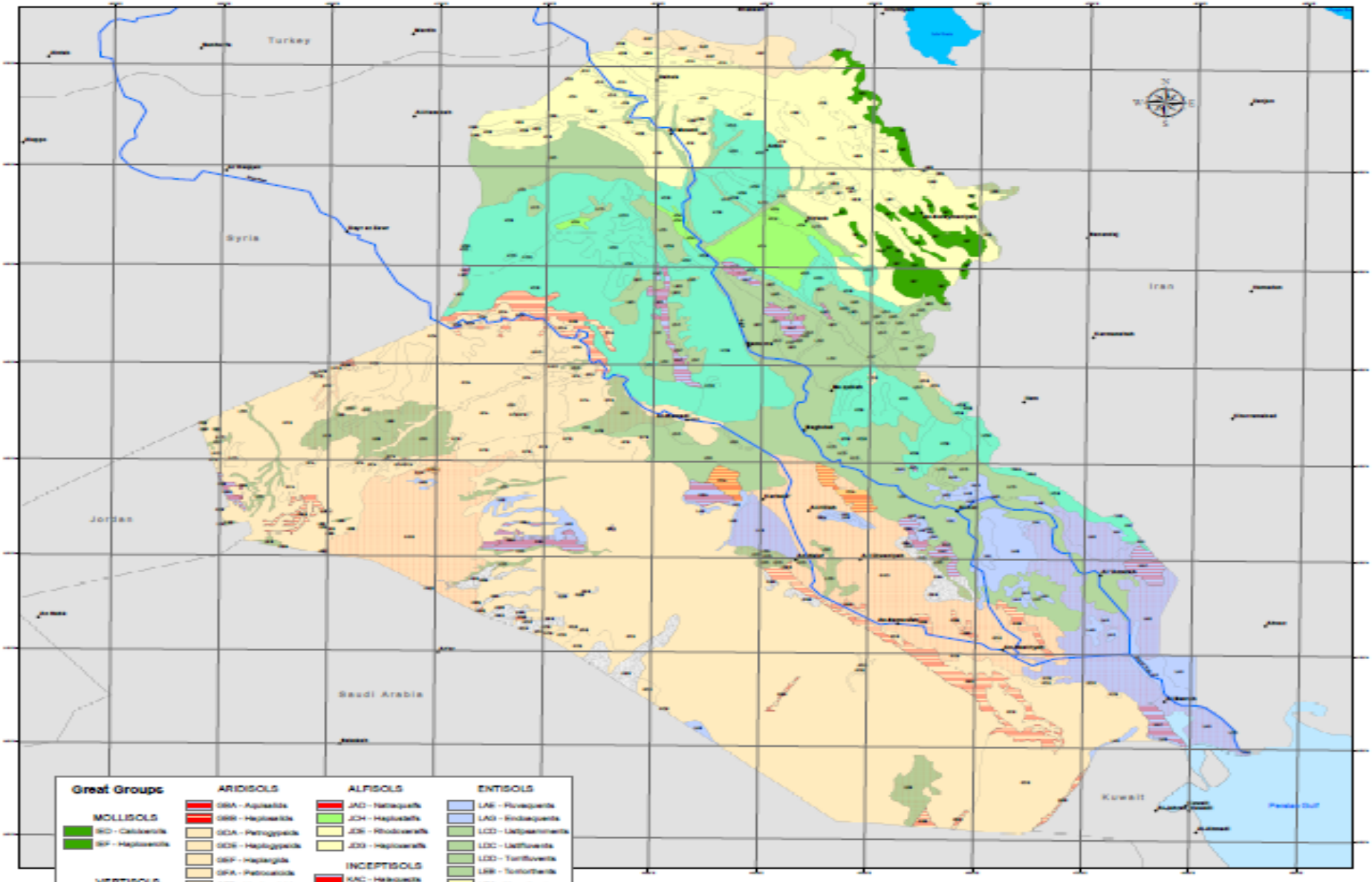

Soil Suborders - Iraq
Turkey
Mosul
Syria
Iran
Baghdad
Jordan
Saudi Arabia
Kuwait
Cities
Iraq -Provinces
Global Soil Suborders
Argids
Calcids
Cambids
Cryids
Fluvents
Gypsids
Orthents
Psamments
Rocky Land
Salids
Shifting Sands
Torrerts
Ustalfs
Usterts
Water
Xerepts
Xererts
Xerolls
0 50 100 200
Kilometers
REFERENCES:
FAO-UNESCO. 2005. Soil Map of the World, digitized by ESRI. USDA-NRCS, Soil Survey Division, World Soil Resources, Washington D.C.
ESRI. 2000. World Countries. Environmental Systems Research Institute, Inc., Redlands, CA, USA.
ESRI. 2000. World Administrative Units. Environmental Systems Research Institute, Inc., Redlands, CA, USA.
ESRI. 2000. World Cities. Environmental Systems Research Institute, Inc., Redlands, CA, USA.

US Department of Agriculture
Natural Resources
Conservation Service

General Soil Map of Iraq

DRAFT

Soil Survey Division
World Soil Resources
Washington, D.C.



