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# TOWARDS ZERO POLLUTION


4 June 2021

## Launch of the **Global Assessment of Soil Pollution Report**

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# Regional Assessment and Management of Soil Pollution in NENA region

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# I. Sources of contaminants in NENA

| Country | Industrial activities | Mining and quarrying activities | Agriculture | Livestock production | Energy production | Transport | Waste management | Other (e.g. dust storms) | Number of publications |
|---|---|---|---|---|---|---|---|---|---|
| Algeria | 2 | 2 | 1 | 1 | 2 | 3 | 3 | 1 | 5 |
| Bahrain | 1 | 0 | 2 | 1 | 2 | 3 | 0 | 3 | 3 |
| Egypt | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 10 |
| Iran | 2 | 2 | 2 | 1 | 3 | 3 | 3 | 3 | 13 |
| Iraq | 2 | 2 | 1 | 1 | 2 | 3 | 0 | 3 | 7 |
| Jordan | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 8 |
| Kuwait | 2 | 1 | 1 | 1 | 3 | 3 | 0 | 3 | 10 |
| Lebanon | 2 | 2 | 1 | 1 | 3 | 1 | 3 | 1 | 10 |
| Libya | 2 | 1 | 1 | 1 | 3 | 3 | 0 | 1 | 4 |
| Mauritania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Morocco | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 |
| Oman | 2 | 1 | 1 | 1 | 3 | 3 | 0 | 3 | 2 |
| Palestine | 0 | 0 | 3 | 1 | 0 | 0 | 3 | 1 | 9 |
| Qatar | 2 | 1 | 2 | 1 | 3 | 3 | 0 | 3 | 2 |
| Saudi Arabia | 2 | 1 | 2 | 1 | 3 | 3 | 2 | 3 | 13 |
| Sudan | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 3 |
| Syria | 2 | 1 | 2 | 1 | 2 | 2 | 0 | 1 | 8 |
| Tunisia | 2 | 2 | 0 | 1 | 0 | 0 | 3 | 1 | 8 |
| UAE | 2 | 1 | 2 | 1 | 3 | 3 | 0 | 2 | 5 |
| Yemen | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 1.94 | 1.52 | 1.53 | 0.90 | 2.40 | 2.46 | 2.50 | 1.94 | 123 |
| | 1: Minor source; 2: Modrate source; 3: Major source; 0: No information | | | | | | | | |

**Based on published works:**

**- Industry, mining and agriculture are moderate to minor sources of soil pollution in the region**

**- Energy production, transport, dust storms and waste management are moderate to major sources in Alegria, Bahrain, Egypt, Iraq, Iran (IR of), Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, UAE.**

**According to the persistence of the contaminants and their bioavailability, the population potentially affected and the health risks that may be associated with the pollution source (carcinogen, chronic diseases); and the environmental compartments affected (soil, groundwater, surface water, indoor/outdoor air).**

