

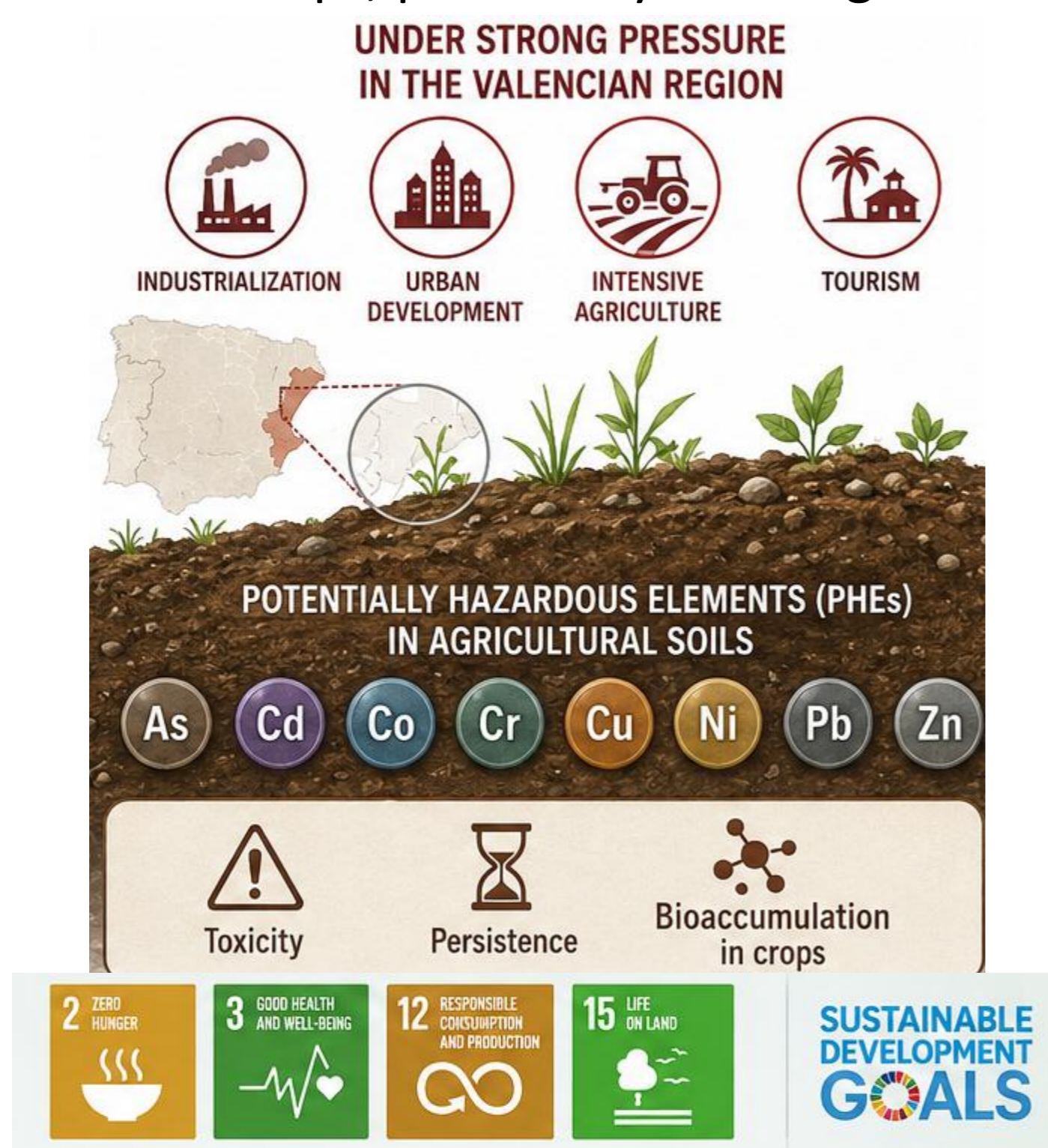
Assessment of the content of potentially hazardous elements in agricultural soils of several municipalities in the Province of Valencia (Spain)

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INTRODUCTION & AIM

Preserving soils and crops is crucial for food quality, as well as for advancing progress toward the Sustainable Development Goals and fulfilling the objectives of the 2030 Agenda. Agricultural soils in the Valencian region are under strong pressure from human activities (industrialization, urban development, intensive agriculture, and tourism). The presence of high concentrations of potentially hazardous elements (PHEs) such as As, Cd, Co, Cr, Cu, Ni, Pb, and Zn poses a risk in agricultural soils due to their toxicity, persistence, and ability to bioaccumulate in crops, potentially entering the food chain.

