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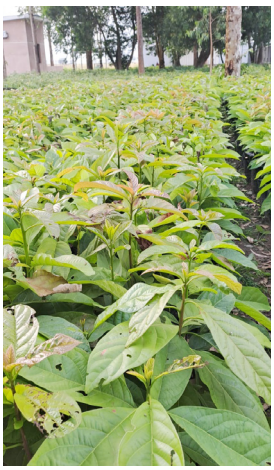
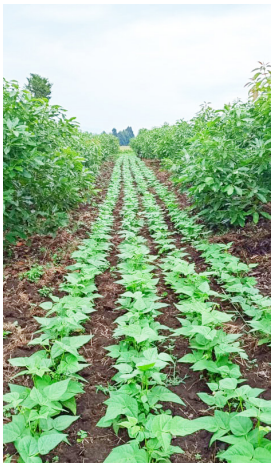



THE BUSINESS CASE AND STRATEGIES TO SCALING LOCAL MANUFACTURING OF ORGANIC FERTILIZER

Implemented by

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About Water and Energy for Food (WE4F)

Water and Energy for Food (WE4F) is a joint international initiative of the German Federal Ministry for Economic Cooperation and Development (BMZ), the European Union (EU), the Ministry of Foreign Affairs of the Government of the Netherlands, Sweden through the Swedish International Development Cooperation Agency (Sida), and the U.S. Agency for International Development (USAID).

The East Africa Hub, based in Nairobi, Kenya, represents WE4F in the region and provides a network function for partners and other potential donors, as well as government agencies in the region. It also works closely with private sector partners and other stakeholders in the fields of water, energy, and food/ agriculture in East Africa.

> **WE4F aims to promote and strengthen the use of climate-friendly, energy–and water-efficient innovations for more productive and ecologically sustainable food production worldwide.**

About Mideva Venture Labs

Mideva Venture Labs (www.mideva.co) is a pan-African social-impact research, design, and innovation collective. Through behavioral, human-centered design, and community-powered approaches, they work with organizations to understand, design, pilot and scale evidence-informed interventions that meet people's needs. Mideva's work provides valuable insights, ideas, and concepts that help people and communities thrive while propelling organizations forward. They focus on key sectors of clean energy and green transition, sustainable food systems and regenerative agriculture, entrepreneurship and workforce development. Mideva Ventures Labs was engaged as a lead consultant for this project.

Project Context

By 2050, the African population is forecast to rise from 1.2 billion to about 2.4 billion. In Kenya, the population is expected to grow to at least 90 million from the current 54 million. Climate change is increasingly being felt by the farming community, which is calling for technologies and products that can help mitigate these effects.

Regenerative agriculture holds immense potential to transform Kenya's agricultural landscape while ensuring food security. Unlike conventional farming methods primarily reliant on inputs that degrade and deplete soils over time, regenerative practices prioritize soil health restoration, biodiversity enhancement, and natural resource conservation. With the increasing need to guarantee more local food production to meet the rising population in Kenya, and with a focus on eating safe and healthy food, regenerative agriculture practices are needed now, more than before. Using organic inputs such as organic fertilizers is one of the practices to achieve regenerative and sustainable agriculture.

The study **"Business Case and Strategies for Scaling Local Manufacturing"** aimed at providing valuable insights into the country's current state of organic and organo-mineral fertilizers, the supply and demand barriers, and opportunities to scale local manufacturing by exploring viable business cases at producer and farmer levels.

The study leveraged existing research such as the CASA study, primary research and stakeholder co-creation sessions and expert feedback in generating insights, recommendations and roadmap for actualization of the identified opportunities. At the core of the approach to the study was human-centered design, an innovative approach to problem solving that puts the needs of the users at the center, prioritizing their current context and needs, realities and future goals and aspirations.

As an outcome, we have developed a Social Return on Investment (SROI) framework that can quantify the economic, social and environmental impact of organic fertilizers at the producer, distributor and farm level. The study also highlights investments needed, the barriers and enablers to scaling local manufacturing of organic fertilizers, strategies to improve the business case and gives a clear roadmap and prioritized initiatives that different stakeholders can undertake to drive the business case for scaling local manufacturing of organic fertilizers in Kenya.

The study leveraged existing research such as the CASA study, primary research and stakeholder co-creation sessions and expert feedback in generating insights, recommendations and roadmap for actualization of the identified opportunities.

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- Fertilizer Industry Association of Kenya (FAK)
- Organic Fertilizer Manufacturers Association of Kenya (OFIMAK)
- Kenya Bureau of Standards
- Kenya Plant Health Inspectorate Services
- Council of Governors Kenya
- Fresh Produce Consortium of Kenya (FPC)
- International Fertilizer Development Center (IFDC)
- National Cereals and Produce Board (NCPB)
- Collective Leadership Institute
- Sustain Africa
- African Fertilizer and Agribusiness Partnership (AFAP)
- Regen Organics
- Equity Bank
- K+S Fertilizers
- The Center for International Forestry Research and World Agroforestry (ICRAF)
- SNV Kenya
- World Vegetable Center

Abbreviations & definition of terms

Abbreviations:

OF	Organic Fertilizer
CF	Chemical Fertilizer
CASA	Commercial Agriculture for Smallholders and Agribusiness
ICIPE	International Centre of Insect Physiology and Ecology
AGRA	Alliance for a Green Revolution in Africa
OFIMAK	Organic Farm Input Manufacturers Association of Kenya
FAK	Fertilizer Association of Kenya

Definition of terms

Organic Fertilizer: A fertilizer that is derived from organic sources. The classification of a fertilizer as organic, according to the ongoing review of the Kenya organic fertilizer standard, is based on having a carbon content of 70% and above.

Organo-mineral Fertilizer: Fertilizers combining organic feedstocks such as biosolids, livestock manure, crop residues, or food waste with mineral fertilizers.

Chemical Fertilizer: Fertilizers made artificially from soil-essential macronutrients like nitrogen, phosphorus, and potassium. They may contain ammonium sulfate, urea, potash and ammonia, micronutrients among other substances, depending on their structure and the crops and soils for which they are intended.

Regenerative Agriculture: An outcome-based food production system that nurtures and restores soil health, protects the climate and water resources and biodiversity, and enhances farms' productivity and profitability.

SROI Framework: Framework that quantifies the value of social, environmental, and economic outcomes generated by an organization's activities.

Biofertilizers: Substances containing living microorganisms which, when applied to seed, plant surfaces, or soil, colonize the rhizosphere or the interior of the plant and promote growth by increasing the supply or availability of selected nutrients to the host plants.

Bio-stimulant: Substance or microorganism applied to plants with the aim of enhancing nutrition efficiency, abiotic stress tolerance and/or crop quality traits, regardless of its nutrients content.

Soil Amendment - Any material such as lime, gypsum, sawdust, compost, animal manures, crop residue or synthetic substances that is worked into the soil or applied on the surface to enhance plant growth. Amendments may contain important fertilizer elements, but the term commonly refers to added materials other than those used primarily as fertilizers.

Soil conditioner - A material which measurably improves specific soil physical characteristics or physical processes for a given use or as a plant growth medium.

Executive Summary

Regenerative agriculture has the potential to revolutionize Kenya's agricultural landscape, ensuring food security while promoting environmental sustainability. Unlike conventional farming, regenerative practices prioritize soil health restoration, biodiversity enhancement, and conservation of natural resources. With a growing population and increasing demand for food in Kenya, the adoption of regenerative agricultural practices is more urgent than ever, particularly through the use of organic fertilizers (OF). Incorporating OF into crop production is vital for achieving sustainable, resilient agricultural systems that can meet current and future food needs.

This report on **Strategies and Business Case for Scaling Manufacturing of Organic Fertilizers in Kenya,** provides a comprehensive analysis of the current state of organic fertilizers (OF), emphasizing their potential to enhance agricultural productivity, improve soil health, and contribute to sustainable development in Kenya. The study, conducted by Mideva Venture Labs, as commissioned by WE4F, a GIZ initiative, highlights the pressing need for scaling local manufacturing of organic fertilizers to address the challenges faced by the agricultural sector in Kenya. The organic fertilizer market in Kenya is characterized by a growing demand driven by environmental, economic, and social factors. Despite the increasing recognition of the benefits of organic fertilizers, their adoption remains limited due to various barriers. The current landscape reveals a mix of emerging and established manufacturers, with significant variability in production capabilities and market reach. Many farmers are still heavily reliant on chemical fertilizers, which have led to soil degradation and reduced agricultural productivity.

> Regenerative agriculture holds immense potential to transform Kenya's agricultural landscape while ensuring food security.

The Social Return on Investment (SROI) for organic fertilizers is substantial, as they not only improve soil health and increase crop yields but also enhance the livelihoods of smallholder farmers and the society in general. By transitioning to sustainable practices including use of organic inputs, farmers can access higher-value export markets and potentially command better prices for their products. The long-term benefits of improved soil health and reduced reliance on chemical inputs further contribute to the overall economic viability of organic fertilizers. The business case for organic fertilizers is robust, driven by the increasing global demand for sustainably produced agricultural products. Organic fertilizers address critical issues such as soil degradation, food insecurity, and the need for environmentally friendly farming practices. However, to fully realize this potential, it is essential to tackle the barriers that hinder their widespread production and adoption.

Several barriers impede the growth of the organic fertilizer market in Kenya. These include limited awareness among farmers about the benefits of organic fertilizers, inadequate access to quality products, and challenges related to production methods and scaling. Additionally, the lack of a robust distribution network and insufficient information on where to purchase organic fertilizers further restricts their uptake. Despite these challenges, there are significant opportunities to enhance the business case for organic fertilizers. Key enablers include the growing demand for organic products in international markets, the potential for improved soil health, increased crop yield, and the increasing recognition of the environmental benefits of organic farming. Collaborative efforts among stakeholders, including

manufacturers, government agencies, and farmer groups, can create a supportive ecosystem for scaling local production.

To effectively scale local manufacturing of organic fertilizers, the report outlines several key recommendations. First, enhancing awareness and education is crucial. Implementing targeted awareness campaigns to educate farmers and other key actors such as agro-dealers, farmer groups and extension service providers about the benefits of organic fertilizers and how to access them can significantly increase adoption rates. Strengthening distribution networks is another vital recommendation. Developing robust distribution channels to ensure that organic fertilizers are readily available to farmers, particularly in rural areas and in agro-dealer networks, will facilitate greater access and usage. Supporting policy development is also essential. Advocating for favorable policies that promote local production of organic fertilizers, including incentives for manufacturers and support for research and development, can create a conducive environment for growth.

Investing in capacity building is another critical recommendation. Providing training and resources to local manufacturers to improve production capabilities and ensure the quality of organic fertilizers will enhance the overall market. Additionally, creating financing mechanisms to support local manufacturers in scaling their operations and investing in production facilities will enable them to meet the growing demand for organic fertilizers. The report emphasizes the importance of collaboration among stakeholders to drive the adoption of organic fertilizers. Key action points include engaging farmers, agro-dealers and other actors in training programs to learn about integrated soil fertility practices and the benefits of organic fertilizers. Manufacturers are encouraged to invest in production capabilities and establish partnerships with local farmer groups to enhance distribution. Government agencies should develop policies that support the organic fertilizer sector and facilitate access to financing for local manufacturers. Development organizations can provide technical assistance and resources to support capacity building and awareness initiatives.

Further exploration is needed in several areas to enhance the understanding on usage and effectiveness of organic fertilizers in Kenya. Key areas for future research include conducting long-term impact assessments to evaluate the long-term effects of organic fertilizers on soil health, crop yields, and food security. Investigating the market dynamics of organic fertilizers, including pricing, demand trends, and consumer preferences, will provide valuable insights for stakeholders. Additionally, exploring innovative production methods and technologies that can enhance the efficiency and sustainability of organic fertilizer manufacturing is essential for the growth of this sector.

In conclusion, this report serves as a vital resource for stakeholders seeking to scale local manufacturing of organic fertilizers in Kenya. By addressing the barriers to adoption and leveraging the opportunities available, the country can harness the benefits of organic fertilizers to improve agricultural productivity, enhance soil health, and contribute to sustainable development. The collaborative efforts of all stakeholders will be essential in driving this transformation and ensuring a resilient agricultural sector in Kenya. The integration of organic fertilizers into the agricultural landscape not only promises to revitalize soil health but also aligns with global sustainability goals, making Kenya a potential leader in sustainable agriculture. The journey towards scaling organic fertilizer production is not just an economic opportunity; it is a pathway to securing food sovereignty, protecting natural resources, and fostering a healthier environment for future generations. By investing in organic fertilizers and regenerative practices, Kenya can protect its natural resources for future generations and meet both domestic and global demands for agricultural produce. The recommendations outlined in this report provide a clear roadmap for stakeholders, including farmers, manufacturers, policymakers, funders, and international partners, to work together in transforming Kenya's agricultural landscape. Ultimately, the adoption of these recommendations will not only strengthen Kenya's food security but also position the country as a leader in sustainable agriculture, paving the way for a more resilient and prosperous agricultural sector.

> This report serves as a vital resource for stakeholders seeking to scale local manufacturing of organic fertilizers in Kenya.

1 Introduction and Context

Introduction and Context

1.1. The Case for Organic Fertilizers

Soil fertility-related issues are a major concern in Kenya's agricultural landscapes given the continuous decline in production of major crops across the country. Continuous cropping and net carbon exports from farms cause reduction of soil organic carbon and related microbial activity. With declining productivity and soil nutrient depletion, many farmers have taken the initiative to improve the situation by use of both inorganic and organic nutrient sources among other good agricultural practices. After soil moisture stress, low soil fertility is the most important constraint limiting crop productivity in Kenya.

The current agricultural situation in Kenya is characterized by a small area under sustainable soil management, soil nutrient depletion, low farmer incomes, expansive land degradation and severe biodiversity loss. Decline in soil health significantly reduces the response of crops to the use of mineral fertilizers, thus direct correlation with food security. Often with declining yields, farmers tend to increase their fertilizer rates while ignoring the health of the soils. The increases in fertilizer rates however .

Organic fertilizers help improve soil pH and increase cation exchange capacity, thus improving soil health. They also boost soil organic matter, helping the soil capture more CO_2. The extensive use of inorganic fertilizers has led to largely acid soils and depleted nutrients and is responsible for 1% of Kenyan GHG emissions, while imports cause more than 5 times of GHG emissions upstream in its supply chain (CASA Study). Organic fertilizers are a product of biowaste management, hence reducing GHG emissions from this sector.

Agricultural sustainability entails moving from crop productivity and profitability to a broader focus on social, economic, and environmental sustainability, climate change adaptation and mitigation, rehabilitation of degraded land, and restoration and maintenance of ecosystem services, including biodiversity. There is therefore a need to increase fertilizer use in Africa, but in a way that supports soil health and environmental resilience.

Impact/Metric	Overview
Soil health, Biodiversity and Productivity	Organic fertilizers promote soil health and biodiversity. They enhance soil structure and increase its ability to hold water and nutrients, which can help mitigate soil erosion and improve overall soil fertility over time. This improvement in soil health is crucial for sustaining long-term agricultural productivity and resilience against climate change impacts such as drought and extreme weather events.
Carbon Footprint	Lowers carbon footprint compared to synthetic fertilizers. Organic fertilizers are often produced locally from renewable resources, reducing the energy-intensive processes associated with manufacturing and transporting chemical fertilizers. This localized production not only cuts down on greenhouse gas emissions but also supports local economies and reduces dependency on fossil fuel-derived inputs.
Soil biodiversity and microbial activity	Promotes biodiversity above and below ground. By enhancing soil microbial activity and diversity, organic fertilizers contribute to healthier ecosystems and support a wider range of beneficial organisms, such as earthworms and beneficial insects, which are vital for natural pest control and nutrient cycling.
Socio-economic Impact	Reduce long-term input costs and promote sustainable agricultural practices to enhance farmer incomes. This is particularly important in regions where smallholder farmers dominate the agricultural landscape.
Food security	Organic fertilizers support food security by improving soil health and crop productivity over time. This resilience is crucial for mitigating risks associated with climate variability and market fluctuations. The adoption of organic farming practices also stimulates local economies by creating opportunities in fertilizer production, distribution, and farm management, thereby contributing to community development.
Health outcomes	Organic farming practices often result in healthier food products due to reduced chemical residues and enhanced nutrient content. This aspect underscores the broader benefits of organic fertilizers beyond agronomic impacts, positively influencing the well-being of consumers and communities alike. Overall, the socio-economic impact of organic fertilizers in Kenya highlights their potential to improve livelihoods, enhance food security, and promote sustainable development in rural areas.

Soil Restoration Data

Previous research outlines some of the data on the impact of organic fertilizers on soil restoration and overall soil health:

Factor	Data	Source
Soil Organic Matter (SOM) Increase	Organic fertilizers can increase SOM by 20-30% over a period of 5-10 years	Nyongesa & Ombori (2020), Afr. J. Agric. Res.
Nutrient Availability	Organic fertilizers increase the availability of essential nutrients by 15-25%	Muendo et al. (2019), J. Soil Sci. Environ. Manag.
Soil pH Stabilization:	Organic fertilizers help stabilize soil pH, reducing acidity by 10-15%.	KALRO Soil Health Report.
Carbon Sequestration Rates:	Organic fertilizers can increase soil carbon sequestration by 0.5-1.0 metric tons per hectare per year.	Maina et al. (2021), Environ. Manag.
Soil Carbon Content:	Organic farming practices increase soil organic carbon by 18-35% over a decade.	Nair et al. (2020), J. Environ. Qual.
Methane and Nitrous Oxide Emissions:	Organic fertilizers reduce methane (CH4) and nitrous oxide (N2O) emissions by 25-40%	Ngeno et al. (2018), Agric. Ecosyst. Environ.
Overall GHG Emissions:	Switching to organic fertilizers can reduce overall greenhouse gas emissions by approximately 20%.	FAO (2019), Organic Agric. & Climate Change.
Water Retention	Organic fertilizers improve the water-holding capacity of soils by 10-15%.	SGachene et al. (2017), Int. J. Agric. Sustain.
Soil erosion reduction	Areas treated with organic fertilizers experience 30-50% less soil erosion.	Wambua et al. (2020), Soil Tillage Res.
Microbial biomass	Organic fertilizers increase soil microbial biomass by 30-50%	Kiptoo et al. (2018), Appl. Soil Ecol.
Soil Fauna Diversity	Organic farming practices boost soil fauna diversity and abundance by 25-40%.	Muchena et al. (2019), Agric. Ecosyst. Environ.
Crop Yield and Health	Organic fertilizers contribute to an average yield increase of 10-20%	Kamau et al. (2021), J. Agric. Sci.

Intersection of OF and CF

- The finding of the study indicates that there is need for complementarity between organic and chemical fertilizer and a drive to promote Integrated Soil Fertility Management across the agricultural landscape is needed. Organic fertilizer is a Key pillar of ISFM and mechanisms to ensure ease of availability, affordability and efficacy are needed. In addition, OF products should be adaptable to existing systems of CF application in order to enhance synergy where the two are integrated. The research outcome is not primarily targeted at reducing the consumption of CF but rather to supplement its use through enhancing soil health and related aspects.
- The Long-term effect of promoting the integration of OF in agricultural production could mean the consumption of more organo-mineral blends as farmers understand the OF and CF interphase and the benefits of the ensuing synergy.
- Other factors of consideration is farmer allocation on input costs where there is a case for increasing spending on inputs or diversifying the contents of the fertilizer input basket to incorporate OF without major changes in total cost. This is premised on the fact that farmers often apply fertilizer indiscriminately without reference to soil test results and with good stewardship they can allocate resources to the critical elements which sometimes include the organic components.

1.2. The case for Local Manufacturing of Organic Fertilizers

Kenya imports 95% of its fertilizer, largely chemical fertilizer with the use of organic fertilizers in Kenya is still in its infancy. Local manufacturers and actors in the fertilizer manufacturing ecosystem attribute costs associated with waste collection, segregation, processing and marketing to be the main production and commercialization barriers. On the farmers' side, the need and justification for them to start using organic fertilizers is still not well understood or appreciated. Despite this, the demand for organic fertilizer has been on the rise due to increasing information on soil and plant health coupled with the recent disruption in the global fertilizer market. Data shows there is potential for the demand for organic fertilizer to grow to 220,000 tonnes (OFIMAK & CASA Study) from the current 8,000 tonnes annually by 2030 if there is a clear business case at the farm level (demand side) and the supply side (at the local manufacturing and distribution level). Beyond the business case for farmers and local manufacturers, there is a need to understand other factors that will drive demand and uptake of organic fertilizer, what existing models work, and what scaling will look like. Identifying, engaging and co-designing with different stakeholders is key to achieving viable and sustainable models.

Endorsement of the Fertilizer and Soil Health Action Plan and the Soil Initiative for Africa Framework as an anchor to drive local manufacturing of OF

As an outcome of the AFRICA FERTILIZER AND SOIL HEALTH SUMMIT held in Nairobi Kenya in May 2024, the Heads of State and Government of the African Union 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. The action plan and framework outlines key commitments by governments and the AU member states to achieve soil health and Soil integrated Management practices. These commitments clearly show the need to invest in local manufacturing of organic fertilizers and other practices that can help guarantee a food-secure future for the continent.

The push for SOIL Health and Integrated Soil Management Practices

- Since the Abuja Declaration in 2006, there has been a significant increase in local manufacturing of mineral fertilizer, which has attracted over $15 billion of investments from the private sector.
- Fertiliser consumption in Africa has only increased from an average of 8 kg/ha to about 18 kg/ha in 2022. This is less than half of the target of 50 kg/ha set in the declaration and way less than the global average consumption rate of 135 kg/ha (13% of the global rate).
- Most countries are over-dependent on imported fertilizers (non-phosphate fertilizers), exposing Africa to external market shocks and price volatility.
- With the recent fertilizer market crush, Africa has been greatly affected, with a year-on-year decline of 25% in the consumption of fertilizer in 2022.
- Opportunities for investment and great inter and intra-regional trade are currently enhanced by AU member states adoption of the Africa Continental Free Trade Area (AfCFTA).

- The efficiency and effectiveness of mineral and organic fertilizers and other complementary inputs must be enhanced to increase productivity, maximize profitability and returns on investment, improve soil health, and enhance resilience to climate change.
- Supporting mechanisms and incentives are necessary to enable farmer investments in soil health improvement.
- Investments in local manufacturing and blending of fertilizers must be leveraged to capitalize on the resources of the continent and reduce reliance on global markets.
- Financing tools such as trade credit guarantees, working capital, and targeted subsidies must be consolidated to reduce market distortions, reduce costs and strengthen input supply chains.
- Last-mile delivery systems in Africa are weak (long distances by farmers to access fertilizers and other inputs, including advisory services).

Key Targets (Commitments) by the Continent by 2034

On Fertilizer

- Tripple local production and distribution of certified organic and inorganic fertilizers by 2034;
  - Prioritize local production and blending of mineral fertilizers using available raw materials.
  - Provide incentives for local production, utilization and recycling of organic resources.
  - Leverage opportunities offered by decentralized, low-carbon and circular fertilizer production.
  - Establish SME ventures (by youth and women) - oriented to the production and distribution of organic and inorganic fertilizers.
  - Leverage AfCFTA to double intra-Africa Trade by 2034.
- By 2034, make available to at least 70% of smallholder farmers on the continent targeted agronomic recommendations for specific crops, soils, and climatic conditions to ensure greater efficiency and sustainable use of fertilizers.
  - Develop context-specific fertilizer and soil health advisory recommendations, leveraging the potential of data and 4R nutrient stewardship and integrated soil fertility management.
  - Develop and deploy standardized and appropriate tools for assessing soil fertility, soil health, and context-specific sustainable soil management and nutrient requirements.
  - Establish a digital information system to operationalize fertilizer, crop and climate decision support tools on soil management at national, regional and continental levels.
  - Supporting efforts of natural gas producing Member States in fertilizer production to increase their production and ensure availability at stable prices.

On Soil Health

- Committing to reverse land degradation and restore soil health on at least 30% of the degraded soil by 2034;
  - Deploy innovative incentive mechanisms - including repurposing current subsidy programs - to encourage soil health investments by smallholder farmers.
  - Promote integrated soil and water conservation, planning, and management practices across.
  - Strengthening collaborative research and extension systems.
  - Promote integrated soil fertility management practices to improve soil health.

On Financing

- Operationalize the Africa Fertilizer Financing Mechanism to improve the production, procurement and distribution of OF and CF fertilizers and soil health interventions;
  - De-risking farmer investments in yield-enhancing technologies and soil health of current and targeted food security crops,
  - Financing infrastructure and logistics to improve the availability of fertilizers,
  - Access to food markets for farmers and supporting fertilizer and soil health policy reforms;
  - Creating a multi-source soil health fund for research, innovation, capacity building, and start-ups on fertilizer use and soil health actions.
- Mobilization of financial and technical resources to execute the agreed-upon commitments in close cooperation with existing climate funds.

On Creating an Enabling Environment

- Formulating and implementing policies and regulations to create a conducive environment for fertilizer and soil health interventions;
  - Continent-wide, context-specific guidelines for the formulation and implementation of relevant and effective fertilizer and soil health policies;
  - Harmonize national and regional policies and regulatory frameworks to ensure coherence and promote regional and continental trade;
  - Enhance engagement and dialogue with the private sector at all levels;
  - Strengthen public-private partnerships to enhance investments in the fertilizer value chain.

Capacity Enhancement to Support Implementation

- Developing and promoting systemic national capacity building for locally relevant fertilizer and soil health management practices and technologies;
  - Investment in regional research and collaboration
  - Standardized fertilizer analysis capacity and services of labs.
- At Least 70% of SHF have access to quality extension and advisory services on fertilizer and soil health both from public and private extension systems.
  - Review and upgrade education content to include subjects relevant to sustainable soil management.
  - Build, strengthen and standardize the soil analytical services to ensure they are available and affordable to smallholder farmers.
  - Strengthen last-mile delivery systems by supporting agro-dealers and SMEs.
- Domesticating promising mechanisms for rewarding smallholder farmers for improved soil health practices, including carbon markets.

The Nairobi declaration of 2024 which highlights priorities and commitments by the countries in the continent is a key anchor point to drive investment, build capacity and goodwill in investing in local manufacturing. With the declaration touching on diverse elements including financing, education and capacity building, access to soil health services, organic fertilizer use, last-mile distribution innovation, collaboration and partnerships, incentives and policy environment, is an accelerator to drive the use of organic fertilizers and other organic inputs by smallholder farmers, and a driver to spur local manufacturing investments.

Fertilizer Importation Data

Organic fertilizer importation accounts for less than 1% of the total fertilizer importation in 2023.

> There was a decline in importation of Organic Fertilizer from **9,385** MT in 2022 to **1,270** MT in 2023. Local organic fertilizer production is estimated to be around **8,000 to 10,000** MT in the last year.

