DISCUSSION PAPER

"GREEN" SYNTHETIC FERTILISERS: SOLUTION FOR SOIL, CLIMATE, WATER AND COMMUNITIES OR A DEAD END?

The situation in Kenya and the role of the German Development Cooperation

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KEY MESSAGES

1. The African Soil Health and Fertilizer Summit underscored the critical need to halt soil degradation as part of the fight against hunger. However, the Soil Health Action Plan lacks a clear vision for long-term soil health strategies and fails to include diverse perspectives. Civil society organisations and farmers must be actively involved in shaping solutions, ensuring that the voices of those most affected are not overshadowed by dominant representatives of the industrial agricultural system like AGRA and Yara.

2. Green hydrogen-based synthetic fertilisers are not a pathway to sustainable agriculture. Despite lower emissions during production, their high costs entrench the agricultural system in an industrial model, delaying the adoption of long-term solutions that improve soil health. On-farm, they have the same damaging impacts as fossil-based fertilisers: high soil emissions, water contamination beyond planetary boundaries, degraded soil health, and increased dependency of smallholder farmers on expensive inputs.

3. Tripling the use of synthetic fertilisers, whether from renewable energy sources like green hydrogen or fossil fuels, is not the solution to achieving zero hunger or food security. Addressing hunger is far more complex than the myth that synthetic fertiliser can guarantee abundant harvests. Both people and soils have unique, context-specific needs that require tailored, informed agricultural strategies. Agroecology offers a holistic, sustainable approach that promotes long-term food sovereignty by considering ecological, cultural and social factors.

4. Civil society organisations in Kenya and worldwide call for a fundamental transformation of agricultural practices to empower small-scale farmers and reduce reliance on synthetic inputs. They emphasise the need for agroecological approaches that prioritise soil health and biodiversity, rather than simply substituting one synthetic fertiliser for another.

5. Moreover, civil society organisations emphasise the crucial role of the German Ministry for Economic Cooperation and Development (BMZ) in advancing these goals. The BMZ's initiatives already prioritise improving soil health and promoting agroecology through various programs and this support should be further expanded. It should lead to an agroecological support program, to integrate soil health into a clear agroecological frame. Rather than supporting the production of green hydrogen fertilisers the emphasis must be on a cohesive policy that champions holistic, sustainable agricultural solutions through agroecology.

INTRODUCTION

In May 2024, the African Soil Health & Fertilizer Summit (ASHF) in Nairobi marked a significant shift in addressing food security by recognizing that increasing fertiliser use alone cannot solve the problem of hunger and malnutrition; prioritising soil health is essential. For years, industry stakeholders and organisations like AGRA (Alliance for a Green Revolution in Africa) and the Bill Gates Foundation have successfully pushed African governments into adopting a simplistic strategy based on the notion that increasing input provision alone could solve food security challenges. This approach, however, has largely overlooked critical factors, such as soil health. As a result, this approach has led to soil degradation, financial strain on governments due to subsidies, and mounting debts for many farmers. A 2020 study already exposed the false promises of this strategy, highlighting the failure of AGRA's approach.[1]

Now, **for the first time the ASHF has called officially for a shift away from these short-term fixes, by integrating soil health into the conversation, aiming to address the root causes of food insecurity** rather than just treating the symptoms. However, one of the summit's outcomes - to triple the production and use of synthetic and organic fertilisers by 2034 - conflicts with this focus on soil health, as it does not adequately weigh the benefits and drawbacks of each option. Serious concerns remain about whether the Nairobi Declaration[2], the 10-year Soil Health Action Plan[3], and the Soil Initiative for Africa[4] will genuinely lead to the restoration of degraded land and ensure sustainable food production.

Civil society has questioned whether these initiatives merely continue ineffective practices, promoting **business as usual under a different guise**.[5a] [5b] Given worsening food insecurity across Africa, their scepticism is justified. In 2023, over 298 million Africans faced undernourishment[6], exacerbated by the COVID-19 pandemic, ongoing conflicts, and climate change. With 65 percent of the continent's land degraded[7] the need for sustainable long-term solutions has become more urgent.

For Kenya, reducing its dependence on imported fertilisers is a key priority, with the production of synthetic fertilisers based on green hydrogen central to this strategy. The **2023 Kenya Green Hydrogen Strategy and Roadmap**[8] aims to replace up to 50 percent of imported nitrogen fertiliser with locally-produced green hydrogen-based alternatives by 2032. However, it does not mention organic fertiliser production. This shift supports efforts to reduce import reliance and transition to cleaner energy, but it also raises concerns about its ability to address broader social and environmental issues, especially with the absence of agroecological solutions.

