POST-EVENT REPORT

Emerging opportunities with organic and bio-organic fertilizers for soil health in Africa

DeSIRA LIFT

Africa Fertilizer and Soil Health Summit (AFSH) in Nairobi, Kenya, and online, 7 May 2024

The Africa Fertilizer and Soil Health Summit (AFSHS) was organised by the African Union and held from the 7th to the 9th of May 2024 in Nairobi, Kenya, and online. It brought together all relevant stakeholders to highlight the crucial role of fertiliser and soil health in stimulating sustainable pro-poor productivity growth in African agriculture. Building on the discussions held during the summit, African Heads of State and Government endorsed the African Fertilizer and Soil Health (AFSH) Action Plan and the Soils Initiative for Africa (SIA) that had been developed by the Africa Union Commission and consolidated in the Nairobi Declaration. The overall objective is to bolster agricultural sustainability and enhance smallholder farmer livelihoods by improving access and affordability of certified quality organic and inorganic fertilisers across the continent. The declaration endorsed the Fertilizer and Soil Health Action Plan and the Soil Initiative for Africa Framework as key guiding documents to harness multi-stakeholder partnerships and investments to drive policies, finance, research and development, markets, and capacity building for fertilizer and sustainable soil health management in Africa.

CAADP XP4 PROGRAMME

FARA Forum for Agricultural Research in Africa

Funded by the European Union

The European Union convened a parallel session in collaboration with DeSIRA LIFT and the International Fund for Agricultural Development (IFAD) to provide a platform for stakeholders ranging from farmers and researchers to policymakers and industry leaders to exchange knowledge and drive forward the agenda for sustainable agriculture in Africa. They raised awareness on the realities and potential of off-farm organic fertilisers and biofertilisers in Africa. Further, pathways to boost the production and use of organic fertilisers and biofertilisers to address soil health and food production productivity were identified. The results of the scoping study on exploring the off-farm production, marketing and use of organic and biofertilisers in Africa (March 2024) were shared. This was then followed by a panel discussion comprising researchers, development partner and private sector representatives.

Main messages and recommendations

- African smallholder farmers produce 70% to 80% of the agricultural output on the continent. The use of inorganic fertilisers by smallholder farmers has always been low. And even where inorganic fertilisers are used more widely, factors such as low soil organic matter content, micronutrient deficiencies and/or high soil acidity hinder the effectiveness of such fertilisers. However, there is a high demand for nutrient sources for agricultural production in Africa and in Sub-Saharan Africa (SSA) in particular. To meet this demand new pathways and a variety of solutions will be required. The scoping study analysed status and potential of off-farm production and marketing of organic fertilizers and biofertilisers in 12 countries in Africa.
- For organic fertilizers, the study shows high organic matter and nutrient recovery potential. Market waste, agro-processing residues, and wood and plant materials demonstrate short-term high potential. The potential was moderate for poultry manure, slaughterhouse residue and household, as well as for human waste when used for co-composting. Urine-based products from human waste and black soldier fly frass from diverse organic materials were found to have low potential.
- Market development for organic fertilisers has been positive in various countries especially with recent disruptions in the global (mineral) fertiliser market. Farmers, influenced by familiarity with mineral fertilisers, hesitate to adopt organic fertilisers due to concerns about increased workload and perceived lower short-term impact on crop yield.
- In the case of biofertilisers, the study findings show that the highest potential was in Rhizobia and could be prioritised for the next five years in combination with addressing low soil pH and development of organic matter.
- A conducive policy environment is needed to promote the production and use of organic fertilisers and biofertilisers. This requires cross-sector collaboration and coordination between linked sectors (e.g. water, waste, sanitation and agriculture) and can include supportive regulations (e.g. organic waste recycling and reuse policies), coherent standards and quality monitoring.
- There is weak awareness, education and training for farmers, agricultural extension services and agro-dealers regarding the utility, handling and application of Organic and Bio-Organic Fertilisers. Education and training for all actors in the agri-food systems play a vital role. As regards the broad variety of organic and biofertiliser products, simple and clear standardised definitions can help stakeholders, including (smallholder) farmers, to (better) understand them.

