



EFFECT OF IRRIGATION LEVEL AND SOIL TYPE ON WATER USE EFFICIENCY IN DYALA RIVER BASIN

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SPATIAL RESEARCH UNIT -February-2022

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Overview

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Introduction

- the aim of this study is to know the impact of five irrigation levels under drip irrigation system and soil type in water use efficiency and reducing added water in diyala basin.
- The study area is of strategic importance for its agricultural production, especially fruit production, the pomegranate, as well as other fruit species (oranges, dates, figs), **and also the study area is characterized by abundance of fresh water and its multiple sources (rivers, wells).** Diyala river is the vital water tributary of Diyala province for agriculture, health and industrial consumption.

The amount of water added during plant growth depends on two main factors : **the first is the climate conditions for high temperature and low relative humidity of the air in the arid and semi-arid regions, the second factor is the type of soil and texture , porosity , organic matter content, and level of salinity of irrigation water and available water sources and is often considered excessive irrigation of plant needs costly or detrimental or both it is considered irrigation process adequate for plant** When the water available in the soil up to field capacity or close to it, To provide amount of water in arid and semi-arid regions of the main determinants of agricultural production **because The water is an important factor and a key to the growth and development of plants, crops production stopped basically on the amount of water added thought the growing season.**

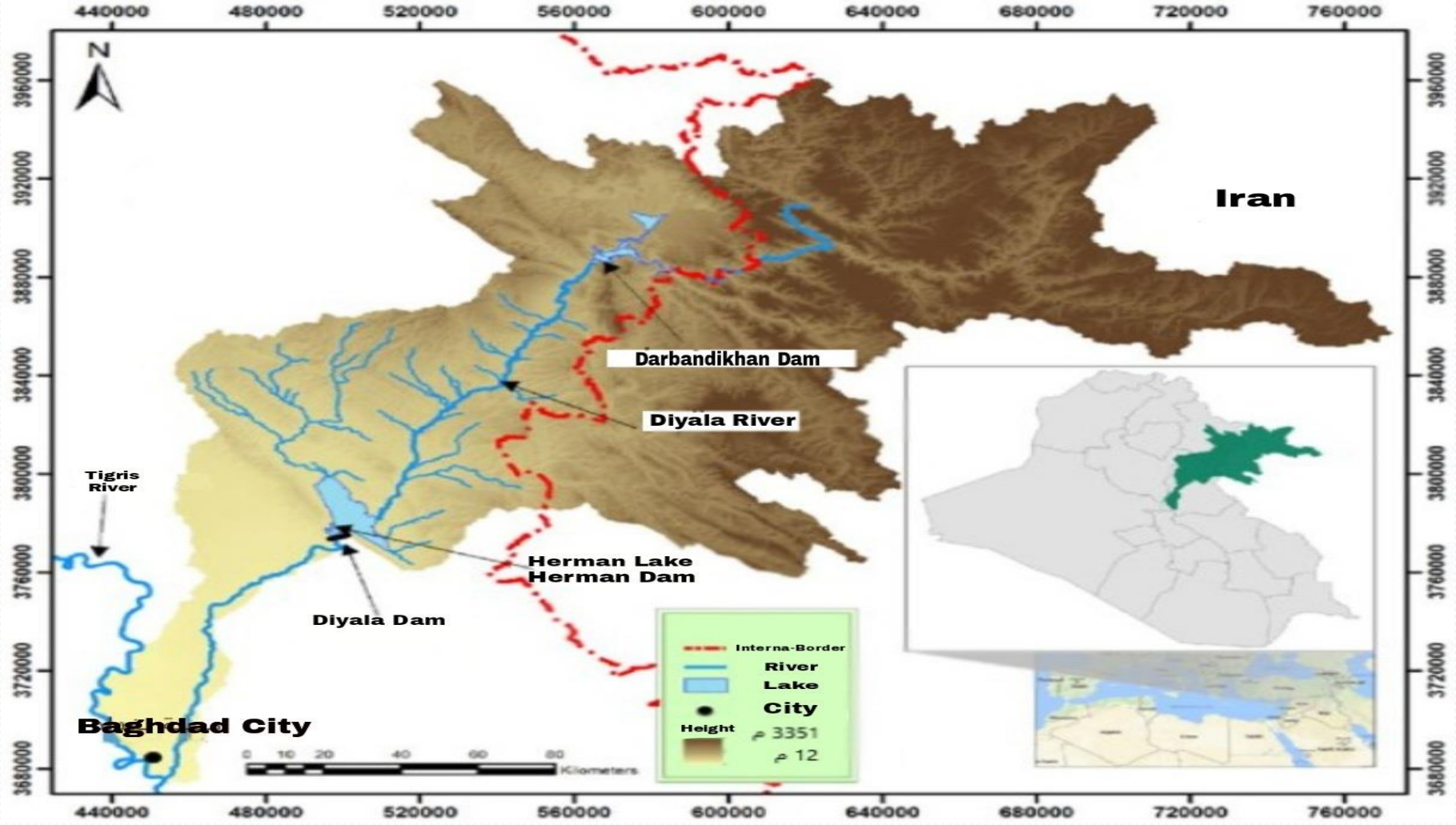
so that the increase in water use efficiency and reduce water consumption can be achieved and in perfect shape especially when using modern irrigation systems such use drip irrigation system that Aim is to provide a greater amount of water and control of the irrigation process, **the water shortage for plant has negative impact on crop production with varying degrees depending on the type of crop , stage of growth , soil type and prevailing weather conditions.**

