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# FROM BRICK KILNS TO MILK AND HUMAN HEALTH: WHY THE WORLD NEEDS A ONE HEALTH APPROACH

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## Introduction

Brick kilns support construction worldwide, particularly in rapidly urbanising regions of Asia and Africa. However, smoke, fine particles, ash and potentially toxic elements released during brick production can affect air quality and surrounding ecosystems. When kilns operate near farms and residential communities, an important question arises: can pollutants move from the environment into animal products and contribute to human exposure? Investigating this requires a One Health approach connecting environmental quality, animal health and human health.

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## What does research reveal?

A systematic review published in *Environmental Research* in 2024 examined 104 studies on brick kiln pollution, including 74 from South Asia. Particulate matter, sulphur dioxide and carbon monoxide were among the most frequently investigated pollutants. Traditional kiln technologies generally produced higher particulate matter and carbon monoxide emissions than improved designs. The review also identified respiratory health concerns among exposed populations, while noting limitations in the available evidence. Environmental contamination is another concern. A 2024 study in Jammu district, India, analysed 200 soil samples from 50 sites, reporting average lead concentrations of 37.04 mg/kg and cadmium concentrations of 1.91 mg/kg. Some pollution indices indicated moderate contamination, although the overall Pollution Load Index remained below one. A separate investigation covering 43 brick kiln sites in Jammu district found a groundwater Pollution Load Index below one. Lead, cadmium and nickel were below the analytical detection limits used in that study. The researchers recommended continued monitoring. These regional findings demonstrate that pollution patterns can differ between soil and water. Kiln design, fuel, geology and surrounding land use may influence environmental conditions.

## Can pollution reach milk?

Livestock may encounter contaminants through fodder, drinking water, soil ingestion and inhalation. Certain elements can enter animal tissues and, under some circumstances, be transferred into milk. A global systematic review and meta-analysis published in *Science of the Total Environment* in 2024 examined 66 studies on lead, cadmium, arsenic and mercury in milk. It documented these contaminants in milk samples from different regions and identified potential dietary health concerns. Concentrations varied across studies and milk types, highlighting the importance of direct measurement. However, detecting a metal in milk does not establish that a nearby brick kiln caused the contamination. Other possible sources include polluted soil, feed, water and industrial activities.

**Three questions are essential:**

1. **Is contamination present?** Measure individual elements in milk and environmental samples.
2. **Are concentrations concerning?** Compare findings with applicable food-safety standards.
3. **What is the source?** Investigate alternative exposure pathways before attributing contamination to kiln activity.

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## Why investigate animal and human health together?

A One Health investigation considers whether the same environmental source could expose animals and people through different pathways. Cattle serum analysis can help assess circulating concentrations of selected elements, but serum does not necessarily reflect total body burden. Age, nutrition, physiological conditions and exposure timing can influence results. Human exposure may occur through contaminated food, drinking water, airborne particles or occupational activities. The World Health Organization identifies lead, arsenic, cadmium and mercury as important chemical hazards. Lead can damage children's developing nervous systems, while prolonged cadmium exposure can affect kidney health and bone integrity. Nevertheless, detecting a metal in human blood or serum cannot independently identify its source or prove that it caused disease. Environmental evidence and appropriate clinical interpretation are essential.

## A global challenge with local consequences

Brick production ranges from traditional kilns with inefficient combustion to modern installations with improved process control. Fuel quality, kiln design and pollution-control measures influence emissions. Researchers can investigate potential exposure pathways by examining interconnected environmental and biological samples.

| Sample category | Main purpose |
|---|---|
| **Soil and water** | Assess environmental contamination |
| **Fodder and grain** | Investigate agricultural exposure |
| **Cattle serum** | Examine circulating concentrations |
| **Milk** | Assess potential dairy contamination |
| **Human samples** | Investigate possible exposure |

Examining several sample types can reveal patterns requiring further investigation. However, chemical concentrations, background levels and alternative sources must be considered before establishing a transfer pathway.

## What should governments and industries do?

- **Modernise kilns:** Encourage cleaner combustion and improved designs.
- **Strengthen monitoring:** Test air, soil, water and agricultural products where necessary.

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- **Protect livestock and food safety:** Investigate feed, water and milk when environmental findings indicate potential risks.
- **Protect workers:** Reduce occupational exposure to dust and combustion products
- **Coordinate One Health efforts:** Connect environmental scientists, veterinarians, food-safety authorities and public-health professionals.
- **Enforce standards:** Monitor compliance with relevant emission and food-safety requirements.

## Conclusion

Brick kilns contribute to economic development, but their environmental effects deserve attention. Research has documented concerns about kiln emissions, differences in environmental metal concentrations and the importance of monitoring food contaminants. Further studies linking environmental measurements with livestock, milk and human exposure can help distinguish genuine risks from assumptions and guide appropriate prevention. A One Health approach offers a practical way forward:

**cleaner brick production, healthier livestock, safer food and better protection for communities.**

## References

[1] "Brick kiln pollution and its impact on health: A systematic review and meta-analysis," *Environmental Research*, vol. 257, article 119220, 2024. https://doi.org/10.1016/j.envres.2024.119220

[2] "Quantitative analysis of soil quality around brick kilns using pollution indices and ANOVA in Jammu district of Jammu and Kashmir, India," *Environmental Research*, vol. 262, part 1, article 119851, 2024. https://doi.org/10.1016/j.envres.2024.119851

[3] "Pollution indices and correlation of heavy metals contamination in the groundwater around brick kilns in Jammu and Kashmir, India," *Heliyon*, vol. 10, no. 6, e27869, 2024. https://doi.org/10.1016/j.heliyon.2024.e27869

[4] S. Hasanvand et al., "Is the milk we drink safe from elevated concentrations of prioritised heavy metals/metalloids? – A global systematic review and meta-analysis followed by a cursory risk assessment reporting," *Science of the Total Environment*, vol. 948, article 175011, 2024. https://doi.org/10.1016/j.scitotenv.2024.175011

[5] World Health Organization, "Food safety," WHO Fact Sheet. https://www.who.int/news-room/fact-sheets/detail/food-safety