

Health Impacts **of irrigation with treated waste water** **as adaptive measure to Climate Change**

Jordan

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Background

- Jordan is ranked among the **poorest countries** in the world in water availability, 75 L/day
- **Quantity, quality and seasonal distribution** of rainfall in Jordan are expected to be affected by Climate change .
- Increasing temperatures, coupled with changing precipitation patterns, are expected to **decrease surface water availability**

- The most important impact of climate change in Jordan is **shortage of water**,
- One of adaptation measures to cope with shortage of water include **reuse of grey or treated wastewater**
- the opportunity for transmission of several pathogens will be increased

Objectives

- To **assess** the **impacts** of irrigation with treated wastewater on **waterborne** and **foodborne** diseases
- To **Correlate** health **outcomes** with **metrological** variables.

Methodology

- A **cross-sectional** household **survey**, structured questionnaire closed-ended questions” to assess the health risks.
- Five years **Retrospectively correlation of health data** statistics with metrological data health centers attendee for gastroenterological diseases, for the period 2008-2013

Study Area:

Downstream Zarka River “83 household”

- “**Irmemeen**” village, which represents lands with vegetables and fruit tree that is irrigated with **surface water**
- “**Subehi**”, which represents lands with vegetables and fruit tree that is irrigated “**biodiversity**” rainfed in addition to partially irrigation from Zarqa river

climate indices considered in health sector

- Total Monthly **Rainfall** Amount (mm)
- Mean Monthly Maximum Air **Temperature** (°C)
- Relative Humidity

Results

- **86%** of study population in **Subehi** confirm irrigating crops with **mixed water** compared with **12%** in **Irmemin**;
- **78%** of household in **Subehi** grow **eatable non cooked vegetables** compared with only **36%** in **Irmemin**,

- 86% of household in **Subehi** use **mixed** water to wash the vegetables,
- **24%** of the study population in **Subehi** had **fever** in the past 30 days compared with only **5%** in **Irmemin**,

Of those ill

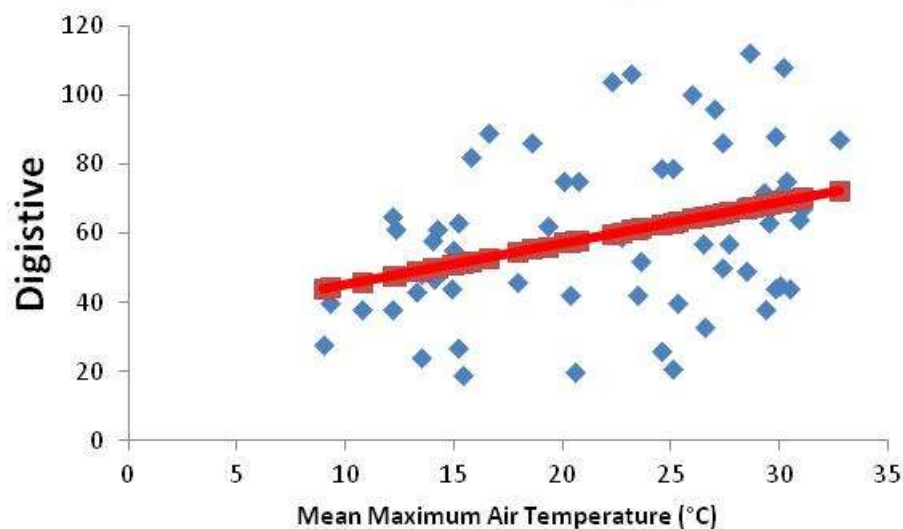
- 89% had diarrhea and 11% had flu like illnesses.
- 42% believes that there illness could be due to climate changes

Health impacts	Area	Correlation	Maximum Temperature (°C)	Rainfall Amount (mm)	Relative Humidity (%)
Digestive	Irmemin	R	0.35	0.28	0.20
		R ²	0.12	0.08	0.04
	Subehi	R	0.23	0.30	0.23
		R ²	0.05	0.09	0.05
Health Centers Attendee	Irmemin	R	0.32	0.12	0.18
		R ²	0.10	0.01	0.03
	Subehi	R	0.27	0.10	0.20
		R ²	0.08	0.01	0.04

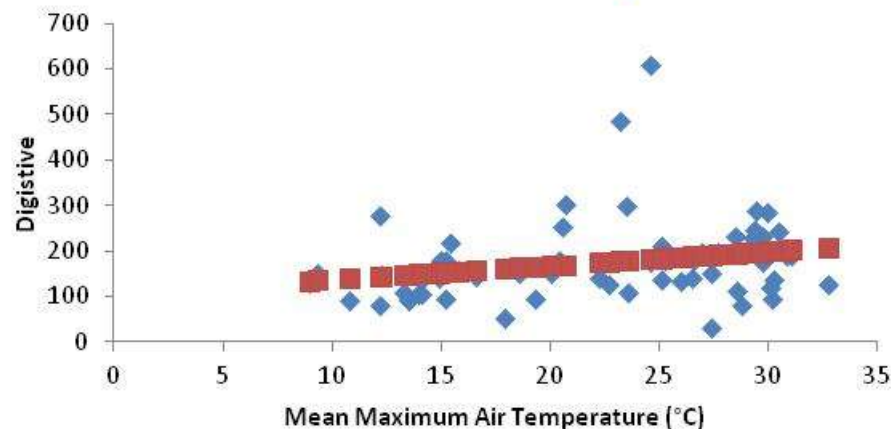
Variation in patients number with Digestive Diseases that is attributed to air **temperature** is more in Irmemin than Subehi

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Digestive System Diseases	Irmemin	R	0.35	0.28
		R ²	0.12	0.08
	Subehi	R	0.23	0.30
		R ²	0.05	0.09

Mean Maximum Air Temperature



Mean Maximum Air Temperature



**Variation in patients number in Subehi is minimal
Due to ongoing contamination**

Conclusion

Using treated waste water from Zarka river
in **Subehi**
as an **adaptive measure**
for decreasing precipitating due to climate
change
is a health risk

Thanks