Great Groups

MOLLISOLS
- SID - Calciorerts
- SIF - Haploxerolls

VERTISOLS
- FCC - Haploxererts
- FDA - Salitorrerts

ARIDISOLS
- GRA - Aquisalids
- GRB - Haplosalids
- GDA - Petrogypsids
- GDE - Haplogypsids
- GRF - Haplargids
- GFA - Petrocalcids
- GFB - Haplocalcids
- GDB - Petrocambids
- GDC - Haplocambids

ALFISOLS
- JAC - Natraqualfs
- JCH - Haplustalfs
- JDR - Rhodoxeralfs
- JDI - Haploxeralfs

INCEPTISOLS
- KAC - Halaquepts
- KAG - Humaquepts
- KAI - Endoaquepts
- KDR - Calciustepts
- KDD - Haplustepts
- KRR - Calcixerepts

ENTISOLS
- LAE - Fluvaquents
- LAD - Endoaquents
- LCD - Ustipsamments
- LDC - Ustifluvents
- LDD - Torrifluvents
- LRR - Torriorthents
- LRC - Xeriorthents
- LRD - Ustiorthents

PHASE
- Dunes
- Saline

Note: Map is based on various sources. No ground-truthing has been done.

Lambert Conformal Conic Projection

Kilometers
0 25 50 100 150 200

Scale: 1:1,500,000

November 2003

For more information contact:
Dr. Karl Zimmerer
National Leader, World Soil Resources
karl.zimmerer@wdc.gov

Proposal of soil mapping works

– Developing Iraqi soil maps :-

- Stage 1 :soil map on scale of 1/250 000 at subgroup This work was started in 2011.

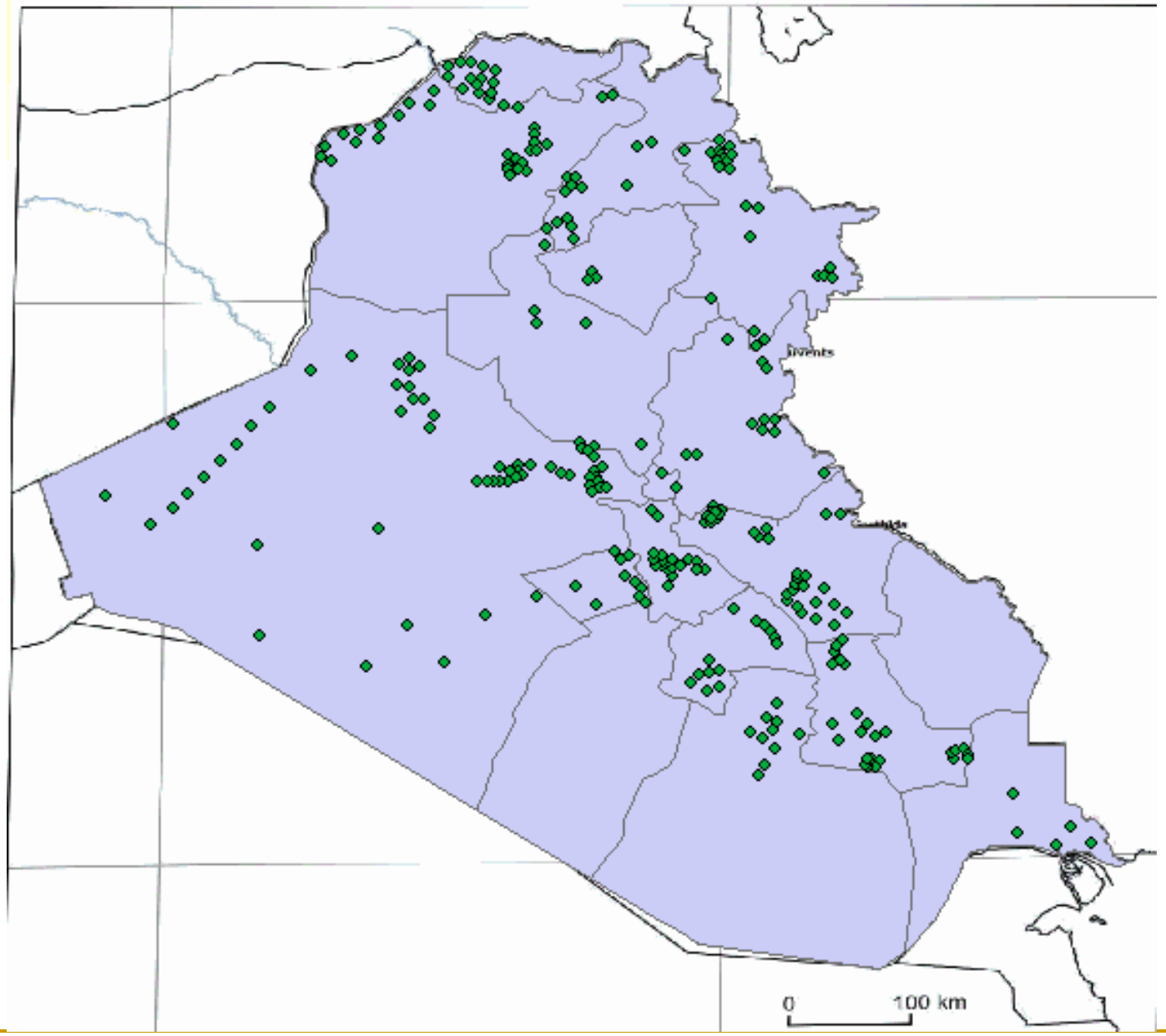
- Stage 2 : on scale of 1/50 000 at soil series level for some counties have detail soil survey works.

- Data from previous pedological works were collected for more than 250 locations in Iraq.

- Data include :
  - general soil profile descriptions
  - soil physical properties.
  - soil chemical properties .

Data Collections:

- developing Iraqi soil map .
- digitizing all the collected data .
- creating soil data base for the next uses.


0
100 km

Suggestions :

In order to increase the accuracy of the out puts of the GSP work :

-Select the most common soil classification system.

- Training some representative team work on the application of the selected system .

-Workshop to recheck the results of soil survey mainly for the soils on the borderers between the joint countries .

Thank you for attention