- Market access for organic fertiliser and biofertiliser needs to be ensured, including by building on existing markets for inorganic fertiliser, training all actors along the value chain and ensuring the affordability of organic and biofertiliser also for smallholder farmers. Affordability is a key challenge identified by the study that limits the use of organic fertilisers, especially by smallholder farmers. However, comparison of the market price for the mineral and organic fertilisers in the 12 countries showed that prices of mineral fertilisers ranged between Euro 25 to Euro 100 per 50 kg bag, while those of organic fertilisers were between Euro 0.72 to Euro 65 Euros per 50 kg bag.
- Mineral and organic fertilisers should be used together to benefit from the useful attributes of each.
- More research, field testing and exchanges between research and farmers are needed. Research should focus on regional collection of source-specific biomass data and raw material assessments. Tests should be conducted to assess diverse fertiliser combinations, soil amendments and biostimulants, as well as forage and multipurpose legumes and alley cropping. Crop specific guidelines are needed too.

Background

The Africa Fertilizer and Soil Health Summit (AFSHS) was organised by the African Union and resulted in African Heads of State and Government endorsing the African Fertilizer and Soil Health (AFSH) Action Plan and the Soils Initiative for Africa (SIA) that have been consolidated in the Nairobi Declaration. DeSIRA-LIFT co-organised a side event and a parallel session with IFAD and respectively the CAADP XP4 organisations and the European Commission to highlight how agroecology and regenerative agricultural practices, including organic and biofertilisers, contribute to productive, inclusive, sustainable farming systems in Africa:

- Side event on Integrated soil health management for productive, inclusive, sustainable farming and food systems in Africa: Exploring the role of agroecology and regenerative agriculture (7 May 2024)
- Parallel session on Emerging opportunities with organic and bio-organic fertilizers for soil health in Africa (8 May 2024)
- The next pages provide a summary of the keynote presentation and of the discussion on the opportunities that organic and biofertilisers represent for soil health in Africa.

Download the event's concept note and programme

Summary of the keynote presentation

Exploring the off-farm production of organic and biofertilizers in Africa – A scoping study

Prof. Bernhard Freyer
Institute of Organic Farming, University of Natural Resources and Applied Life Sciences (BOKU), Austria

Download Presentation

Prof. Freyer set the scene by presenting the findings of the scoping study on the off-farm production and marketing of organic and biofertilisers in 12 case study countries in Africa commissioned by the European Union (EU) (Directorate-General for International Partnerships) through DeSIRA LIFT. The study started in spring 2023 and focused on research of biomass and nutrient at country and farm level. Mineral fertilisers were not excluded from the study as it aimed at combining fertilising methods together. He emphasised that while this scoping study is a starting point, more studies are needed, especially to collect regional specific biomass data to support actions regionally.

Prof. Freyer started by reminding the requirements fixed by the EU as regards Product Function Categories (PFCs) to which EU fertilising products belong by virtue of their claimed function. Organic fertilizers may be defined as 'materials of animal or plant origin used to feed plants; they may be made from manure, guano, compost and residues of biogas production. Organic fertilisers can be of solid or liquid nature, containing organic carbon (Corg) and nutrients of solely biological origin. The minimum of nutrients should be at least 1% by mass of total nitrogen (N), 1% phosphorous (P2O5) and 1% potassium (K2O)' (EU, 2019b). Inputs with nutrient levels below 1% are considered to be soil conditioners or improvers. Biofertilisers were defined as any bacterial or fungal inoculant applied to soils and plants with multiple benefits, such as nitrogen fixation, enhance resistance to biotic and abiotic stress, improve nutrient use efficiency, nutrient and water uptake and nutrient availability. Prof. Freyer pinpointed the wide variety of organic and biofertiliser products which are not well understood by all stakeholders, especially farmers, and recommends simple and clear definitions for clarity.