What Local Manufacturing Can Do

Local manufacturing of organic fertilizers has tangible socio-economic benefits both at the community level and at the country level. Some of the benefits include:

Waste Redirection

Organic wastes from different sources that would have otherwise ended in the landfills can be redirected to produce organic fertilizers. Local manufacturing has the potential to redirect MT of waste each year. The CASA study indicates that around 1.4 million tons of organic urban and industrial waste is estimated economically viable to access today and around 2.0 million tons in 2030. At the moment, only 20% of this waste is redirected for OF processing. Waste redirection has a positive impact on the environment (GHG gas emission, reduction on effects of pollution) and a commitment to a circular economy.

Business case

Local Manufacturing of OF has a clear business case for the manufacturer and the country/government at large. Local manufacturing can stimulate the growth of local industries, which can be an avenue for local direct and foreign investments and the use of local resources, which leads to a better GDP for the country.

Impact case

Local manufacturing has the potential to create job opportunities at different levels–from the community level to the country level. Jobs are created along the entire value chain, from waste sourcing, waste separation, OF production, distribution, and last-mile delivery. On average, small-scale manufacturers create at least 5 full-time jobs and 10 temporary jobs, while large-scale manufacturers create at least 200 jobs.

1.3. State of Organic Fertilizer in Kenya

Kenya has a long history of using organic fertilizers, with traditional farming practices relying on animal manure and compost for soil fertility. However, the mid-20th century brought a shift towards chemical fertilizers due to their immediate yield benefits. In the past two decades, there has been a resurgence in the use of organic fertilizers driven by concerns over soil health, environmental sustainability, cost of inorganic fertilizers and increasing consumer demand for organic produce. In addition, enacting policies and regulations on the use of organic inputs has triggered greater interest in commercial organic fertilizers. This shift reflects a broader movement towards sustainable agriculture in the country.

Kenyan farmers are becoming more aware of the long-term benefits of organic fertilizers, which are supported by government policies promoting regenerative agriculture. The market for organic fertilizers is expanding, with both subsistence and commercial farmers showing increased interest. Innovations in production, such as processed organic fertilizers, bio-fertilizers and organo-mineral fertilizers, are driving this growth. However, challenges still need to be addressed, including variability in fertilizer quality, higher application costs compared to chemical fertilizers, handling and storage challenges, and limited farmer awareness. Addressing these issues is crucial for the growth of the organic fertilizer market.

The landscape of producers and suppliers of organic fertilizers in Kenya includes key local manufacturers like Regen Organics, InsectiPro, Safi Organics, Rotooba, Mazao, Ecofix, Organic Fields, Dudu Masters, the Organic Fertilizer Production Unit (OFPU) and smaller agro-enterprises that produce compost, vermicompost, bioslurry and bioslurry enriched compost. Some organic fertilizers are also imported, particularly those with specialized formulations or customer demands that cannot be met by locally produced options. Major distributors, such as Osho Chemical Industries, Yara East Africa, Elgon Kenya Limited, MEA Fertilizers, IPS Africa and the Agro Dealer network, play a crucial role in making these products accessible nationwide. The presence of both local and international players indicates a developing supply chain for organic fertilizers.

The primary users of organic fertilizers in Kenya are smallholder farmers motivated by cost considerations and the availability of raw materials like animal manure. There is also a growing interest among commercial farmers who seek to meet market demands for organic produce and improve soil health. Demand for organic fertilizers varies regionally, with higher adoption rates in areas where organic farming practices are more established, and farmers have greater awareness and access to organic inputs. This regional variation highlights the need for targeted awareness and distribution efforts.

The regulatory framework for organic fertilizers in Kenya is overseen by the Kenya Bureau of Standards (KEBS) and the Kenya Plant Health Inspectorate Service (KEPHIS), which ensure quality and safety standards. Organic certification bodies, such as the Kenya Organic Agriculture Network (KOAN), certify farmers and producers adhering to organic farming practices. Despite the regulatory support, challenges still need to be addressed, including variability in the quality of organic fertilizers, higher costs compared to chemical fertilizers, and limited awareness among farmers. Addressing these challenges is crucial for the growth of the organic fertilizer market.

Key players in organic fertilizer include producers like OFPU, major distributors, NGOs such as KOAN, ICIPE, ICRAF and Biovision Africa Trust, which promote organic farming. Government agencies, particularly the Ministry of Agriculture, Livestock, and Fisheries, and the umbrella body of organic inputs and fertilizer manufacturers (OFIMAK), also play a significant role. Geographically, regions with high adoption rates of organic farming practices, such as Central Kenya, Rift Valley, Nyanza and parts of Western Kenya, are critical. Additionally, there is potential in other regions with untapped demand for organic fertilizers, presenting opportunities for market expansion.

The focus crops for organic fertilizer application include high-value horticultural crops like vegetables, fruits, and herbs, which have significant market demand for organic produce. Staple crops such as rice, maize, beans, and peas also benefit from improved soil fertility and yield through organic fertilizers. Cash crops, including tea, coffee, and flowers, can gain enhanced market value and meet international standards through organic certification or regenerative production practices. This diverse crop focus indicates the broad applicability of organic fertilizers across various agricultural sectors in Kenya.

Several key gaps need to be addressed to enhance the organic fertilizer market in Kenya. Increasing farmer awareness and education about organic fertilizers' benefits and proper use is essential. Ensuring consistent quality and standardization of organic fertilizers will build farmer confidence. Addressing the high cost and improving accessibility through subsidies, incentives, and better distribution networks can promote wider adoption. Investing in research and innovation to develop more effective and affordable organic fertilizer formulations is also crucial. Additionally, strengthening government policies and support mechanisms will further promote the adoption of organic fertilizers and sustainable farming practices. By addressing these gaps, Kenya can significantly enhance the adoption and impact of organic fertilizers, leading to healthier soils, improved crop yields, and a more sustainable agricultural sector.

1.4. Existing Data and Insights on Organic Fertilizers

Waste collection and segregation from the four main waste streams (household and green waste, market waste, human waste, and agricultural by-products) has been highlighted as the main challenge limiting the overall organic fertilizer production. Organic market waste sometimes competes as animal feed, while human waste collection is limited largely because of the design of waste disposal and management systems. Existing organic fertilizers have varying qualities, directly impacting consumer trust and demand. The demand for organic fertilizers depends on factors like quality control, improved product descriptions, advisory service, training and research on soil health impact.

The recent disruption in the global fertilizer market due to the full-scale Russia-Ukraine war has increased the demand for locally produced fertilizer, including organic options. The CASA study estimates that the overall fertilizer market is expected to exceed $,700M, of which the OF market is expected to grow to between $45M and $,75M (45-50% CAGR from 2022)

1.4.1. Early Insights on Barriers to Uptake of Organic Fertilizer

On the demand side, adoption of organic fertilizer is limited due to inadequate access to organic fertilizer, lack of awareness on organic fertilizer, limited knowledge in use, lack of demonstrations, insufficient advisory services, and delayed nutrient availability, thus lower yield in the short term compared to chemical fertilizer. Challenges with transportation, handling and storage of organic fertilizers may also hinder their adoption. In addition, a lack of quality control, beliefs, and practices, especially regarding certain organic fertilizer types, may also limit adoption. Familiarity with chemical fertilizers and inflexibilities to change is another big factor in the adoption of organic fertilizers.

Key stakeholders, such as agro-dealers who interact with farmers, have a limited understanding of product specifications and general risk aversion to take on "novel" products, given the potential impact on cash and profitability. Extension service providers have yet to have full information on organic fertilizers to adopt or recommend to their network of farmers. Farmers still do not have clear information about yields, and the existing fertilizers are generalized, not production system crop, or crop stage-specific.

1.4.2. Existing Research & Ideas on Scaling Local Production of Organic Fertilizers

1. **Implementing source separation of waste to enhance the quality of raw materials for organic fertilizer production.** Gathering information about available feedstocks, their locations, quantities, and quality will be essential to inform production capacities for organic fertilizer. Sometimes, a regular supply of raw materials or the quantities needed are not guaranteed, making a case for re-evaluating sourcing, processing, production, and distribution models. Enabling manufacturers to adopt best practices and scale through targeted investments and technical assistance is a starting point.
2. **Developing crop-specific organic fertilizer products tailored to the individual nutrient requirements of different crops.** Local manufacturers can explore developing organic fertilizers for specific value-chain crops rather than offering one-size-fits-all products. This can help develop clear business cases for specific crops and specific segments of farmers.
3. **Providing farmers with precise application rates of organic fertilizer for diverse soils, crops, and crop stages.** There is potential for developing granulated formulations for organic fertilizers, simplifying farmers' ability to regulate application rates, mechanizing application, and easing the change of behaviour from the existing use of purely chemical fertilizers.
4. **Expanding the adoption of organic farming as a possible driver for the uptake of organic fertilizers.** Responding to increasing consumer demand for organic products (locally and for export crops) can spur the use of organic fertilizers for specific consumer segments and crops. Local manufacturers can explore this as an avenue to optimize their production.
5. **Subsidizing the cost of waste management.** Exploring ways county governments or the public can cater to waste management costs, thereby reducing production costs. The government can alternatively substitute the import subsidies offered for chemical fertilizers by offering subsidies for local manufacturing of organic fertilizers.

6. **Onsite business model/pre-financing fertilizer application.** Allowing farmers to uptake organic fertilizer and repay the costs with the proceeds from their harvest. This creates a stronger connection to their supply chain.
7. **Exploring carbon markets for organic fertilizer manufacturers.** Models can be developed that allow local manufacturers to qualify for payments for ecosystem services and support manufacturers in exploring the use of low-energy and renewable energy sources in the organic fertilizer production process. This also includes greenhouse gas emission calculations, which should be part of the strategy, including mitigating GHGs from landfills and manure left on pasture.
8. **Developing a holistic approach.** In addition to developing the organic fertilizer value chains, the entire farming system needs to be optimized. Such a systems approach will emphasize an integrated fertilizer strategy, with soil health as a central goal. There is an opportunity for a multi-stakeholder approach to the value chain development. This means making investments across the value chain. Such investments include technology optimization in processing, waste collection, segregation, and efficient product distribution. At the core of this is ensuring product quality and standardization.
9. **Policies, regulations and certifications -** Rethinking and enhancing existing frameworks to cover waste collection, processing, organic fertilizer production, marketing, distribution, quality standards, certifications and on-farm applications. These policies could integrate into existing agricultural practices alongside inorganic inputs. Cross-sector collaboration and aligning sanitation, waste management, and agriculture policies are essential to establish a circular economy. Policy efforts should support private sector initiatives and investments and establish mechanisms to support the market to scale.
10. **Increasing farmer awareness and driving change** towards integrated soil fertility management practices. Exploring innovative ways of communicating the value of organic fertilizers to farmers and addressing barriers to their adoption.

> The CASA study estimates that the organic fertilizer market will be worth $200m by 2030.

1.5. Scope of the Project

The objective of the consultative study was to engage with the government, farmers, local manufacturers, and other relevant stakeholders to define strategies to scale local manufacturing of regenerative farm inputs in Kenya, improve the business case at both farm and manufacturer levels, and assess the economic, social, and environmental benefits at the country level.

The work's outcome is a report articulating the benefits of scaling local organic fertilizer manufacturing in Kenya and defining an action plan for relevant stakeholders.

In particular, the scope involved:

Key Tasks	Key Activities
Development of a 'A Social Return on Investment (SROI)' framework	Establishing the baseline for localized organic fertilizer and organo-mineral blends (high-level structure) producers.
	Mapping relevant economic, environmental and social benefits from organic fertilizer/ organo-mineral blends using an SROI framework at the farm and country levels.
	Mapping of further relevant economic, environmental, and social benefits from local manufacture of organic fertilizer using an SROI framework at the producer level and at the country level.
Development of a business case for scaling local manufacturing of organic fertilizer (at farmer and producer level, and at country level)	Identification of drivers of demand and supply constraints
	Quantification of mapped economic, environmental and social impacts from the use of organic fertilizer and from local manufacturing.
Development of strategies to improve the identified business cases	Identification of main barriers impeding the business case at farm-, manufacturer - and country level.
	Prioritization of opportunities to address identified barriers based on high-level feasibility and impact.
	Seasonality estimation and localization of the demand for organic fertilizers and organo-mineral blends for three selected crops across Kenya.

Development of a roadmap for the enabling environment	Detailing/ sizing of required investments and expected impact for prioritized key initiates.
	Defining the role of the enabling environment to address identified barriers.
	Mapping of key relevant government, research, finance and other private sector actors.
	Roadmap prioritizing key initiatives for each relevant stakeholder group.
Design a Validation Workshop with key stakeholders	Insights presentation and validation with key stakeholders through co-design sessions. Key stakeholders included local manufacturers, government agencies, farmer groups, off-takers, aggregators, agro-dealers, research organisations, funding organizations and other relevant actors.
	Gather input and feedback.
Development of a final report	Integrate feedback into final report.
	Review report with key stakeholders and experts.
	Dissemination of the report with key stakeholders, including defining action items and key initiatives for each relevant stakeholder group and gathering any final input.

1.5.1. Overall Approach & Strategy

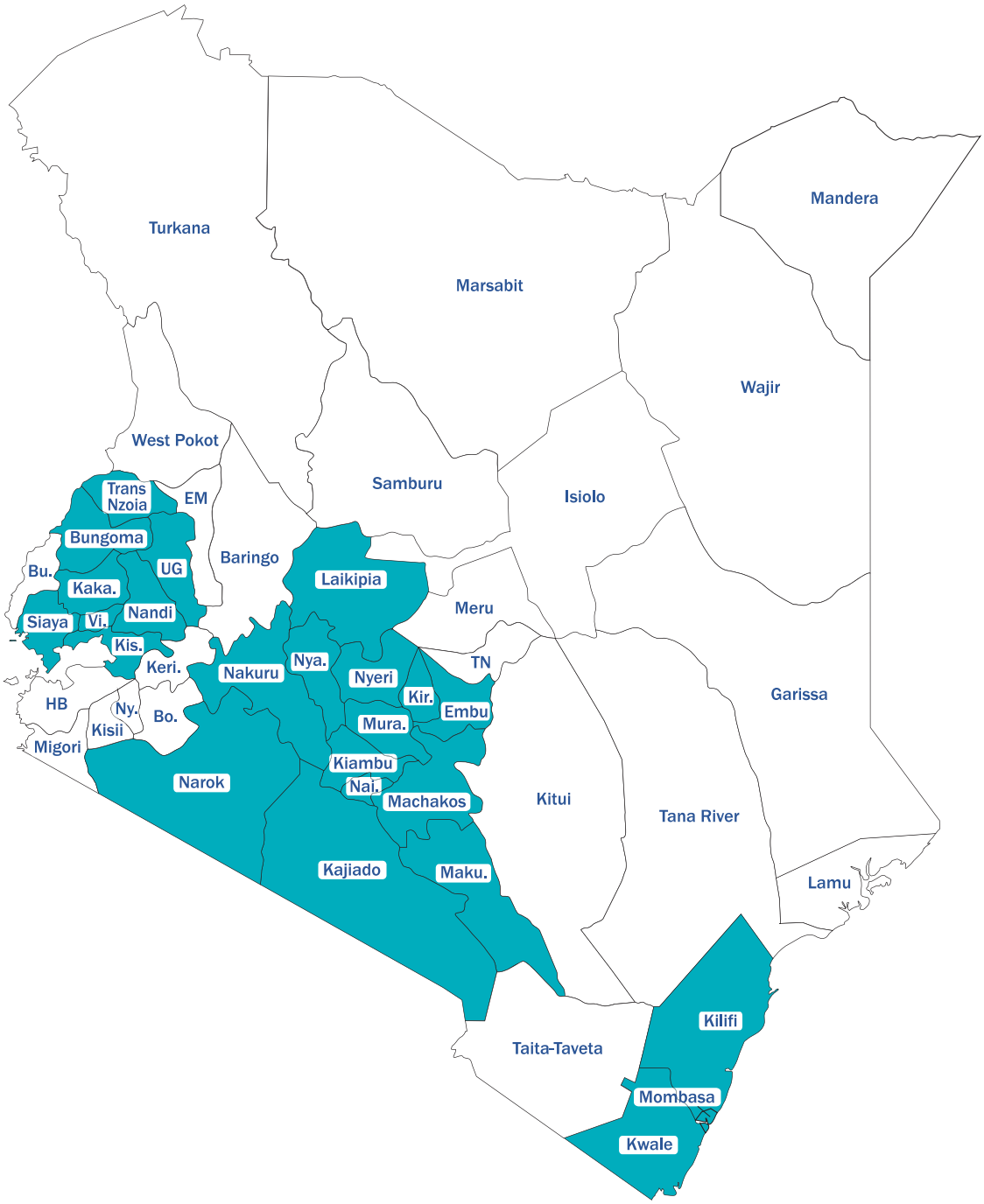
Mideva Labs leveraged a human-centered co-design to achieve the project's outcomes. Here is a summary of the approach:

1.5.2. Geography of Focus for the Study

The study covered several counties in Kenya (Kisumu, Kakamega, Nakuru, Uasin Gishu, Trans Nzoia, Narok, Nandi, Bungoma, Machakos, Muranga, Nyeri, Mombasa, Kwale, Laikipia, Kilifi, and Nairobi).

Stakeholders	Regions covered
Farmer and Farmer Groups	Kajiado, Kiambu, Muranga, Kirinyaga, Kisumu, Eldoret, Machakos, Kwale, Kilifi, Mombasa, Nairobi, Kakamega, Mumias, Nandi,
Manufacturers	Nairobi, Kiambu, Muranga, Kisumu, Mombasa, Eldoret, Kwale
Agro-dealers	Kajiado, Kiambu, Muranga, Kirinyaga, Kisumu, Eldoret, Machakos, Kwale, Kilifi, Mombasa, Nairobi, Kakamega, Mumias, Nandi
Farmer Cooperative Societies	Uasin Gishu, Nandi, Nairobi,
Research Institutions	Nairobi, Kiambu,
Government Institutions	Nairobi, Mombasa
Associations (Farmer and Fertilizer associations)	Nairobi, Kiambu, Mombasa
Agriculture related organizations	Kisumu, Nairobi, Mombasa

In terms of crops we explored coffee, onions, tomatoes, maize, rice, wheat, mangoes, citrus gooseberries, avocados, bananas, legumes, leafy vegetables.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Kisii
Bo.
Kir.
Embu
Mura.
Migori
Kiambu
Narok
Nai.
Machakos
Kitui
Tana River
Kajiado
Maku.
Lamu
Kilifi
Taita-Taveta
Mombasa
Kwale

1.5.3. Data Collection Strategies

We applied a variety of approaches for data collection.

Focus Group Sessions and workshops with farmer groups and associations of organic input manufacturers and other key stakeholders

Field visits and immersions to analyse existing models

Validation workshops with key actors and stakeholders to get feedback on the findings and insights

Field research and 1:1 interviews to gather data from farmers and farmer groups, local manufacturers, suppliers and distributors, financial institutions, and other key stakeholders

Surveys - both qualitative and quantitative questionnaires to gather extensive data sets across the ecosystem.

Key Informant interviews to gather data from key stakeholders

Analysis Tools (Stakeholder Analysis tool, Business Model tool, Opportunity Mapping tool)

1.5.4. Stakeholder Engagement

Stakeholder group	Stakeholders	Entities engaged
Fertilizer manufacturers	Organic fertilizer manufacturers	Regen Organics, Safi Organics, Insecti Pro, Rokovia, Ts, Ecodudu, Organic Kenya Limited, Ecofix, Ziada Solutions Ltd, AgriSolutions Kenya, Afrisol, DonBosco Kirimi, Wanergy Africa, Biogas International, Elephant Vert Kenya, Olivado
	Organo mineral fertilizer	K+S, Minjingu Organic Fertilizers Ltd, SBL Innovate, ICL
	Inorganic fertilizer manufacturers	YARA East Africa
	Importers	IPS Africa, East African Business Company
Farmer networks & groups	Farmer Groups (self-organized)	AWACH, Sirikwa Avocados Group
	Farmer Cooperatives	Nandi Avocado Farmers Cooperative
	Large Farms	Kakuzi, Olerai, Manera Farm, AAA Growers, Sunripe, KHE
	Farmer Associations	Value-specific associations such as Avocado, Coffee, Vegetables Ahero Rice

Intermediaries	Off-takers & Outgrowers	AAA Growers, Sunripe, KHE, Biofarms
	Processors	Kakuzi, KTDA, Coffee Millers
Agro-dealers	Suppliers & input dealers	Thika, Kitengela, Kilifi, Kisumu, Eldoret, Mombasa
	Extension service providers	Uasin Gishu, Trans Nzoia, Laikipia, Nyeri, Nairobi, Kajiado, Nakuru, Meru, Embu
Waste Management Providers	Private entities	Fresh Life, Grinncom
	County services	County-contracted service providers
Enabling Environment dealers **Service providers**	Financiers/Financial Institutions	Equity
	Investors & funders	Afric Climate Ventures, IFDC, AFAP
	Development Agencies & Donors	IKEA FOUNDATION, Rockefeller Foundation, SNV, AGRA
	Government agencies	Ministry of Agriculture & Livestock Development Ministry of Industrialization, Trade and Enterprise Development Kenya Plant Health Inspectorate Service (KEPHIS) Kenya Bureau Of Standards (KEBS) Kenya Industrial Research and Development Institute (KIRDI) Kenya Industrial Property Institute (KIPI)
	Research Universities	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenyatta University (KU), University of Nairobi (UoN), Egerton University (EU), University of Eldoret (UoE), University of Embu (UoE)
	Research institutions and Other actors	World Veg, ICIPE, SNV, AGRA, ICRAF, IKEA Foundation, Biovision CIAT, CAS4H

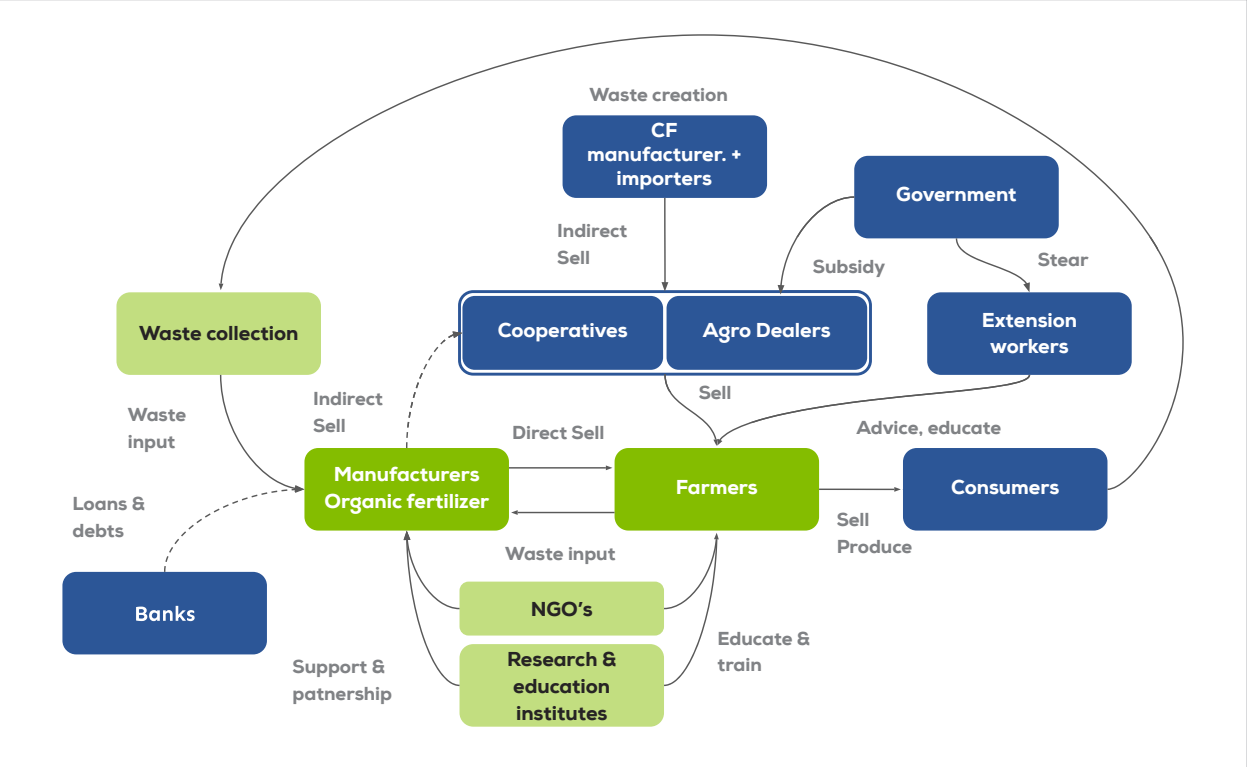
1.5.5. Assessment Areas

Sample Stakeholders	What data we collected
Manufacturers	• Operating model and operating environment • Raw material sourcing and production models • Business model and pricing • Market size and customer segments • Delivery and distribution channels & strategies • Supply vs demand data • Product awareness and training • Partnerships & Financing • Financing & Technology • Policy environment • Impact Data • Scaling Efforts
Farmer groups	• Current demand for organic fertilizer • Demand barriers • Opportunities/enablers to increase demand
Agro-dealers and logistic services	• Current need for organic fertilizer by clients • Distributor Access • Barriers to trade in organic fertilizer • Opportunities/enablers to trigger demand and supply
Research Institutions	• Existing data on OF • Collaboration between research institutions, regulators and private sector • Gaps in research
Funders	• The OF funding landscape • Barriers to funding • Impact and venture assessment • Trends in funding and future plans
Farmers	• Experience with OF • Challenges, barriers and opportunities • Impact

2 Baseline for Organic Fertilizer

2.1. The Current Landscape

Kenya's organic fertilizer (OF) market is undergoing dynamic development as local manufacturers carve out their place within the broader fertilizer industry. While the market for organic fertilizers and organo-mineral blends is set for significant growth over the next decade, these new players must navigate an existing landscape dominated by chemical fertilizer manufacturers and importers. The evolving ecosystem includes a diverse set of stakeholders such as farmers, waste collectors, agro-dealers, extension workers, Non Governmental organizations (NGOs), government institutions, banks, and consumers. As Kenya positions itself as a leader in sustainable agriculture and climate smart approaches, the integration and scaling of organic fertilizers and organo-mineral blends will play a crucial role in shaping the future of the country's input landscape and agricultural sector.



2.2. Stakeholders in the OF landscape

The organic fertilizer (OF) system in Kenya is a complex, interdependent network of stakeholders working together to promote sustainable farming practices.

