

Analysis of Human Health Risks Linked to Irrigation with Treated Wastewater in Oued Souhil, Tunisia

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Introduction

- Farmers in Oued Souhil, Tunisia, irrigate with treated wastewater because rainwater is unreliable and ground water is contaminated.
- Wastewater treatment plants serving Oued Souhil operate over capacity, thus there are questions of effluent quality.
- Farmers are at risk for intestinal illnesses, skin infections and parasites due to direct contact with treated wastewater.
- A study showed a direct relationship between farmers having direct contact with wastewater and those with skin problems.¹
- Controlling the amount and intensity of exposure to wastewater by wearing boots and gloves can limit the burden of disease.



¹Do Thuy Trang et al. Dec. 2007. "Skin disease among farmers using wastewater in rice cultivation in Nam Dinh, Vietnam." *Tropical Medicine and International Health* 12: 51-58.

Objectives

1. To conduct a preliminary risk assessment of the impact of wastewater reuse on human health.
2. To design and implement health education workshops.
3. To evaluate health education and motivation after workshops.

Methods

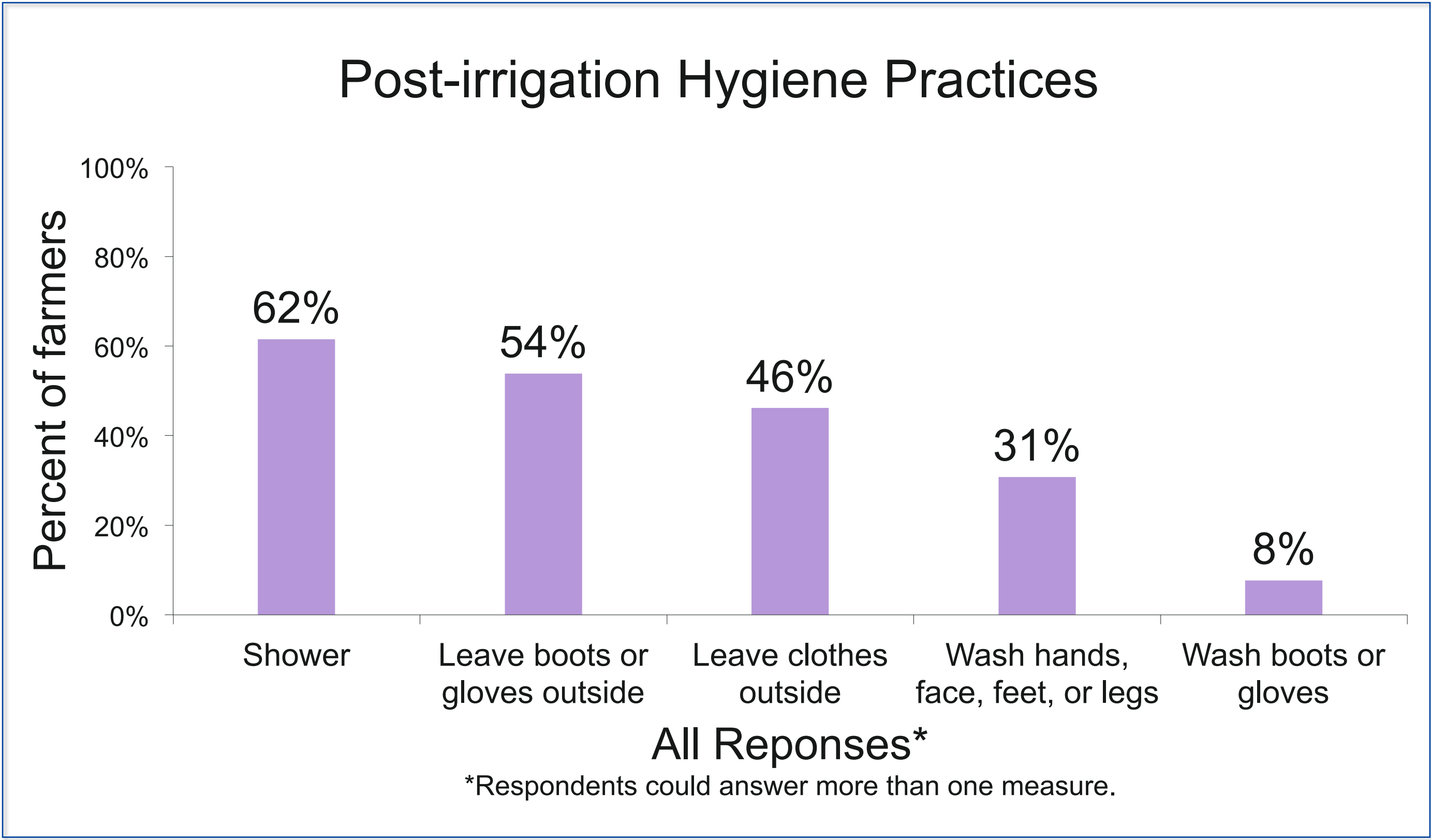
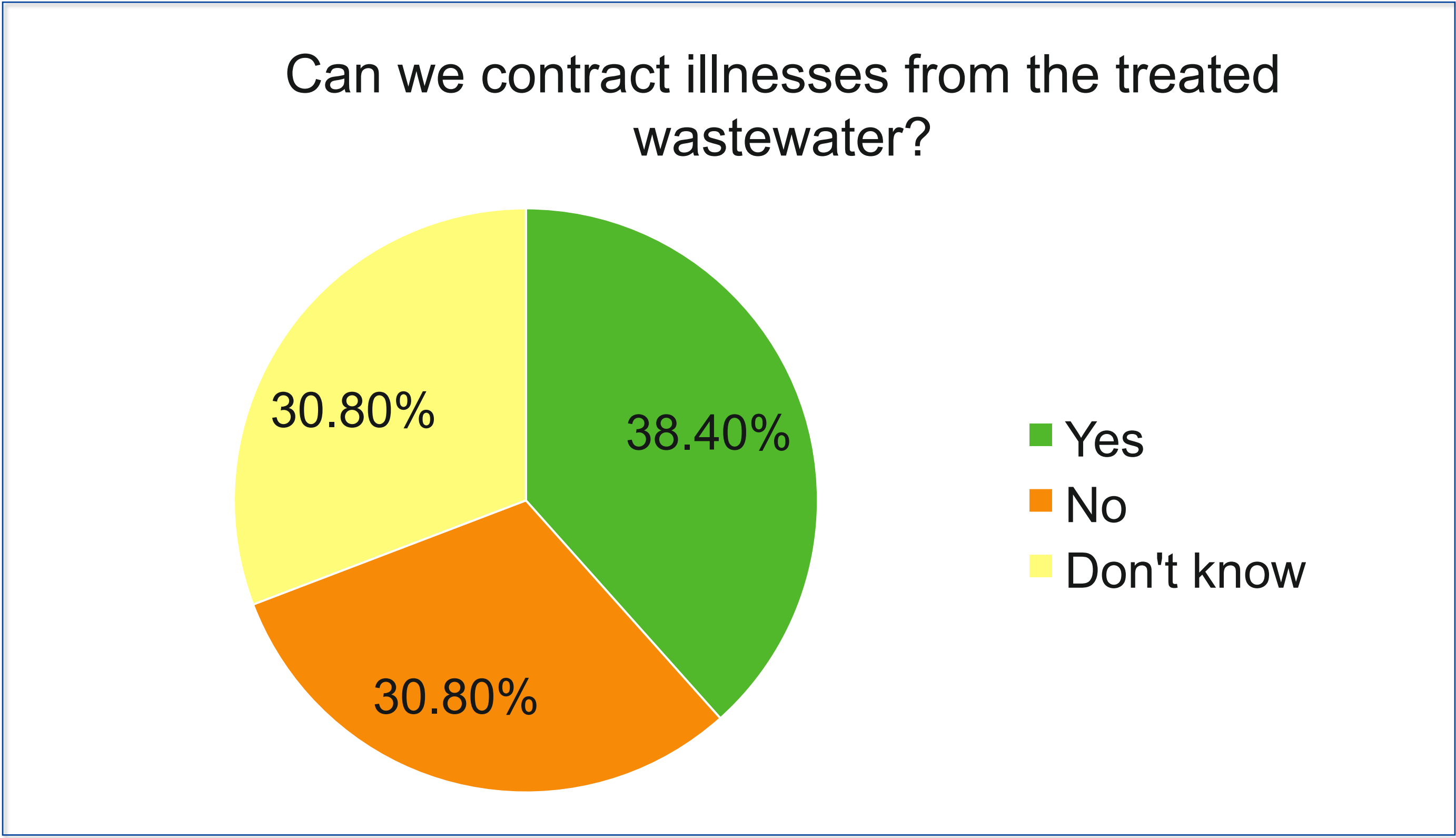
Activities	Design Process	Analysis
Baseline surveys	Questions drew from and complimented INRGREF survey	Stata 13.0; FOAM
Structured participant observations	Observations of farming practices	Qualitative; FOAM
Focus group with women with any relation to irrigated land	Questions drew from survey results	Qualitative; FOAM
Health and hygiene education workshop	Topics pulled from all results	Qualitative
End-of-workshop surveys	Questions to assess immediate response	Stata 13.0