Germany, a key partner in Kenya's green hydrogen strategy, has increased its interest in fostering hydrogen markets due to its energy transition and the geopolitical effects of Russia's war in Ukraine. With limited hydrogen production capacity within Europe, Germany is actively supporting hydrogen projects in African countries like Namibia, Nigeria, Angola, and Kenya. Germany's backing of Kenya's Green Hydrogen Strategy, particularly its promotion of synthetic green hydrogen-based fertilisers for African agriculture, aligns with its own energy goals.

These approaches raise important questions that we aim to explore in this paper:

Will the shift from fossil-based synthetic fertiliser to green hydrogen-based fertiliser truly address Africa's food security challenges and ensure that the Soil Health Action Plan is implemented in a transitional way, or simply perpetuate harmful practices?

Are these so-called "green" hydrogen-based fertilisers truly as sustainable as they claim, or do they merely maintain reliance on synthetic inputs? The term "green" suggests sustainability, but the environmental and social impacts of synthetic fertiliser use must be carefully scrutinised to avoid repeating the same mistakes that have led to soil degradation and food insecurity in the past.

What role does the German government, particularly the Federal Ministry for Economic Cooperation and Development (BMZ), play in steering the Soil Health Action Plan toward a genuine transformation aimed at improving soil health and enhancing long-term food security?

CRITICAL ASPECTS OF THE SOIL HEALTH ACTION PLAN

The African Fertiliser and Soil Health Action Plan (2023-2033) emphasises the need to **boost Africa's agricultural production without expanding the area under cultivation**, while also increasing the production of nutritious crops. Achieving this requires addressing biodiversity loss and environmental degradation, particularly in the face of climate change. Kenya is already grappling with **severe climate-related challenges**, including irregular rainfall patterns, prolonged droughts, and degraded soil. But Kenya is not alone in this, approximately 65 percent of Africa's soils are currently in a degraded state.[9]

The ASHF summit officially recognized this critical issue for the first time, highlighting the **urgent need to halt soil degradation**. This marks an important but overdue shift towards achieving food security and a chance to implement a transformational change. However, while the Soil Health Action Plan serves as a framework for member states of the African Union, it **lacks clear direction** for countries to develop long-term soil health improvement strategies. The 10-year action plan, instead of offering comprehensive guidance, fails to address the differing views that emerged during the Nairobi AFSH summit. Although agroecological perspectives contributed to shaping the AHSH, the conversation was still dominated by influential industrial players like AGRA and the fertiliser company Yara. This dominance is evident in the 10-year action plan, which fails to adequately reflect the diversity of voices involved.

The Soil Initiative promotes a **mix of synthetic (inorganic) and natural (organic) fertilisers** as a win-win solution, and the Soil Health Action Plan calls for tripling this mix, downplaying the importance of organic fertilisers. However, past experiences have shown that focusing solely on fertilisers is not sufficient to achieve food security[10]: Despite increased fertiliser use since the Abuja Declaration in 2006, food insecurity remains widespread, and soil degradation has worsened, posing a growing threat to future food security. For instance, Kenya applies 68 kg/acre of fertiliser[11] yet produces less grain per hectare than Uganda[12], which uses only 2 kg/acre.[13] This stark contrast demonstrates that more fertiliser does not necessarily result in higher yields.

An analysis of AGRA projects in Burkina Faso and Ghana reveals that **chemical inputs and high-yield seeds have not improved production or incomes for smallholder farms**.[14] Many farmers are now in debt and reliant on expensive pesticides and fertilisers, with prices soaring since the Russian war in Ukraine, while fertiliser companies like Yara have seen a substantial increase in profits.[15] Similarly, Zambia, despite having one of the highest fertiliser consumption rates in Africa—averaging 65 kg per hectare—ranks poorly on the Global Hunger Index 2023, demonstrating that higher agricultural productivity in specific crops does not guarantee better food access for local populations.[16] Factors such as political conflicts, land and water access, and the types of crops grown (e.g. nitrogen-dependent cash crops versus locally adapted varieties) significantly influence food security.

African countries should have the autonomy to choose **sustainable practices tailored to their specific needs**, rather than being subjected to a one-size-fits-all approach. The ten-year action plan's proposal to use both inorganic and organic fertilisers to increase food production is seen by many Kenyan CSOs as a false solution. Decades of synthetic fertiliser use have already acidified soils, necessitating a major shift towards agroecological practices to restore soil health and build organic matter. This transformation cannot be achieved by simply increasing the use of nitrogen-based fertilisers. In this context, African faith leaders, supported by AFSA (African Food Sovereignty Alliance), have called upon the Bill and Melinda Gates Foundation, one of the major funders of AGRA, to make reparation payments for the damage caused by their initiatives in Africa. **These initiatives, which promoted industrial agriculture reliant on synthetic inputs and seeds, have degraded soils and placed farmers in a cycle of dependence on these synthetic products**. As a result, many farmers have lost their dignity and autonomy. This call for reparations underscores the widespread recognition across Africa that solutions centred on synthetic fertilisers are not seen as viable by millions of farmers and stakeholders.