At the core of the system are **local manufacturers,** who redirect organic waste from **farms, markets** and **waste collectors** to produce OF. Farmers, as both suppliers and end-users, depend on manufacturers for access to OF and play a key role in the supply chain by providing raw materials. Existing **Agro dealers** act as avenues for OF distribution, even though this largely depends on the manufacturer's distribution model. Currently, manufacturers often handle this directly due to logistical challenges and the need to build direct relationships with farmers.

Extension workers help bridge knowledge gaps by educating farmers about OF's benefits, though their involvement in promoting commercial OF is still limited. **Institutions** and **NGOs** further support the system by conducting research, driving innovation, and providing financial and educational resources.

The **government** plays a smaller role, mostly in setting standards and pushing conversations on regenerative agriculture, with a lot of its focus on chemical fertilizers. However, it could significantly boost OF adoption through policy shifts, subsidies, and standardization. Meanwhile, **banks** are cautious in providing financial support, viewing the OF industry as high-risk, forcing manufacturers to seek alternative funding.

Rising **consumer** demand for organic products drives farmers to adopt OF, creating a feedback loop that pressures manufacturers to scale production. **Chemical**

fertilizer manufacturers dominate the market but may explore partnerships with OF producers to diversify and contribute to sustainable agriculture.

2.3. The production of organic fertilizers and local manufacturers

Local Organic Fertilizer manufacturers

Currently, the role of the local OF manufacturers in the landscape is mainly based on their relationship with farmers. The manufacturers are the central player of the OF landscape and have a multifaceted role besides the local production of OF. They often take care of the collection of and storage of inputs, handling and distribution of final product, and capacity building of farmers on OF. They are also expected to do the marketing and demand creation. All of these responsibilities are based on direct contact with the farmers and the established relationship.

Perception of OF

Manufacturers of OF generally perceive OF as a crucial element for the future of agriculture. They recognize the significant role OF can play in combating soil acidification and promoting soil restoration in Kenya. Additionally, manufacturers believe in the positive results of OF, such as increased yields, healthier and higher nutrient value produce, and better-tasting crops. They also see OF contributing to higher production numbers and the overall improvement of soil health, which can lead to a decreased need for and use of chemical fertilizers. However, they acknowledge the challenges associated with market acceptance and profitability. There is a need to educate farmers and consumers about the benefits of OF to increase its adoption and ensure its economic viability.

2.3.1. Types of Organic Fertilizers and methods of production

In Kenya, various organic fertilizers enhance soil health and boost crop productivity.

Organic Fertilizer Type	Overview
Bio Slurry	A by product of biogas production, rich in nutrients and beneficial micro-organics, enhancing soil fertility and crop yield.
Compost	Made from decomposed organic matter, it is widely used to improve soil structure and nutrient content. Organic matter that has undergone decomposition through microbial activity, resulting in a nutrient-rich, humus-like material.
Vermicompost	Produced through the breakdown of organic matter by earthworms, is known for its high nutrient content and ability to improve soil aeration and water retention
Manure (Animal & Green)	**Animal manure** is nutrient-rich organic matter from livestock that enhances soil fertility and promotes plant growth while improving soil structure and moisture retention. **Green manure** consists of cover crops specifically grown to be tilled back into the soil, enriching it with organic matter and nutrients. Thus, it supports sustainable agriculture by improving soil structure and suppressing weeds.
Bioslurry-enriched Compost	Nutrient-rich organic fertilizer produced by combining traditional compost with bioslurry, a byproduct of biogas digesters.
Frass Fertilizer	Derived from insect excrement and exuviae, particularly from insects like black soldier flies, and is rich in nitrogen, phosphorus, and potassium. It serves as a natural soil amendment that improves nutrient availability and supports plant growth.
Biochar	Carbon-rich soil conditioner created by pyrolyzing organic matter, such as agricultural residues, in low-oxygen conditions. It enhances soil fertility, improves water retention, and contributes to carbon sequestration.

The production of organic fertilizers in Kenya incorporates several innovative technologies that enhance efficiency, nutrient content, and environmental sustainability.

Fertilizer	Technology	Overview
Bioslurry	Anaerobic digestion	Anaerobic digestion involves the breakdown of organic materials by microorganisms without oxygen. This process occurs in a sealed digester, where feedstock (livestock manure and crop residues) is converted into biogas and bio-slurry. The biogas can be captured for energy production, while the nutrient-rich bio-slurry is used as an organic fertilizer, enhancing soil fertility and crop yields.
Compost	Aerobic composting, windrow composting, and in-vessel composting	Aerobic composting involves the controlled aerobic decomposition of organic matter, which can reduce composting time by up to 50%. Windrow composting, which piles organic waste in long rows, allows for natural aeration and efficient breakdown of materials. In-vessel composting, a more controlled and enclosed method, ensures optimal conditions for decomposition and is particularly useful in urban and peri-urban areas with limited space.
Vermicompost	Vermiculture/ Vermicomposting	Vermicomposting employs earthworms to decompose organic waste materials such as kitchen scraps and agricultural residues. The process takes place in controlled environments, where worms consume the organic matter, excreting nutrient-rich castings (vermicompost). These castings are rich in essential nutrients and beneficial microorganisms, improving soil structure and fertility.
Biochar	Pyrolysis	Biochar is produced through pyrolysis, a thermochemical process that decomposes biomass at high temperatures (400-700°C) in an oxygen-limited environment. This process converts organic material into a stable form of carbon, resulting in biochar that can improve soil fertility, water retention, and carbon sequestration. Its application in agriculture enhances soil health and mitigates climate change.
Manure	Composting and Anaerobic Digestion	Manure management can utilize both composting and anaerobic digestion technologies. In composting, manure is mixed with carbon-rich materials (like straw) and decomposed aerobically, producing stable organic fertilizer. In anaerobic digestion, manure is processed in the absence of oxygen to produce biogas and bio-slurry. Both methods improve the nutrient profile of the manure, making it more beneficial for soil application.
Frass	Insect Farming and Processing	Frass is produced through insect farming, particularly from the larvae of insects like black soldier flies. The larvae feed on organic waste, and their excrement, along with the residual organic matter, is collected as frass. The technology involves rearing insects in controlled environments to optimize their growth and waste production, yielding a nutrient-rich organic fertilizer that supports sustainable agriculture.
Organo blends	Blending and Granulation	Organo-minerals are manufactured through blending organic materials (such as compost or biochar) with mineral fertilizers (like NPK). The blending process ensures a balanced nutrient profile, while granulation may be used to create uniform particles for easier application. This technology allows for the combination of organic benefits with the immediacy of mineral nutrients, enhancing crop productivity and soil health.

These advancements in organic fertilizer production technologies enhance efficiency and nutrient content and contribute significantly to environmental sustainability by reducing waste and greenhouse gas emissions.

2.3.2. Characteristics of different types of OF

Application and Amount

Organic fertilizers in Kenya are applied at various rates depending on the type of fertilizer and the specific crop being cultivated. These application rates are essential for optimizing benefits while preventing nutrient overload.

Adhering to these recommended application rates allows farmers to maximize the benefits of organic fertilizers, ensuring sustainable and productive agricultural practices. The growing adoption of organic fertilizers, which has increased by 50% over the past decade, reflects their effectiveness in improving soil health and crop productivity. With an annual growth rate of 12% in demand for organic fertilizers, these sustainable practices are expected to continue benefiting Kenyan agriculture, providing long-term economic and environmental advantages.

Fertilizer	Recommended amount per ha	Actual amount
Slurry	20-30 tons	50-200 kg
Vermicompost	2-5 tons	50-200 kg
Compost	5 -10 tons	200-1000 kg
Animal Manure	10-20 tons	200-1000 kg
Frass Fertilizer	1-2 tons	50-200 kg
Biochar	1-3 tons	50-200 kg
Bioslurry Enriched Compost	8-12 tons	50-200 kg
Green Manure	15-20 tons	200-1000 kg

Composition

The nutrient composition of organic fertilizers varies significantly depending on the source materials and production methods. Key components typically include nitrogen (N), phosphorus (P), potassium (K), and organic matter, all of which are essential for enhancing soil fertility and crop productivity.

Fertilizer	Components	Crop yield increase %
Bioslurry	up to 1.5% nitrogen, 0.8% phosphorus, and 1.2% potassium	20-25%
Compost	up to 1.2% nitrogen, 0.6% phosphorus, and 0.8%	20-30%
Vermicompost	up to 2.5% nitrogen, 1.5% phosphorus, and 1.8% potassium	20%
Animal Manure	up to 2.0% nitrogen, 1.0% phosphorus, and 1.5% potassium	15-25%
Green Manure	2.0-2.5% nitrogen	25-30%
Frass	up to 4% nitrogen, 2% phosphorus, and 3% potassium	10-20%
Bioslurry enriched compost	up to 2% nitrogen,1% phosphorus, and 2% potassium.	15-30%

By understanding the nutrient composition of these organic fertilizers, farmers can select the most appropriate type for their specific soil and crop needs, optimizing soil health and agricultural productivity. The growing adoption of organic fertilizers, which has increased by 50% over the past decade, reflects their effectiveness in improving soil health and crop productivity. With an annual growth rate of 12% in demand for organic fertilizers, these sustainable practices are expected to continue benefiting Kenyan agriculture, providing long-term economic and environmental advantages.

Summary of OF Types and Prices

OF type	Cost of Production (50kg)	Margin	Sell price (50kg)	Cost of distribution (KES per 50kg bag)
Vermi liquid	2000 - 2500	400 - 800	2500 - 3500	300
Vermicompost	800 - 1500	250 - 400	2000 - 3000	300
Frass	1200 - 2000	500 - 800	2700 - 3500	300
Biochar	1700 - 2200	400 - 800	2400 - 3000	300
Bio Slurry	500 - 800	400 - 700	1200 - 2000	300
Processed Compost	1200 - 2000	500 - 800	2400 -3500	300

Summary of OF types and application amounts

OF type	Lowest application rate per acre	Highest application rate per acre	OF:CF Ratio
Vermi liquid	1	10	1:1
Vermicompost	50	200	1:1
Frass	50	200	1:1
Biochar	50	200	1:1
Bio Slurry	50	200	1:1
Processed Compost	200	1000	1:1
Bio slurry enriched compost	50	200	1:1

Summary of OF Types and Usage Insights

	Crops	Current Demand	Customer segments
Bioslurry	Various crops, including cereals, vegetables, trees and fodder	Moderate, increasing awareness of its benefits and biogas adoption.	Smallholder and commercial farmers, biogas users, and eco-friendly farming initiatives
Compost	Wide range of crops, including horticultural crops, cereals, and legumes.	High, widely used by farmers for its soil-improving properties and low cost.	Small to large-scale farmers, gardeners, and horticulturists. Large informal trade network for unprocessed compost between farmer to farmer, farmer to aggregator and aggregator to farmers
Vermicompost	High-value crops, vegetables, fruits, and ornamentals	Niche market, with high demand among organic farmers and those growing high-value crops.	Organic farmers, high-value crop producers, and environmentally-conscious growers.
Frass	Speciality crops, including high-value vegetables and fruits.	Growing demand, particularly in innovative and organic farming sectors.	Innovative and organic farmers looking for sustainable and high-nutrient fertilizers.
Bio-slurry enriched compost	Wide range of crops, including horticultural crops, cereals, and legumes.	Low, used by farmers for its soil-improving properties and low cost.	Small to large-scale farmers, gardeners, and horticulturists.
Organo-blends	Various crops, tailored depending on the product formulation and intended use.	High, with a growing market due to the perceived benefits and ease of use.	Broad customer base including smallholder and commercial farmers, horticulturists, and landscapers.

Summary of OF types, trends, barriers to production and demand

Of type	Trends	Barriers to production	Barriers to demand
Bioslurry	Increasing use with the adoption of biogas technology and growing awareness of organic farming benefits. Manure is the most known organic fertiliser in Kenya. Treated manure such as bioslurry is mostly used on farm by biogas owners.	High initial setup cost, technical knowledge required, high water content, lack of standardized design for storage & transport and variability in feedstock availability.	Lack of awareness among farmers, limited distribution networks, and initial resistance to new technology.
Compost	Stable growth with increased urban composting initiatives and growing demand for sustainable farming practices.	Availability of organic waste, variability in compost quality, and potential regulatory hurdles.	Quality variability, market competition from other organic fertilizers, and the need for education on compost benefits.
Vermicompost	Growing interest in organic farming and sustainable agriculture, driving demand for vermicompost.	Limited knowledge among farmers, initial setup costs for vermiculture, and the need for specific conditions for worm farming.	High cost compared to traditional fertilizers, niche market awareness, and limited availability.
Frass	Emerging market with significant potential as insect farming becomes more mainstream.	Technical knowledge required for insect farming, initial investment costs, and potential regulatory issues.	Limited awareness among farmers, niche market perception, and potential skepticism about new products.
Bio-slurry enriched compost	Increasing use with the adoption of biogas technology and growing awareness of organic farming benefits. Easier to store and transport as the water content is low. The compost benefit from an increase of nutrient specially nitrogen.	High initial setup cost, technical knowledge required, variability in feedstock availability, need for knowledge on compost enrichment. Absence of standardised design for storage and transport.	Lack of awareness among farmers, handling challenges, and initial resistance to new technology.
Organo-blends	Expanding market with continuous innovation in product formulations and growing adoption among commercial farmers.	High production costs, regulatory compliance, and the need for consistent quality control.	Price sensitivity among farmers, market penetration challenges, and competition from traditional fertilizers.

Summary of OF types and Current Business Case

OF type	Business Case
Bioslurry	Viable with increasing biogas adoption, potential for integrated farming systems, and opportunities for rural development.
Compost	Sustainable and profitable with the growing demand for organic products, potential for community-based composting projects.
Vermicompost	Profitable for organic farming niche, opportunities for high-value crop production, and growing market for sustainable agriculture.
Frass	High potential in innovative agriculture, opportunities for sustainable waste management, and market growth in organic farming.
Bio-slurry enriched compost	Viable with increasing biogas adoption and synergy of slurry with compost, potential for integrated farming systems, and opportunities for rural development.
Organo-blends	Strong growth potential with increasing demand for sustainable farming solutions, profitability.

2.3.3. Comparative Analyses

Comparative analyses between pure organic fertilizers and organo-mineral blends are crucial for understanding their distinct benefits and applications in agriculture, particularly within the context of Kenya. Organic fertilizers, such as compost, bioslurry, and animal manure, are prized for their ability to enhance soil structure, foster microbial activity, and improve overall soil health over the long term. These organic inputs contribute organic matter to the soil, which helps in nutrient retention, water infiltration, and erosion control. Farmers often prefer organic fertilizers for their sustainable benefits, as they reduce dependence on synthetic chemicals and promote environmentally friendly farming practices.

In contrast, organo-mineral blends combine organic materials with mineral fertilizers that contain essential nutrients like nitrogen (N), phosphorus (P), and potassium (K). These blends aim to leverage the immediate availability of nutrients from mineral sources while harnessing the soil-building properties of organic matter. By incorporating both organic and mineral components, organo-mineral blends provide a balanced nutrient supply that can satisfy immediate crop demands and support robust growth and development. This approach is particularly beneficial in situations where crops require a quick nutrient response to achieve optimal yields.

Studies and field trials have demonstrated that organo-mineral blends can offer superior benefits compared to pure organic fertilizers in certain contexts. For instance, in regions where soils are inherently low in nutrients or where crops have high nutrient demands, organo-mineral blends can provide a more targeted and effective nutrient supply. This not only enhances crop productivity but also helps in mitigating nutrient deficiencies that may limit yields with purely organic inputs alone.

The choice between organic fertilizers and organo-mineral blends often hinges on factors such as soil fertility status, crop type and growth stage, local climate conditions, and economic considerations. Farmers and agricultural experts in Kenya weigh these factors to determine the most suitable fertilizer strategy for maximizing yields while maintaining soil health and sustainability. Adoption of organo-mineral blends may be more prevalent in intensive farming systems or where immediate productivity gains are crucial, while organic fertilizers are favored for their long-term benefits in enhancing soil fertility and ecological sustainability.

2.4. Waste resourcing

Waste collection

Waste collection is a task that can be done by farmers or actors in urban and industrial waste management. For farm wastes, the farmers bring the waste to the manufacturers' production sites. In some instances, the waste may be collected by the manufacturers from farmers, local markets or food processing factories. Another option is that of waste collectors who collect, sell and redirect waste to a manufacturer of OF.

Raw material sourcing is a crucial component in the production of organic fertilizers, influencing both the quality and cost-effectiveness of the final product. In Kenya, organic fertilizer manufacturers rely on a variety of raw materials, including agricultural residues, organic wastes from households and industries, animal manure, and bio-waste from crop processing. The availability and procurement of these raw materials significantly impact production efficiency and environmental sustainability.

The "Raw Material Sourcing for Organic Fertilizer Production in Kenya" report by KALRO provides valuable insights into the challenges and opportunities in this aspect of fertilizer production. It identifies several key challenges that manufacturers face, such as inconsistent supply chains, seasonal fluctuations in raw material availability, and competition with other agricultural uses. These challenges often lead to fluctuations in production volumes and operational costs, affecting the overall profitability of organic fertilizer production https://www.kalro.org/natural-resource-management-systems/.

Variability in raw material availability and competition

One of the primary challenges highlighted in the report is the variability in the quality and quantity of available raw materials. Agricultural residues, for instance, are subject to seasonal availability based on crop harvesting cycles. This variability requires manufacturers to implement flexible sourcing strategies and storage solutions to ensure continuous production throughout the year. Additionally, the competition for these materials with other agricultural practices, such as animal feed and bedding, poses logistical challenges that can affect procurement timelines and costs.

Logistical challenges in raw material procurement

Another critical aspect discussed in the report is the logistical infrastructure required for efficient raw material procurement. Transporting organic wastes from urban centers to rural production facilities, for example, involves logistical complexities that impact production costs and environmental sustainability. Improving transport infrastructure and implementing efficient logistics management practices are essential for reducing these costs and enhancing the reliability of raw material supply chains.

Sustainable sourcing practices and community impact

Moreover, the report underscores the importance of sustainable sourcing practices in organic fertilizer production. Manufacturers are increasingly adopting practices that minimize environmental impact, such as sourcing organic wastes from local communities and implementing waste reduction strategies in processing facilities. These practices not only contribute to environmental conservation but also support community livelihoods by creating opportunities for waste recycling and resource recovery.

While raw material sourcing for organic fertilizer production in Kenya presents significant challenges, such as supply variability and competition with other agricultural uses, there are opportunities for improvement through strategic planning and investment in infrastructure. Addressing these challenges requires collaborative efforts among stakeholders, including government agencies, agricultural producers, and waste management entities, to ensure sustainable and efficient raw material supply chains for the organic fertilizer industry.

2.5. Manufacturer Insights & Data

Overview

We engaged a diverse group of local manufacturers to understand their current set up and operations, current business models and strategies and impact, current performance and activities and existing barriers and challenges. In addition, we reviewed their future goals, opportunities and plans for scaling production, and barriers for scaling. While there was openness to engage, gathering some of the data proved to be a challenge, with cases of no existing data or data being considered confidential. We were also not able to engage a number of manufacturers to gather their input.

A summary of the classification of manufacturers depending on type of fertilizer is represented below:

OF type	Manufacturers
Bioslurry	Sistema.bio, Organic Fields Limited, Ziada Solutions, Big Organics And Naturals, Afrisol Energy
Frass fertilizer	Feedbugs, Insectipro, Insectary, Regen Organics, Mzuri, Insectipro, Insectary
Vermicompost	Comfort Worms and Insects, Loopa, Dudu Masters
Bio-slurry enriched compost	Taita Biodigestor, Biogas producers at household and farm level
Biochar	Safi Organics, Organic Fertilizer Kenya, Ecofix
Seaweed	Morganics, Selected importers

Summary of manufacturing information per business size

Metrics	Idea/early stage	Product-market-fit	Scale
Production amount	24 - 1000 tonnes a year	1000 - 4000 tonnes a year	4000+ tonnes a year
Technology	**Mostly manual systems (sun drying technology)** Lack equipments on aspects such as sorting, mixing, packaging, processing	**Partly manual, partly automated and professionalized** Has equipments on sorting, mixing, packing, but still lack on for example drying	Mostly automated and professionalized
Product innovation	Not ready to put the product in the shop. Sometimes not packed in a bag yet.	Product might be ready to put in the shop, but could still be bulky or is missing proper branding.	Product is ready and available in the shop through own brand, through existing brands or blend.
Waste redirected	35 - 5000 tonnes per year	2000 - 20,000 tonnes per year	10,000+ tonnes per year

Sourcing type	Own sourcing	Own sourcing but has some contracts with local markets and farmers for example	**Outsourced:** industrial and commercial sourcing and works with waste collectors
Distribution	Picked up by farmers in the area or distributed by manufacturer. Only close enough areas, so it is still viable to sell with extra distribution costs.	Picked up by farmers in the area or distributed by manufacturer. Could have one or more other models based on the existing CF distribution: like a couple of agro-dealers or off-takers.	Leverage existing CF distribution with partnership and blends. Through direct to consumer (small %), agro-dealers, work with coop. (coffee, tea, etc), aggregators, off-takers and commercial farms (AAA farmers).
Marketing and branding	Mostly word to mouth, because no capacity for field officers, sales representatives or clear relationships with agro-dealers. Spend little on marketing, awareness, and promotions. No existing marketing plans.	Mostly word to mouth, few field officers, sales representatives. Starting some relationships with agro-dealers. Allocate some resources to primary marketing and customer awareness.	Invest and work with agro-dealers (setting up demo farms, branding, creating marketing campaigns with agro dealers) Efforts mostly focused on driving sales.
Employment	6-20 jobs created	20-150 jobs created	150+ jobs created
Source of investment	Grant and competitions Own Investment	Grant Foundation investments	Grant Venture Funding (Debt & Equity)
Cost elements	Machinery, team, technology, raw materials	Automation, professionalization, certification	Waste management optimization, lobbying for standardization
Start up capital	10,000 -25,000 USD	-	-
Current investment	20,000 - 100,000 USD	100,000 - 1,000,000 USD	Over 1,000,000 USD
Certification	Not yet or in the process.	Certified	Certified
Business model	Simple model selling directly to farmers, cash-only for quick turnaround. Agro-dealer sales didn't work due to credit demands and low margins.	Direct sales to farmers and some through agro-dealers, though prices are higher through dealers, and quantities remain small.	Sales through agro-dealers and cooperatives with consistent pricing and margins, sometimes leveraging CF business models through blends or existing brand names.
Profitability	Not profitable High operational costs, minimal marketing, 12-month runway.	Starting to be profitable Strict cash flow, revenue reinvested, no selling on credit.	Profitable Focus on branding, upscaling, professionalization, attractive for partnerships and collaborations.

2.6. Trends in Local Manufacturing of OF

Sourcing

- Free sourcing vs Competitive sourcing.
- Depending on the waste types or geographical, manufacturers are either doing free sourcing - where they source freely from the market and from farms or competitive (for biochar - they have to make arrangements with farmers for waste sourcing).
- New types of wastes (sugarcane, macadamia nuts, seaweed).
- Manufacturers sourcing from other manufacturers to make organic fertilizer blends or to meet production requirements.
- Centralized and decentralized Research and Development.
    - Centralized R&D - manufacturers doing their own R&D mostly in their production facilities; decentralized - manufacturers collaborating with other actors such as research institutions for segmented R&D.
- Research institutions and manufacturers for research, product development and testing
- Partnerships with soil testing providers to offer farmers bundled services.

Production

- Blended OF types - manufacturers looking producing OF that have a combination of different OF such as Biochar and frass fertilizer.

Distribution

- Leveraging existing networks and delivery channels such as entering into partnerships with NCPB and other large-scale agro-dealer networks for OF distribution to farmers.
- Whitelabeling - customized OF types for specific customer segments (e.g Regen Organics working with YARA for YARA Suna and with K+S).

Last-mile delivery

- Leveraging pioneer farmers, farmer groups as last-mile distribution points to create awareness and drive uptake of organic fertilizers.

Business model

- Bundled service offering (combining OF and other services as a package to farmer.
- B2B distribution - selling OF to large-scale uptakers - commercial farms, other manufacturers).

Technology

- Pelletized and granulation technology.
- Leveraging technologies in soil-testing, fertilizer applications to drive large-scale use of OF.

Manufacturer Highlights

2.7. The demand side: farmer perspective

Farmers

The farmers are the other main player in the OF landscape. They are the ultimate offtaker of OF and their choice of OF is often dependent on awareness and accessibility. Although the average farmer is aware of the benefits of using organic residues in farms, there is a need to increase the knowledge regarding OF and education about the way of working and handling OF through capacity building of the different profiles of farmers. Where farmers have this information, they are often eager to share with other farmers. The ease of access by farmers to sources of OF is a critical consideration to adoption. If distribution is not done by the local OF manufacturers themselves, the farmers often pick-up the OF directly from the production site. A final role the farmers could fulfill is that of waste supply to OF processors since most farmers produce organic wastes which are suitable for production of OF. This supply can be individual or via aggregators.

Perception of OF

Farmers in Kenya are gradually recognizing the potential benefits of OF, particularly when they observe positive outcomes in yield and soil health.

Those who have experienced these improvements firsthand are more inclined to increase their use of OF, seeing it as a valuable tool for enhancing their agricultural practices. However, this positive perception is not yet widespread, as the processed versions of OF are still relatively unknown to many farmers.

The use of manure is well-established and appreciated for its advantages, but the concept and effects of processed OF are less understood. Many farmers remain uncertain about how these fertilizers work and the specific benefits they offer. This knowledge gap contributes to hesitation in fully embracing OF, despite the growing interest.

A significant number of farmers express a conditional willingness to adopt OF, but this willingness hinges on several key factors. Improved product quality, reduced costs, increased availability, and better training on the effective use of OF are crucial to driving broader adoption. Farmers often mention that if OF were readily available at local agrovets, they would consider purchasing it. However, a common barrier is the lack of knowledge about where to obtain OF, coupled with concerns about potentially higher costs compared to conventional options.

2.7.1. Examples of farmers and their use cases from the field

1. Commercial Farmer -Avocado (Export)

About:

This farmer focuses on avocado exports and is heavily dependent on high-quality inputs to meet export standards. While they are part of multiple cooperatives, they face challenges in manure sourcing, which affects their ability to scale up sustainably. Organic fertilizers could provide a reliable alternative, especially if certified for export. The use case revolves around quality control and securing consistent organic fertilizer supply to reduce dependency on middlemen and enhance export potential.

Bio:

Accountant by profession, 15 acres of avocado farming (Hass Avocados for export)

Farming Background: 7 years of farming. Diversified with 5 acres of vegetable farming using bio-slurry.

Associations: Nandi Avocado Cooperative Society, Sirikwa Avocado Group.

Main Goals: Acquire an export license and reduce dependency on secondary buyers.

Organic Fertilizer Use: Manure from livestock and imported fertilizers. Uses bio-pesticides and foliar fertilizers.

