



**ECONOMIC AND SOCIAL
COUNCIL**

Economic and Social Commission for Western Asia (ESCWA)

Expert Group Meeting on Sustainable Land Management
as a Best Practice to Enhance Rural Development
in the ESCWA Region
Beirut, 25 – 27 March 2009

**Sustainable Land Management as a Best Practice
to Enhance Rural Development in the ESCWA Region**

by

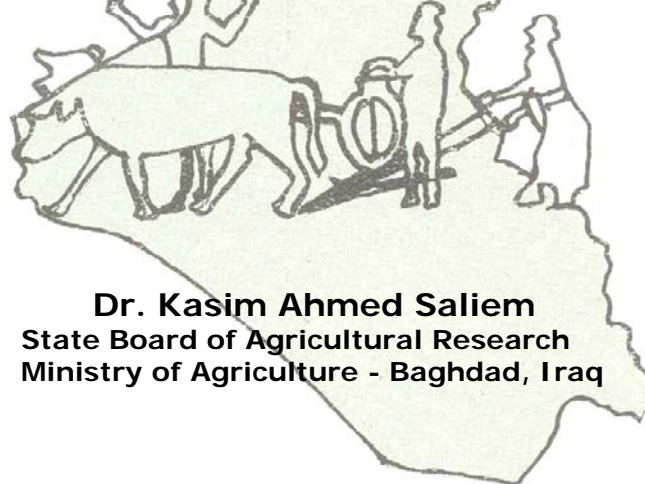
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Meeting on
“Sustainable land Management as a Best
Practice to Enhance Rural Development in The
ESCWA Region”

Lebnan, Beirut 25-27 March, 2009



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State Board of Agricultural Research
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□ OVERVIEW ON IRAQ



➤ GEOGRAPHICAL LOCATION

- Latitudes $29^{\circ}5'$ to $37^{\circ}15'$ N and Longitude $38^{\circ}45'$ to $48^{\circ}45'$ E
- Adjoining Iran, Turkey, Syria, Jordan, Saudi Arabia, Kuwait.

LAND AREA

- 438,000 Km² with 20% of this land is considered potentially cultivable.
- Substantial part of this cultivable land is not utilised because of lack of water.
- Around 7% of the total land area has been annually cultivated.



❑ CLIMATE

Sub-tropical, continental, arid to semi arid with dry hot summers and cooler winters

➤ Temperature

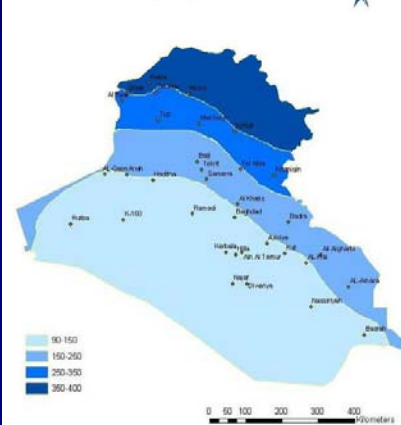
- Annual average 8.5 to 49°C
- * Summer range 16 – 49 °C
- * Winter range 8.5 - 14 °C

➤ Rainfall

FALLS IN OCTOBER TO APRIL

- 100 – 200 mm in central and southern of Iraq
- Up to 1000 mm in northern of Iraq

Annual Rainfall (mm) Distribution



Courtesy of the Iraq National program for the Preparation of Agro-Ecological Zones Maps

❑ PHYSIOGRAPHIC REGIONS

- Mountain range
- Foothills
- Jezira
- Desert land
- Lower Mesopotamian plain



□ SOILS

- *Soil texture* varied from *Light* (Sandy) to *heavy* (Clayey) depending mainly on *parent material*.
- All Iraqi soils are *calcareous*, most of them contain *15* to *35% carbonate* with a few having < 15 or > 35% carbonate minerals.
- About *75%* of the entire land surface of the flood plain in center and south Iraq is *salt affected solis* in various degrees.
- More than *20%* of the total area is *gypsiferous soils*.
- The soil orders in Iraq (as defined by US Soil Taxonomy) are *Aridisols, Entisols, vertisols, inceptisols and Mollisols*.