BOX 1

ONGOING INITIATIVES IN KENYA TOWARDS SOIL HEALTH MANAGEMENT

The ongoing promotion of synthetic fertilisers, whether mixed with biofertilisers or not, undermines current policy interventions in Kenya that are driving holistic soil health initiatives. Kenya's recent **Agricultural Soil Management Policy (2023)** emphasises the need for sustainable soil management, yet biofertilisers remain underutilised. Local initiatives offer alternative paths to improving soil fertility without relying on harmful external inputs. Murang'a County in Kenya has taken the lead by designing and implementing an Agroecology Policy and Strategy, while many other counties are following suit. Furthermore, the **Intersectoral Forum on Agrobiodiversity and Agroecology (ISFAA)**, a multi-stakeholder platform in Kenya, is in the final phase of launching a **National Agroecology Strategy**. However, these efforts are threatened by the outcomes of the Summit. The **National Fertiliser Use Recommendations** unfortunately does not mention sustainable methods of adding nutrients to the soil. Only **Kenya's National Environmental Action Plan (NEAP)** mentions biofertilisers as an environmentally friendly alternative to chemical fertilisers.

SYNTHETIC FERTILISERS AND SOCIO-ECOLOGICAL IMPACT

The availability of synthetic nitrogen fertilisers contributed to a massive boost in agricultural production in the Global North, but they come with significant ecological and social costs.

Impacts on the food system, nutrient composition and human health:

Synthetic nitrogen fertilisers have transformed agriculture into linear models characterised by monocultures and a disconnection between land and livestock. This shift has reduced dietary diversity, transformed food into agricultural commodities to redirect oversupply from food markets into fuel, feed, and fibre markets, and marginalised small-scale farms. As a result, global malnutrition has worsened, particularly in the Global South, as overproduction has been channelled into non-food sectors rather than addressing hunger, while also driving down prices for small-scale farmers. Compounding these issues, the inefficiency of nitrogen use—where around 60 percent is lost[17]—has further strained ecosystems, breaching the planetary boundary for nitrogen-phosphorus cycles[18] and deepening the environmental crisis. The reliance on nitrogen fertiliser has led to the dominance of crops like maize, wheat, and rice, which are bred for monoculture and respond with high yields to synthetic fertilisers but are highly susceptible to pests and underperform when not adequately fertilised. These monocultures reduce plant diversity, diminish soil organic matter and increase reliance on pesticides, which pose health risks. As a result, local food production with local, often nutrient-rich plants have been displaced and at the same time the dependency on expensive food imports increased.[19] High-yielding varieties are more prone to nutrient dilution due to rapid growth and less developed roots. Consequently, essential minerals have been reduced in the food supply, impacting global health.[20] At the same time these crops are more vulnerable to drought conditions.

Effects on Climate change:

The lifecycle of synthetic nitrogen fertilisers - from production to application—significantly contributes to climate change, accounting for approximately 2 percent of global greenhouse gas emissions. Of these emissions, 38 percent originate from the production of fertilisers, while 62 percent are attributable to their application and transport.[21]
A major concern is the significant increase in nitrous oxide (N_2O) emissions that occur after synthetic fertilisers are applied to fields.[22] N_2O is 265 times more harmful to the climate than carbon dioxide (CO_2), making it vital to reduce these emissions in the fight against climate change. Organic fertilizers are not entirely emission-free either. However, due to their slower release of available nitrogen and increased denitrification, they emit less nitrous oxide compared to synthetic fertilizers.[23]

Impact on Soil Health:

Excessive use of synthetic fertilisers accelerates soil degradation by disrupting natural nutrient cycles, such as biological nitrogen fixation and mycorrhization, and reducing microbial diversity. This disruption leads to nutrient imbalances, soil acidification, impaired phosphorus absorption, and decreased organic matter.[24] As a result, soil fertility declines, further reducing the effectiveness of fertilisers and undermining ecosystem stability.