Challenges:

- High demand for on-farm manure, supply shortages.
- Price fluctuations for avocados and non-transparent pricing from middlemen.

Opportunities:

- Strong cooperative network for best practices.
- Potential to use locally manufactured OF if quality and certification meet export standards.

> "Sourcing manure is becoming hard. You want to buy it, but it is not there."

2. Commercial Farmer (Local market - Tomatoes & Onions)

About:

A tech-savvy, entrepreneurial farmer aiming to expand operations while optimizing water and input usage. They already use processed organic fertilizer but struggle with sourcing due to high weed content in manure. Their focus is on efficiency, and integrating organic fertilizers could help them minimize input costs while maintaining high yields. With the potential to create biochar from waste, this farmer is exploring innovative ways to increase productivity and create a demonstration farm model for other farmers.

Bio:

Tech-savvy farmer, 13 acres of irrigated farming (aiming to expand to 20 acres).

Farming Background: Former landscaping professional, started farming during the COVID-19 pandemic. Produces tomatoes, onions, cabbages.

Associations: Works with suppliers like Yara Suna for trials and fertilizer inputs.

Main Goals: Expand acreage, reduce water and input costs.

Organic Fertilizer Use: Focuses on reducing weed presence with processed OF, uses manure and Yara fertilizers.

Challenges:

- High costs of water and fertilizers.
- Difficulty sourcing manure due to weed problems.

Opportunities:

- Demonstration farm model for educating others.
- Potential for biochar production to reuse farm waste.

> "Produce increased from 16 tons per acre to 24 tons. Organic manure comes with a lot of weeds."

3. The Regenerative Farmer (Small Scale Mixed Crop - Local Consumption)

About:

A community-oriented farmer practicing sustainable farming methods for local consumption. Organic fertilizers are key to maintaining soil health and ensuring high-quality produce, but limited access and price competition with chemical fertilizers pose challenges. Her strong community trust positions her as a leader in promoting organic farming practices, with room to expand through cooperative marketing. This farmer focuses on improving soil quality and yields while reducing soil acidity.

Bio:

The Regenerative Farmer - Mixed Crops (Local Consumption).

Farming Background:

Monica, farming since 1995, mixed crop farming for local consumption and sale.

Associations: Part of a cooperative of 60 active members. Participates in the GIZ/SNV RA program.

Main Goals: Improve income and reduce soil acidity with OF.

Organic Fertilizer Use: Composes her own manure, stocks 30 bags of processed OF, and uses it to enhance yields.

Challenges:

- Price factor and limited access to OF.
- Competition with cheaper chemical fertilizers.

Opportunities:

- Strong community trust and high-quality produce.
- Room for cooperative marketing and expansion

> "With R.A - 30% increase in income."

4. The Pioneer Farmer (Organic Rice Farmer)

About:

As a leader in the organic rice farming community, this farmer aims to scale by adding value through processing and packaging organic rice. She relies heavily on organic fertilizers but faces challenges with transport costs and access to consistent supplies. With a large network of farmers, she is positioned to foster partnerships for soil testing and expand the use of organic inputs. Her focus is on improving the health and efficiency of farming operations while promoting safer, labor-friendly method.

Bio:

The Pioneer Farmer - Organic Rice Farmer

Farming Background:

Organic rice farmer, aggregator, and leader of 600 farmers with access to 8,400 acres.

Associations: Member of several farmer associations. Chairperson of an irrigation scheme for 600 farmers.

Main Goals: Start processing and packaging organic rice.

Organic Fertilizer Use: Utilizes Evergrow, BioMax, and vermicompost. Makes her own biochar and compost.

Challenges:

- Transport costs for rice stalks.
- Limited access to organic fertilizers like Evergrow.

Opportunities:

- Saves on labor and health costs by using organic inputs.
- High potential for community partnerships in soil testing and marketing.

> "OF is more safe and labor-friendly; it doesn't affect health as much as chemical fertilizers."

5. The entrepreneurial farmer - Mixed crops & aggregation

About:

This entrepreneurial farmer adds value through crop aggregation and flour milling, benefiting from the use of organic fertilizers to improve soil fertility and crop weight. She serves as an advocate for organic farming within her cooperative, though the high cost of organic fertilizers remains a barrier. Her influence within the community provides an opportunity to promote the advantages of organic inputs, driving collective adoption and improving income through better yields and higher-quality produce.

Bio:

Aggregator of various crops, entrepreneur in flour milling.

Farming Background:

Started in 1995, farms maize, potatoes, and millet, among others.

Associations: Cooperative member with 60 active participants, works closely with other farmers.

Main Goals: Value-addition through flour milling to increase income.

Organic Fertilizer Use: Regular use of Evergrow, sells and uses OF to improve soil fertility.

Challenges:

- High cost of OF compared to chemical alternatives.
- Limited access to local suppliers.

Opportunities:

- Can increase produce weight and income with OF use.
- Influential voice within her cooperative to promote organic farming practices.

> "When I sell, I talk to farmers and tell them the application qualities."

2.7.2. Identified farmer profiles

In the ideal world each farmer has the required knowledge about OF, the way of usage and the results it could lead to. Furthermore, each farmer would have access to enough OF for a competitive price. The farmer understands this product, believes in it and will see positive results when using it for several crops. There are currently farmers that already operate in this ideal world and profit from the positive impact and results that it brings. However, a lot of farmers have not reached this ideal farmer situation yet. The reason for this varies because of the different situations of farmers. These different situations can be distinguished in five specific farmer profiles, each with its own circumstances, barriers and needs.

Profile I: Unaware farmer

The unaware farmer lacks knowledge about processed OF. They might currently rely on no fertilizer at all, chemical fertilizers (CF), or manure sourced from their own livestock or neighbors. Even if the farmer is familiar with regenerative agriculture and organic inputs, they remain unaware of processed OF products and the potential benefits these could bring to their farming practices. This farmer is often traditional in their approach, sticking to what has worked for them in the past, and may not seek out new information unless directly exposed to it.

Profile II: The searcher

The searcher is a farmer who has recently become aware of organic fertilizers and understands their potential benefits. However, they face challenges in accessing OF due to factors like price competitiveness, availability in their region, and awareness of where to find it. This farmer is motivated to improve their practices but is held back by logistical and economic barriers. They are actively seeking solutions but need support to overcome these challenges and integrate OF into their farming system.

Profile III: The high-demanding pro

The high-demanding pro is a medium-to-large-scale or commercial farmer with a strong focus on production and profit. This farmer requires large quantities of fertilizer and prioritizes fast results and consistent quality to ensure high yields. They are heavily invested in modern farming techniques, including the use of specialized machinery and automation for fertilizer application, which imposes specific requirements on the fertilizers they use. For this farmer, the reliability and efficiency of the input are critical, and any product they adopt must meet these standards. Their decision-making is driven by economic performance, making them highly selective about the fertilizers they use.

Profile IV: The CF loyal farmer

The CF loyal farmer remains unconvinced about the benefits of organic fertilizers. They prefer chemical fertilizers because they are familiar with their application, effects, and reliable results. This farmer often benefits from subsidies that make chemical fertilizers more affordable, reinforcing their loyalty. The immediacy of the results from CF is particularly important for farmers who lease land, as they need quick returns to cover rent and reinvest in the next crop cycle. Their skepticism about OF is rooted in a desire for guaranteed outcomes and financial security.

Profile V: The pioneering partner

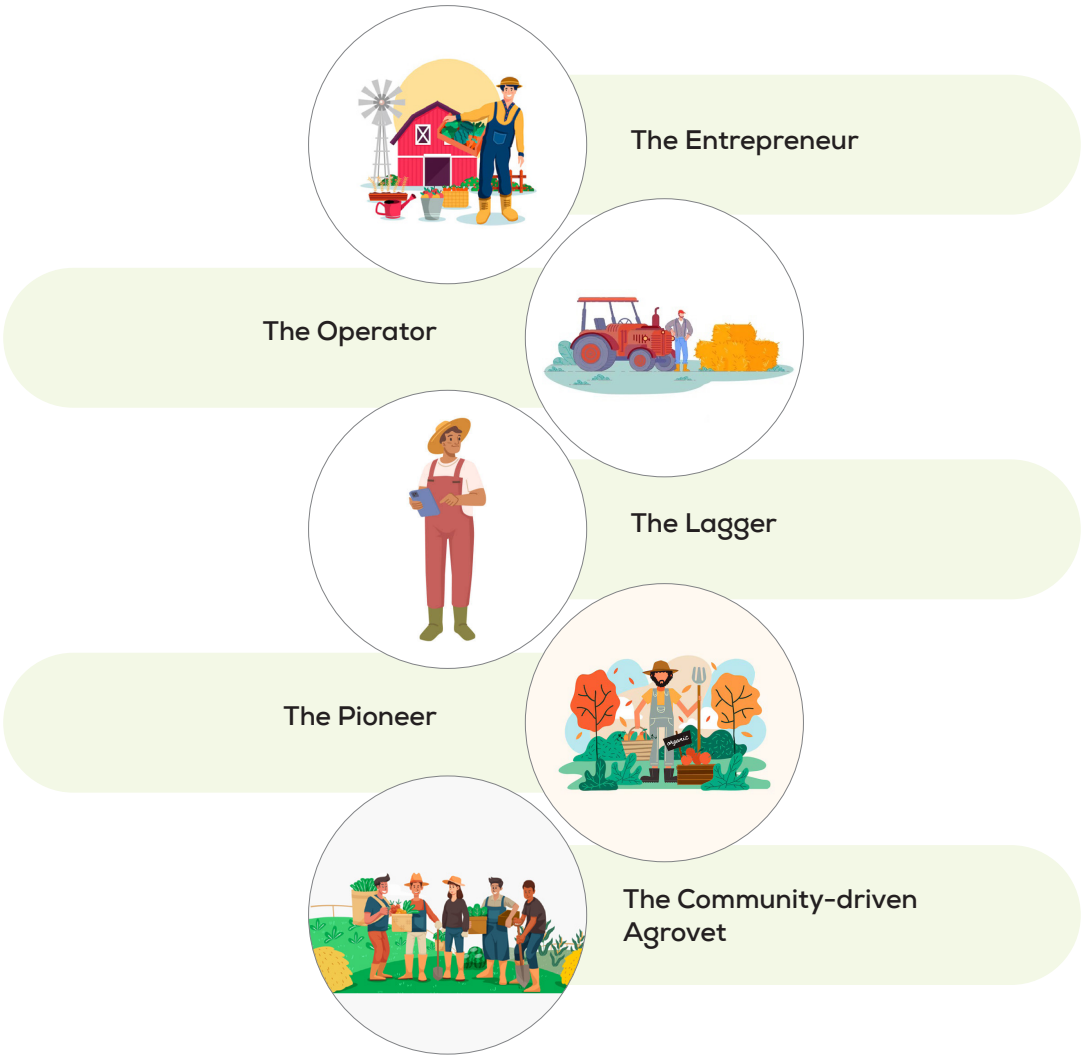
The pioneering partner is an advocate for organic fertilizers and a leader within their farming community. Not only do they use OF on their farm, but they may also contribute to the local market's growth by producing OF for personal use or small-scale commercial purposes. This farmer often takes on the role of educator, training others about soil health, OF usage, and even how to produce organic fertilizers on a small scale. They are deeply committed to sustainable practices and are instrumental in spreading knowledge and driving the adoption of OF among other farmers.

2.8. Agrodealer Insights

Agro dealers

Agro dealers play a crucial role in making inputs including OF accessible for farmers. They comprise main distributors and stockists and are an important segment to include in the OF supply chain. Although agro dealers are key to scaling up the adoption of OF through education, distribution, and advocacy, they still play a small role in the current OF landscape. A lot of the tasks typically done by agro dealers in relation to general input supply are done by OF manufacturers themselves. This is primarily attributed to several economic and logistical barriers. At the moment there are only a few agro dealers selling OF products with some agro dealers not aware of a single commercial OF that they can stock. Some OF brands are only sold directly to the farmers by the producers.

2.8.1. OF Agro-dealer profiles



1. The Entrepreneur

An experienced agrovet serving small to medium-scale commercial farmers, focused on profit and reluctant to stock products that don't sell well. Open to trying organic fertilizers but struggles with bulky products and low margins. Seeks better support and clearer marketing from manufacturers.

> "I'm open to new products, but I can't afford to have stock sitting here for months."

Overview

- Business-focused: "If it is not selling, I am not stocking."
- Open to try new products but doesn't want to bear the costs.

Demographics & Stats

- 8 years as an agrovet, with experience as a sales agent and field officer for fertilizer/pesticides.
- Works with small to medium-scale commercial farmers across two counties (Kajiado, Machakos, Makueni).
- Direct relationships with fertilizer manufacturers and distributors.

Current Experience with Organic Fertilizers

- Stocks brands like Yara Suna, K+S Fertilizer, and used to stock Evergrow.
- Primarily serves commercial farmers (vegetables, spices, herbs).
- Prefers processed organic fertilizers due to fewer weed and pathogen risks.

Margins & Pricing

Organic Fertilizer: Kes 150/50kg bag.

Chemical Fertilizer: Kes 300/50kg bag.

Challenges & Barriers

- Organic fertilizers are bulky (7 bags of OF = 20 bags of chemical fertilizer).
- Inconsistent supply and lower margins for organic fertilizers.
- Marketing and product visibility for OF are low.

Opportunities

- Better terms of engagement with manufacturers (subsidies, better credit terms, training).
- Need for clearer product differentiation and branding from OF manufacturers.
- Invest in supportive services such as soil testing.

2. The Operator

An established agro-dealer with multiple stores and a strong focus on agronomy, promoting organic fertilizers but facing challenges with inconsistent supply, low uptake, and weak manufacturer support. Sees potential in better branding, farmer education, and stronger engagement with soil testing.

Overview

- Keen to push organic fertilizers but notes many challenges such as confusing messaging and inadequate soil testing support.
- Infrastructure in place but needs manufacturer support.

Demographics & Stats

- Over 18 years in business, agronomist with a team of 6 agronomists.
- Operates multiple stores, member of FIPS Africa.
- Sells 10 tons of fertilizers weekly.

> "Farmers don't understand the benefits of organic fertilizers; we need stronger branding and more education."
>
> "Supply is inconsistent, and I've had issues getting organic fertilizer on time."
>
> "If we could tie soil testing with organic fertilizer recommendations, we might have more uptake."

Current Organic Fertilizer Stock

- **Brands:** Evergrow, Yara Suna, K+S Fertilizer.
- Since 2022, moved into organic fertilizers but reports low uptake.

Organic Fertilizer Sales & Margins

- Organic fertilizer sales ratio: 1 organic to 10 inorganic bags.
- Stocks Evergrow (Kes 2500/50kg) and Yara Suna (Kes 4300/50kg).

Challenges & Barriers

- Storage issues due to packaging quality.
- Low marketing investment from manufacturers.
- Vagueness in application rates and poor product differentiation.

Opportunities

- Need for subsidies to drive organic fertilizer uptake.
- Improved messaging and support from manufacturers (branding, knowledge transfer).
- Collaboration with soil testing organizations to improve farmer adoption.

3. The Lagger

A cautious agro-dealer currently stocking only chemical fertilizers due to higher demand. Willing to stock organic fertilizers if demand increases but sees bulky products and a lack of farmer education as barriers. Believes that smaller packages and granulated organic fertilizers could help drive adoption.

> "Chemical fertilizers fly off the shelves; why should I stock bulky organic products that just sit here?"
>
> "Maybe if there was more demand, I'd consider it, but farmers don't ask for it."

Overview

- Currently stocks only chemical fertilizers but is open to adding organic fertilizers if demand rises.
- Follows customer demand: "They ask for DAP & NPK mostly and that is what I stock."

Demographics & Stats

- Previously tried organic fertilizers 5 years ago, but demand was low.
- Would consider complementing chemical fertilizers with organic products.

Challenges & Barriers

- Farmers are more focused on nitrogen and phosphorus levels than soil health, so OF requires more farmer education.
- Organic fertilizers are bulky, which is an issue for smaller shops in urban areas.
- Consistency and standards of OF are lacking.

Opportunities

- Small package trials for farmers could be a good entry point for organic fertilizers.
- Believes granulated versions of organic fertilizers could attract farmers.

4. The Pioneer

A passionate advocate for regenerative agriculture with strong ties to manufacturers and testing programs. Actively promotes organic fertilizers despite challenges with storage and shorter shelf life. Sees government involvement and awareness campaigns as key to increasing adoption among farmers.

> "I believe in organic farming, and I'm always telling farmers how important soil health is."
>
> "We need more government support, and manufacturers should partner with us to educate farmers."

Overview

- Pro-regenerative agriculture advocate with deep knowledge of soil health.
- Has a dedicated shop section for organic fertilizers and organic inputs.

Demographics & Stats

- Works closely with manufacturers and takes part in testing new fertilizer product lines.
- Collaborates with CropNuts and participates in training and pilot programs.

Organic Fertilizer Sales & Margins

- Stocks multiple OF brands including Yara Suna, Minjingu Tanzania, Evergrow, and K+S Plus.
- Also recently introduced Biochar (from macadamia waste).

Challenges & Barriers

- Storage space is a challenge due to the bulkiness of organic fertilizers.
- Organic fertilizers often come with shorter shelf lives compared to chemical fertilizers (OF: 2 years, CF: 5 years).

Opportunities

- Sees great potential in increasing awareness through "show and tell" methods.
- Interested in soil health improvement and government involvement to incentivize farmers.

5. The Community-driven Agrovet

A locally embedded agro-dealer serving small-scale farmers, focused on affordable inputs. Organic fertilizers are seen as too expensive for most customers, but there's potential to increase demand through education and better manufacturer support for lower-cost products.

> "Organic fertilizers are just too expensive for most of them, but if prices came down or if we had smaller packs, we could try it."
>
> "Education is key—if farmers understood the long-term benefits, we could build demand together with manufacturers."

Overview

- Local agrovet strongly embedded in the community, supporting small-scale farmers.
- Focuses on accessible inputs and strong customer relationships.

Demographics & Stats

- Operates in rural areas, mostly stocking products that are affordable and accessible to small-scale farmers.
- Primarily stocks fertilizers in smaller bags (10-25kg) to meet farmer budgets.

Challenges & Barriers

- Organic fertilizers are perceived as too expensive and not aligned with small farmers' budgets.
- Lack of awareness and poor marketing of OF limits demand.

Opportunities

- Sees the potential for education to increase demand among small-scale farmers.
- Would benefit from manufacturer-driven training to better explain product benefits to farmers.

2.9. Insights from agronomists

Extension workers

The Extension system in Kenya is a key cog in dissemination of agricultural technologies to the farmers especially in the rural areas. Extension workers educate and empower farmers, and they have developed strong and trustworthy relationships with farmers and communities. Most extension staff promote use of organic inputs at the farm level and could therefore play a role in education, training, awareness creation and the promotion of commercial OF. Furthermore, they have a good view on the farmers perspective, their needs and feedback. Currently, the potential of such a role for extension workers in the OF landscape is not yet fully utilized with many extension workers not aware of availability of commercial OF and other organic inputs.

The woke Agronomist

Bio

Aware of Regenerative Agriculture

Experience and Knowledge in OF

- *'Most farmers want to go organic' → the appetite is there*
  - It takes 2-3 seasons to convince including training
- *'If you want an OF it is not there'*
  - **For small farmers** (70%) biggest challenge is the availability of OF → for a big move, target small farmers
  - **Commercial farmers** (20%) have machines and OF does not work for these machines often & they want consistent input
  - **Semi-commercial** (10%) (15-100 acres)
  - **Cooperatives:** the capacity of OF is not enough to let them transition

Challenges & Barriers	Opportunities
• How to get started/ convince • Knowledge and training necessary • New brands take a lot of time and money to be known and trusted	• Decentral training • Start small • Bring the product in via an existing brand like Yara → we need the muscle and they already have network, storage and distribution in place • Collect frass from farmers that use BSF for chickens • People are always looking to start unique agriculture businesses → OF could be that

> Agro Dealers have distributors and stockist, they are important to include in the value chain.
>
> When setting up the distribution and scaling of OF → a lot is about trust and communities → people know you, they trust you.
>
> OF will lead to more organic produce → demand for organic produce is growing.
>
> The big guys like YARA don't talk organics, it is the farmers who do → should convince the big guys

The concerned/Farmer Agronomist

Bio

Bridget - Extension worker with the government for 3 years

Experience and Knowledge in OF

- Uses manure herself in one farm and in the other CF because of the scale of the farm → She is searching for options of OF but cannot find them
  - It needs to go with the machinery in the field
  - There is a need because tested the soil health with CropNut, and it is going down because of the CF use
  - The prices need to compete as well
- Maize is getting replaced for other crops because the production numbers are decreasing → while this is probably because of the use of CF and the soil health
  - In the beginning you need 1 bag, then 1,5 and now already 2 bags. It gets worse
- OF takes time → after 3 years assurance of positive change and some give up after 1 or 2 years
  - But: *'You don't want to suffer for 3 years'*
  - You want the processed version and results after 1 season: 'that will be perfect and motivate farmers'

Challenges & Barriers

- Information and knowledge is key: Agrodealers and farmers don't know currently
  - Or it is not closely available → small scale farmers cannot go far for lime or OF
- Government policies for OF and subsidies need to be there
  - Need standards and good regulation
- Extensive services need to be involved to tell and convince farmers
- To convince farmers:
  - Need for trials and proof
  - Confident → see it → *'they go on what they see and know'*
  - Build further on the trust that is already there for organic manure
  - 'Start feeding the soil not the plant'
  - Organic mineral could be an inbetween thing, but is also not pushed yet

Barriers/challenges:

  - 100 bags of OF take the space of 200 bags of CF
  - The business man needs to believe in it/buy-it and believes that is works → more margins would give an incentive as well
  - The agrodealer needs to know his stuff and convince the farmers
- The potential is there but a lot needs to be done around in the system also for the extensive workers it is a change of mindset

Opportunities

- Set an example with a demo farm at a neutral spot: community owned or part of a local church
- Country can decide for subsidies on OF
- Make it visible, show the farmer he ends up with more maize if he uses OF

2.10.Associations

Overview

Manufacturer associations play a critical role in protecting member interests, and in spearheading efforts to drive local manufacturing, distribution and uptake of fertilizers.

Existing associations in Kenya include:

2.10.1. OFIMAK

OFIMAK was created to promote the use of organic farm inputs and promote the local production of organic farm inputs. Ofimak has a membership of 18 OF manufacturers.

> *"We are a new association registered in March 2024. We are on that journey. Our aim is to create a platform where we can sell our products (guaranteed markets), advocate for use of OF, promote an enabling environment for local manufacturers to make high quality OF, and from each company will grow."*

To achieve some of the set outcomes, OFIMAK has been actively engaging key stakeholders. Some highlights include signing an MOU with KALRO, developing partnerships with KEFAAS, KENAAF, PELLUM, Ministry of Agriculture. There is still more support that is required by OFIMAK to realize its full potential. Areas such as aggregation of data on metrics such as jobs created, volume sold vs produced, waste recycled, type of products produced would be most critical.

- The Association predicts that approximately 6000 direct jobs can be created in 10 years.
- As an association, they expect to produce and sell 500,000 tons in 5 years and 1M tones

2.10.2. FAK (Fertilizer Association of Kenya)

FAK is the umbrella body of manufacturers, importers, formulators, blenders and distributors of organic and inorganic fertilizer in Kenya. Established in 2009, FAK's mandate includes protecting and furthering members' interests as well as instilling professionalism and ethical standards within the fertilizer industry.

Insights by the Associations

1. **Priority Areas**

a. Efforts in product standardization and quality.

b. Efforts in product messaging, placement and awareness.

c. Efforts in certification process simplification.

d. Efforts in pushing for collaboration, partnerships.

2. **Challenges & Barriers**

a. Resource constraints.

b. Lack of awareness by farmers on the existence of processed organic fertilizer in the market.

2.11. Funding and support

2.11.1. Actors

NGO's (and funders)

NGOs are increasingly interested in the promotion and support of organic fertilizer in Kenya. They contribute significantly to education and training initiatives, helping to raise awareness about the benefits and proper use of OF. Additionally, NGOs provide funding and empowerment opportunities to local OF manufacturers.

Institutions

Institutes play a significant role in the landscape of OF, especially in education and training. They empower farmers to start Furthermore, they conduct product research and development activities, which often involve forming partnerships with manufacturers that can lead to additional funding and resources. These institutions extend their focus beyond just OF, frequently encompassing regenerative agriculture (RA) practices. By driving innovation and best practices, institutes help to elevate the standards and efficiency of OF production and utilization, fostering a more sustainable agricultural sector.

Banks

Banks play a critical yet cautious role in the current OF system in Kenya. They have the potential to serve as essential partners by providing loans and debt financing to businesses within the sector. However, the OF industry is still perceived as new and high-risk, which affects how banks evaluate business proposals. Banks often view business cases in this sector as weak or insecure, leading to a reluctance to extend large loans or even provide any financing at all. This financial hesitation forces many emerging OF manufacturers to rely on grants or their own savings to fund their operations. In contrast, larger-scale manufacturers typically secure funding through private investors or other financial backers, bypassing traditional bank loans.

2.11.2 Partnerships and funding

Partnerships and funding play crucial roles in advancing the organic fertilizer industry in Kenya, fostering innovation, scalability, and sustainability. Collaboration between government bodies, research institutions, and private sector entities. These collaborations often focus on research and development initiatives aimed at improving organic fertilizer formulations, enhancing production techniques, and conducting field trials to validate efficacy. For example, partnerships between agricultural research institutions like KALRO and private fertilizer manufacturers have led to the development of new organic fertilizer blends tailored to local crop and soil conditions.

Financial support and funding mechanisms are critical enablers for industry growth. The report highlights how government subsidies, grants from international development organizations, and private sector investments, including contributions from the Rockefeller Foundation and the IKEA Foundation, have facilitated the expansion of organic fertilizer production facilities and distribution networks. These funding sources help overcome initial investment barriers and provide ongoing support for research, training programs, and market development efforts. By securing these financial resources, the organic fertilizer industry can continue to grow, innovate, and meet the increasing demand for sustainable agricultural inputs.

Moreover, partnerships with non-governmental organizations (NGOs), community-based organizations (CBOs), and institutions such as the International Centre of Insect Physiology and Ecology (ICIPE) have played a significant role in promoting organic farming practices and increasing farmer awareness. These partnerships often involve capacity-building initiatives, farmer training workshops, and demonstration plots to showcase the benefits of organic fertilizers in improving soil health and increasing crop yields sustainably. By leveraging the expertise and resources of these organizations, the adoption of organic fertilizers and sustainable farming practices is further supported and accelerated.

Certification bodies and standards organizations have a role to play in fostering consumer confidence and market acceptance of organic fertilizers. Collaborations between certification bodies and fertilizer manufacturers ensure compliance with international organic standards, enabling access to export markets and premium pricing for certified organic products.