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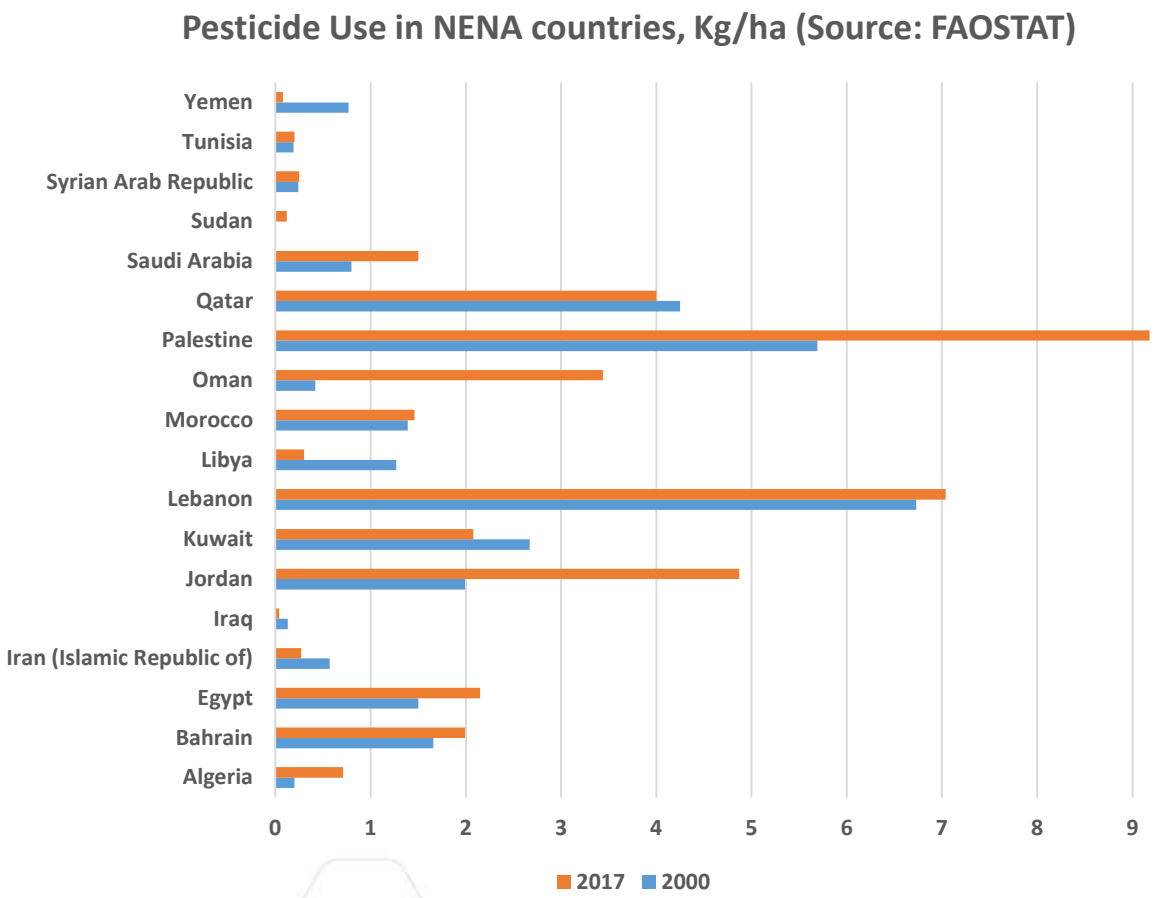
# II. Main contaminants in NENA region




| Country | Types of contaminants (from Literature) | | | | |
|---|---|---|---|---|---|
| | Trace Elements | Pesticides | Radionuclides | Trace Elements in concern | N of Studies |
| Algeria | 2 | 2 | N/I | Hg, Pb, Cu, Zn, Cr | 3 |
| Bahrain | 2 | 1 | N/I | Pb | 5 |
| Egypt | 3 | 2 | 1 | V, Ni, Cr, Cd | 6 |
| Iran | 3 | 2 | N/I | Hg, Pb, Cd, Cr, As, Ni, Zn | 18 |
| Iraq | 2 | N/I | 3 | Zn, Mn, Ni, As | 7 |
| Jordan | 2 | N/I | N/I | Cd, Hg | 3 |
| Kuwait | 2 | 2 | 1 | Cr, Ni, Hg | 10 |
| Lebanon | 2 | N/I | 1 | Cr, Ni, Pb, As, Cd, NO3 | 8 |
| Libya | 2 | 2 | N/I | Pb, Cd, Zn, Cu, Fe, Ni, Ti, Be, V | 4 |
| Mauritania | N/I | N/I | N/I | N/I | N/I |
| Morocco | 2 | N/I | N/I | Cd, Cu, Zn, Pb, Cr, | 2 |
| Oman | N/I | 1 | N/I | N/I | 2 |
| Palestine | 3 | 3 | 1 | NO3, Zn, Cd, Mn, As, Co, Cu, Ni, Pb | 9 |
| Qatar | 1 | N/I | N/I | N/I | 1 |
| Saudi Arabia | 2 | N/I | N/I | As, Cd, Pb, Cu, Hg, Ni, | 9 |
| Sudan | 1 | N/I | N/I | N/I | 2 |
| Syria | 2 | N/I | N/I | Cr, Cd, Zn, Pb, Zn, As | 4 |
| Tunisia | 3 | N/I | N/I | Zn, Pb, Cd | 5 |
| UAE | 2 | N/I | N/I | Cr, Cd, Hg, Ni, V, Cu, Zn | 5 |
| Yemen | N/I | N/I | N/I | N/I | N/I |
| 1. Low, 2 moderate, 3 high; N/I. No information or not reported | | | | | 100 |

High pesticide use on agricultural soils, with Palestine (9 kg/ha/y) and Lebanon (7 kg/ha/y) and Jordan (5 kg/ha/y) applying the highest rates, while Iraq, Sudan, Yemen or Mauritania apply much lower doses (0.2 kg/ha/y).