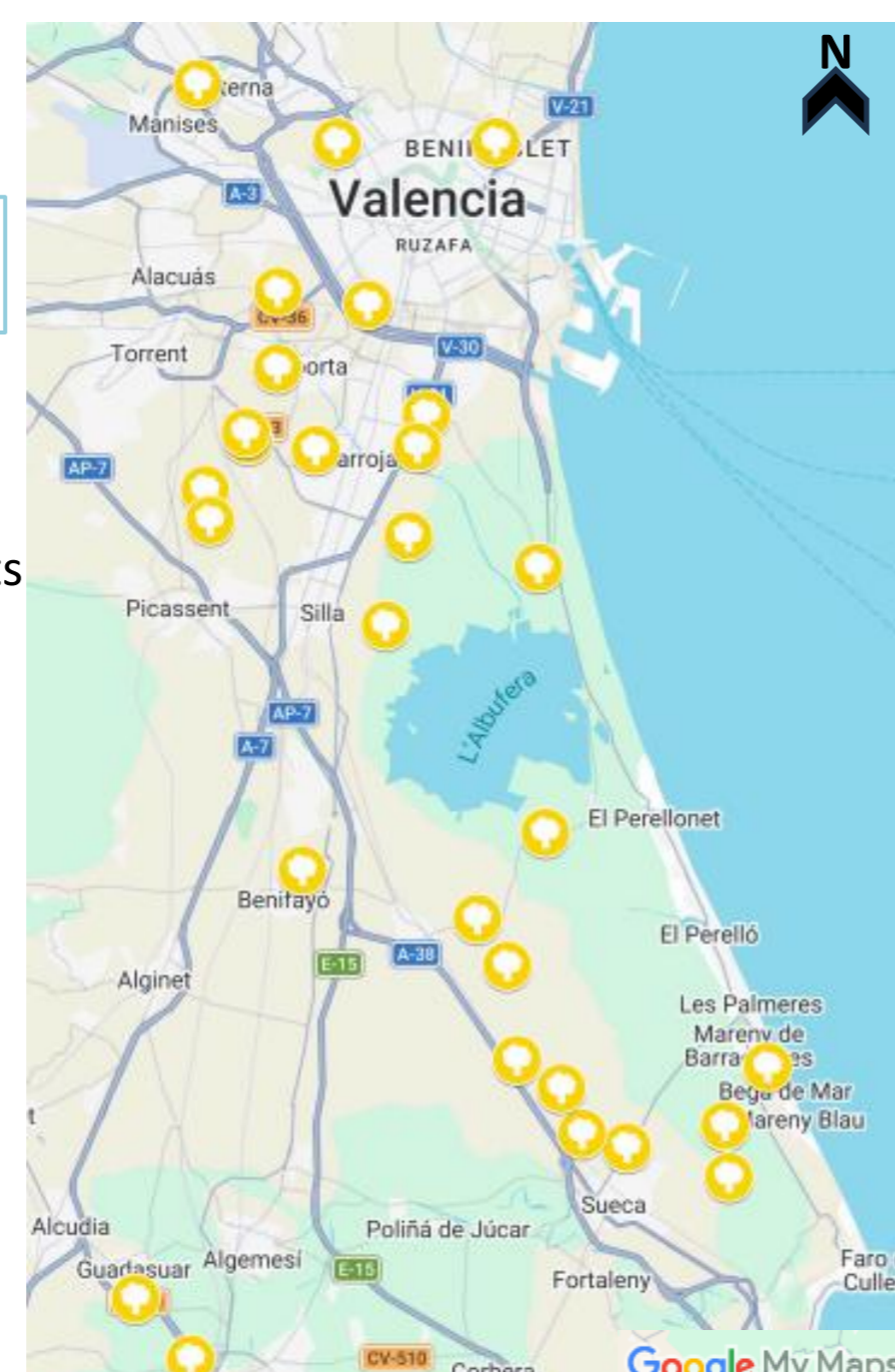
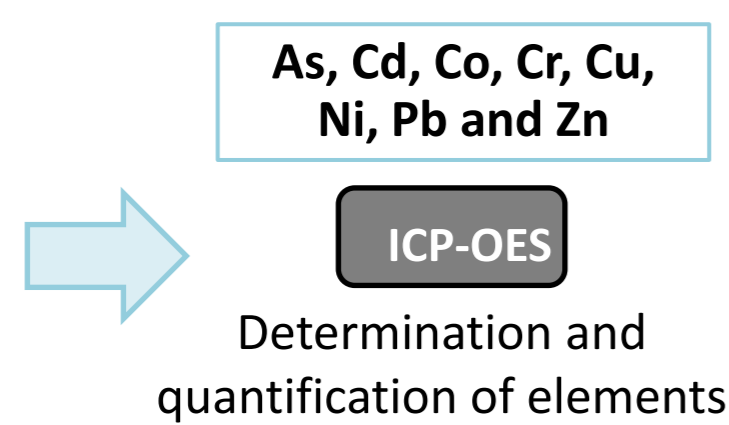


METHOD

In this study, 25 agricultural soil samples from 17 municipalities in the L'Horta and La Ribera districts (Valencia) were analyzed and evaluated. The determination of PHEs was carried out by microwave-assisted digestion in a strongly acidic medium and quantified by ICP-OES.