□ IRRIGATION

The source of Irrigation water in Iraq are:

- Twin rivers - Tigris and Euphrates
- Well water
- Ground water
- Drainage water



❑ Irrigation waters Problems

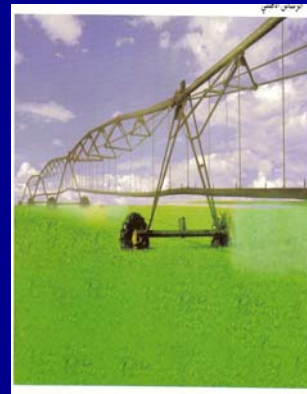
- Low water productivity
- Declining of water quality
- Shortage in water resources
- Traditional irrigation methods
- Low rainfall
- Deficiency in researches of water use
- Regulation

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❑ LAND USE

Based on crops and water resources:

- ❑ **Dry farming (Northern part of Iraq)**
 - Dominant cereal crops are Wheat, Barley (Northern part).
 - Dominant legume crops are Lentil, chickpea, fababean
 - Fallow system is commonly followed in this area .
 - Grown in October to May for winter crops and in March to September for summer crops with supplementary irrigation



٨

❑ Irrigated farming (Central and southern part)

- Main summer cereal crops are Rice and Maize
- Main irrigated **winter cereal crops** are Wheat and Barley

• **Vegetables crops are:**

Tomato, Okra, Eggplant, Cucumber, Squash, Watermelon, Melon, Pepper, Onion, Green bean and Cabbage.

• **Orchards**

North - deciduous fruit trees, Grape, Apple, Apricot, Plums, Pomegranate, Pear, Peach and Olive

Central and southern of IRAQ, evergreen fruit trees, Date palm, Citrus, Olive and Deciduous fruits.

➔ **Pasture**

Main fodder crop are Alfalfa and Clover

1

❑ **Constraints for Iraqi Agriculture**

- ❖ Salinity
- ❖ Deficit in Irrigation water
- ❖ Drought and low rainfall
- ❖ Desertification
- ❖ Low productivity
- ❖ Highly costs of inputs
- ❖ Low price of products
- ❖ Weakness in Soil and Water Management
- ❖ Lack of markets information
- ❖ Weakness in extension services

1

❑ Success Experience of Iraq on Sustainable Land Management

1. Reclamation of saline Soils

- Misuse of water and Soil resources have rendered millions of hectares of productive land.
- About 75% of entire land surface of Mesopotamian Plain have been damaged by secondary sanitization caused by the poor Water and Soil management.

11

Therefore

- ✓ The SOSLR, MOA and MOWR plan to bring the vast area of Mesopotamian Plain under irrigation and drainage (I&D) net work.
- ✓ Iraqi Government launched several I&D projects in order to protect the cultivation land from further deterioration and to reclaim the salt affected soils
- ✓ Some of such projects are: Dujaila, Mussayyab, Al-Khalis, Ishaqi and Middle Tigris project...etc.

12

After that Studies on soils and water and implementation of such projects were done:

- Semi-detailed soil survey.
- Mapping the area, using the photo-interpretation technique.
- Hydrological conditions so important for designing I & D net-work.
- I & D Net-work have been successfully implemented:
 - Main drains.
 - Sub-main drain.
 - Collecting drains.
 - Covered drain.
 - Lining irrigation canals.
 - Soils with high salt content have leached.

13

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Therefore

- ✓ **Vast** area of abandoned land put under cultivation.
- ✓ The crops **productivity** have been **increased** many time.

14

2. Combating Desertification

- Desert covered vast area in IRAQ.
- Deterioration of natural vegetation cover in desert due to misuse of natural resources.
- Sand dune formation cause by wind erosion.
- More than million hectare covered with active sand dunes in middle and south of IRAQ.
- The sand dunes effect on Road, Railway lines, Irrigation and Drainage systems, Cities, agriculture lands and Human health.

10

Therefore

- ✓ MOA planed to **fix** these sand dunes through Sand Dune Fixation project in Middle and south of the country. More than **125,000 ha** have been **stabilized** by different methods:

- 1- **Mechanical method**: By using heavy equipments such as Bulldozer, Shovels and leveling grader to **cover mobile** sand dunes with heavy soil. This method give **success** results in south of IRAQ.
- 2- **Biological method**: To have sustainable fixation of shifting sand dunes, Trees and Shrubs tolerant to drought and salinity planted as **wind break** and **shelter belt**. For this **five millions seedling** been planted in south of the country.
- 3- **Dry farming**: By planting steam cutting of **Tamarix spp** with **length** of **100 cm**(90 cm planted into the soil and 10 cm remain out) in sand dune which have some moisture. This method help the growing of stem cutting during winter and spring season. This method gives a good results in the middle part of IRAQ, so **vast area of sand dune covered by Tamarix spp plants**.

