

From Environment to Plate: Contaminant Detection in Agricultural Systems through a One Health Perspective

M.Azouz¹, H.Bachir¹, I.Ben Ouadah², W.Lakhdari¹, A. Dahlis¹, H.Irekti¹, H.Si Elhadi³, S.Benarous³, M.Mokhtari⁴, C.Zekkaoui², A.Ouamerali⁵, M.Douzane¹
 INRAA¹, USTHB University², CRNA³, CRAPC⁴, ENSA⁵

Abstract

Contamination of environmental matrices represents a major challenge due to the increasing presence of pollutants affecting ecosystems and human health. This study assesses contaminants in water, soil, and date samples through physicochemical analyses, targeting heavy metals, pesticides, and antibiotics. Adopting an integrated approach, it evaluates interactions between these matrices and associated health risks.

Introduction

The progressive degradation of natural environments due to anthropogenic pressures leads to declining quality of water, soils, and agricultural production. This promotes the dispersion of contaminants (heavy metals, pesticides, antibiotics) that can transfer between environmental compartments and enter the food chain. In this context, an integrated One Health approach is essential to understand these interactions and their impacts on global health (environment–animal–human).

Objectives

- Identify major environmental contaminants (heavy metals, pesticides, antibiotics)
- Evaluate their presence in :
 - Water
 - Soil
 - Dates
- Apply the One Health approach to understand these interactions

Problematics

How do environmental contaminants transfer through water–soil–crop systems, and what are the associated risks to human health within a One Health framework?

Methods and materials

Samples of borehole water, fish basin water, irrigation water, soil, and date (food product) were collected from different region in Algeria to assess their physicochemical characteristics (pH , conductivity....) and the presence of environmental contaminants were performed using the CHARM II radioreceptor assay system. Pesticides , antibiotics and heavy metals analysis still under processing