Impact on Water Quality:

Synthetic nitrogen fertilisers heavily impact water quality, with excess nitrogen leaching into both surface and groundwater. This runoff can cause eutrophication, leading to harmful algal blooms that deplete oxygen and disrupt ecosystems. Groundwater contamination is especially concerning, as nitrates from fertilisers can infiltrate drinking water, posing serious health risks like methemoglobinemia (“blue baby syndrome”) in infants. The challenge is even more pronounced in many countries in the Global South, where comprehensive water quality programs are often lacking. Without effective monitoring and regulation, the risks of water contamination are heightened, threatening both public health and environmental sustainability.

Effect on Food Security:

Programs aimed at increasing the use of synthetic fertilisers have shown little impact on food security, often failing to alleviate malnutrition and increasing economic risks for smallholder farmers.[25] In 13 AGRA target countries, where synthetic fertilisers were heavily promoted, the number of undernourished people grew from 100.5 million to 131.3 million between 2004-2018.[26] This suggests that synthetic fertilisers do not solve global hunger and often exacerbate economic challenges.

FOSSIL-FREE FERTILISER IS NOT GREEN!

Kenya is actively promoting green hydrogen fertiliser production as a key strategy to **reduce its reliance on synthetic fertiliser imports and decarbonize agriculture**. The country aims to replace 50 percent of its nitrogen fertiliser imports (300,000–400,000 tons annually) with locally produced alternatives. Several large-scale projects are planned, including two major plants near Lake Naivasha, one of which may receive support from the German government. Kenya is also exploring the export of green hydrogen-based fertilisers and plans to build facilities in Mombasa to reduce transport costs, while smaller on-site plants are already operational to kickstart local production.

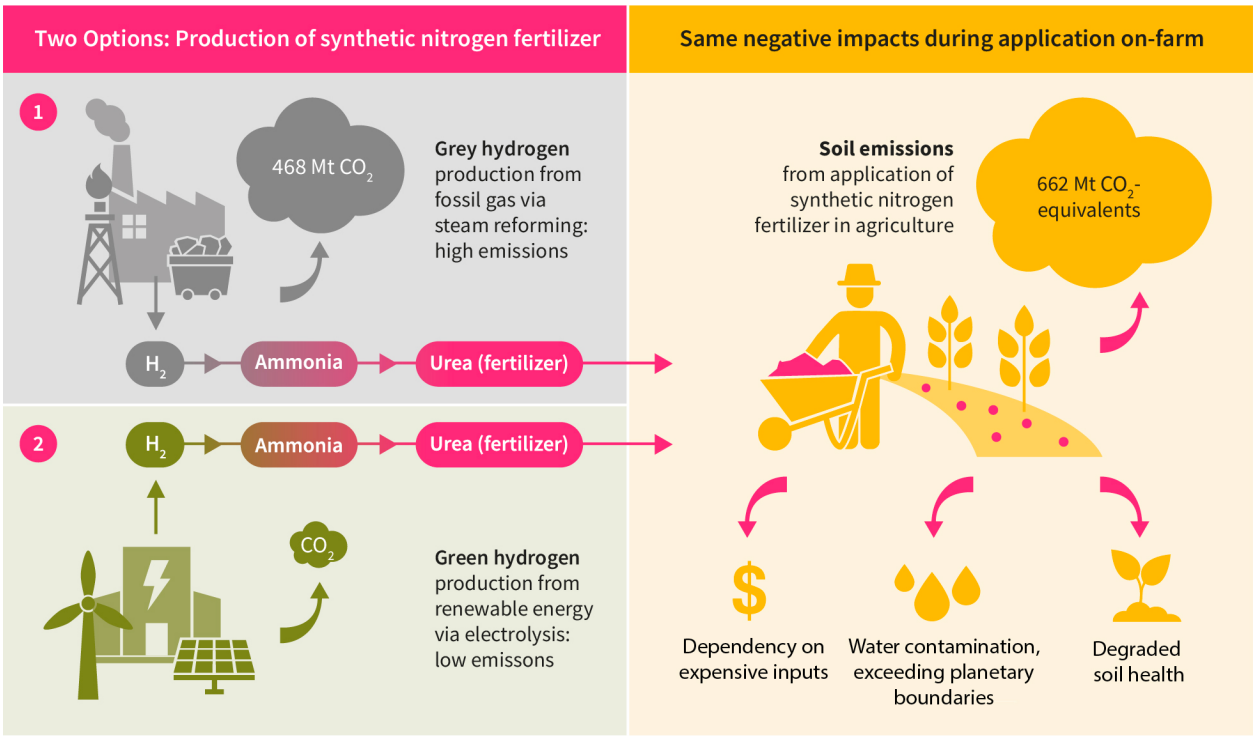
Although this approach could reduce dependency on imports, it raises **sustainability concerns**. The plan focuses solely on green hydrogen-based fertilisers, without considering organic alternatives, prompting questions about whether these "green" fertilisers are truly sustainable or simply perpetuate reliance on synthetic inputs. The **environmental and social impacts of producing and using green hydrogen-based fertilisers** must be carefully scrutinised to avoid repeating the mistakes that have led to soil degradation and food insecurity in the past.