11

3- Desert Oasis Project

- Fifty Oasis been established on an area of 50 – 200 ha for each in Iraqi desert.
- Using Drip irrigation system to irrigation the cultivated plant by using of well as a source of water.

The main aim of these oasis are:

- 1-Providing the water for sheep holders in the desert.
- 2-To avoid of over grazing.
- 3-To improve of local environmental in the region by increasing green areas.
- 4-To be as seed bank for natural vegetation in the region.

17

4- Range land Management

- Many range land stations in the desert to help in developing rang land and to provide the follow:
 - 1- Water for sheep holders.
 - 2- Propagating range shrubs seedling to be planted in the desert.
 - 3-Digging water well in different places in the desert in order to avoid over grazing.

18

5- Water Harvesting

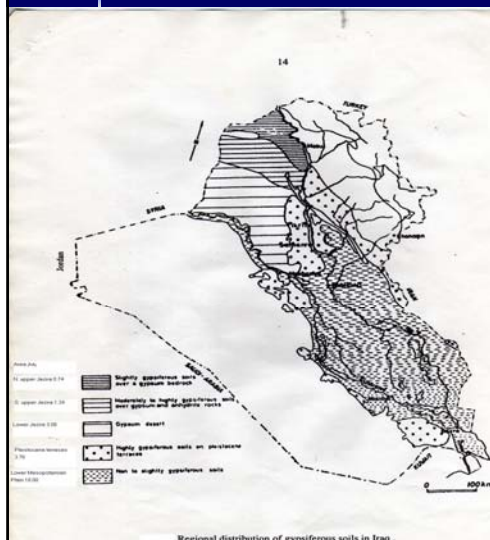
- Applying water harvesting technique in the desert by:
 - 1- Constructing water **dams** in the wadies.
 - 2- collecting and spreading water to increase rainfall effectiveness to provide **enough water** to **sheep holder** and **natural vegetation** cover as well.

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6- Gypsiferous Soil Management

Distribution of gypsiferous soil in Iraq

They occur in **8.7** millions hectares forming about 20% of the total Iraqi area which is 43.5 millions ha.

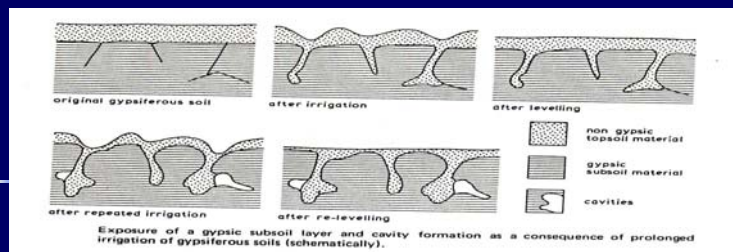


14

Problems of Gypsiferous soils

- The most important problem with respect to irrigation is the relatively high solubility of gypsum (2.6 g/L).
- Irrigation with a good quality of water (river water) causes piping, cavities, subsidence, collapse, and degradation of soil as a result of gypsum dissolution.
- When using surface irrigation with river water, the irrigation water percolating into the gypsic horizon tend to flow through fissures, holes, and cracks. Hence, gypsum is dissolved locally, the small holes and fissures being widened until finally piping and cavities are formed. Most of irrigation water will waste in these pipes and cavities.

11



Vertical cracks , fissures and holes in the gypsiferous soil



Piping, cavities formation in the gypsiferous soils which waste most of irrigation water

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Therefore,
an impervious lining must be used for irrigation
canals



Sprinkler, drip, and via flow irrigation systems
must be used for irrigation with river water,



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Ground Water (Well Water)

Using slightly to moderately saline water (well water) having common ions with gypsum (Ca^{2+} and SO_4^{2-}) for irrigation will decrease gypsum solubility and will inhibit subsidence or formation of sink-holes

Well water is being used for surface irrigation in gypsiferous soils of Iraq with good yields and without problems except for salinization under poor water and soil management



- Well water also being used for sprinkler irrigation for wheat, barley, and maize with good production



Sprinkler irrigation using well water ($\text{EC}=4.5 \text{ dS /m}$)