Several agricultural and environmental challenges negatively impact productivity levels in Africa with 65% of productive land that is degraded and 45% of the continent's land area affected by desertification (FAO and AUDA-NEPAD, 2021). The lack of forage legumes attributed to the unavailability of seed; the lack of nutrient recirculation of the organic manure; the low share of agroforestry and forests; the low soil pH; the low tillage efficiency resulting in compaction of fields and soil dust; unfavourable cost-benefit ratio; and low access to mineral fertiliser which is highly dependent on international markets. Having examined the perception of stakeholders on mineral fertilisers, Prof. Freyer deduced that challenges that mineral fertilisers faced were similar to those of organic and biofertilisers.

There is great potential for a (re)circulation of organic matter and its nutrients (resource). The recycling of organic wastes such as household, food and green wastes, human excreta, wastewater, agro processing wastes and the herein described organic matter and macro- and micronutrients can help closing urban rural resource flows and recovery of these elements. At the same time externalities such as greenhouse gas emissions, environmental pollution and human health burdens can be reduced. The potential varies with context and regional, urban and national assessments are needed for detailed information.

Several examples of off farm organic and biofertilisers were shared. RegenOrganics, a company based in Kenya that produced about 3,600 tons of organic fertiliser in 2022 and projected to produce 12,000 tons in 2023. The company's main market was primarily for producers linked to the export market. However, there is limited scientific evidence on the application rates and effectiveness of their fertiliser.

Muzunduzi Turf was developed in the context of the RUNRES project in South Africa. Faecal and organic waste have been used to produce 5,750 tons of organic fertiliser per year. One of the main factors of success was the involvement of the National Governmental Department for Water and Sanitation that enabled production to be scaled up. However, the content of essential minerals (P and K) was below 1%. The end-product was not sold through the regular marketing channels but through an alternative distribution system. This was mainly due to the lack of training of stakeholders involved in sale of fertilizers who fail to prioritise organic products. To ensure market access of organic agricultural inputs, training for all actors along the whole value chain is key.

The potential for off-farm production of organic fertilisers from different sources of organic waste varies. Market waste, agro-processing residues, and wood and plant materials demonstrate short-term high potential. The potential was moderate for poultry manure, slaughterhouses residue and household, as well as for human waste when used for co-composting. Urine-based products from human waste and black soldier fly frass from diverse organic materials were found to have low potential. However, relative to human excreta, household-based waste had low nutrient content. Crop residue (e.g. stover) and animal manure in-situ should be excluded for off-farm use because their exploitation, particularly of crop residues, would leave smallholder farmers vulnerable to soil erosion which had already affected most of the soils.
The scoping study shows that Rhizobia has the highest short-term potential for the production of biofertiliser (or biostimulants).

Organic fertilisers and biofertilisers should not be viewed as direct substitutes for mineral fertilisers but rather as complementary. Integrating them with mineral fertilisers offers benefits to farmers by reducing the cost of mineral fertilisers and improving soil health. For instance, in sandy soils, mineral fertilisers can be ineffective without the incorporation of organic materials due to mineral leaching.
Shifting the focus towards improving soil health is crucial. Poor and degraded soils reduce the effectiveness of mineral fertilisers, decreasing demand for them. Introducing compost in these areas can lead to noticeable yield improvements, potentially increasing demand for compost. Affordability is the main challenge identified by the study that limits the use of organic fertilisers, especially by smallholder farmers. Comparison of the market price for the mineral and organic fertilisers in the 12 countries showed that prices of mineral fertilisers ranged between Euro 25 to Euro 100 while those of organic fertilisers were between Euro 0.72 to Euro 65 Euros.

II Summary of the panel discussion

Experts from research organisations, development partners, private sector actors and non-governmental organisations discussed and highlighted emerging opportunities for organic and biofertilisers for soil health in Africa, along interventions, research developments, potential markets and policy frameworks.

