

Global Oil Conflict, Fertiliser Dependence and Kenya's Soil Future

Why this calls for a different approach

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SOIL ATLAS 2025 FOOD SYSTEMS GEOPOLITICAL RISK





When Oil Shocks Become Food Realities

When conflict escalates — such as the one unfolding in the Gulf — the first images that come to mind are oil tankers, fuel prices and diplomatic tension. But the effects do not stop there. They move into fertiliser markets, then into farms, and from there into food systems. In countries like Kenya, this is not something distant or theoretical. It shows up quickly in the cost of farming, even if the full effects on consumer food prices may take longer to work their way through markets.

The Hidden Link

Modern food systems are tightly bound to fossil fuels — not only through fertiliser, but across production, transport, storage, processing and packaging. Food systems account for at least **15% of global fossil fuel use** each year.

Where Energy Is Embedded

Only about **20% of food system energy use** occurs at the farm level. The majority is embedded in processing, packaging, retail and consumption — making the dependency far broader than fertiliser alone.

Disruptions around key trade routes such as the **Strait of Hormuz** are already contributing to rising fertiliser prices, reflecting tightening energy markets and supply constraints.

⚠️ Recent global analyses are clear: the more agriculture depends on fossil fuels and imported synthetic fertilisers, the more exposed it becomes to global instability. This Gulf crisis is not only an oil story — it is a food systems story.



A System Built on Dependency

Kenya is firmly part of this system. Agriculture depends heavily on synthetic fertilisers, most of which are imported. This ties production directly to international energy markets, shipping routes, and geopolitical stability.



Most commonly used fertilisers, such as urea, originate from ammonia produced through the Haber-Bosch process — which relies heavily on natural gas as both an energy source and a key feedstock for hydrogen. In practical terms, this makes nitrogen fertiliser a fossil fuel-based product.

Fertiliser

Nitrogen fertiliser production is closely tied to fossil fuels and global supply chains, as documented in the Soil Atlas 2024.

Farm Machinery

Tractors, irrigation pumps and harvesting equipment all depend on fossil fuel energy, embedding dependency at every stage of production.

Transport & Storage

Cold storage, food processing, transport networks and packaging — particularly plastics — together account for a significant share of petrochemical demand.

Living Soil

The Soil Atlas 2024 reminds us that soil itself is a living system underpinning food production, water regulation and ecological balance — fertility cannot simply be supplied from outside.



Soil Health: The Missing Foundation

The *Soil Atlas: Kenya Edition 2025* brings the global argument into local focus, revealing a picture that makes fertiliser dependency even more precarious.

20%

Arable Land

Only about 20% of Kenya's land is suitable for agriculture — underscoring how limited and valuable this resource truly is.

Low

Soil Organic Carbon

Soil organic carbon is low across large areas of Kenya, reducing the capacity of soils to retain nutrients and support plant growth.

Wide

Degradation Spread

Soil degradation — including erosion, nutrient depletion and soil acidity — is widespread, undermining productivity and long-term resilience.

- ⊗ Fertiliser access alone cannot solve declining soil fertility. Where soils are degraded, fertiliser efficiency declines. In some cases, continued application without restoring soil health can deepen imbalances. The issue is not only whether farmers can access fertiliser — but whether soils are healthy enough to respond.

Globally, soil degradation is already affecting a significant share of agricultural land, reinforcing the urgency of restoring soil systems. The central question must shift: not how to secure more fertiliser, but how to build soils that sustain productivity.



What Soil Biology Tells Us — and What Must Change

Scientific evidence supports a broader understanding of soil fertility. Mineral fertilisers can increase yields, particularly where nutrients are limiting. But their effects on soil biological systems are complex, and they do not necessarily improve long-term soil health or resilience.

The Biological Reality

More recent work highlights that soil fertility depends on **biological processes** — microbial diversity, organic matter and nutrient cycling — rather than nutrient inputs alone. This has renewed interest in biological pathways:

- Composting and manure use
- Nitrogen-fixing plants and cover crops
- Microbial interactions and arbuscular mycorrhizal fungi
- Agroforestry and crop diversification

Studies on arbuscular mycorrhizal fungi show they can improve nutrient uptake and support soil function, potentially reducing fertiliser dependence — though benefits depend on overall soil health and management.

Why "Green" Fertiliser Is Not Enough

There is growing recognition that even "green" fertiliser solutions do not address the deeper issue of dependency. While alternative production methods may reduce greenhouse gas emissions, they do not fundamentally change the reliance on externally produced inputs or the vulnerabilities that come with it.

i Focusing only on fertiliser risks missing the broader system. The same fossil fuel dependence runs through transport, processing, storage and packaging — meaning a shift in fertiliser production alone does not fundamentally change the food system.

The conclusion is increasingly clear: **the issue is not only fertiliser supply; it is the system built around it.**

Soil fertility is fundamentally biological, not just chemical. The lesson from science and from the field points in the same direction: restore the living system, and productivity follows.

From Crisis to Transition: Kenya's Path Forward

The current Gulf crisis should be read as more than another episode of price volatility. It reveals a deeper vulnerability in how food systems are organised. But it also creates an opportunity. Kenya already has the evidence, the policy direction and the practical experience to support a genuine transition.



Invest in Soil Organic Matter

Support farmers to build biological fertility through composting, manure use and organic inputs — generating fertility within farming systems rather than importing it through global supply chains.



Strengthen Agroecological Farming

Kenya's National Agroecology Strategy (2024–2033) recognises the need to strengthen soil health, support ecological farming systems and reduce dependency on external inputs. Farmers are already using agroforestry, crop diversification and biological soil inputs.



Build Local Input Systems

Strengthen local production of organic and biological inputs so that supply chains are shorter, more resilient and less exposed to geopolitical shocks in distant energy markets.



Align Policy with Soil Health

Align agricultural policy with long-term soil health goals — not reactive responses to price spikes. This does not mean abandoning fertilisers overnight, but rethinking their role within a broader, more resilient system.

- ✔ Kenya already has the evidence, the policy direction and the practical experience to support this transition. The soil atlases remind us that soil is the foundation of life. The question is whether this moment of crisis will lead to real change — or whether the cycle of rising costs, external shocks and reactive responses will continue.

Footnotes

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