While the **production** of these fertilisers may result in ower CO_2 emissions, the impact during the **application** on-farm stays the same. Synthetic nitrogen fertilisers based on green hydrogen share the same environmental and socio-economic issues as their fossil-based counterparts. The most harmful emissions, such as nitrous oxide (N_2O)—which is 265 times more potent than CO_2—continue to occur during their use on-farm. Therefore, **despite the**

BOX 2

PRODUCTION OF GREEN HYDROGEN-BASED SYNTHETIC FERTILISERS

Green hydrogen-based synthetic fertilisers are produced using renewable energy to power electrolyzers, which split water into hydrogen and oxygen. This green hydrogen is then combined with nitrogen from the air through the energy-intensive Haber-Bosch process to create ammonia, similar to fossil-based fertiliser production. The use of green hydrogen reduces emissions emerging from the production process of fossil based synthetic fertilisers by about 40 percent. However, approximately 60 percent of on-farm emissions, as well as water contamination, degraded soil health and dependencies of farmers on external inputs still persist.



greener production process, these fertilisers are not climate friendly. Moreover, they both contribute to soil degradation and decrease water quality. Both types of fertilisers are often inaccessible to small-scale farmers due to high production and transportation costs. This makes them unaffordable, especially in the Global South, exacerbating inequalities in agricultural production and food security. Thus, the promotion of "green" fertilisers as a sustainable solution is misleading, as they do not resolve these fundamental issues and continue to **perpetuate current industrial agricultural practices**, creating dependencies on these products and allowing fertiliser companies to continue producing under the guise of decarbonization.

GREEN HYDROGEN BASED FERTILISERS POSE ADDITIONAL CHALLENGES:

The **high investment costs** associated with producing fertilisers from green hydrogen excludes this option for short-term solutions within the transition toward soil health. Substantial investments in new technologies and infrastructure are necessary, and a long-term commitment is often needed for these investments to pay off, making green fertilisers expensive and even less accessible for small-scale farmers. These high prices keep them out of reach for small-scale farmers, limiting their access to sustainable options and increasing their economic burden. Even worse, when state funds or development aid are invested in these technologies and infrastructure, it diverts resources from other critical areas. For instance, it limits support for agroecological extension services that could benefit all farmers.

Producing green hydrogen requires **significant energy**, usually sourced from renewables like wind and solar power. The high energy demand makes this process both inefficient and expensive, limiting its feasibility to regions with abundant, low-cost energy. While Kenya generates 80 percent of its energy from renewables[27], primarily geothermal sources (45 percent), a significant portion of the population still lacks access to electricity. Expanding green hydrogen production would necessitate further geothermal development or large-scale solar projects, potentially requiring extensive land use, which could lead to environmental and social challenges.

The production of green hydrogen via electrolysis consumes **large amounts of fresh water**, which is particularly problematic in regions already facing water scarcity (see box 3). As a result, desalination becomes a necessity in many of these locations. To produce one kilogram of hydrogen, 83 kilograms of seawater are needed, resulting in 59 kilograms of waste, primarily consisting of high salinity brine.[28] The high energy requirements of the desalination process and the management of brine pose significant environmental challenges.

As demonstrated by the only on-site green fertiliser plant at Lake Naivasha (see box 4 next page), **the technology is still under development**, raising questions about large-scale availability and cost-effectiveness. Currently available forms of green fertilisers have clear technical and economic disadvantages and can significantly harm the environment.

BOX 3

WATER AVAILABILITY IN KENYA

Kenya faces a serious water shortage, with each person having access to less than 1000 m^3 per year, which is far below the level considered necessary to avoid water stress. Around 18 million people don't have reliable access to clean water, and only 56 percent of the population has access to safe water supplies.[29] The situation is worsened by unequal water distribution, climate change, and pollution from industrial and agricultural activities, with the two latter responsible for 80 percent of water contamination.[30] The use of fertilisers, supported by government subsidies, leads to **runoff that carries nutrients and soil into water sources** causing high pollution levels.[31] This pollution has led to increased nitrate levels in water, which caused livestock deaths[32] and the spread of water hyacinths in Lake Naivasha over the past few years. Despite efforts to improve the situation, Kenya struggles with **declining water quality and a yearly shortfall of 2.7 billion m^3 of water**.[33] The recent expansion of Rift Valley lakes does not necessarily mean more water; it could be due to land degradation, sediment yield into the lakes from the catchment, or agroecological activities in the region.[34] Industries with high freshwater consumption, such as the production of green hydrogen, could make the water crisis even worse. The Kenyan Water Resources Authority (WRA) must ensure that these industries follow legal rules. After that, we can address the ethical and human rights issues, including weighing the costs and benefits of those operations.