Carla Montesi
Director of Directorate-General for International Partnerships (DG INTPA) at the European Commission

Montesi listed the numerous challenges impacting Africa that need to be addressed. They include ensuring the affordability and availability of inorganic fertilisers that were even more affected by the COVID-19 pandemic and the Ukraine war, the increased degradation of the soils, climate change and the increasing need for sustainable productivity to ensure food and nutrition security. To address these multiple challenges, Montesi called for an integrated approach that looks at the entire agricultural system. Such an approach involves increased production of organic and biofertilisers, and combining them with chemical fertilisers while addressing issues of water and services to agriculture.
Strong evidence was identified to be instrumental in putting forward a case for organic and biofertilisers in addressing soil health and fertility and improving food production. In this regard, it was explained that EU was leveraging on partnerships and cooperation instrument to establish robust evidence for organic and biofertilisers and increasing their share of production and use. The scoping study on emerging opportunities with organic and bio-organic fertilizers for soil health in Africa was commissioned by the European Commission to generate evidence. The study was financed by the DeSIRA LIFT project as part of the DeSIRA initiative that financially supports research programmes to generate evidence and solutions, such as agroecology and organic and biofertiliser. These activities contribute to the implementation of the Global Gateway strategy of the European Commission which aims to translate into practice. In this context, Montesi stressed the importance of multistakeholder collaboration involving research organisations, Governments, the private sector and civil society organisations to translate research outputs into practice. Collaboration was echoed as being paramount in addressing the challenge of soil fertility in Africa.

Oscar (Joshua) Aghan
Founder of Eco Bio Fertilizer, Kenya

Eco Bio Fertilizer is a Kenyan social enterprise that recycles waste biomass into Eco Bio Fertilizer and sells it to farmers at an affordable cost. Aghan has developed an innovative production process using an enzyme to fasten organic waste biodegradation into organic resin. The organic waste is collected from municipal waste, animal manure, animal by-product from slaughterhouses, industrial plant waste and crop residues (compost) by community-based organisations.
Trials of Eco Bio Fertilizer Eco Bio Fertilizer had shown potential yield increase across different locations hence creating value for the farmers. Besides, Aghan noted that the demand for organic and biofertilisers is increasing fueled by consumer consciousness for healthy and safe foods, hence demanding organic products. However, the demand surpasses supply which presents an opportunity to engage with organic and biofertilisers.

Abdou Tenkouano
Director General at the International Centre of Insect Physiology and Ecology (ICIPE)

Tenkouano elaborated on the instrumental role of insects as bioregulators contributing to biological diversity. The role of research organisations in supporting organic and biofertilisers was exemplified through extensive research work on insect-based solutions involving the development of fast and efficient insect driven organic fertilisers production technology that reduces fertiliser production to just five weeks. ICIPE conducts research to provide insect-based solutions as they improve soil heath, support the diversification of crops and environments, and address soil degradation.
To ensure research outputs get traction, Tenkouano underscored the importance of socio-economic returns in terms of income generated and contribution to other benefits such as carbon sequestration. A case example was how insect-based waste management was contributing to wealth creation in Uganda and carbon sequestration in Kenya and Ethiopia. Therefore, an opportunity was identified for municipalities in urban waste management through use of insect-based solutions, while generating organic fertilisers that could contribute to agriculture production in the continent.

David Amudavi
Executive Director at Biovision Africa Trust

Amudavi underscored that organic and biofertilisers and other environmentally sustainable solutions can address the food security challenge in Africa which requires significant increase in production. To attain this objective, organic and biofertilisers are solutions to complement use of chemical fertilisers.
Biovision Africa aims at lowering African farmers' dependence on chemical fertilisers and to promote the use of organic fertiliser as it offers many opportunities to the African continent. Organic fertiliser can contribute to produce more food and so to meet the growing demand while ensuring that safe products are being consumed. The African Continental Free Trade Area (AfCFTA) can facilitate trade in organic and biofertiliser products and spur their development, growth and accessibility.
Furthermore, Amudavi highlighted that the political commitments of African States to support the development of organic and biofertilisers, including through investments in agriculture through mechanisms such as the Comprehensive African Agricultural Development Programme (CAADP) African governments have agreed to allocate at least 10% of national budgets to agriculture and rural development.