Strategic partnerships along the supply chain, including collaborations between fertilizer producers, distributors, and agro-dealers, enhance market access and distribution efficiency. By establishing reliable distribution networks and marketing channels, these partnerships ensure that organic fertilizers reach farmers in remote and underserved regions, thereby increasing adoption rates and improving agricultural productivity.

Partnerships and funding play integral roles in driving the growth and sustainability of the organic fertilizer industry in Kenya. By fostering collaboration among stakeholders, leveraging financial support for research and development, and promoting market acceptance through certification and standards, the industry can continue to expand its impact on sustainable agriculture and rural development in the country.

Examples of existing funding include:

1. **The Africa Fertilizer Financing Mechanism**

The Africa Fertilizer Financing Mechanism is a special fund administered by the African Development Bank Group. The Mechanism provides innovative financing solutions required to accelerate the use of fertilizers in Africa and improve agricultural productivity in regional member countries of the African Development Bank Group.

Some notable projects from the fund include:

- Fertilizer Financing for Sustainable Agriculture Management Project in Kenya.
  - This project consists of a $2 million partial trade credit guarantee and a $219,000 grant from the Africa Fertilizer Financing Mechanism to Apollo Agriculture Limited For the Fertilizer Financing for Sustainable Agriculture Management project in Kenya.
    - The project has four components: (i) support of access to finance for farmers through the credit guarantee facility, (ii) support of increased fertilizer availability, (iii) soil health management and extension services, and (iv) data collection and analysis, monitoring, reporting, and project management.

2. **Rockefeller Foundation's $1.2 million grant to ICIPE 1.2 million - Technology of Insects.**
3. **Equity Bank - financing for SME BSF farmers (working with Rockefeller Foundation).**

Between 2024 and 2026

the project targets the distribution of **7,928** metric tons of fertilizers to

106,000 smallholder farmers

through **150** retail agro-dealers

and **800** village-based agents

using Apollo Agriculture Limited's digital platform

2.12. Policy and regulatory environment

2.12.1 Government

The government has the potential to significantly influence the OF landscape through various tools and programs. These include subsidies, promotional campaigns, and educational initiatives aimed at encouraging the use of OF. Although the government places a critical focus on chemical fertilizers, there is increasing attention towards development of a structured organic fertilizer, biostimulant, biofertilizer and soil amendment sector. This shift in attention has been necessitated by the number of research findings and recommendations on soil health and the need for an integrated approach to soil fertility and plant nutrition management. Additionally, the government plays a critical role in establishing regulations, standardization, and certification processes that ensure the quality and safety of OF products, thus building trust among producers, agro dealers, farmers and other stakeholders in the sector.

2.12.2 Manufacturers of chemical fertilizer and importers

Manufacturers of chemical fertilizers and importers hold a dominant position in Kenya's fertilizer market, with the largest market share by far. They have a strong relationship with agro dealers and farmers that have set the expectation around fertilizer and are now the standards that OF manufacturers have to meet and to compete with. These CF and import players typically focus on their existing business models, often overlooking the potential of organic fertilizers. However, there are emerging opportunities for partnerships between chemical fertilizer manufacturers and OF producers, as seen in some practical examples. By entering the OF market, these manufacturers could diversify their offerings and contribute to a more sustainable agricultural future.

The CASA study analyzed the policy and regulatory environment around organic fertilizer and identified acts and policies guiding Plant protection, Inputs, Waste, Soil, Capacity building and others that are overarching.

The Acts include Plant Protection Act, Crops Act, Fertilizers and Animal Foodstuffs Act, and Sustainable Waste Management Act.

The Fertilizers and Animal Foodstuffs Act in particular Regulates the importation, manufacture and sale of agricultural fertilizers and animal foodstuffs and substances of animal origin. It is meant to also cover organic fertilizers but much of it places a premium on inorganic fertilizer with proposals to amend it to take a more soil health centric perspective.

The Sustainable Waste Management Act establishes a framework for the sustainable management of waste and to ensure the realization of a clean and healthy environment. This act prescribes how waste should be handled and processed and it promotes the transition to a circular economy where wastes are recycled or upcycled thus supporting the utilization of organic wastes in fertilizer manufacture.

Policies of interest for OF include National Agricultural Soil Management, Plant Protection, National Agricultural Research System and the Kenya Agricultural Sector Extension Policy. The National Solid Waste Strategy is an integral guide for sustainable solid waste management in Kenya and is critical in driving the OF agenda. It is however conservative on how on farm organic wastes should be handled.

2.12.3. Technology trends and opportunities

Technological innovations driving organic fertilizer production

Technological innovations play a crucial role in enhancing the efficiency, quality, and scalability of organic fertilizer production in Kenya. These innovations range from simple composting techniques to more advanced processes involving biotechnology and bioengineering. Composting remains a fundamental method, utilizing organic materials such as crop residues, animal manure, and food waste to create nutrient-rich fertilizers. Innovations in composting technology include mechanized turners and aeration systems that accelerate decomposition and improve product consistency.

Biotechnological advancements for sustainable agriculture

Biotechnological advancements involve the use of microbial inoculants and bio-stimulants to enhance

nutrient availability and soil health. These products harness beneficial microorganisms that facilitate nutrient cycling and suppress pathogens, thereby improving crop yields sustainably. Additionally, biochar production is gaining traction, where agricultural residues are pyrolyzed to create a carbon-rich material that enhances soil fertility and water retention.

Skills assessment and training for effective organic fertilizer application

Skills assessment in organic fertilizer production underscores the need for a diverse skill set among workers and managers. Training programs are essential to equip personnel with technical knowledge in composting techniques, biotechnology applications, quality control, and product formulation. Agricultural extension services play a crucial role in disseminating best practices and innovations to farmers, ensuring proper application and maximizing the benefits of organic fertilizers.

In Kenya, as in many regions, promoting technological innovations in organic fertilizer production is vital for meeting the growing demand sustainably.

These innovations not only improve product quality and efficiency but also contribute to environmental sustainability by reducing dependence on synthetic chemicals and promoting soil health. Continuous research and development in technology and skills training will be essential to address production challenges, enhance market competitiveness, and support the broader adoption of organic fertilizers in agricultural systems.

2.13. Consumer groups

Consumers

The demand for organic produce is steadily increasing among Kenyan consumers. People are becoming more health-conscious and are often drawn to organic products for their perceived health benefits and better taste. This shift is partly driven by concerns over diseases such as cancer and diabetes. As awareness grows, consumers are more likely to seek out and prefer products cultivated with organic fertilizers, thus creating a strong market incentive for farmers and manufacturers to adopt OF practices.

3 SROI framework

SROI framework

3.1. Background

The Social Return on Investment (SROI) methodology offers a comprehensive approach to evaluating the impact of locally manufactured organic fertilizer in Kenya. Unlike traditional economic analyses, which focus primarily on financial outcomes, SROI extends the lens to include environmental and social benefits. This broader perspective is particularly relevant in the context of organic fertilizer, where the ripple effects on soil health, community well-being, and environmental sustainability are as crucial as the economic gains.

The SROI framework is essential for organizations aiming to create social good, as it offers a comprehensive way to measure and value the impact of their activities. By capturing the full range of benefits SROI ensures a holistic understanding of value creation. It enables organizations to make informed decisions about resource allocation, enhancing accountability and transparency in demonstrating the true impact of their investments. Moreover, SROI is a powerful tool for advocacy and securing funding, as it clearly communicates the broader value of initiatives beyond mere financial returns.

The calculations presented in this report aim to provide an average view of the current organic fertilizer industry in Kenya. These estimates are derived from data points collected from eight different manufacturers, supplemented with secondary data sources. While these calculations offer valuable insights, it is essential to acknowledge the limitations of the data set. The data's quality and richness vary, and as such, this SROI analysis should be viewed as a baseline–a first step in identifying the diverse types of value created by the industry. It is not intended to serve as the final word on the impact of organic fertilizers in Kenya, as the current data set is not robust enough to yield definitive outcomes.

Transparency about these limitations is critical. The purpose of this report is not to offer conclusive results but to initiate a conversation about how to measure and understand the broad impacts of organic fertilizer production and usage. By doing so, we hope to lay the groundwork for more refined and data-driven SROI calculations in the future, ultimately supporting the growth and development of Kenya's organic fertilizer industry.

3.2. SROI framework

SROI process overview

The Social Return on Investment (SROI) process is designed to measure and understand the full spectrum of value created by a project or organization. It begins with stakeholder engagement, where key participants and beneficiaries are identified to ensure their perspectives are included. A theory of change is then developed to map out how inputs lead to outputs, outcomes, and ultimately, long-term impacts. For the case of locally manufactured organic fertilizer we will zoom in into the impact created on a farmer-level, producer-level and country-level. The next step involves gathering data to measure these impacts, assigning financial proxies to quantify the value of social, environmental, and economic benefits. Finally, this data is used to calculate the SROI ratio, which compares the value generated to the investment made.

Key stakeholders

In this report, the key stakeholders identified include farmers, local manufacturers of organic fertilizers, and on country level the Kenyan government. We also acknowledge the potential effect on the community by for example creating more jobs and the effects of waste management. Besides, we see potential effects on players providing equipment, raw materials and resellers of the organic fertilizer products.

We specifically focused on eight manufacturers of organic fertilizers, representing various products such as BSF frass, vermicompost, biochar, and a biochar-enriched blend. These manufacturers were at different stages of development, ranging from the idea-stage and start-up phase to medium-scale operations and more developed scaling phases with multiple facilities. This variation in scale reflects the current state of the organic fertilizer industry in Kenya, which is still in a highly dynamic phase of growth and development.

Impact areas

The impact areas considered in this SROI analysis include economic, environmental, and social dimensions. Economically, we assessed factors like cost savings for farmers and income generation for manufacturers. Environmentally, the analysis looked at improvements in soil health, waste management, and reductions in chemical fertilizer use. Socially, the focus was on job creation, community well-being, and contributions to food security. These impact areas are crucial for understanding the full range of benefits that locally manufactured organic fertilizers bring to Kenya's agricultural sector.

3.3. Farm-level benefits

This section focuses on the different benefits at the farmer level, as farmers are one of the key stakeholders in the organic fertilizer system and the primary users of the product. The benefits outlined here represent the effects of using organic fertilizer on the farm, capturing both the direct and indirect impacts on agricultural practices.

In assessing the economic, environmental, and social benefits for farmers, we carefully considered which changes could be reliably quantified and included in the SROI analysis. While some benefits, such as the reduction in chemical fertilizer usage, were excluded due to a lack of clear data and the tendency of farmers to substitute these savings with investments in organic fertilizers, other benefits were more definitively measurable. For instance, the potential increase in yield and production due to soil restoration was included, as it represents a direct economic gain that could be supported by available data.

On the environmental side, the potential for increased carbon sequestration by the soil was included, though the data on this was somewhat limited. On the other hand, increases in soil health and biodiversity were excluded due to the absence of a clear financial indicator and insufficient data to support the claim.

Social benefits, such as improved health from higher crop quality and nutrient levels or increased knowledge about soil health, were also excluded from the SROI calculation for similar reasons. Additionally, the potential social benefit of increased education and health due to higher income spent on this was excluded due to a lack of clear data.

Table 3.1: The economic, environmental and social benefits on farmer-level

Benefit type	Potential experienced change/outcome	Included/excluded?
Economic	Reduction in usage chemical fertilizer that leads to less	Excluded: often substituted for the investment in organic fertilizer and also no clear data gathered
Economic	Increase in yield and production because of soil restoration.	Included
Environmental	Increase in carbon sequestration by the soil.	Included: but limited data available
Environmental	Increase in soil health and biodiversity levels.	Excluded: lack of financial indicator and no clear data
Social	Increase in health because of crop quality and nutrient levels in the produce based on soil restoration.	Excluded: no clear data
Social	Increased knowledge about soil health and the importance of organic inputs.	Excluded: lack of financial indicator
Social	Increased education and health because of increased income to spend on this.	Excluded: no clear data

However the exclusion in the final SROI calculations because of the lack of financial indicator and clear data, the importance of soil health and biodiversity cannot be overstated. In Kenya, soil degradation and acidification have significantly diminished soil fertility, making chemical fertilizers increasingly ineffective. Organic fertilizers address these issues by improving soil structure, enhancing microbial activity, and promoting biodiversity. Without supporting and stimulating farmers to use organic fertilizers–whether alone or in combination with chemical fertilizers–soil health could further deteriorate. This would likely lead to a drastic decrease in production levels and food security, resulting in severe problems at the country level. Thus, the role of organic fertilizers is crucial not only for individual farms but also for national agricultural stability and food security.

It is important to recognize that even if some of the values were excluded from the final SROI calculations, the usage of organic fertilizer does indeed have effects on these aspects. Acknowledging these impacts is crucial, as they contribute to the overall understanding of the benefits organic fertilizers bring, even if they cannot be fully quantified within the current analysis. By focusing on the benefits that could be accurately measured, the SROI provides a more reliable baseline, while highlighting that additional areas of value exist and deserve further exploration.

3.4. Producer-level benefits

This section focuses on the different benefits at the producer level, another key stakeholder group within the organic fertilizer system. As the producers of organic fertilizers, these stakeholders play a crucial role in the value chain, and the benefits outlined here represent the effects of production on various affected stakeholders.

In evaluating the economic, environmental, and social benefits for producers and related stakeholders, we considered which changes could be reliably quantified and included in the SROI analysis. On the economic side, several potential benefits were identified but ultimately excluded due to a lack of clear data. For instance, the potential increase in income for equipment suppliers, raw material suppliers, and resellers was excluded. Equipment suppliers could benefit from increased investment, raw material suppliers might see higher demand, and resellers could gain new clients. However, these benefits were not included due to insufficient data or complications, such as materials sometimes being provided for free or the fact that new products might only substitute existing ones without increasing overall income.

On the environmental side, the benefits were more measurable. The improvement in waste management practices, initiated or enhanced by the production of organic fertilizers, was included as it leads to better-sanitized environments for the community. Additionally, waste redirection, which contributes to a reduction in CO_2 emissions, was also included in the analysis.

Socially, the creation of more jobs through manufacturing facilities was recognized as a significant benefit and was included in the SROI calculations. Even though some economic benefits were excluded due to data limitations, it is important to acknowledge that the production of organic fertilizer could have effects on these aspects. Recognizing these impacts is vital, as they contribute to the overall understanding of the broader benefits of organic fertilizer production, even if they cannot be fully quantified in this analysis. By focusing on the benefits that could be accurately measured, the SROI provides a more reliable baseline, while underscoring the need for further exploration of the additional areas of value.

Table 3.2: The economic, environmental and social benefits on producer-level

Benefit type	Affected stakeholder	Potential experienced change/ outcome	Included/excluded?
Economic	Equipment supplier	More investment in equipment, so the income of suppliers is increased.	Excluded: No clear data gathered
Economic	Raw material supplier	Demand for raw materials has increased. This could potentially lead to an increase in income of the supplier.	Excluded: Sometimes materials will be taken by others, sometimes the material is provided for free, and there is no clear data on this.
Economic	Reseller	New products could lead to new clients and extra income.	Excluded: the new products will often substitute other products and the margins are often lower. However there is also no clear data.
Environmental	Community	The initiated or improved waste management leads to better sanitized environments.	Included
Environmental	Environment	Waste redirection leads to reduction in CO2 emissions.	Included
Social	Community	More jobs are created through manufacturing facilities.	Included

3.5. Country-level benefits

This section focuses on the different benefits at the country level, encompassing the broader impacts that arise from both the production and usage of locally manufactured organic fertilizer. These benefits reflect the potential shifts in the national economy, environment, and social landscape as Kenya moves towards greater reliance on locally produced fertilizers.

Economically, several key benefits were included in the SROI analysis. The potential increase in GDP, driven by the shift from imported products to locally produced ones, was considered a significant benefit. Additionally, the decrease in import costs due to the substitution of imported fertilizers with locally manufactured products was also included. Both of these economic benefits represent the positive impact of local production on the national economy.

On the environmental front, the reduction in imported fertilizers, which typically have a large environmental footprint, was included as a benefit. This reflects the environmental advantages of decreasing reliance on imports with higher associated emissions and resource use.

However, some social benefits, while recognized as important, were excluded from the final SROI calculations due to limitations in data and financial indicators. For instance, the potential improvement in food security, stemming from higher production levels, was excluded due to a lack of clear data. Similarly, the potential increase in national health, attributed to improved nutrient levels in locally grown produce, was also excluded due to insufficient data and the absence of a clear financial measure.

Table 3.3: The economic, environmental and social benefits on country-level

Benefit type	Potential experienced change/outcome	Included/excluded?
Economic	Moving from imported products towards locally produced products.	Included
Economic	Decrease in import because of the substitution of imported products by locally manufactured products.	Included
Environmental	Decrease in imported fertilizer with a large environmental footprint.	Included
Social	Improved food security because of higher production levels.	Excluded: no clear data
Social	Increased national health because of the improved nutrient levels in the produce.	Excluded: lack of financial indicator and no clear data

While the SROI analysis excludes certain social benefits due to data limitations, it is crucial to highlight the significant potential of organic fertilizers in enhancing food security and national health—two critical drivers for investment in this sector. Improved food security is a direct result of increased agricultural production levels facilitated by organic fertilizers, which contribute to higher yields and more resilient crops. By enhancing soil health and fertility, organic fertilizers support sustainable agricultural practices that can lead to more consistent and reliable food supplies.

Similarly, the increased nutrient levels in produce resulting from the use of organic fertilizers can have substantial benefits for national health. Healthier crops contribute to better nutritional outcomes for consumers, which can reduce the prevalence of diet-related health issues and improve overall public health. Although these benefits were not quantified in the current analysis, their importance underscores the broader value that organic fertilizers bring to Kenya. Recognizing these impacts is essential for understanding the full range of benefits that organic fertilizers offer, reinforcing their role as a crucial investment for both economic and social advancement.

3.6. Analysis and SROI calculation

This section presents the detailed data on various benefits associated with the use and production of organic fertilizers. The benefits are categorized into economic, environmental, and social outcomes, each with specific outputs and financial indicators used to measure their impact. It is important to note that this data reflects only the benefits for which a financial indicator and clear data were available as explained in the sections on farmer-level, producer-level and country-level.

Table 3.4: Overview of all the benefits: the outcome, impact and financial indicator

Benefit type	Outcome	Output	Financial indicator
Economic	Increase in yield and production because of soil restoration.	Higher income for the farmer	The amount of income increase for the farmer
Economic	Moving from imported products towards locally produced products.	Increase in GDP because of increase in local sales	Amount spend on local fertilizer instead of imported fertilizer
Economic	Decrease in import because of the substitution of imported fertilizer by locally manufactured fertilizer.	Decrease in the import costs for imported fertilizer.	Amount of import costs saved by substituting imported by local
Environmental	Increase in carbon sequestration by the soil.	Less CO_2 in the environment.	Financial value of the amount of CO2 less in the environment (price of CO_2)
Environmental	The initiated or improved waste management leads to better sanitized environments.	Cleaner and improved living environments for communities.	Amount of costs saved on cleaning the living environment.
Environmental	Waste redirection leads to reduction in CO_2 emissions.	Reduction in CO_2 emissions.	Financial value of the amount of CO2 less in the environment (price of CO_2)
Environmental	Decrease in imported fertilizer with a large environmental footprint.	Reduction in CO_2 emissions.	Financial value of the amount of CO2 less in the environment (price of CO_2)
Social	More jobs are created through manufacturing facilities.	Increase in the amount of jobs.	Amount of income created by extra jobs

Table 3.5: The industry data based on our sample size

Type of data	Data	Data source
Total production of 2023	8344 tonne	Interviews;
Amount of OF applied acres in 2023	37,084.44 (0.225 tonne per acre)	Interviews;
Financial value of total production in 2023	2,578,296.- USD (average price 309 USD per tonne) (average price 1980 KES per 50kg)	Interviews;
Total investment	4,232,243.68 USD	Interviews;
Total increase in farmer income	24,220,605.78 USD (494.79 USD per acre per year)	Interviews; fao;
Amount of waste redirected in 2023	37,548 tonne (4.5 tonne waste per tonne OF)	Interviews;
Amount of CO_2 reduced by waste redirection in 2023	15,019.2 tonne (0.4 tonne CO_2 per tonne waste)	Interviews;
Amount of carbon sequestered by the soil in 2023	63,043.56 tonne (1.7 tonne CO_2 per acre per year)	Interviews;
Amount of income generated by job creation in 2023	2,067,481.6 USD (640 jobs in total) (3230.44 USD annual salary)	Interviews;

Table 3.6: Extra external data of the industry

Type of data	Data	Data source
Average price for chemical fertilizer	932 USD per tonne (6000 KES per 50kg)	Interviews;
Average import cost for fertilizer	553.87 USD costs per tonne	Nation Media Group;
CO_2 footprint for imported fertilizer	3.65 tonne CO_2 per tonne	Kabiri, 2020
Percentage goal for substituting import with local production	50%	Energy and Petroleum Regulatory Authority;
CO_2 price	20 USD per tonne	Kenya Private Sector Alliance;
Cost for organic waste management	27 USD per tonne	Kejanicleaning, Clean Management, EnvironBuzz™ Magazine

Table 3.6: SROI of the industry sample size including value created and build up of the total SROI

Category	Value created (USD)	SROI
Increase farmer income	24,220,605.78	5.72
Increase in GDP	3,888,304.00	0.92
Decrease in import costs	2,310,745.64	0.55
CO_2 sequestration by soil	1,260,871.11	0.30
Waste redirection	301,636.56	0.07
Waste management/ sanitation improvement	1,018,023.30	0.24
Decrease in footprint of imported fertilizer	296,629.20	0.07
Job creations	2,067,481.60	0.49
Total SROI	**37,568,618.28**	**8.36**
Investment	4,232,243.68	1

Table 3.7: The final SROI calculation for early stage size, PMF size, scale size and the average of the organic fertilizer industry in Kenya.

Category Production level (tonne/year)	Early stage 1-1000	PMF 1000-4000	Scale 4000+	Industry 8344
Increase farmer income	4.18	5.73	9.07	5.72
Increase in GDP	0.67	0.92	1.46	0.92
Decrease in import costs	0.40	0.55	0.87	0.55
CO_2 sequestration by soil	0.22	0.30	0.47	0.30
Waste redirection	0.06	0.02	0.17	0.07
Waste management/ sanitation improvement	0.19	0.08	0.58	0.24
Decrease in footprint of imported fertilizer	0.05	0.07	0.11	0.07
Job creations	0.14	0.29	2.73	0.49
Total SROI	**5.91**	**7.95**	**15.46**	**8.36**

Using the financial indicators, we calculated the final SROI based on the average data gathered from multiple manufacturers. This analysis was also broken down by the three development stages of manufacturers to provide a clearer view.

The most significant contributor to the total SROI is the increase in farmer income. Job creation by manufacturers in the scaling phase also adds substantial value. A notable observation is the lower impact on waste redirection and sanitation improvements for PMF-sized manufacturers. This can likely be attributed to the fact that much of the data for this group was sourced from biochar or enriched biochar producers, whose production processes typically require less waste input compared to other types of organic fertilizer.

Our findings show that the more developed and scaled a manufacturer is, the higher their SROI. This is largely due to the reduced investment costs per tonne of production as they scale. Therefore, it's important to explore ways to support manufacturers in transitioning from early-stage to Product Market Fit (PMF) and from PMF to Scale. This support could be tailored individually, but there are also opportunities for collaboration among multiple manufacturers to achieve these scaling steps. The transition from PMF to Scale, in particular, presents a significant challenge, one that could be eased through collective efforts and support from various stakeholders.

3.7. Reflection and limitations of the framework

Limitations and data gaps in impact overview

While this framework provides a useful baseline for understanding the social return on investment (SROI) in the organic fertilizer sector, several limitations and data gaps should be noted:

Limited data set

The analysis is currently based on data from just 8 manufacturers, focusing on the products from BSF (Black Soldier Fly), vermicompost, biochar, and enriched biochar. It is important to note that data from bioslurry production and organic fertilizers made from seaweed has not been included yet. While the dataset has been made as rich as possible, it still only covers a portion of the Kenyan organic fertilizer industry and is not fully comprehensive. Ongoing efforts to gather additional data will help refine and expand these insights further.

Variation among manufacturers

There is significant variation in the size and professionalism of manufacturers in the organic fertilizer industry. This variability may influence the findings, but it could also be representative of the current industry, which includes both emerging and more established players. To address this, we categorized manufacturers into different stages—early, Product-Market Fit (PMF), and scaling. This differentiation provided clearer insights, particularly emphasizing that the more developed the stage of the manufacturer, the higher the potential social return on investment (SROI). It also highlights the significant impact that focusing on scaling strategies could have on maximizing these returns.

Some key points in the impact assessment remain underdeveloped, largely due to the long-term nature of the effects:

Soil health: While short-term improvements in soil quality are documented, the critical long-term effects on the overall soil health of Kenya remain unclear. This gap limits our ability to fully assess the regenerative potential of organic fertilizers in sustaining agriculture in the future.

Food security: Although there are immediate benefits to crop yield, the long-term contribution of organic fertilizers to national food security has not been fully quantified. Understanding this relationship is essential for addressing the broader agricultural challenges Kenya faces.

National health: The connection between improved soil quality, healthier crops, and the overall health of the population is an important aspect of the broader impact of organic fertilizers. However, this link requires further research to assess long-term outcomes for national health.

4 The Business Case for Scaling Local Manufacturing

The Business Case for Scaling Local Manufacturing

The demand for organic fertilizers (OF) in Kenya is steadily rising due to a blend of environmental, economic, and social factors. This growing demand is influenced by a wide array of stakeholders, including farmers, manufacturers, government agencies, development organizations, and consumers, all of whom are motivated by different drivers. Together, these drivers are reshaping the agricultural landscape and opening up opportunities for scaling local production of organic fertilizers.

4.1. The supply side: local manufacturers of organic fertilizer

Diving deeper into the manufacturers of organic fertilizers, we looked into their perception of OF, their incentives, drivers, and the challenges and barriers to scale. There are multiple types of OF on the market and these types know their differences. We have looked into four specific types, namely BSF, vermicompost, biochar, and bioslurry. Furthermore, it was noticed that different manufacturers were in different phases of scaling. In each of these phases manufacturers go through different developments, and experience specific challenges and barriers. These also require specific actions, strategies and support.

4.1.1. Incentive and drivers to start with local manufacturing OF

Manufacturers are driven by several key incentives and drivers when it comes to the local production of OF:

1. **Responding to environmental and consumer trends:** Local organic fertilizer manufacturers are driven by rising demand for sustainable farming practices, both domestically and internationally. Consumers and farmers are increasingly aware of the environmental risks of chemical fertilizers, such as soil degradation and pollution, driving interest in organic alternatives. This demand is particularly strong in high-value export sectors like avocados and tea, where organic certifications are often required.