BOX 4

CASE STUDY: KENYA'S ON-SITE GREEN HYDROGEN TO NITROGEN FERTILISER PLANT

The company TalusAg has launched the world's first commercial on-site green hydrogen to nitrogen fertiliser plant for the Kenya Nut Company at Lake Naivasha. Powered by 2.1 MW of solar energy, the facility produces **one tonne of liquid ammonia daily**.[35] However, liquid ammonia requires large volumes of water for transportation, raising freshwater demand, costs, and logistical complexity. As a result, it is often applied in its gaseous form (**anhydrous or "water-free" ammonia**), which contains up to 80 percent nitrogen and requires personal protection equipment for the applicator. Additionally, it is toxic to soil bacteria, necessitating the addition of expensivebacterial stimulants to prevent a decline in soil health. While anhydrous ammonia itself is not a greenhouse gas, it can easily convert to nitrous oxide (N_2O) in the soil. To prevent this conversion, it must be injected deeply into the ground, a process that is typically feasible only in monocultures and requires modern machinery. All these factors contribute to increased costs, making anhydrous ammonia a less cost-effective solution for small-scale farmers.

Talus Renewables is not the only planned project in the region. Looking ahead, Maire Tecnimont is also developing a renewable power-to-fertiliser plant at Oserian Two Lakes Industrial Park, located north of Nairobi. This facility aims to produce 550 tonnes of nitrate fertilisers daily, utilising approximately 70 MW of renewable power.[36] Furthermore, Fortescue Future Industries (FFI) has signed an agreement with the Republic of Kenya to establish a 300-MW green ammonia and fertiliser facility, leveraging the geothermal resources of the Olkaria field in Naivasha[37], which may also be supported by BMZ.

These plants pose concerns on their sustainability and applicability. The high water consumption, the complicated technical requirements and the handling of hazardous materials, as well as the high investment costs, casting doubt on the project's long-term viability. These problems render it unfeasible for farmers, particularly on a small scale.

ALTERNATIVES TO SYNTHETIC FERTILISERS

The use of synthetic fertilisers may increase soil fertility in the short term, but it fails to address the deeper, long-term challenges of soil health. **Agroecological methods offer sustainable, long-term solutions** by enhancing the soil's capacity to store and build nutrients, retain water, improving its structure, and supporting biodiversity. **Site-specific approaches**, such as crop diversification, agroforestry, and the use of organic fertilisers, are particularly beneficial as they cater to the unique conditions and needs of local ecosystems. These strategies not only maintain soil health but also help small-scale farmers adapt to climate change and ensure resilient food systems, ultimately reducing reliance on external inputs and promoting sustainable agricultural practices.

Replacing synthetic fertilisers with organic alternatives such as compost, green manure, black soldier fly frass, vermicompost and biochar, can effectively enhance soil health and improve crop yields. In Kenya, most organic fertilisers are produced on farms, fostering independence from external inputs. However, inconsistent nutrient availability and unknown nutrient content pose challenges. It is, therefore, crucial to enhance soil health and determine the best practices that are locally adapted and tailored to the specific context instead of only replacing synthetic fertilisers with organic alternatives. Many farmers rely on home-produced manure and compost, but few have experience with commercial organic fertilisers, partly due to the perception that they are less effective than chemical alternatives. Logistical issues related to the bulkiness and storage of organic fertilisers further complicate matters, as agro-dealers often prefer stocking inorganic fertilisers due to higher perceived demand and profitability. This creates a cycle where **low demand for organic options leads to limited availability**, further suppressing demand.[38] Overcoming these challenges requires targeted efforts in demand creation (e.g. shifting subsidies from synthetic fertilisers to organic alternatives), distribution strategies, awareness raising, sectoral support and the strategic set-up of agroecological extension networks.

Adopting practices like crop rotation and intercropping with locally grown legumes improves soil health and fertility. Legumes fix atmospheric nitrogen, converting it to organic forms that benefit crops. Moreover, an increase in nitrogen favours soil organic carbon sequestration by improving microbial activities.[39] Crop rotation enhances soil quality by varying the types of crops grown in an area, ensuring diverse nutritional needs are met.