To ensure that the opportunities to exploit organic and biofertilisers are seized, Amudavi underlined the need to have supportive policies and programmes that create an enabling environment for companies, small and medium sized enterprises (SMEs) and farmers to produce and use organic and biofertilisers. Notably, the implementation of the policies was considered crucial in yielding the benefits that they embody.
It was also noted that a multistakeholder approach is key to scale organic and biofertilisers and hence address food security, climate change and other challenges facing agriculture. By integrating all stakeholders policies and support programmes can harness the potential of trade between African countries of organic and biofertilisers.

Prof. Bernhard Freyer
Institute of Organic Farming, University of Natural Resources and Applied Life Sciences (BOKU), Austria

Prof. Freyer highlighted the importance of building a system that ensures sufficient supply of raw materials for waste recycling. This might be challenging at farm level hence the need for tailored programmes to enable all stakeholders, including (smallholder) farmers, optimise organic matter recycling.
Different options for recycling wastes were identified. Prof. Freyer stated that the recirculation of farm organic matter needs to be improved in Africa. Recycling organic matter on the farm is a prerequisite to recycling it outside of the farm. At off-farm level, efforts would be on educating consumers on importance of waste and waste segregation to reduce cost of waste processing and improve quality.

Going further, research is needed to assess the potential of transforming human excreta into organic matter and how to ensure the safety of the organic manure from this waste source. Technologies to achieve safe organic fertilisers from human excreta are expensive thus not affordable by (smallholder) farmers.

III Main takeaways and conclusion

Nelida Alé
Senior Technical Specialist in the Agricultural Research for Development (AR4D) unit, IFAD

Alé noted that the session had explored the emerging opportunities that organic and biofertilisers present for enhancing soil health across Africa, in addition to their environmental benefits and their role in enhancing soil fertility, increasing crop yields, and supporting the livelihoods of millions of smallholder farmers in Africa.
Alé reflected on the case studies and research that had been presented as having underscored the critical need for integrated soil health management practices that are sustainable, economically viable, and accessible to farmers. She noted that it was evident that embracing organic and biofertilisers could lead to more resilient agricultural systems in the face of climate change and other environmental challenges.
Alé called to carry forward the knowledge and strategies shared and to commit to fostering partnerships that would drive the adoption of organic and biofertilisers and translate identified opportunities into tangible benefits for the communities and environment.

The DeSIRA Initiative (Development Smart Innovation through Research in Agriculture), funded by the European Commission, Directorate General for International Partnerships (DG INTPA), seeks to enhance an inclusive, sustainable and climate-relevant transformation of rural areas and of agri-food systems, by linking better agricultural innovation with research for more developmental impact. It supports actions in low- and middle-income countries (LMICs) to strengthen the resilience of their agri-food systems, the relevance of the national and regional research and innovation systems, and the coherence and efficiency of their agricultural public research and extension services related to climate change challenges.

DeSIRA-LIFT (Leveraging the DeSIRA Initiative for Agri-Food Systems Transformation) is a service project (June 2021 – May 2024) to the European Commission, DG INTPA, with the main objective to enhance the impact of the DeSIRA Initiative by providing (on-demand) services to DeSIRA project holders and partners. DeSIRA-LIFT includes three service areas aligned to the three DeSIRA Pillars: Service Area 1 supports country-led DeSIRA projects to enhance their impacts on climate-oriented innovation systems in line with more sustainable food system transitions. Service Area 2 supports the Comprehensive Africa Agriculture Development Programme (CAADP) ex-pillar IV organizations in their Agricultural Knowledge and Innovation Systems (AKIS) related roles. Service Area 3 provides support to policymakers on themes related to agricultural research for development (AR4D) and innovation policies and programming.

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Agrinatura (http://agrinatura-eu.eu) is the European Alliance on agricultural knowledge for development. The European Forum on Agricultural Research for Development (EFARD) (http://www.efard.org) is an umbrella network of European research and non-research stakeholders from public and private European organisations and the European Commission.

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