2. **Diversification, innovation, and market growth:** Manufacturers are motivated by the potential to diversify their product lines, offering customized organic fertilizers tailored to different crops and soil types. This includes developing organo-mineral blends that enhance nutrient efficiency by combining organic and chemical inputs. With an estimated 15-20% annual growth in organic fertilizer demand, manufacturers see significant opportunities for expanding production and introducing new products. The export market, particularly in Europe, further drives this growth, as regulations increasingly favor organic produce, opening new opportunities for local manufacturers.
3. **Promoting sustainability through education**: Manufacturers are not only committed to promoting sustainable agriculture by reducing reliance on chemical fertilizers, but they also play an important role in educating farmers. By producing high-quality organic fertilizers, they contribute to soil health and environmental protection, while also sharing knowledge and offering training. This empowers farmers to adopt sustainable farming practices and make informed decisions about organic fertilizer use, fostering a broader shift toward environmentally friendly agriculture.
4. **Insect-based production and double value stream:** Insect-based production is another emerging driver. Manufacturers, particularly those engaged in worm or Black Soldier Fly (BSF) farming, often start with a focus on insect farming and evolve into organic fertilizer production by leveraging the by-products from insect farming. This dual production process offers an additional value stream for manufacturers.

4.1.2. Barriers and needs for scaling

In the evolving landscape of OF production in Kenya, local manufacturers face a range of challenges as they scale up their operations. Despite the growing interest in organic fertilizers (OF), several factors constrain their market penetration and scalability, with the primary challenge being competition from chemical fertilizers (CF), which dominate the Kenyan agricultural market. CF remains the preferred option for many farmers due to its lower cost, widespread availability, and government subsidies. These factors present significant barriers to the uptake of organic fertilizers, which are perceived as more expensive and less accessible.

Key factors

Key factors contributing to this competition include:

1. **Cost and subsidies:** CFs are significantly more affordable than OFs, largely due to substantial government subsidies that lower the cost of CFs. This makes CFs the go-to choice for smallholder farmers who prioritize immediate yield increases and cost-effectiveness. In contrast, OFs, though they offer long-term benefits like improved soil health, have higher upfront costs. For resource-constrained farmers, the lack of government subsidies for OFs exacerbates the financial barrier, making adoption difficult in the short term. The absence of comparable financial incentives for OFs hinders their competitiveness against CFs.
2. **Familiarity and trust:** Many farmers have long relied on CFs, and this established familiarity contributes to their ongoing use. CFs have clear, established guidelines on application rates, and farmers know they can expect immediate and reliable results. OFs, on the other hand, are less familiar to many farmers, who may face confusion about the different types of OFs, their application methods, and the expected benefits. This knowledge gap, coupled with the lack of visible short-term results from OFs, makes farmers hesitant to switch from CFs.
3. **Logistics and distribution:** OFs are bulkier than CFs, making them more challenging to store and transport. Given the inefficiencies in transportation infrastructure, particularly in rural areas, the distribution of OFs is limited. This results in poor availability in local markets, further complicating access for farmers. Agro-dealers, the primary distributors of fertilizers, often choose not to stock OFs due to their bulkiness, higher storage costs, and lower demand compared to CFs. As a result, the limited reach of OFs in the market affects adoption, particularly in areas where infrastructure is weak and access to agricultural inputs is already constrained.

Besides the competition with CF, the local manufacturers of OF experience several other barriers. To better understand these barriers and the needs of manufacturers, we will explore their journey through the different phases of business development.

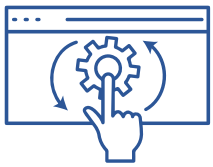
This journey framework will guide us through each of the following stage:

By structuring the analysis around these phases, we can clearly identify the key obstacles manufacturers encounter and their specific needs at each stage, offering insights into how the OF sector can better support these entrepreneurs as they strive to grow and succeed.

The barriers, needs and opportunities in different phases of the manufacturer journey

Set up Phase:

Establishing the facility, securing permits, and acquiring equipment to begin production.



Barriers:

- Significant financial investment needed for production setup and scaling is often unattainable due to limited access to financing.
- High Cost of equipments.
- High cost of energy.
- The complex and time-consuming process of meeting regulatory standards and obtaining certifications increases operational challenges.
- The lack of technical capacity and skills to set-up the facility.
- Lack of clear standardization and regulations.
- Specified for organic input.

Needs and opportunities

- Supportive government policies and incentives are needed to foster growth and create a stable environment for organic fertilizer production.
- Manufacturers require increased access to capital to invest in new equipment, facilities, and process improvements.
- Manufacturers need assistance navigating regulations and obtaining certifications to meet industry standards and build market trust.
- Risk Sharing between government and manufacturer.
- Reduce costs of energy (leverage special economic zones).
- Incentivise local production of machinery.
- Tax breaks and tax holidays for early stage businesses.

Sourcing Phase

Sourcing and transporting organic materials from suppliers to the manufacturing site.

Barriers:

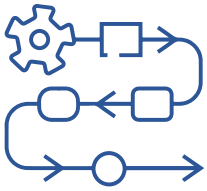
- Organic waste is often diverted to other uses,limiting the availability of materials for fertilizer production.
- Inefficient waste collection and segregation reduce the volume and quality of raw materials for organic fertilizer.
- Fluctuating availability and costs of raw materials destabilize supply chains and affect production feasibility.
- Limited technology in sourcing, aggregation and segregation.
- Quality of Raw Materials or waste varies.
- Quality Control for raw materials is a challenge (including cases of contamination).

Needs and opportunities

- Manufacturers need reliable partnerships with farmers and waste suppliers to ensure a consistent supply of raw materials.
- Innovation of value machineries.
- Reduce gaps between supply chains.
- Implementation of quality control systems from source to production for high quality OF manufacturing.

Production Phase

Processing raw materials into organic fertilizer through composting or other methods.



Barriers:

- Maintaining consistent product quality during production is challenging, impacting fertilizer reliability.
- Wet weather conditions and the need for specialized drying equipment hinder production efficiency.
- Consistent availability of waste
- Technologies and machinery available

Needs and opportunities

- Manufacturers need access to the latest research and best practices, with support from extension workers, researchers, and experienced manufacturers.
- Expanding production requires upgraded equipment and additional space to handle larger volumes efficiently.

Packaging Phase

Packaging the finished fertilizer and storing it in conditions that maintain its quality.

Barriers:

- The bulkiness of organic fertilizers complicates storage, transport, and logistics.
- No proper packaging and/or branding yet.
- Issues around brand awareness due to branding and packaging
- Dusty storage and high moisture content
- Unattractive branding

Needs and opportunities

- Enhanced branding, packaging, and marketing efforts are essential for differentiating products and attracting more customers.
- Work together with other manufacturers to great more supply and one new brand name to introduce.
- Looking to reduce moisture content to ensure they are not overpacking bags to compensate for evaporation weight losses
- Invest in packaging aesthetic to promote brand loyalty
- Explore standardized messaging so customers can understand

Distribution Phase (working with distributors)

Identifying and partnering with retailers or distributors to carry the product.

Barriers:

- Agro- dealers' lack of understanding of organic fertilizers limits their willingness to stock and promote them.
- Immediate cash needs and lack of credit options discourage agro- dealers from investing in organic fertilizers.
- Marketing tasks are heavily on agro-dealers.

Needs and opportunities

- Strong partnerships with agrodealers and large distributors are crucial for ensuring broad market reach and effective distribution.
- Work together with existing brands, so have advantage of awareness and trust of the brand.
- Better Support for Agro Dealers in terms of information, training, marketing materials.
- Manufacturers can also have region of focus instead of being spread out to maximize returns.
- Joint efforts by manufacturers and agro dealers to create awareness and empowerment.
- Leverage extending agro dealer network (EADN) and International Fertilizer Development Centre (IFDC)for financing and support.
- Manufacturers to work directly with farmers (value of word of mouth) and model farmers to further develop distribution channels.
- Partner with credit facilities to make the price of the unsubsidised OFs more attractive and competitive.

Distribution Phase (finding customers)

Marketing and outreach to attract buyers and create demand for the fertilizer.

Barriers:

- Farmers' adherence to traditional practices and skepticism about organic fertilizers slow adoption.
- Organic fertilizers' longer time to show benefits compared to conventional fertilizers deters adoption.
- Inconsistent product quality and concerns over fake fertilizers create skepticism among farmers.
- Seasonal demand fluctuations complicate production planning and financial stability.
- New organic fertilizer brands struggle to gain recognition and market share against established competitors.
- Too many products and information overload.
- Business and cost of labor (application).
- Cost of distribution per unit or kg of fertilizer is high.
- A lack of clear understanding on the long term value of OF by farmers.

Needs and opportunities

- Engaging larger industry players requires strategic marketing and partnerships to promote the benefits of organic fertilizers.
- Government subsidies that also include organic input.
- Increased awareness on solutions offered by manufacturers.
- Providing holistic solutions that can cater for a range of needs.
- Streamline government policies that guide the distribution channels for organic fertilizers.
- Having standardized products to support the needs of the farmers and create confidence.

Last mile delivery

Finalizing sales and ensuring efficient delivery of the product to customers.

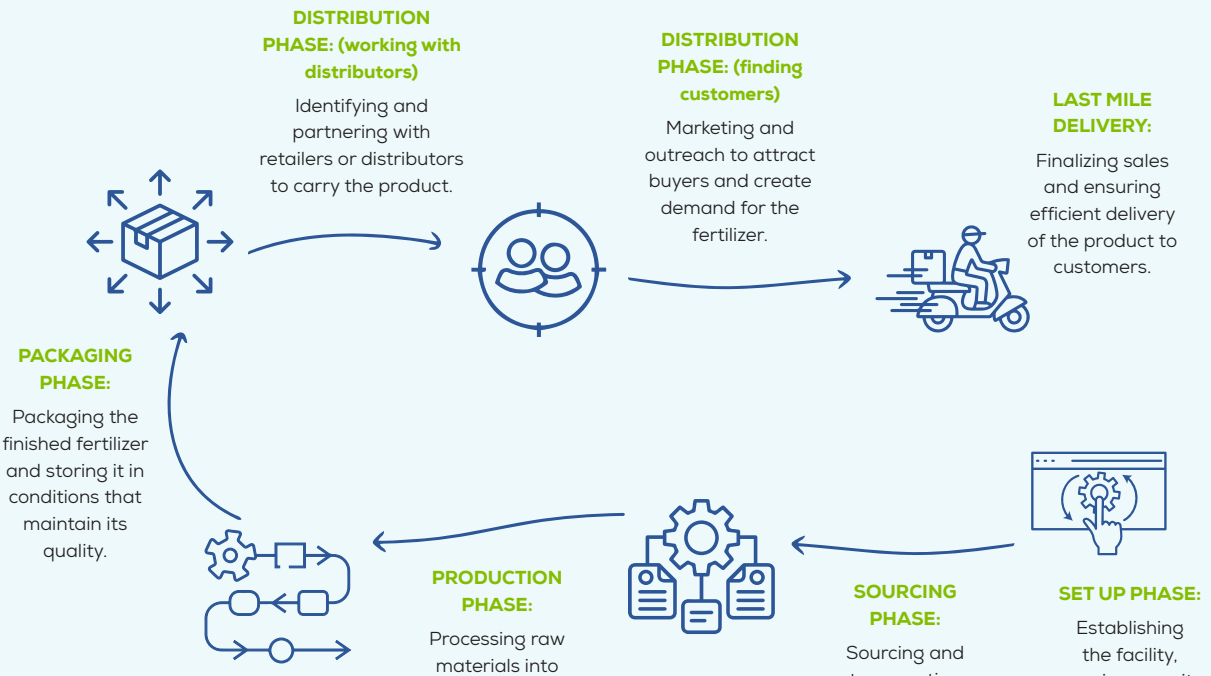
Barriers:

- Inconsistent product supply frustrates farmers and undermines trust.
- Reliance on limited distribution channels restricts geographical reach and market expansion.

Needs and opportunities:

- Use pioneering farmers as distributors for other farmers in its community/area.

Manufacturer journey input



4.2. The demand side: farmer perspective

Diving deeper into the users of organic fertilizers, we looked into their perception of OF, their incentives, drivers, and the challenges and barriers to scale. There ar

4.2.1. Incentives and drivers to start using OF

Farmers are driven by one or multiple of the following incentives/driver:

1. **Sustainability, environmental benefits, and long-term soil health:** Farmers are increasingly motivated to use organic fertilizers due to their alignment with sustainable farming practices and significant environmental benefits. OF helps restore soil health by improving soil structure, increasing nutrient availability, and promoting microbial activity. This results in long-term soil fertility, reducing reliance on chemical fertilizers (CF), which deplete soil over time. The use of OF also helps mitigate environmental pollution and greenhouse gas emissions, making it a key component of regenerative agriculture practices. Farmers concerned about soil degradation and the long-term productivity of their land are adopting OF to enhance farm sustainability.

2. **Potential increase in production and improved crop yields:** The adoption of organic fertilizers can significantly boost agricultural production across a range of crops. Farmers report a 15-25% increase in yields, particularly in high-value crops like coffee, tea, vegetables, and export crops such as avocados. Enhanced soil health from OF contributes to improved crop performance, resulting in higher productivity and increased farm income. This potential for greater yields is a strong incentive for farmers looking to optimize their production.

3. **Potential decrease in fertilizer inputs:** With the improvement in soil health brought by OF, farmers can reduce their reliance on chemical fertilizers over time. This results in lower input costs, making OF a cost-effective alternative for maintaining soil fertility. By adopting a balanced approach to fertilization, farmers can decrease the environmental impact of farming while ensuring efficient use of inputs.

4. **Strategic crop shifts and market opportunities:** Farmers facing declining yields in staple crops like maize are increasingly shifting towards high-value crops such as avocados, often for export. OF plays a crucial role in cultivating these crops, as it is aligned with organic certifications and market demands. The growing global and local demand for organic produce offers farmers a chance to tap into lucrative markets, where organic products fetch premium prices. This strategic shift allows farmers to capitalize on market opportunities while enhancing both economic returns and environmental benefits.

5. **Healthier produce and consumer demand:** The rising demand for healthier, chemical-free food is another driver for farmers to adopt OF. Both consumers and farmers are becoming more aware of the health benefits associated with organic produce, which is often perceived as healthier and tastier. By using OF, farmers can meet this growing demand for organic products, positioning themselves to sell premium-quality, health-conscious food in both local and global markets. This expanding consumer preference for organic food reinforces the economic viability of organic farming practices.

4.2.2. Farmer profiles with challenges and needs

Profile I: Unaware farmer

The unaware farmer lacks knowledge about processed organic fertilizers (OF) and continues using traditional methods like chemical fertilizers or manure, without seeking new information.

Challenges:

- None or little knowledge about soil health and/or processed OF
- Lack of awareness among farmers about different types of organic fertilizers.
- Currently no exposure to this new knowledge

Needs:

- Education on soil health and organic input provided by agro-dealers, extension workers, institutes, NGOs, or manufacturers.
- Shown proof of the results and impact OF can have (through research, demo farms, and testimonials).
- Government subsidies for organic fertilizers to reduce costs for farmers.
- Focus on price reduction to generate further interest among farmers.
- Advice to farmers on experimenting with a combination of organic fertilizers (OF) and inorganic fertilizers.

Opportunities:

- Increased R&D in the organic fertilizer space for innovation and improvement.
- Enhanced use of technology in application to make OF more appealing to farmers.
- Improved packaging for dust-form fertilizers to reduce loss during application.
- Attractive packaging designs to stimulate curiosity and interest in OF products.
- Creating awareness of the range of different OFs available to farmers.

Profile II: The searcher

The searcher is aware of organic fertilizers and wants to adopt them but faces barriers like price, availability, and access.

Challenges:

- Lack of marketing about OF availability and locations
- Limited availability of organic fertilizers, especially in remote areas and during dry seasons: almost not available through agro-dealers, no OF manufacturer closeby
- Because of the bulkiness of the product farmers want to be able to buy the product at the moment they need it and will directly use it
- Difficulty in using organic fertilizers to increase yield and quality.
- Lack of a comprehensive database of organic fertilizers.
- Unclear instructions for application, particularly for smallholder farmers.
- Poor categorization of organic fertilizers, leading to confusion about which types are best.

Needs:

- Wide-spread information and campaigns about the location of manufacturers and availability at agro-dealers.
- Improvement in distribution infrastructure through contracts with agro-dealers and other organizations providing and selling fertilizer.
- Less bulky products and/or enough storage space at manufacturers or agro-dealers to manage capacity during peak moments.
- Clear application methods indicated on organic fertilizer (OF) packaging.
- Standardization of organic fertilizers by organizations like KEBS to increase buyer confidence.
- Extension services from county governments to support farmers.
- Partnering with agro-dealers to raise awareness and train them in the use of organic fertilizers.
- Manufacturers should provide clear guidelines for application.

Opportunities:

- Establish a database, possibly managed by farmer organizations like OFIMAK, for better access to information.
- Create OFs targeting specific crop-related programs, with guidance on application for different seasons.
- Address the bulkiness of organic fertilizers to improve storage and transport efficiency.
- Modify drones to handle powder, pellet, and liquid forms of fertilizers, enhancing application methods.

Profile III: The high-demanding pro

The high-demanding pro is a commercial farmer focused on large-scale production, prioritizing fertilizer efficiency, consistency, and fast results to ensure high yields.

Challenges:

- There is a concern about the quality of some organic fertilizers, with reports of poor formulation and incorrect information about nutrient content.
- The high quantities of fertilizers needed by large (commercial) farms are not reached yet on the supply side or not in a secured way, which makes it too risky to switch when farmers aim for consistency at their farm.
- A lot of the current OF is not optimized yet to be used with professional equipment and machinery.

Needs:

- Standardization, regulation, and certification specified for organic fertilizers (OF).
- Shown proof of the results and impact OF can have (through research, demo farms, and testimonials).
- Scaling of manufacturing businesses to secure higher supplies.
- R&D investment into product improvement to make OF compatible with current machinery and equipment.
- Partnerships between farmers and manufacturers.
- Reframing of OF compared to chemical fertilizers (CF), emphasizing that OFs are not direct replacements but complementary to CF.
- Soil testing to ensure optimal fertilizer use.
- Government subsidies for organic fertilizers.

Opportunities:

- Introduction of advanced machinery, including drones and specialized equipment for OF application.
- Adoption of drones and other machinery to enhance efficiency.
- Use of granulated organic fertilizers and blending with chemical fertilizers to support gradual transitions.
- Highlighting that OFs provide a base for plants to absorb inorganic fertilizers, rather than replacing them.

Profile IV: The conventional farmer

The conventional farmer prefers chemical fertilizers for their reliable results, familiar usage, and affordability, often remaining skeptical about organic alternatives.

Challenges:

- Current subsidies make OF not competitive price wise compared to CF
- Application of organic fertilizers, especially bulk manure, is labor-intensive and time-consuming, increasing the overall cost of farming.
- Farmers are concerned about the slow and uncertain release of nutrients from OF, which may not align with the crops' needs at critical growth stages.
- Higher pricing of organic fertilizers compared to chemical fertilizers.

Needs:

- Shown proof of the results and impact OF can have (via research from institutes, demo farms, or testimonials from other farmers).
- Competitive pricing and subsidies focused on making OF more affordable.
- Educational and awareness campaigns to increase farmer knowledge and convince them of the benefits of OF.
- Introduction to methods that show results faster or with less risk, providing a smoother transition toward organic inputs (e.g., small packaging for trials).

Opportunities:

- Utilize carbon credits as incentives to promote the adoption of sustainable farming practices.
- Explore blending organic and chemical fertilizers to support a gradual transition to organic farming.

Profile V: The pioneering partner

The pioneering partner is a champion of organic fertilizers, using them and promoting sustainable practices within their farming community.

This farmer is deeply commited to sutainable practices and its instrumental in spreading knowledge and driving the adoption of OF among other farmers

Challenges:

- Access to raw materials, equipment, and financing for scaling production can be difficult.
- Convincing other farmers, who may be skeptical of organic fertilizers, requires persistent effort.

Needs:

- Financial support and resources are crucial for expanding production and educational outreach.
- Further education in organic farming techniques and business management is needed.
- Building connections with other like-minded farmers, agricultural experts, and potential partners would enhance collaboration and resource sharing.

Opportunities:

- As the organic market grows, the Pioneering partner can increase their role as a community leader and educator.
- Scaling up production offers the chance to turn their farm into a commercial success.
- Partnering with NGOs and government programs could provide valuable support and extend their impact.
- Exploring new methods in organic fertilizer production could position them as a leader in sustainable agriculture.

General barries to uptake of OF by farmers

- OF not being in the subsidy program.
- Challenges of OF certification, brand trust, credbility.
- Inadequate components of nutrients (no clear value of OF in terms of metrics that matter to the farmer)
- Little R&D to address farmer needs.
- Unawareness among farmers (on existing OF types, application rates, prices, availability).
- Govt subsidy on CF undermines use of OF.
- Farmers already used to current CF which is already working.
- Inexistent database that contains OF manufacturers.
- Confusing categorization of OF (too many products being sold as OF products) confusing the farmers.

Insights and ideas to drive demand for OF among farmers (from validation workshop)

- Direct farmer engagement strategies.
- Farmer field days.
- Educational tours.
- Demo farms and show farms.
- Documented trials.
- Behavior change interventions.
- Encourage activities such as regular soil tests.
- Data driven approach to track output or yield from use of OF.
- Data aggregation and communication.
- Consistency in messaging (contents, percentages, usage, application amounts).
- Provide working capital (to support regular soil tests and input acquisition.
- Make blends available (product bundling and positioning).
- Better marketing and promotion strategies.
- Coordinated approach by all players in working with farmers.
- Value chain interventions.
- Make soil testing solutions available.
- Make access to manufacturers to subsidize costs by themselves (use of carbon credits).
    - Partnerships between farmers and manufacturers - Staggered partnerships (develop demo farms).

- What interventions have OF Manufacturers put in place to overcome challenge of equipment & machinery usage?
- making farmers understand the difference in contribution of fertilizers (cf - crop yield, OF - soil health).
- Innovatively tap into the govt extension systems.
- Integrate OF into govt fertilizer interventions
- don't replace CF with OF.
- Communicating how Soil Health eventually leads to Crop yields (organic matter, bio stimulant, minerals, nutrients).
- Product Samples for farmer to learn "touch and feel".
- Rethink distribution approaches for OF.
- Consistency in messaging (contents, percentages, usage, application amounts), soil health vs yield.
- Platforms to share about OF, OF manufacturers, application rates, OF types, -(Offimak to help with data collection).
- Info on OF and other bio inputs (and their applications) so farmers are not overwhelmed by information or being given false or incomplete information.
- Develop standardized crop guides from manufacturers giving clear guidance on application
- Specification of bio-iputs (for planting, top dressing).
- Collaboration between OF and other bio inout producers.
- Training Agro-dealers on OF and make them readily available to farmers.
- Rethinking how to package affordability and costs.
- Rethinking access to agrovets - how do you tell which agrovets have OF in stock?
- Extension service from county level to ward level.
- "Farmers feel organic fertilizer is expensive".
- Supporting farmers to scale own production of OF (they lack the technologies and knowledge).
- Govt to walk the talk on OF - what local narrative is being spearheaded on OF?
- Agronomists to be empowered to learn about OF.
- Integrate RA in schools.
- Innovative packaging for OF.
- How do we price cost of inputs for farmers
- How do we guarantee better markets for OF Farmers.
- Co-relation between OF, soil health, plant health and human health.
- - Granulated OF for mechanization? And use of technology such as drones.

4.3. Drivers for supply and demand from other stakeholders

Government and Policymakers:

1. **Policy support and soil health restoration initiatives:** The Kenyan government is actively promoting the use of organic fertilizers as part of its broader agricultural sustainability goals. Through initiatives like the Nairobi Declaration of 2024, the government aims to reverse soil degradation and restore at least 30% of degraded land by 2034. This ambitious goal will be supported by government policies that prioritize tripling the production and distribution of both organic and inorganic fertilizers. The government is also aligning its efforts with international sustainability goals, such as reducing carbon emissions and promoting regenerative agricultural practices.
2. **Incentives and regulatory support:** Regulatory reforms and government subsidized tax are being introduced to encourage the local production of fertilizers. These efforts include simplifying the certification process for organic fertilizers, providing financial incentives to manufacturers, and launching awareness campaigns to educate farmers about the benefits of organic inputs. By fostering a supportive policy environment, the government is addressing barriers to entry for local manufacturers and facilitating market access for organic fertilizers.
3. **Subsidies and extension services:** Although chemical fertilizers still dominate the market due to subsidies, the government is considering measures to promote organic fertilizers like extending subsidies to organic inputs or offering blended fertilizer options. The expansion of extension services that educate farmers on sustainable farming practices and organic inputs is another key driver of demand. This alignment of policy with sustainability and food security objectives is crucial for scaling the use of organic fertilizers.

Development agencies and funders:

1. **Financial and technical support for SMEs:** International development agencies such as GIZ, USAID, and IFCD are key enablers of the organic fertilizer market in Kenya. These agencies provide technical assistance, capacity-building programs, and financial support to small and medium-sized enterprises (SMEs) engaged in organic fertilizer production. By investing in research and development (R&D), these agencies help improve product quality, enhance production efficiency, and expand market access for local manufacturers.
2. **Scaling initiatives and capacity building:** Development agencies are also instrumental in creating scalable business models for organic fertilizer producers. Through incubators, accelerators, and grants, they are driving innovation and supporting the commercialization of organic fertilizer production. This support enables manufacturers to scale up operations, meet growing demand, and compete more effectively with chemical fertilizer producers.
3. **Research and innovation:** In addition to providing financial support, development agencies fund research aimed at improving the effectiveness of organic fertilizers and developing new formulations. This focus on innovation helps address soil-specific challenges, promoting the use of organic inputs in diverse agricultural contexts across Kenya. Collaboration between agencies, research institutions, and manufacturers ensures that cutting-edge technologies and practices are adopted, further driving the supply of organic fertilizers.

Consumers

1. **Health and environmental consciousness:** Rising consumer awareness of the health and environmental benefits of organic produce is a major driver of demand for organic fertilizers. As more consumers seek food grown without harmful chemicals, farmers are increasingly incentivized to adopt organic farming practices to meet this demand. The preference for organic produce is not limited to the export market; locally, consumers are also seeking healthier, chemical-free options.
2. **Premium prices and market opportunities:** Organic produce often commands higher prices in both local and international markets. This premium pricing creates a financial incentive for farmers to switch to organic fertilizers and embrace sustainable farming methods. The trend toward organic farming is expected to continue as consumer preferences shift toward sustainability and environmentally friendly products, further fueling the demand for organic fertilizers

4.4. Barriers for supply and demand from other stakeholders

Agro-Dealers and retailers:

1. **Low demand and high storage costs:** Agro-dealers and retailers are often reluctant to stock OFs due to low and unpredictable demand. Organic fertilizers require more storage space due to their bulkiness and are often more expensive than CFs. This creates financial and operational inefficiencies for retailers, who may not have the capital to invest in higher storage costs and are unlikely to see quick returns on their investment in OFs.