Tables and maps:

table (1) physical and chemical properties of study soils .

character	measure Unit	Sandyloam(S3)	loam(S2)	Clay loam(S1)
Particle size distribution ;	Sand $-(g.Kg^{-1})$	550	425	300
	Silt $-(g.Kg^{-1})$	320	465	335
	Clay $-(g.Kg^{-1})$	130	110	365
EC	dS m^{-1}	3.85	3.28	3.51
pH	-	7.1	7.3	7.0
Na ⁺	Centi.mol.Kg ⁻¹	0.36	0.60	0.63
K ⁺	Centi.mol.Kg ⁻¹	0.02	0.03	0.07
SO ₄ ⁻²	Centi.mol.Kg ⁻¹	0.16	0.46	0.66
Available -N	mg.Kg ⁻¹	53.38	59.837	61.06
Available - P	mg.Kg ⁻¹	25.98	31.205	32.75
Organic mater	%	1.9	2.4	2.5

Map and Pathway for Diyala River Basin in Iraq.



Material and method;

This Study was carried out in a diyala provenance / diyala basin in shrween district ,for the year 2019 in private orchards for pomegranate trees (cv.salemy), twenty years old were chosen for the study, the factorial experiment conducted by using Randomized Completely Block Design with two factors and three replication , **the first factor included three types of soil texture (clay loam , loam , sandy loam) symbol it (S1 , S2 , & S3) respectively, the second factor included five irrigation level of added water after depletion (40, 50 ,60 , 70 & 80%) from available water symbol it (IR1 , IR2 , IR3, IR4 & IR5) respectively.**

Characteristics of study :

1-water use efficiency(kg/m³)

It was calculated as water quantity in each treatment divided on the obtained yield :

$$\text{WUE} = \text{Total Yield (Kg)} / \text{water quantity during season (m}^3\text{)}.$$

2- water Consumption (m³/ donum⁻¹):

Amount of water added from March till October :

$$\text{Irrigation Number} \times \text{water quantity at Irrigation (m}^3\text{)}.$$

3-added water depth (NDI.mm⁻¹):

This character was calculated for season from march till October , and showed data in table (4) for critical months only (June , July and August) because height consume of water .

Results:

Effect of irrigation levels and soil type in water use efficiency (kg/m³).

Soil \ Irrigation	S1	S2	S3	means
IR1	15.58	12.06	11.60	13.08
IR2	11.83	10.27	9.51	10.53
IR3	9.55	9.35	9.30	9.40
IR4	8.35	8.46	10.07	8.96
IR5	8.44	8.48	7.52	8.15
means	10.75	9.72	9.60	
LSD:	S= 1.50	IR= 1.93	IR*S=3.35	

: Effect irrigation levels and soil type in water consumption use (m³. Water. donum⁻¹).

Soil Irrigation	S1	S2	S3	means
IR1	112.4	123.3	161.6	132.4
IR2	115.5	145.5	165.5	142.1
IR3	136.6	147.7	168.6	150.9
IR4	130.4	155.5	177.7	154.5
IR5	138.3	157.7	182.5	159.5
means	126.64	145.94	171.18	
LSD:	S =7.20	IR =9.29	IR*S=16.09	

CONCLUSION:

It might concluded when application different irrigation level and different soil texture in (dyala basin) , had a positive influence an increase in water use efficiency and decreasing in water consumption and add water depth especially if determine add water amount for soil and plant by modern irrigation methods especially at using drip irrigation system with different soil texture that will reflected positively on increased quantity and quality of production .

**Thank you very much for listening
with appreciation**

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February-2022**

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