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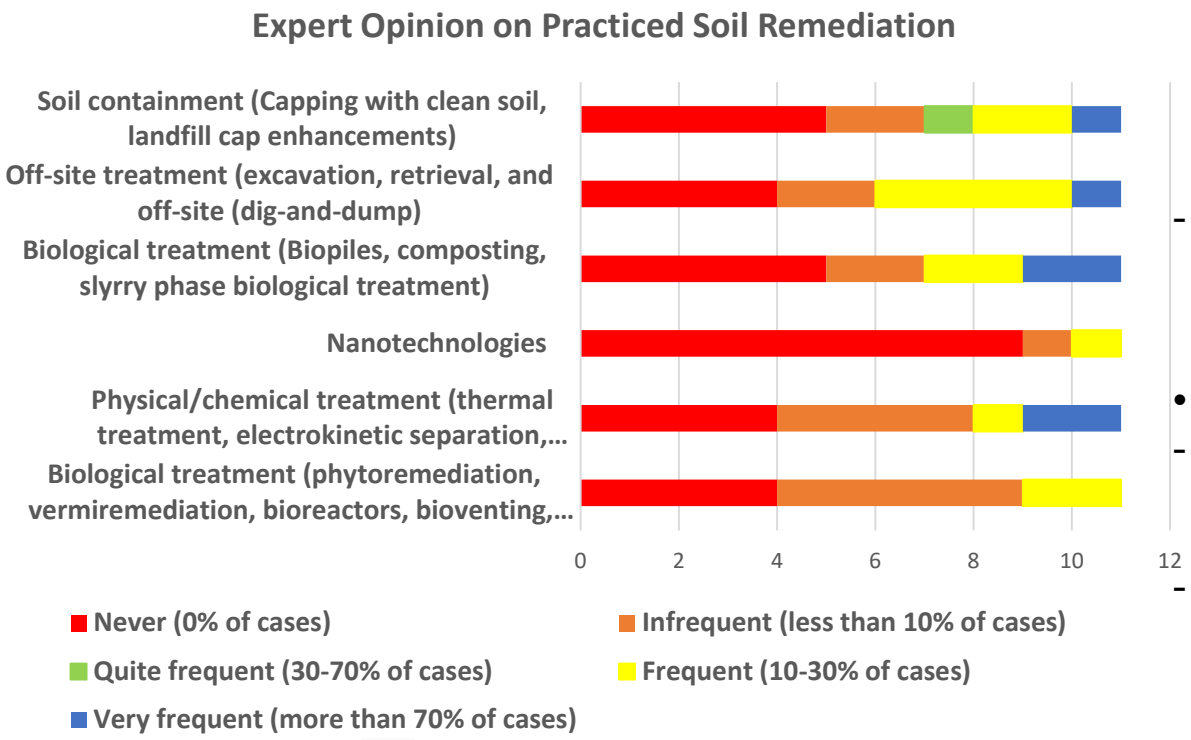
# III. Successful examples of remediation and management




- **In Algeria**
- **Technosols constructed from treated soil, recycled waste and industrial by-products were successfully used for ecological reclamation of degraded industrial wastelands that had been contaminated with PAHs and TEs.**
- **The ability of Bacillus megaterium and Pseudomonas aeruginosa to biodegrade petroleum product (PAH) from contaminated Algerian soil was significantly improved with the addition of biosurfactant like urea.**

- **In Saudi Arabia**
- **The anaerobic digestion of organic fraction and pyrolysis of plastics have been tried for the management of solid wastes and rehabilitation of polluted site.**
- **The detailed review of remediation methods POPs using phytoremediation, bioremediation and a synergy between plants and POPs degrading and detoxifying bacteria was done.**

- **In Syria**
- **preliminary bioremediation of oil spills in Deir ez-Zor, al-Raqqa and Qamishli;**
- **Phytoremediation of TEs polluted soils was tested in Idleb.**

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# IV. Main barriers and constraints in the region to address soil pollution

- Pollution from waste, particularly in urbanized areas, is becoming a significant issue in the NENA region, which is reflected in a high rate of countries that have ratified the Basel, Rotterdam, Stockholm and Minamata Conventions. The Ministry of Environment is the responsible body.
- While having different priorities, most NENA countries lack specific laws on soil pollution and a designated institution with responsibility and sufficient resources. In many cases, the responsibility for regulating pollution is split among a number of institutions with poorly defined competencies.
- Solving the issues of land degradation in NENA region is still within the NAP and focuses mainly on soil salinity, erosion, drought, loss of fertility and conservation of land resources through pollution prevention or remediation.
- **Policy and legislative gaps**. Technical assessment surveys on soil pollution and soil remediation are mainly oriented towards laboratory assays, pilot sites and peer-reviewed journals. The link between science and policy needs to be strengthened and knowledge and awareness needs to be bridged. Sufficient legislation, awareness, technical infrastructure and funding must be in place in the office and in the field.
- **Science to policy gaps**. The management of polluted soils requires a functional, updated, soil information system to enable land quality assessment in order to establish soil conservation strategies and identify green spots to protect and hot spots to remediate.