2. **Limited turnover and market infrastructure:** The lower turnover rates for OFs, compared to CFs, make them less attractive to agro-dealers. In rural areas, where market infrastructure is already underdeveloped, the financial constraints of stocking OFs further limit their availability. Moreover, consumer awareness of OFs is still low, making it difficult for agro-dealers to justify the high costs of maintaining and transporting these products. As a result, the reduced presence of OFs in local markets perpetuates the cycle of low adoption and limited market growth.

3. **Customized marketing strategies:** The benefits of organic fertilizers, such as improved soil health and sustainability, are often less tangible and immediate than the yield-boosting effects of chemical fertilizers. This means that agro-dealers need to develop more tailored and persuasive marketing strategies to convince farmers of the long-term value of organic inputs. Crafting such messages involves a higher degree of complexity and investment in communication materials and campaigns compared to promoting CF.

5 Forecast (of OF and sizing of waste diversion)

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The business case for scaling local manufacturing of organic fertilizers (OF) in Kenya can be significantly bolstered by systematically addressing specific barriers and seizing opportunities that permeate the agricultural value chain—from farm-level operations to national regulatory frameworks and international export markets. Organic fertilizers not only present substantial environmental and economic advantages but also offer social benefits crucial for enhancing the livelihoods of smallholder farmers. To ensure their wider adoption and production, it is imperative to tackle systemic challenges while strategically enhancing key drivers of change.

5.1. Opportunities in the Business Case (Farm, Manufacturer, and Country Level)

Organic fertilizers have the potential to address several of Kenya's pressing agricultural issues, including soil degradation, food insecurity, and the accessibility of export markets. To effectively build a robust business case for OF, it is essential to delve into opportunities at various operational levels:

Farm-Level Opportunities:

- **Increased Export Market Demand:** The growing global demand for high-value agricultural exports—such as coffee, tea, avocados, and various horticultural products—is prompting exporters to adopt organic farming practices that comply with international standards. Regions such as Europe, North America, and parts of Asia are increasingly requiring organic certifications as a prerequisite for market entry. By transitioning to organic practices, Kenyan farmers can enhance their access to these lucrative markets and potentially command higher prices for their products. This scenario underscores the need for greater utilization of organic fertilizers, which are indispensable for attaining the necessary organic certifications.
- **Sustainability and Soil Health:** The use of organic fertilizers is pivotal in restoring soil health by enhancing soil structure, boosting organic matter

content, and fostering microbial activity. These improvements not only fortify soils against the adverse effects of climate change but also reduce reliance on chemical fertilizers (CF), which can degrade soil quality over time. Many farmers are increasingly recognizing that improved soil health can lead to enhanced long-term productivity, lower input costs, and greater resilience to climate-related challenges such as droughts and floods. Moreover, the application of OF aids in mitigating water contamination risks, particularly in regions susceptible to runoff from chemical fertilizers.

Manufacturer-Level Opportunities:

- **Growing Demand for Organic Products:** The escalating international appetite for organic produce—especially within export markets—presents a substantial business opportunity for local manufacturers of organic fertilizers. By developing tailored product lines that cater specifically to the nutritional needs of export-oriented crops, manufacturers can position themselves advantageously. Focusing on high-demand crops such as tea, avocados, and various vegetables allows manufacturers to tap into a burgeoning market for OF, which continues to expand as consumer preferences shift toward sustainably produced goods.
- **Product Innovation and Diversification:** There exists a pronounced opportunity for manufacturers to innovate through the introduction of organo-mineral blends, which synergistically combine the nutrient efficiency of chemical fertilizers with the long-term soil health benefits of organic inputs. This hybrid approach enables farmers to meet immediate yield demands while simultaneously fostering soil fertility, thus creating a compelling value proposition for manufacturers. Furthermore, manufacturers can leverage research and development (R&D) initiatives to create more user-friendly, mechanization-compatible organic fertilizers, such as pellets or granules. Such innovations would cater to the operational needs of larger-scale commercial farms, enhancing their adoption rates.

Country-Level Opportunities:

- **National Policy Alignment with Sustainability Goals:** The Kenyan government has made significant commitments to improving soil health and promoting agricultural sustainability, as evidenced by initiatives like the Nairobi Declaration of 2024. This declaration aims to restore 30% of degraded land by 2034, which aligns directly with the use of organic fertilizers. Manufacturers stand to benefit from this alignment, as it provides not only policy support but also a conducive environment for growth. By integrating the local organic fertilizer industry with these national sustainability objectives, there exists a viable pathway to secure funding, gain policy backing, and access market incentives essential for scaling OF production.
- **Reduced Dependency on Imported Chemical Fertilizers:** Kenya's reliance on imported chemical fertilizers renders the nation susceptible to fluctuations in global markets and supply chain disruptions, a reality highlighted during the COVID-19 pandemic and the geopolitical tensions stemming from the Russia-Ukraine war. Scaling up local production of organic fertilizers represents a crucial opportunity to diminish this dependency, reduce import costs, and bolster national food security. The government's focus on fostering local production through subsidies, regulatory reforms, and capacity-building initiatives will be instrumental in capitalizing on this opportunity.

5.2. Barriers Impeding the Business Case (Farm, Manufacturer, and Country Level)

While the potential for scaling organic fertilizers (OF) in Kenya is clear, several significant barriers hinder the full realization of the business case for OF production and adoption. These barriers span from regulatory and policy challenges to farm-level practical issues, affecting both the supply and demand for organic fertilizers. Addressing these barriers is essential to make organic fertilizers a viable and competitive alternative to chemical fertilizers (CF).

a. Licensing, Taxes, Legislation, and Certification

Regulatory Barriers for Manufacturers:

One of the most significant obstacles facing manufacturers of organic fertilizers is navigating Kenya's complex regulatory framework. The Kenya Bureau of Standards (KEBS), which is responsible for certifying organic fertilizer products, has an extensive and often costly certification process. For small and medium enterprises (SMEs), these certification hurdles are particularly challenging as they often lack the resources needed to meet regulatory requirements promptly. Delays in obtaining KEBS certification prevent manufacturers from legally marketing and selling their products, causing significant disruptions in market entry, and leading to revenue losses.

Additionally, inconsistent standards for organic fertilizers across different government bodies create confusion within the market. This inconsistency affects both manufacturers, who struggle to meet varying certification requirements, and consumers, who are unclear about product quality and efficacy. A lack of uniformity in regulatory frameworks makes it difficult for organic fertilizers to gain widespread market acceptance.

Tax Burdens on Organic Inputs:

The current tax structure in Kenya also presents a barrier for organic fertilizer manufacturers. While chemical fertilizers receive government subsidies and tax breaks, organic fertilizers do not benefit from similar fiscal policies. This creates a significant cost disparity between the two, with organic fertilizers often priced higher than their chemical counterparts. Without tax relief or subsidies for OF, manufacturers face an uphill battle in making their products competitive, and farmers are reluctant to pay premium prices for organic inputs. Addressing this tax imbalance is critical to leveling the playing field and encouraging more farmers to adopt organic fertilizers.

b. County Licensing

Fragmented Licensing at the County Level:

In addition to national regulatory challenges, organic fertilizer manufacturers must contend with fragmented licensing requirements at the county level. Kenya's decentralized governance structure means that each county has its own set of licensing regulations for the sale and distribution of fertilizers. These requirements often vary significantly from one county to another, resulting in administrative bottlenecks and financial burdens for manufacturers seeking to distribute their products across multiple regions.

The lack of harmonized licensing frameworks means manufacturers must expend additional resources to comply with different sets of regulations, limiting their ability to scale operations efficiently. This not only affects the profitability of the manufacturers but also reduces access to organic fertilizers for farmers in different parts of the country. Harmonizing licensing requirements at a national level would streamline the process, lower operational costs, and facilitate broader access to OF across Kenya.

c. Certification Challenges for Exporters

Lack of Support for Exporters Seeking Organic Certification:

For Kenyan exporters aiming to tap into high-value international markets, securing organic certification is critical. However, obtaining organic certification for exported produce involves meeting stringent international standards, which many Kenyan farmers—especially smallholders—find difficult to achieve. The certification process requires technical expertise, substantial financial resources, and institutional backing, which are often out of reach for small-scale farmers.

Without proper certification, exporters cannot fully capitalize on the growing global demand for organic products, which limits their ability to access premium markets in Europe, North America, and Asia. Additionally, smallholder farmers are left out of lucrative export opportunities, as they lack the institutional support needed to meet certification standards. There is a need for greater government and industry investment in capacity building and technical assistance to help farmers and exporters achieve organic certification, thereby unlocking new market opportunities.

d. Farm-Level Barriers

Input Basket – Yield Comparisons:

One of the key barriers to farm-level adoption of organic fertilizers is the uncertainty surrounding their impact on crop yields. Farmers, particularly those cultivating staple crops such as maize, are hesitant to transition from chemical fertilizers to organic alternatives due to concerns over yield performance. Chemical fertilizers are often associated with rapid, short-term yield increases, which farmers prioritize to ensure their immediate livelihood and financial stability.

In contrast, organic fertilizers may take longer to show their benefits, focusing on improving long-term soil health rather than providing immediate yield boosts. The lack of clear evidence or demonstrations of comparable yields between OF and CF creates a psychological barrier for farmers. Until farmers are presented with clear, accessible data and success stories showing that organic fertilizers can provide similar or superior yields in the long term, they will remain reluctant to adopt them. Demonstration farms and farmer education programs that emphasize the long-term economic and environmental benefits of OF are essential to overcoming this hurdle.

Confusing Products in the Market:

Another critical farm-level barrier is the fragmented and inconsistent market for organic fertilizers. Currently, a wide variety of organic fertilizer products are available, each with different qualities, applications, and levels of effectiveness. This lack of standardization creates confusion among farmers, who often struggle to determine which product best suits their needs. Without clear guidelines or standardized messaging from manufacturers, farmers may feel overwhelmed by the choices available and may ultimately opt for chemical fertilizers, which are more familiar and often come with clearer instructions.

Inconsistent product positioning also makes it difficult for farmers to trust the efficacy of organic fertilizers. The absence of a cohesive market strategy for organic fertilizers reduces farmers' willingness to experiment with or invest in them, particularly when they are unfamiliar with how different products will perform in their specific soil and crop conditions. The market needs clear, unified messaging and product standardization to help farmers make informed decisions and build confidence in organic fertilizers.

5.3 Prioritization of Opportunities Based on Feasibility and Impact

To effectively scale the use of organic and organo-mineral fertilizers, it is crucial to prioritize opportunities based on both their feasibility of implementation and the potential impact they can have on improving the sector. This approach ensures that resources are allocated strategically, leading to the highest returns in terms of adoption rates, sustainability, and economic benefits for smallholder farmers.

a. Harmonization of Regulatory Standards and Certification Processes

One of the most significant challenges for organic fertilizer manufacturers and farmers is navigating the complex and fragmented regulatory environment. Different counties in Kenya often have varying regulations, creating barriers for manufacturers to distribute products across regions. Harmonizing these regulations at the national level would ease these barriers.

A centralized certification body for organic fertilizers could streamline the certification process, reducing the bureaucratic hurdles for manufacturers. This could also create a fast-track certification process specifically designed for small and medium-sized enterprises (SMEs) involved in organic fertilizer production. SMEs often face difficulties in accessing certification due to the high costs and lengthy procedures, but this approach would allow them to enter the market more easily. Simplifying these procedures would also reduce delays in market entry, enabling manufacturers to meet demand more quickly and efficiently.

b. Government Support for Organic Inputs

Expanding government subsidies and tax breaks to include organic fertilizers can help create a level playing field between organic and chemical fertilizers. Currently, many farmers choose chemical fertilizers due to lower upfront costs, partially driven by government subsidies. By extending these subsidies to organic inputs, the government can encourage farmers to switch to more sustainable options without the financial strain.

In addition, direct financial incentives could be introduced for farmers who adopt organic farming practices. This could take the form of input cost reductions tied to organic certification or payment schemes that reward farmers for meeting organic standards. Such measures would help reduce the initial investment required by farmers to transition from chemical to organic fertilizers. Expanding subsidies to include organic fertilizers is relatively feasible, as it builds on existing government frameworks for subsidizing agricultural inputs. However, this strategy would require lobbying and advocacy efforts to ensure that policymakers understand the long-term benefits of organic fertilizers and their role in sustainable agriculture.

c. Capacity Building and Farmer Education Programs

A significant barrier to the adoption of organic fertilizers is the lack of knowledge among farmers regarding their benefits and appropriate application techniques. Many farmers are unfamiliar with the long-term benefits of organic inputs, which can lead to hesitancy in adopting them.

Robust extension services that provide education and technical support to farmers are essential in promoting organic fertilizers. These programs should include demonstration farms and pilot projects that showcase how organic fertilizers improve soil health and increase yields, particularly for high-value crops such as tea, coffee, and vegetables. Such hands-on examples help farmers see the tangible benefits of organic inputs, increasing their confidence in making the switch.

Moreover, extension services should train farmers on the best practices for applying organic fertilizers, including the optimal amounts, timing, and combination with other inputs such as organo-mineral blends. This technical knowledge is crucial to ensuring that farmers maximize the benefits of these fertilizers. Implementing farmer education programs is highly feasible, especially if it is integrated with existing extension services. This strategy can be rolled out quickly and at a relatively low cost, making it an attractive option for governments and NGOs looking to promote sustainable agriculture practices.

d. Product Standardization and Branding Support

The organic fertilizer market in Kenya can be confusing for farmers due to the lack of standardized product formulations and packaging. Farmers often struggle to differentiate between the various products available, leading to hesitation in purchasing organic fertilizers.

Manufacturers need to work together to develop clear, standardized formulations that meet specific agricultural needs. These formulations should be based on well-researched nutrient requirements for different crops, ensuring that farmers receive products tailored to their regional conditions and crop types. Uniform product packaging and labeling guidelines should also be established to make it easier for farmers to identify organic fertilizers that meet their needs.

Government and industry bodies could play a key role in facilitating this process by establishing and enforcing product standards for organic fertilizers. This would create more transparency in the market, giving farmers confidence that the products they purchase are of consistent quality. Standardizing organic fertilizer formulations and packaging would significantly reduce confusion in the market and make it easier for farmers to make informed decisions. This would lead to increased trust in organic fertilizers, improving market penetration and adoption rates.

5.4. Seasonality and Localization of Demand for Organic Fertilizers and Organo-Mineral Blends

Understanding the seasonal and regional demand for organic fertilizers is critical for manufacturers to optimize production and distribution strategies. Different crops and regions in Kenya have varying nutrient requirements based on their growing cycles and climatic conditions. Manufacturers must tailor their production schedules and distribution networks to meet these localized needs effectively.

a. Irrigated Crops (Avocados, Rice, Coffee, Tea)

Irrigated crops, such as avocados, rice, coffee, and tea, are grown in regions with access to consistent water supplies, such as Central Kenya (Kiambu, Murang'a), Nyanza (Ahero, West Kano), and parts of the Rift Valley (Nandi, Kericho, Bomet). These crops can be cultivated year-round, creating a continuous demand for fertilizers, including organic inputs and organo-mineral blends.

These high-value export crops require well-balanced nutrient management to maintain soil fertility and produce high yields that meet international quality standards. Organic fertilizers, with their ability to improve soil water retention and enhance long-term soil health, are particularly valuable for these crops.

Fertilizer Demand for Irrigated Crops: The year-round cultivation of irrigated crops means there is a consistent demand for fertilizers, unlike rain-fed crops, which rely on seasonal rainfall. Organic fertilizers help maintain soil health and fertility while reducing the environmental impact of synthetic inputs. Additionally, the use of organo-mineral blends provides the immediate nutrient availability required for export-quality crops.

Meeting the demand for organic fertilizers in irrigated crop systems can lead to higher export-quality produce, increased farm productivity, and improved water-use efficiency. This is especially important for regions prone to water scarcity, where soil moisture retention is critical. The continuous demand for fertilizers in irrigated systems makes it feasible for manufacturers to target these regions with consistent production and supply schedules. However, the high standards required for export crops mean that organic fertilizers must meet stringent quality controls, necessitating investment in product development and certification.

b. Rain-Fed Crops (Maize, Beans)

Rain-fed crops, including staples like maize and beans, are grown in regions such as Western Kenya (Kakamega, Bungoma) and the Rift Valley (Uasin Gishu, Narok). These crops depend on seasonal rainfall, creating peaks in fertilizer demand during the planting seasons, which coincide with the long rains (March-May) and short rains (October-December).

Fertilizer use is closely tied to the growing seasons, with farmers applying organic fertilizers to prepare the soil before planting. Organic inputs are particularly beneficial for rain-fed crops, as they improve soil structure and moisture retention, helping farmers manage drought-prone conditions.

In regions with unpredictable rainfall, organic fertilizers help increase the resilience of crops by improving soil organic matter and water retention. This is especially valuable for farmers in semi-arid areas, where organic fertilizers can mitigate the impact of dry spells on crop yields. The seasonal nature of rain-fed agriculture means that manufacturers need to align their production and distribution schedules with the planting seasons. While this requires careful planning, the demand for organic fertilizers during the long and short rains is predictable, making it feasible to meet farmers' needs effectively.

Seasonality of Demand for Organic Fertilizers

Different crops have distinct nutrient requirements that change with their growth cycles. As a result, the demand for fertilizers varies significantly throughout the year based on planting and harvesting seasons. Key crops in Kenya, such as maize, tea, and vegetables, each have specific growing cycles that determine the timing of fertilizer applications:

- **Maize:** As Kenya's staple crop, maize is grown primarily in the Rift Valley, Western, and parts of Central Kenya. The main maize planting season occurs between March and April, with a secondary season in October in some regions. Organic fertilizers like bioslurry and compost, which improve soil structure and provide slow-release nutrients, are needed at the onset of planting. Top-dressing fertilizers, which enhance nutrient uptake during the vegetative stage, are in demand around June and July for the main season and December to January for the secondary season.
- **Tea:** Kenya is one of the world's largest tea exporters, and tea is grown year-round in the highlands of Central and Western Kenya. However, there are specific periods in the tea growth cycle when the demand for organic fertilizers spikes. These periods coincide with rainy seasons (typically in March-April and October-November) when tea bushes experience vigorous growth. Organic fertilizers that boost soil fertility, such as compost and biochar, are used to improve soil structure and nutrient-holding capacity during these peak growing periods.
- **Vegetables:** Vegetables such as kale, spinach, and tomatoes are widely grown in peri-urban areas around Nairobi and other irrigated regions across Kenya. These crops have shorter growing cycles, typically ranging from 3 to 6 months, which leads to more frequent fertilizer application. Unlike maize and tea, vegetables are grown continuously throughout the year, although demand for fertilizers tends to spike during dry seasons (e.g., January to March and July to September) when irrigation is more common. Organic fertilizers rich in nutrients like nitrogen and potassium are often required to maintain healthy, fast-growing crops.

Localization of Demand

Localizing the demand for organic fertilizers involves understanding the geographic distribution of crop cultivation and the specific soil and climatic conditions of each region. Kenya's diverse agro-ecological zones lead to varied nutrient requirements, which means that fertilizer formulations must be tailored to suit the local conditions:

- **Rift Valley and Western Kenya (Maize Belt):** This region is dominated by large-scale maize farming and has nutrient-depleted soils due to continuous cropping. Organic fertilizers that improve soil fertility by adding organic matter and enhancing soil structure are essential. Fertilizers rich in nitrogen

and phosphorous are in high demand, especially during the planting season. Additionally, these areas experience soil acidity, so organic fertilizers that buffer soil pH and promote healthier root systems can be highly beneficial.

- **Central Kenya (Tea and Coffee Zone):** Central Kenya is a major producer of tea and coffee, which are both perennial crops. The region has unique soil requirements due to long-term nutrient depletion. Organic fertilizers tailored for this region often need to be high in potassium and phosphorous to support the growth of tea bushes and coffee plants. Fertilizers that enhance microbial activity and improve soil moisture retention are also crucial, as the region experiences periodic dry spells.
- **Peri-Urban Areas and Irrigated Regions (Vegetables):** Peri-urban areas, such as those around Nairobi and other cities, are characterized by high-intensity vegetable farming. Farmers in these regions use fertilizers frequently due to short crop cycles. Organic fertilizers that release nutrients quickly, such as liquid bioslurry or compost tea, are often favored. These areas also require fertilizers with higher nitrogen content to support leafy vegetables. Organic fertilizers that improve soil fertility and reduce reliance on synthetic inputs are critical in these regions due to the growing demand for sustainable, healthy produce.
- **Coastal and Eastern Kenya (Dryland Farming):** The coastal and eastern regions of Kenya are more arid and prone to drought. Organic fertilizers play a crucial role in improving soil health by enhancing water retention and reducing soil erosion. Organic fertilizers like biochar, which can hold water and nutrients for longer periods, are particularly useful in these areas. Additionally, organic fertilizers can help reduce soil salinity, which is a common problem in coastal regions.

Soil and Climatic Considerations

Each region of Kenya has unique soil types and climatic conditions, which require fertilizers to be tailored to address specific nutrient deficiencies. For instance:

- **Western and Rift Valley:** Soils in these regions tend to be acidic and nutrient-poor due to prolonged cultivation of crops like maize. Organic fertilizers must be formulated to address these deficiencies, often including materials like lime or biochar to reduce acidity while improving soil structure and water-holding capacity.
- **Highlands of Central Kenya:** Continuous tea and coffee cultivation can lead to depletion of essential nutrients like potassium and phosphorous. Organic fertilizers used here need to replenish these specific nutrients, while also enhancing soil organic matter content to maintain long-term fertility.
- **Coastal and Eastern Kenya:** These areas face challenges like soil salinity and drought. Organic fertilizers that help retain moisture and reduce salt buildup are ideal. Additionally, organic inputs that encourage soil microbial activity can help restore soil health in these regions.

Tailored Production and Distribution Strategies

By understanding the seasonal and localized demand for organic fertilizers, manufacturers and distributors can plan their production and inventory management more effectively. This strategy ensures that fertilizers are available when and where they are needed most,

minimizing both shortages and wastage. Specific steps include:

- **Production Planning:** Fertilizer manufacturers can align their production schedules with the planting and growing seasons of key crops. For example, a manufacturer might increase production of nitrogen-rich fertilizers ahead of the maize planting season in the Rift Valley, while boosting the production of potassium-rich fertilizers for tea farmers in Central Kenya before the rainy season.
- **Just-In-Time Delivery:** Fertilizer distributors can implement just-in-time delivery models to ensure that fertilizers are delivered to farmers at the optimal time for application. This reduces the need for large storage facilities and minimizes the risk of fertilizer degradation due to prolonged storage.
- **Localized Storage and Distribution Hubs:** Establishing regional storage hubs in key agricultural areas can improve access to fertilizers for farmers, particularly in remote or underserved regions. For example, distributors might set up storage facilities in Eldoret to serve maize farmers in the Rift Valley, while establishing hubs in Kericho for tea farmers in Western Kenya.
- **Farmer Cooperatives and Extension Services:** Engaging with farmer cooperatives and local agricultural extension services can help manufacturers and distributors forecast demand more accurately. These organizations can provide valuable insights into the specific fertilizer needs of farmers in different regions, allowing for more targeted production and distribution efforts.

Tailoring Formulations to Crop and Regional Needs

Beyond aligning fertilizer supply with demand, manufacturers can further optimize their products by tailoring formulations to the specific nutrient needs of crops in different regions. For example:

- **Maize farmers in the Rift Valley** might benefit from organic fertilizers enriched with nitrogen-fixing bacteria or compost that boosts soil fertility.
- **Tea farmers in Central Kenya** may require fertilizers that improve soil moisture retention and provide sustained potassium release.
- **Vegetable farmers in peri-urban areas** could use quick-release liquid organic fertilizers for fast-growing crops like spinach and kale.

5.5. Regional Focus

a. Irrigated Crops in Central Kenya, Nyanza, and Rift Valley

Regions such as Central Kenya, Nyanza, and the Rift Valley are key areas for the cultivation of high-value irrigated crops like avocados, rice, coffee, and tea. These crops require continuous nutrient replenishment, driving year-round demand for organic fertilizers. The proximity of these regions to major export hubs, such as Nairobi and Mombasa, further strengthens their role in the organic fertilizer market.

b. Rain-Fed Crops in Western Kenya and Rift Valley

Western Kenya and the Rift Valley are important regions for rain-fed crops such as maize and beans. These regions experience peak fertilizer demand during the long and short rainy seasons, as farmers prepare for planting. Organic fertilizers are gaining popularity in these areas

Scaling and expansion strategies for organic fertilizer (OF) manufacturers in Kenya are essential to meet the growing demand for sustainable agricultural inputs. To ensure success, manufacturers must address challenges related to distribution, market awareness, supply chain inefficiencies, and partnerships while leveraging opportunities for growth. Below is a detailed breakdown of how various strategies can contribute to scaling operations effectively:

Opportunity Areas for Scaling Local Manufacturing

Innovating Last-Mile Distribution

- **Lack of On-Ground Presence:** Many organic fertilizer manufacturers lack a robust distribution network with people on the ground to promote the adoption of organic fertilizers (OF). Without a dedicated local presence, OF awareness and availability are limited, reducing uptake by farmers.
- **Awareness Gaps:** Farmers often face significant challenges in finding reliable sources for OF. The information on where to purchase these products is insufficient, leaving many unaware of how or where to access them.
- **Transportation Burden on Farmers:** Unlike chemical fertilizers that are more widely available through agro-dealers, many farmers who choose OF must use their own resources to transport the products, which is both costly and time-consuming. This lack of convenient access further discourages the use of OF.
- **Successful Case Studies:** There are some successful grassroots initiatives that serve as models for last-mile distribution:
    - *Grace, a rice farmer in Ahero,* sources OF for her farmer group and provides them with fertilizers on credit. She works directly with a manufacturer, ensuring a steady supply while offering flexible payment options to farmers.
    - *A farmer in Mumias* operates a similar model, distributing OF in flexible quantities while also aggregating produce for market. However, this model faces storage issues that need addressing.

Strengthening Extension and Advisory Services

- **Access to Quality Advisory Services:** According to the Nairobi Declaration, 70% of smallholder farmers in Kenya have access to quality extension and advisory services focused on fertilizer and soil health. These services, provided by both public and private entities, are essential in promoting OF use among farmers, but gaps still exist.
- **Updating Educational Content:** Educational systems need to integrate updated, relevant topics on sustainable soil management to better inform future generations of farmers about the benefits of OF.
- **Standardizing Soil Analysis Services:** A critical enabler for scaling OF is making soil analytical services more widely available and affordable for smallholder farmers. Accurate soil testing is crucial for determining which OF products are best suited for different soil types, improving efficiency and uptake.