Strong acid digestion
EPA Method 3051A



- Contamination assessment indices**
- Zinc equivalent (ZnEq)
 - Geoaccumulation Index (Igeo)
 - Enrichment Factor (EF)
 - Pollution Load Index (PLI)
 - Modified Degree of Contamination Index (mCd)
- Generic Reference Levels (GRLs)**
Aragón, Cataluña and Madrid

RESULTS & DISCUSSION

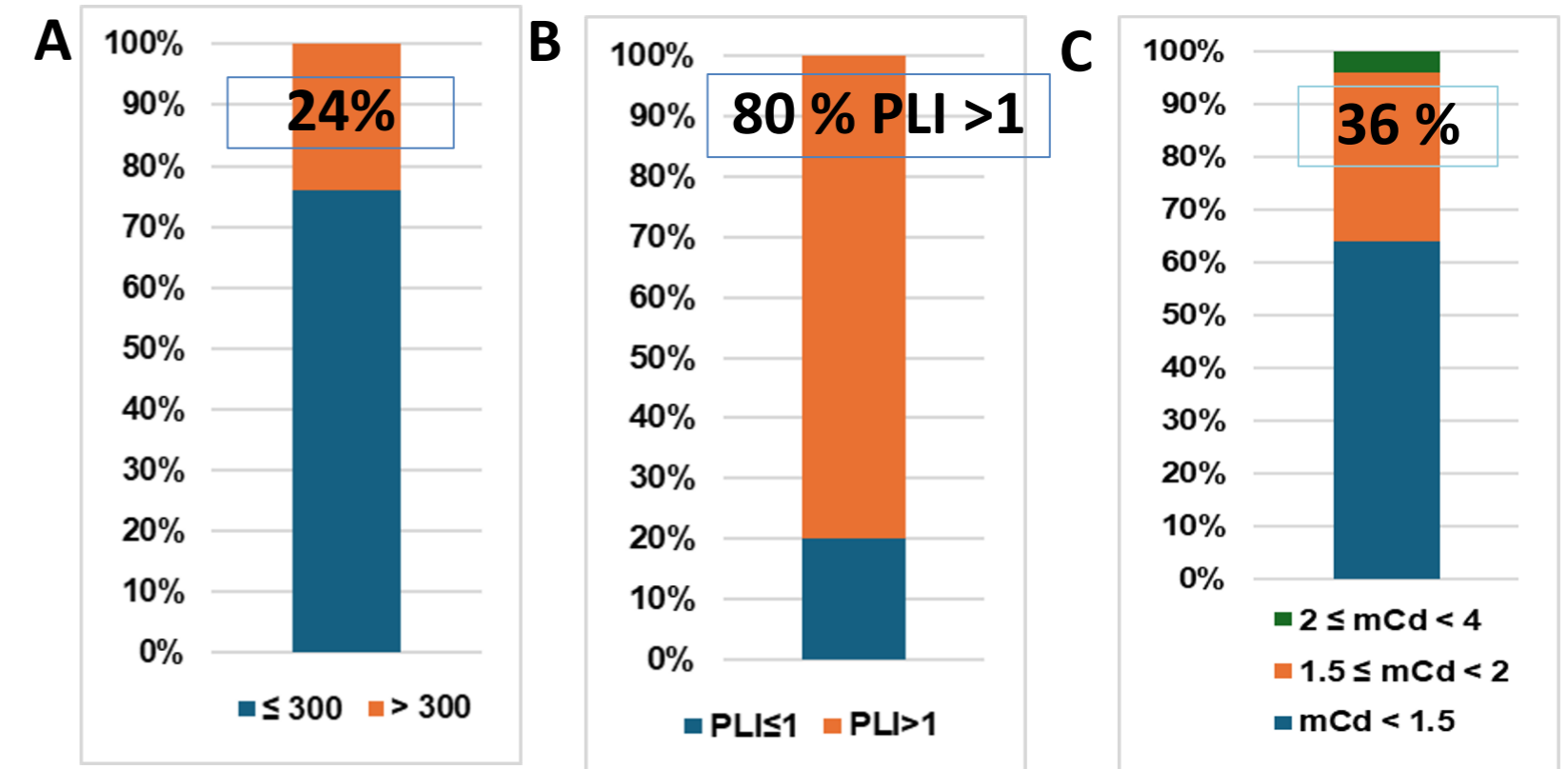


Figure 1. A) ZnEq, values > 300 mg kg⁻¹ indicate elevated contamination levels. B) PLI, values > 1 indicate PHEs contamination. C) mCd, values between 1.5 and 4 indicate low to moderate contamination.