- Sample size: 5% of target population, randomly selected.



Results

- No direct relationship between the farmers' sex or level of education and their knowledge of these risks was found.
- A strong correlation was found between farmers who employ post-irrigation hygiene practices and those who perceive human health risks, suggesting that knowledge of health risks will result in safer practices.
- All participants had a post-workshop awareness of the importance of wearing protective equipment, and 89% considered wearing them.
- In light of few agricultural extension services, farmers expressed interested to have information about the extent of wastewater treatment.



FOAM Framework (adapted from the World Bank):

Focus	Opportunity	Ability	Motivation
Target Behavior Use of protective equipment (boots and gloves) while irrigating.	Access/Availability Protective equipment is readily available.	Knowledge Farmer is lacking information or only has a basic understanding of human health risks from experience or word of mouth.	Belief and Attitudes Direct contact with water is unhealthy, but risks are overlooked. Boots perceived as practical; gloves are not. Water has been treated, so it's safe.
Target Population Farmers who irrigate with treated wastewater in Oued Souhil, Tunisia.	Product Attributes Boots and gloves protect from direct contact with wastewater.	Social Support Information lacking about human health risks. Irrigation with treated wastewater is a common practice, so discussion of risks is welcome.	Outcome Expectations Protective equipment can lower risk for skin infections.
	Social Norms Use of boots is common; gloves are rare.		Threat Belief that showering after irrigating eliminates health risk.
			Intention Boots worn to protect from thorns.



Implications and Broader Impact

- Additional workshops on the proper use of treated wastewater should be conducted in the region.
- There is a need for improved wastewater treatment.
- These measures, especially when combined, can minimize farmers' health risks in Oued Souhil.

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