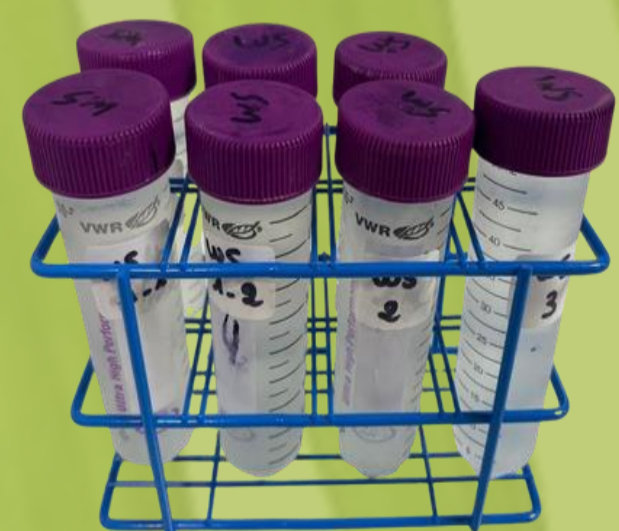


Figure 1 . Water samples



Figure 2. Soil sample



Figure 3. Dattes samples

Analytical methods



Physicochemical analysis for water



Nuclear analysis by radioreceptor assay



Conductivity meter



pH meter

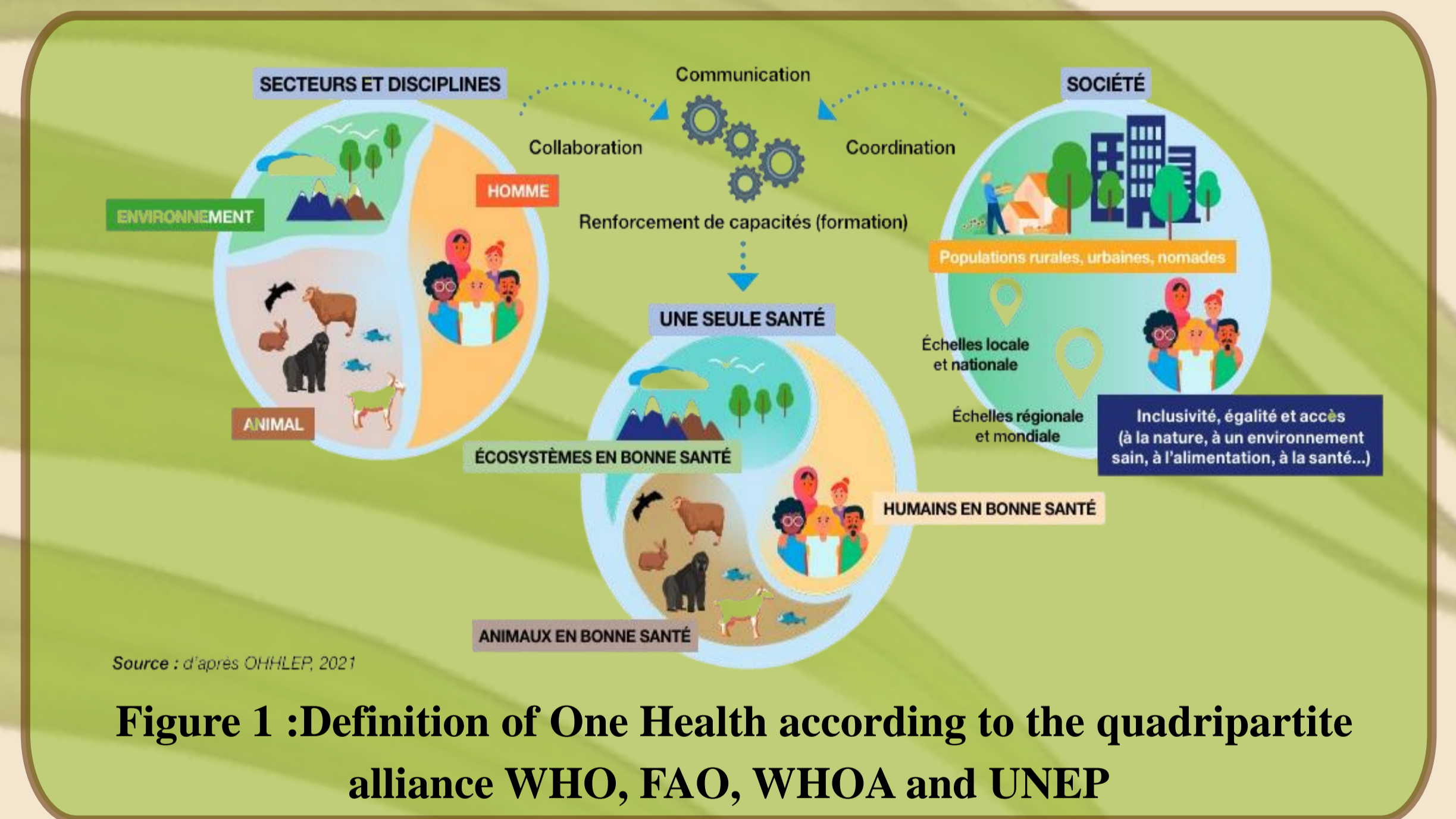
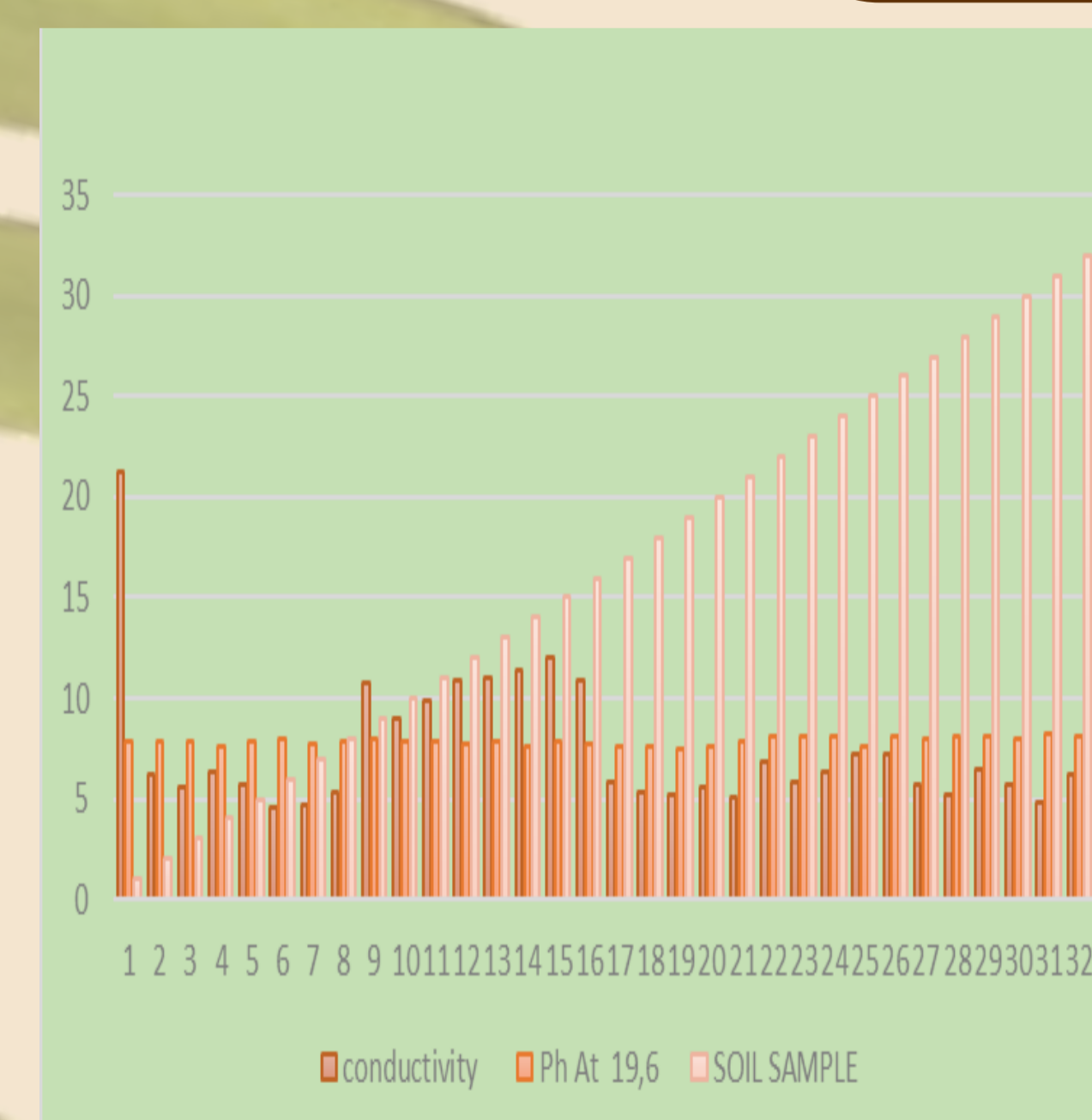


Figure 1 :Definition of One Health according to the quadripartite alliance WHO, FAO, WHOA and UNEP

RESULT



Soil Analysis : pH and conductivity



Water analysis : pH and conductivity

Conclusion

This work contributes to environmental monitoring within a One Health approach. It strengthens food safety and quality, as well as the protection of consumers and the environment. These advances support stronger public policies and future research.

This work was carried out within the Framework of the Regional African project RAF 5091 IAEA / INRAA and the AFOSAN DZ network <https://afosan.org/>