Restructuring the whole cultivation system to agroforestry increases biodiversity, soil fertility and yield. One of the many benefits of agroforestry systems is the provision of nutrients. Trees' deep roots draw nutrients from the soil and deposit them into the topsoil after leaf fall, where microorganisms make them available to crops rooted in the upper layer. Some trees like sesbania are nitrogen fixers and therefore help in enriching the soil.[40] Moreover, this natural fertiliser strengthens the soil fauna, which in turn improves soil quality. Agroforestry has been highly successful in Kenya's organic coffee production, meeting the plant's significant nitrogen requirements.

Organic solutions for nutrient supply frequently face a challenge of lower yields and higher land consumption compared to conventional farming, if grown in monocultures. A recent study by the Research Institutes of Organic Agriculture (FiBL) shows that working with agroforestry systems is productive and economically beneficial without requiring more land or struggling with a "yield gap". Well-managed, diversified, organic systems can even produce almost twice as much per hectare as monocultures.[41]

Ecological intensification of agriculture requires a more strategic approach than simplified production systems and is not without risks and challenges. Incentive programs designed to reduce the financial burdens and risk for farmers, as well as expanding capacity building for farmer-to-farmer approaches could promote the more widespread low-risk adoption of agroecological practices.

BMZ'S CRITICAL ROLE IN ADVANCING SUSTAINABLE SOIL HEALTH INITIATIVES IN AFRICA

The 10-year Soil Health Action Plan for the African continent presents a crucial opportunity for transformative change in agricultural practices and soil health management. However, its ambiguity and the missing inclusion of agroecology and its practices, raises concerns about whether it will lead to genuine sustainability or just perpetuate reliance on synthetic fertilisers. At this crucial juncture, it is essential for the BMZ to actively guide efforts in the right direction, ensuring that activities aligned with the plan avoid a "business-as-usual" approach that contradicts agroecological principles. A clear, consistent focus on sustainable, agroecological solutions is key to achieving long-term soil health and food security. This approach must be championed by African governments and supported by the BMZ.

CURRENT FUNDING AND INITIATIVES TOWARDS LONG-TERM SOIL HEALTH

The BMZ's commitment to agroecology and sustainable soil management, as outlined in its **core strategy "Life without Hunger – Transformation of Food and Agriculture Systems"**,[42] is aligned with the broader objectives of the „Sonderinitiative Transformation der Agrar- und Ernährungssysteme" which places a strong emphasis on soil health[43], particularly in key partner regions such as Kenya.[44] It has already undertaken significant initiatives to improve soil health. A notable example is the GIZ Global Project on Soil, **"ProSoil"**, which has been active in Western Kenya since 2014. This project focuses on integrated soil health management and agroecological practices but is set to conclude in 2027.[45] In addition, the BMZ has supported organic fertiliser production through the **Knowledge Hubs** for Organic Agriculture and Agroecology[46], which have been instrumental in providing training and disseminating knowledge on sustainable agricultural practices. However, their funding is expected to end by 2029, casting uncertainty over their long-term viability.

The BMZ also contributed €4 million to the EU's "Pro-Silience" project, which focuses on agroecological transformation and policy reform.[47] Complementing these efforts, the Global Project "Supporting sustainable agricultural systems and agriculture worldwide" (2023–2027) aims to transform agricultural systems, implement Kenya's Agricultural Soil Management Policy, and offer advisory services in soil health management, in partnership with the Kenyan government.[48] The ProSoil initiative may also continue during the proposed global project "Soil Matters," expected to launch in early 2025, though it remains under review.

With several **key initiatives set to conclude soon**, it remains uncertain how effectively the BMZ will invest in soil health initiatives and guide the 10-year Soil Health Action Plan in a truly transformative manner, particularly given the conflicting priorities present in other projects.

FUNDING FOR SYNTHETIC FERTILISERS

According to the Agroecology Finance Assessment Tool of the International Agroecology Coalition, projects that support the use of synthetic fertilisers cannot be considered as contributing to the implementation of

agroecology and are classified under a "red flag".[49] While the BMZ has supported soil health initiatives, it also funds projects that focus on synthetic fertilisers:

➜ Between 2017 and 2025, the BMZ allocated approximately €25 million to AGRA projects, which have been instrumental in promoting synthetic fertilisers in partnership with African nations and multinational companies like the Norwegian fertiliser producer Yara since 2006. Fortunately, the BMZ has since announced it will not extend funding for AGRA beyond 2025.

➜ Another significant concern is the BMZ's consideration of a €60 million loan for a green hydrogen-based fertiliser plant in Olkaria, Kenya (see Box 5). Although this initiative is framed within climate finance and is paired with a €60 million debt-for-renewable energy/sustainable agriculture swap[50], it diverges from agroecological principles by supporting synthetic fertiliser production. The high financial and operational costs, along with the lengthy timelines required, render green hydrogen fertilisers an unfeasible short-term solution for achieving climate-friendly agroecological soil health. Supporting such initiatives risks locking Kenyan agriculture into an industrial system rather than fostering sustainable practices.