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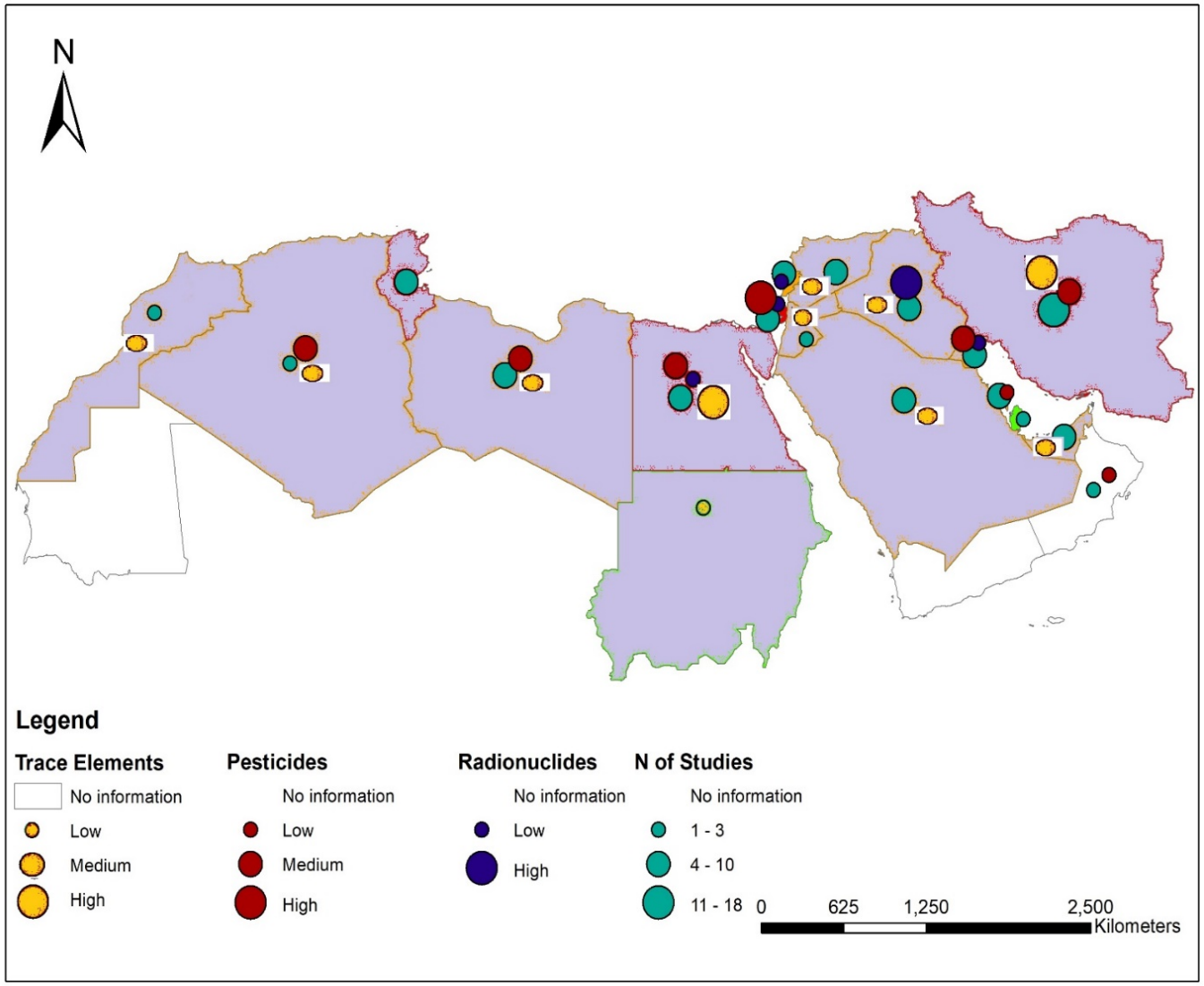
# V. Conclusion

1. Studies on the hazards from pollution in NENA countries focused mainly on TEs. No information was found from Yemen and Mauritania.
2. Assessment of the status of soil pollution with other contaminants such as pesticides, radionuclides, or microplastics is still at an early stage.
3. Radionuclide pollution was reported only in five NENA countries (Iraq, Gaza, Kuwait, Lebanon and Egypt).
4. The assessment and monitoring of soil pollution continues to receive attention from academia and researchers. It has not yet reached the level of regular national assessment and monitoring policies and programmes.



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