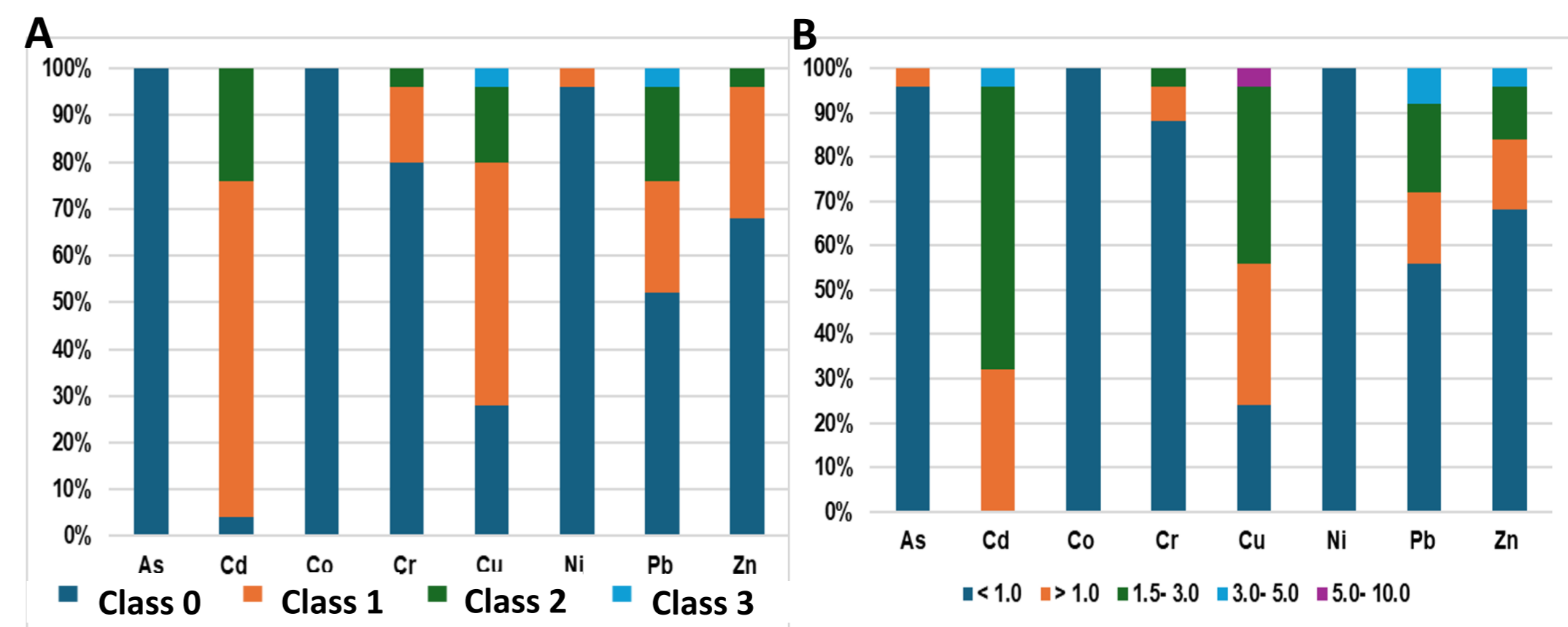


Figure 2. A) Igeo, Class 3 indicates that the soil is moderately to heavily contaminated. B) EF, values between 5.0 and 10.0 indicate significant anthropogenic enrichment.

Contamination ranged from moderate to severe and was associated with anthropogenic sources. Moreover, the application of the indices confirmed the presence of a potential contamination risk, with Cu, Pb and Zn exhibiting the highest risk levels.

Agricultural soil (mg kg ⁻¹)		
Element	Mean value	Aragón
Cu	35,50	28
Pb	49,49	45

Agricultural soil (mg kg ⁻¹)		
Element	Valencia, (V-30)	Madrid
Cr	110,26	90

Agricultural soil (mg kg ⁻¹)		
Element	Alboraya	Cataluña
Zn	226,50	170

The concentrations of Cd, Cr, Cu, Pb, and Zn in some soils exceeded the generic reference levels established for agricultural soils by the Autonomous Communities of Aragón, Cataluña and Madrid.

CONCLUSION

These findings highlight the need to adopt soil management and monitoring measures in the most affected areas in order to prevent risks to food safety and public health.

FUTURE WORK / REFERENCES

Fernández-Gómez, E.; Roca-Pérez, L.; Bech, J.; Rodríguez-Martín, J.A.; Boluda, R. Soil-Plant Transfer and Environmental Levels of Potentially Toxic Elements in Agricultural, Urban and Industrial Areas of the València Region (Eastern Spain). *Toxics* **2026**, *14*, 353. <https://doi.org/10.3390/toxics14050353>