BOX 5

BMZ LOAN FOR OLKARIA PLANT

This potential project follows KfW's funding of a feasibility study and consultancy from 2019 to 2023, along with a 2022 GIZ-commissioned baseline study[51] identifying nitrogen fertiliser as a promising pathway for green hydrogen in Kenya. Another GIZ study is planned to assess the potential impact on water resources, and there are also considerations for a plant near the coast to reduce transport costs for possible export. This initiative in Kenya is partly supported through the 2022 Just Energy Transition Partnership between Germany and Kenya. In 2023, the EU and GIZ co-funded the Kenya Green Hydrogen Strategy and Roadmap, which identifies a domestic fertiliser industry based on green hydrogen as a "no-regrets option". [52] The "Power-to-X Hub" project, funded by BMZ, IKI, and BMWK and implemented by GIZ, provides policy advice and capacity-building on green hydrogen.[53] The Foreign Office has also advanced this agenda, notably through the H2 Diplo initiative[54], which supports new green hydrogen sources and is backed by 15 million EUR from the International Climate Initiative (IKI), now including an H2 diplomacy office in Nairobi.[55]

RECOMMENDATIONS FOR BMZ/AA/BMEL

BMZ has the potential to play a crucial role in steering the 10-year Soil Health Action Plan in the right direction and ensuring its transformative vision prevails. By supporting agroecological practices and sustainable soil management, it can help African countries align their initiatives with long-term soil health and food security goals. Current projects, such as ProSoil and the Knowledge Hubs for Organic Agriculture and Agroecology, have laid important groundwork. However, for the Action Plan to be truly transformative, BMZ must expand and better connect these efforts and ensure that resources are directed toward agroecological solutions instead of conflicting approaches like synthetic fertilisers.

1. Policy Coherence with Agroecological Direction
Supporting contradictory dual approaches undermines effectiveness. If agroecology is the guiding principle, there should be no exceptions.

2. Direct Support for Agroecological Practices
BMZ should prioritise and expand support for long-term soil health initiatives that directly benefit small-scale farmers.

3. Policy and Funding
Advocate for policies and funding that promote long-term soil health improvements. Engage with local governments and stakeholders to support ongoing processes in the development of policies that truly enhance soil health.

4. Investment in Research and Education
Expand investments in research and education that promote organic farming and sustainable soil management practices. Training programs should enhance access to local and organic fertilisers while providing technical assistance to smallholder farmers.Promote agroecology in partnership with African governments across the continent and advocate for its adoption within the FAO to drive global change: Collaborate to integrate agroecological principles into national policies and prioritise agroecology in global agricultural frameworks and discussions.

5. Alignment with Sustainable Development Goals
Ensure that geopolitical goals align with sustainable development objectives. The promotion of agroecological practices should reinforce Germany's commitment to sustainable and equitable agricultural systems.

6. End Cooperation with AGRA
BMZ should immediately cease its financial and political cooperation with AGRA. The German government should not be misled by AGRA's new strategy for 2023–2027 and must phase out support for AGRA projects.

CONCLUSION

In conclusion, addressing soil health is crucial to achieving zero hunger in Africa. Strategies must avoid locking countries into industrial agriculture, such as the production of green hydrogen-based synthetic fertilisers. While decarbonizing agriculture and achieving fertiliser import independence are important goals, many civil society organisations advocate for a **comprehensive transformation of the agricultural and food system**. This approach emphasises reducing reliance on synthetic fertilisers and prioritising long-term investments in soil health. This includes a combination of traditional practices with modern methods.

What is needed is a holistic and transformative approach that prioritises **restoring soil health, reducing soil erosion, strengthening water holding capacities and transitioning to agroecology** with minimal external inputs. Achieving the right to food in Africa necessitates comprehensive strategies that tackle the **root causes of food insecurity**, such as land tenure issues, resource management, and sustainable agricultural practices.

While the 10-year Soil Health Action Plan lacks clear guidance for African countries to design and implement soil health strategies, development cooperation—especially initiatives by the BMZ—play a vital role in steering the shift toward sustainable soil health practices. By **supporting long-term projects that prioritise genuine soil health over business-as-usual approaches**, the BMZ can contribute to a more resilient agricultural landscape. **The same responsibility falls on African governments**. A commitment to authentic soil health initiatives is vital for establishing a sustainable and equitable food system that benefits all communities.

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