Redefining the role of Agro-Dealers, Extension Service Providers, and Cooperatives

- **Incentives for Agro-Dealers:** One of the major barriers to scaling OF is the lack of motivation for agro-dealers to promote these products. While agro-dealers are accustomed to receiving substantial incentives from chemical fertilizer producers, they demand similar or even higher incentives to push OF, which is difficult due to the higher cost of organic products. Without proper incentives, agro-dealers are less likely to prioritize OF.
- **Limited Technical Expertise of Agro-Dealers:** Many agro-dealers focus solely on selling products without sufficient technical knowledge about their benefits or how to effectively promote OF. This gap hampers efforts to increase adoption and leaves farmers without the necessary guidance on how to use OF properly.
- Successful Agro-Dealer Models: Some agro-dealers have successfully integrated OF into their businesses:
    - *Model agro-dealers* invest in demonstration farms where they grow crops using OF to show farmers the effectiveness of the product. They also attend trainings on OF (both in-person and online) and dedicate a section of their businesses to promoting these fertilizers.
- Supporting cooperatives, aggregators and other farmer groups to drive adoption of organic fertilizers. Some key initiatives can include:
    - Incentivising cost of OF for farmer groups, cooperratives, aggregators
    - Large scale sourcing from manufacturers to a network of farmers
    - Availing soil testing services at subsidized prices
    - Exploring targeted markets for produce from use of organic fertilizers.

Empowering Supply Chain Innovation

- **Farmer-Led Mini-Processing:** One innovative solution is empowering farmers to perform mini-processing of organic fertilizers at the farm level. For instance, organizations like SNV and the Rockefeller Foundation have invested in promoting regenerative agriculture (RA) by empowering farmers to produce OF on their own farms. This reduces dependence on larger manufacturers and localizes production.
- **Waste Management and Collection:** Efficient waste collection and segregation are vital to scaling OF production. One of the biggest cost drivers in the OF value chain is the collection and separation of organic waste. Only a fraction of the organic waste generated in Nairobi, for example, is redirected for fertilizer production. Safi Organics works with youth groups to create bio-char through mini-processing, providing a model for how local waste can be turned into valuable OF.
    - **Incentives for Waste Segregation:** By offering farmers incentives to sell their organic waste and counties creating streamlined waste collection systems, a reliable and cost-effective supply of raw materials can be ensured for OF production.

Simplifying Organic Fertilizers vs. Bio-Inputs

- **Clarity in Standards:** The growing demand for organic inputs has led to the development of various bio-inputs and bio-stimulants. However, many of these products are marketed under the umbrella of OF without clear regulatory guidelines. Some bio-inputs promise instant results, which appeals to farmers accustomed to chemical fertilizers but may create confusion over the efficacy of different organic inputs.
- **Packaging Innovation:** Some innovative packaging, such as sachets of OF, could mimic the accessibility and familiarity of chemical fertilizers for smallholder farmers, helping bridge the gap between these two input types.

Strategic Partnerships and Collaboration among OF Manufacturers

- **Blending Options for OF:** Partnerships between organizations such as ICIPE and SAFI Organics demonstrate the potential of blending organic materials with biochar or other inputs to improve OF effectiveness. These partnerships help drive innovation, particularly in developing organo-mineral blends that cater to both smallholder and commercial farmers.
- **Collaboration for R&D:** Many OF manufacturers lack the resources to prioritize research and development (R&D). High costs and lengthy procedures involved in collaborating with research institutions further hinder innovation. The need to streamline collaboration and reduce bureaucracy is vital for unlocking R&D investments.

Rethinking Market-Oriented Business Models

- Aggregating Services: Farmers often struggle to access services such as soil testing, which is critical for optimizing OF use. Manufacturers can improve market uptake by aggregating these services and making them more accessible to smallholder farmers.
- Leveraging Financial Institutions: Financial institutions can play a role in scaling OF by offering credit and financing options for smallholder farmers, agribusinesses, and Village-Based Advisors (VBAs) to invest in regenerative agriculture practices.
- Demo Farms for Farmer Trust: Building trust among farmers through demonstration farms is an effective strategy. By showcasing successful OF usage in respected farmers' fields, others are more likely to adopt these inputs. However, the government's focus on synthetic fertilizers leaves little room for promoting OF through official extension services, a gap that needs to be addressed.

Revisiting Compliance and Regulations

- **Regulatory Clarity:** A major issue facing the OF sector is the lack of compliance with regulations. Many manufacturers sell their products under the "organic fertilizer" label without adhering to existing standards, creating an uneven playing field for compliant manufacturers. This regulatory ambiguity also extends to cost structures, taxation, and permits, making it difficult for legitimate OF producers to compete.
    - **Taxation Issues:** Organic waste collection is currently subject to VAT, while OF itself is exempt, creating discrepancies in cost structures. Clarifying the roles of regulatory agencies, such as the National Environmental Management Authority (NEMA), and streamlining permitting processes is critical for fostering a circular economy in the OF sector.

Developing Standardized Business and Marketing Strategies

- Packaging and Messaging Innovation: Effective marketing is essential for scaling OF. This includes clear messaging on application amounts, usage directions, and the benefits of organo-mineral blends. Innovations in packaging, such as producing OF in pellet, granule, powder, or liquid forms, can make it easier for farmers to apply the product using familiar techniques or mechanization.
- Standardizing Industry Metrics: Manufacturers should adopt standardized frameworks for measuring and communicating their impact and business case. This includes industry-wide metrics for data collection, analysis, and reporting, which can drive collaboration and attract more investment.

Developing and Adopting a co-designed SROI Model

The SROI model is a standard for communicating business and impact case at farmer, producer and country level. The SROI framework can be useful to investors, funders, impact organizations, government, manufacturers and other stakeholders to drive a case for investment, policy and enabling environment.

While the SROI can be a great framework, it is important to develop an agreed industry or sector approach in deriving the SROI.

Some key aspects to look at include:

- How do we empower OF manufacturers to agree on industry metrics for SROI calculation?
- How do we empower OF manufacturers on data collection, analysis, reporting?
- How do we build their capacity and skills
- What tools and methodologies can be made available for data gathering, analysis and reporting?
- How do we build industry aggregated data?
- How are we aggregating data to communicate industry impact?
- What is our ROI in data collaboration?
- What data are we collecting at an aggregated level?
- How do we handle data privacy and data confidentiality?
- **In developing an agreed upon SROI framework, it is important to expore some of the current gaps that include:**
    - Information on climate financing and carbon markets
    - Incentive standardization
    - Data accuracy and data ethics
    - Impact reporting (how and where do we share our impact data)

Role of Supportive Innovation (Soil Health Innovations)

- To drive adoption and demand for OF, SMEs and startups offering solutions along the entire value chain are critical. Equally important is looking at what role technology can play in driving uptake.
- Some of the opportunities for startups and **SMEs to tap into include:**
    - Soil testing solutions
    - Packaging and branding solutions
    - Solutions in the distribution of organic fertizers
    - Solutions on Data and impact reporting

- Solutions on waste collection and aggregation
- Solutions on farmer training, and knowledge sharing
- Solutions on financing and access to OF
- Solutions on OF fertilizer applications

- It is important to build supportive environments to surface these innovations by working with young people and entrepreneurs through innovation challenges, incuubation programs, venture studio programs and accelerator programs
- A commitment from teh Nairobi 2024 declaration included creating a multi-source soil health fund, for research, innovation, capacity building, and start-ups on fertilizer use and soil health actions.

Seeing is believing

- Farmers need to see the benefits of use of OF for them to start using OF. It's a lot more about demo farms and subsidizing the fertilizer usage to the most respected farmers in each community, and leveraging them as an avenue to drive interest
- "Ultimately the government has a lot of credibility with farmers. There's zero communication coming out from the Ministry of Agriculture or any of their extension services on Organics and a balanced use of organic. It's all synthetic. If you think about farmer awareness ,synthetics have had something like a billion dollars over the last couple of decades pumped into getting farmers to use synthetics
- I think the government is doing the complete opposite of this and they're very much incentivizing and promoting through their extension services and their subsidiary programs imported, synthetic fertilizers which are not locally manufactured, not good for the soil and not helping farmers improve their yields.

Scaling and expansion strategies for organic fertilizer manufacturers in Kenya are multifaceted and require a holistic approach encompassing geographic expansion, product diversification, strategic partnerships, infrastructure investments, market intelligence, and sustainability initiatives. By adopting these strategies, manufacturers can capitalize on emerging market opportunities, strengthen their market presence, and contribute to sustainable agricultural development in Kenya.

6 Roadmap for the Enabling Environment

Roadmap for the Enabling Environment

Scaling the organic fertilizer (OF) industry in Kenya requires a well-defined enabling environment, clear policies, and collaborative efforts from both public and private sectors. The roadmap below outlines how key initiatives can be prioritized to address gaps in the market, foster growth, and support smallholder farmers, while promoting sustainable agricultural practices.

Sizing of the Required Investment and Expected Impact for Prioritized Key Initiatives

The success of organic fertilizer scaling efforts depends on targeted investment in key initiatives that will have the greatest impact on both production capacity and adoption rates. These initiatives require substantial financial commitment, but their long-term benefits in terms of soil health, food security, and environmental sustainability will outweigh the costs.

- **Investment in R&D and Innovation:** Organic fertilizer manufacturers need access to modern research and development (R&D) facilities to innovate new products, such as organo-mineral blends and more efficient bio-inputs. This requires capital to fund partnerships with research institutions, upgrade manufacturing processes, and improve supply chain logistics. The expected impact includes better product quality, more effective fertilizers, and higher adoption rates among farmers.
- **Infrastructure for Local Production:** A significant portion of investment must go towards upgrading production facilities to support higher output. Investments in composting technology, biochar production, and waste processing equipment will enable manufacturers to produce OF at scale. The anticipated outcome is an increase in domestic production capacity, reducing reliance on imported chemical fertilizers.
- **Scaling Extension Services and Advisory Systems:** Allocating funds to strengthen public and private extension services will facilitate better farmer education and promote OF adoption. Investments in training, demonstration farms, and advisory tools will help farmers understand the long-term benefits of organic inputs, ultimately improving crop productivity and environmental health.
- **Market Infrastructure Development:** Investments in market access, such as rural road networks and distribution channels, will be essential for reaching smallholder farmers. Enhancing the last-mile distribution systems, particularly for underserved regions, will directly increase the availability of OF and other sustainable inputs.

The expected impact of these investments includes improved soil fertility, higher crop yields, reduced environmental degradation, and greater resilience to climate change. Additionally, local manufacturing will reduce Kenya's dependency on imported chemical fertilizers, contributing to national food security and economic sustainability.

Role of Enabling Environment Definition to Address Identified Gaps

The enabling environment refers to the policies, regulations, financial frameworks, and institutional support structures that promote the growth of the organic fertilizer sector. A conducive enabling environment is critical for addressing key gaps that currently hinder the development of the OF industry.

- **Policy and Regulatory Frameworks:** Clear, consistent policies are needed to regulate and support OF production and distribution. This includes harmonizing standards across counties, streamlining certification processes for organic products, and enforcing quality controls to prevent non-compliant products from entering the market.
- **Financial Incentives:** Governments should offer subsidies, tax breaks, and grants to organic fertilizer manufacturers and smallholder farmers. These financial incentives will reduce the cost barriers for adopting OF, allowing farmers to transition away from chemical fertilizers. For manufacturers, tax exemptions on raw material imports, as well as equipment for processing and production, will lower production costs and make OF products more competitive in the market.
- **Licensing and Certification:** Simplifying licensing procedures and providing fast-tracked certification for organic inputs can boost market entry for new players. Establishing a centralized certification body will eliminate bureaucratic delays and allow small and medium enterprises (SMEs) to access the market more easily.
- **Capacity Building and Extension Services:** The government must invest in improving extension services to bridge knowledge gaps around OF. This includes training extension officers on the benefits of organic fertilizers and equipping them with modern tools for advising farmers. Additionally, integrating organic fertilizer education into national agricultural curricula will build long-term capacity within the farming community.
- **Waste Management and Circular Economy Support:** Governments should introduce policies that incentivize waste collection and segregation to ensure a steady supply of raw materials for OF production. For instance, creating a framework that supports decentralized organic waste processing at the county level would streamline waste collection and recycling into fertilizers.

These elements of the enabling environment will create a solid foundation for the scaling of OF, ensuring that policies, financial incentives, and regulatory frameworks align with the needs of manufacturers and farmers alike.

Demand and supply Interventions to Improve the Business Case

Demand interventions:

- Connect processed OF to knowledge about more traditional manure use practices.
- Focus on soil health as result instead of (only) production and yield → it is different from the CF.
- Educate about soil health .
- Database about different types and brands of OF and how to use.
- Map where to find OF in the country and how to get it easily.
- Subsidies for OF.
- Soil testing technologies and initiatives → how to understand.

Supply interventions:

- Collaboration among multiple manufacturers to move from PMF to scale.
- Work together on production level, branding, investment into professional machines etc. for product improvement .and consistency.
- Offer blends and/or work with large existing brands.
- Work with cooperatives.
- Focused financing and grants from NGOs.
- Partnership with waste management organizations.
- Circular model where farmers hand in waste and get for a small amount of money OF back in return.

Roadmap Prioritizing Key Initiatives for Each Relevant Stakeholder Group

This roadmap outlines strategies for prioritizing key initiatives across different stakeholder groups, including the government, manufacturers, financial institutions, NGOs, and research institutions.

a. Government

Key Initiatives:

1. Policy and Regulatory Reforms:

- **Harmonizing Standards Across Counties:** The government must work towards harmonizing organic fertilizer standards to avoid fragmentation. A unified national framework will simplify licensing and certification processes for manufacturers, ensuring that organic products meet consistent quality standards.
- **Streamlining Certification Processes:** Establish a fast-track certification process for SMEs and organic product innovators. This could include creating a centralized certification body that simplifies the approval process, reducing costs and time-to-market for organic inputs.

2. Financial Support:

- **Subsidies for Organic Fertilizers:** The government should extend subsidies to organic fertilizers to create a level playing field with chemical fertilizers. Reducing the cost of OF for farmers will encourage adoption and support the transition to more sustainable farming practices.
- **Tax Incentives for Manufacturers:** Offer tax exemptions on raw materials used for OF production, particularly organic waste, to lower production costs. Additionally, remove VAT on waste collection services and provide tax breaks on investments in OF processing equipment.

3. Licensing and Compliance:

- **Simplifying Licensing for New Entrants:** The government must streamline the licensing process for new OF manufacturers and service providers. Removing bureaucratic red tape will encourage more players to enter the market and scale their operations.
- **Enforcing Compliance Standards:** Clear enforcement of quality standards for organic fertilizers will reduce the prevalence of sub-standard or misrepresented products, increasing farmer confidence in OF.

4. Investment in Infrastructure and Capacity Building:

- **Upgrading Manufacturing Infrastructure:** Support the development of local composting, waste processing, and biochar production facilities through public-private partnerships (PPPs) and direct government investment.
- **Strengthening Extension Services:** Invest in upgrading public agricultural extension services to focus on promoting OF adoption. Extension officers should receive specialized training in organic inputs, soil health, and regenerative agricultural practices.

5. Waste Management and Circular Economy:

- **Incentives for Waste Segregation and Collection:** Introduce policies that encourage the segregation of organic waste at the source, ensuring an affordable and consistent supply of raw materials for OF production.
- **Support Local Waste Processing:** Provide financial incentives for counties to establish local waste processing centers that can support small-scale organic fertilizer producers.

b. Manufacturers

- **Product Innovation and R&D:** Prioritize research and development (R&D) to create new organic fertilizers and organo-mineral blends, collaborating with research institutions for innovation.
- **Quality Compliance and Standards:** Ensure all products meet national certification standards and participate in fast-tracked certification processes to maintain quality and build trust with farmers.
- **Supply Chain Optimization:** Invest in infrastructure upgrades and partnerships with waste management systems to secure a reliable supply of raw materials, improving production scalability.
- **Partnerships with Farmers and Agro-dealers:** Build strong relationships with farmers and agro-dealers to improve product distribution and provide farmers with better access to organic fertilizers. Engage agro-dealers in educating farmers on product use and benefits to drive adoption.

c. Financial Institutions

- **Accessible Financing Solutions:** Design tailored loan products and credit lines specifically for organic fertilizer manufacturers and farmers transitioning to sustainable farming practices.
- **Risk Mitigation Through Insurance:** Partner with insurance companies to offer crop insurance or loan guarantees for farmers adopting organic fertilizers, reducing risk for both lenders and borrowers.
- **Public-Private Partnerships (PPPs):** Collaborate with the government and other stakeholders to co-finance infrastructure projects, such as composting facilities, and support market growth through blended financing models.

d. NGOs and Research Organizations

- **Capacity Building and Farmer Training:** Provide technical expertise and resources to strengthen extension services and farmer education on the benefits and application of organic fertilizers.
- **Pilot Projects and Data Generation:** Lead or fund pilot projects to assess the socio-economic and environmental impacts of organic fertilizers, generating data to inform policy and market strategies.
- **Advocacy and Funding Support:** Advocate for sustainable agriculture practices and support research-driven initiatives that align with long-term food security and soil health goals, while securing grants for R&D and scaling efforts.

Next Steps and Collaboration

- **Engage with Private Sector Partners:** The government should collaborate with OF manufacturers, agro-dealers, and financial institutions to co-create solutions that drive market growth. For instance, private sector investments in R&D, coupled with government subsidies, can stimulate innovation in OF products.
- **Support NGOs and Research Institutions:** NGOs and research institutions play a pivotal role in driving sustainable agricultural practices. Collaborating with these entities will provide technical expertise, help pilot new initiatives, and generate data to support policy decisions.
- **Monitoring and Evaluation Frameworks:** Implement a monitoring and evaluation (M&E) system to assess the progress of OF adoption and the impact of government interventions. Regular reviews will help refine strategies and address any emerging gaps.

This roadmap for the enabling environment sets the stage for a coordinated effort to scale organic fertilizers in Kenya. By aligning policy, investment, licensing, and subsidies with the needs of the sector, the government can foster an ecosystem that supports sustainable agriculture, improves soil health, and enhances food security across the country.

The table below outlines the key stakeholders involved in scaling organic fertilizers in Kenya, their action points, and how they fit into the roadmap interventions:

Farmers

Action points

Adoption of organic fertilizers and organo-mineral blends.
Shift from chemical fertilizers to sustainable farming practices.
Provide feedback on fertilizer performance and crop productivity.

Involvement in roadmap interventions

Involvement in capacity-building programs: Participate in training sessions organized by extension services on the benefits of organic fertilizers.

Market demand generation: Farmers' adoption will drive demand for OF products.

Pilot projects: Engage in pilot projects and case studies to demonstrate the impact of organic fertilizers on crop yield and soil health.

Manufacturers

Action points

Scale production of organic fertilizers and organo-mineral blends.
Innovate new products through R&D and collaboration with research institutions.
Improve supply chain and distribution models.

Involvement in roadmap interventions

Involvement in infrastructure investment: Upgrade production facilities and adopt new processing technologies.

Product quality and standards compliance: Ensure all OF products meet certification and quality standards set by the government.

Partnerships: Collaborate with waste management systems for steady raw material supply.

Agro-dealers

Action points

Facilitate distribution and retail of organic fertilizers to smallholder farmers.
Educate farmers on product benefits and application techniques.
Provide feedback to manufacturers on farmer needs.

Involvement in roadmap interventions

Last-mile distribution: Improve supply chains to deliver fertilizers to remote areas.

Market engagement: Work with local manufacturers to ensure that products are positioned well in the market and accessible to farmers.

Farmer training: Serve as intermediaries in farmer education initiatives about organic fertilizer application.

Funders, NGOs

Action points

Provide funding for scaling initiatives in OF production and distribution.
Support capacity-building programs and farmer education efforts.
Advocate for sustainable agriculture and food security.

Involvement in roadmap interventions

Capacity building: NGOs provide technical expertise and resources to strengthen farmer advisory services and train local manufacturers on best practices.

Pilot funding: Fund pilot initiatives to assess the socio-economic impacts of organic fertilizers on smallholder farmers.

Support for innovation: Provide grants and support to manufacturers for R&D activities.

Government

Action points

Set and enforce policy, regulatory, and certification frameworks for organic fertilizers.
Provide subsidies and financial incentives to manufacturers and farmers.
Invest in infrastructure development.

Involvement in roadmap interventions

Policy formulation and regulatory oversight: Develop and harmonize organic fertilizer policies across counties.

Financial support: Provide subsidies and tax breaks to reduce costs for both manufacturers and farmers.

Licensing and certification: Streamline certification processes and ensure quality control in the OF market.

Public investment: Invest in infrastructure, including roads and market access for OF distribution.

7 Conclusion

Conclusion

As Kenya's population is projected to reach 90 million by 2050 and the effects of climate change intensify, the urgency for sustainable agricultural practices has never been greater. Regenerative agriculture, with its focus on soil health, biodiversity, and resource conservation, is critical for ensuring the country's food security. Organic fertilizers are a central component of this transformation, playing a pivotal role in Next Generation Integrated Soil Fertility Management (NG-ISFM). The business case for scaling local organic fertilizer manufacturing highlights not only the potential economic, social, and environmental benefits but also the importance of addressing barriers to production and uptake.

Through the Social Return on Investment (SROI) framework, the study illustrates how expanding organic fertilizer use and production can generate widespread benefits across the entire agricultural value chain—from manufacturers to farmers and the nation. Prioritized investments such as regulatory harmonization, tax incentives, capacity building, public-private partnerships, and product standardization form a clear roadmap for scaling. The strategies outlined offer a pathway for stakeholders, including farmers, manufacturers, policymakers, funders, and international partners, to work together in transforming Kenya's agricultural landscape.

Ultimately, the adoption of these recommendations will not only strengthen Kenya's food security but also position the country as a leader in sustainable agriculture. By investing in organic fertilizers and regenerative practices, Kenya can protect its natural resources for future generations and meet both domestic and global demands for agricultural produce.

8 Recommendations

Recommendations

Based on the conclusions drawn, the following detailed recommendations are proposed to promote the scaling of organic fertilizer (OF) production and uptake in Kenya:

1. Simplify Regulatory Environment

- **Harmonize National and County Licensing:** Streamline the regulatory processes for organic fertilizer manufacturers by aligning licensing requirements across national and county governments. A centralized certification body should be established to reduce bureaucratic delays and costs, particularly for SMEs. This will expedite market entry and facilitate faster product distribution.
- **Centralized Certification:** A national certification authority for organic fertilizers will standardize quality and eliminate inconsistencies across regions, ensuring a cohesive market framework for both manufacturers and consumers.

2. Introduce Tax Incentives and Subsidies

- **Tax Relief and Subsidies for Organic Fertilizers:** Offer similar financial incentives to organic fertilizers as provided for chemical fertilizers. This will reduce production costs and make organic fertilizers more accessible and affordable for farmers, leveling the playing field in the competitive market.
- **Inclusion in National Fertilizer Subsidy Programs:** Integrating organic fertilizers into existing national subsidy frameworks will promote widespread adoption and bolster their presence in Kenya's agricultural inputs market.

3. Capacity Building for Farmers

- **Educational Programs on Organic Fertilizers:** Launch nationwide training initiatives for farmers on the long-term benefits of using organic fertilizers, focusing on integrating them into regenerative agricultural practices. Demonstration farms and field days should be established to showcase the success of organic inputs, particularly for high-value and export-oriented crops.
- **Farmer Field Schools and Digital Platforms:** Leverage both in-person and digital platforms to provide farmers with practical knowledge on organic fertilizer usage, soil health improvement, and yield optimization.

4. Promote Public-Private Partnerships (PPPs) for R&D

- **Collaborative Innovation for Organic Fertilizers:** Foster partnerships between government bodies, private sector players, research institutions, and international organizations to drive innovation in organic fertilizers, including the development of organo-mineral blends and mechanization-compatible organic fertilizers. PPPs can also play a critical role in financing the expansion of manufacturing and distribution channels.
- **Research & Development (R&D) Funding:** Encourage PPPs to fund and develop new organic fertilizer formulations tailored to different crops and regions, ensuring scalability and adaptability.

5. Capitalizing on Global Demand for Organic Produce

- **Support Organic Certification for Export:** Provide financial and technical assistance to help farmers and exporters obtain organic certification. This will open up lucrative premium markets in Europe, North America, and other regions, where demand for organic produce is rising.
- **Market Access for Exporters:** Work with international trade bodies to ensure that Kenyan organic produce complies with global standards, enhancing access to foreign markets.

6. Standardization and Branding for Organic Fertilizers

- **Develop Standardized Formulations:** Organic fertilizer manufacturers should collaborate to standardize product formulations, ensuring consistent quality across the market. Clear and relatable branding will also help differentiate their products and foster trust among farmers and distributors.
- **Collaborative Marketing and Branding:** Manufacturers can develop joint branding strategies to promote organic fertilizers as a viable alternative to chemical fertilizers, particularly in regions where the use of organic inputs is underexplored.

7. Promote Research and Data Collection

- **Research on OF Formulations and Business Models:** Invest in research on organic fertilizer value chains, focusing on formulations, packaging, logistics, application rates, business models, and new technologies. Insights from this research will provide manufacturers and agro-dealers with the data they need to make informed decisions.
- **Capacity Building for Data Collection and Reporting:** Enhance the capacity of organic fertilizer organizations in data collection, analysis, and reporting to foster transparency and allow for informed decision-making.
- Develop Standardized metrics for farmers, manufacturers, and agro-dealers to help in tracking and assessing the effectiveness of OF interventions, starting with the SROI framework.

8. Fostering Innovation and New Market Opportunities

- **Leverage Technology for Optimization:** Encourage the use of technology to optimize sourcing, production, packaging, distribution, and farmer education. Innovations such as AI-driven data collection, soil testing technologies, and mechanized fertilizer application will enhance scalability and efficiency.
- **Support Startups in the Organic Fertilizer Space:** Promote the entry of startups focused on areas like AI-powered soil testing, last-mile distribution services, and learning platforms for organic fertilizers. These innovations will enhance access and affordability for smallholder farmers.

9. Ready Market for Regenerative Agriculture Produce

- **Price Structuring for Organic Produce:** Develop a pricing structure for regenerative agriculture produce that reflects its added value. This will tap into the growing health-conscious consumer market both locally and internationally.
- **Expand Healthy Foods Market:** Capitalize on the increasing demand for healthy and organic foods by creating linkages between organic fertilizer users and the healthy foods market, both locally and for export.

10. Strengthen Industry Standards and Regulations

- **Quality Control and Regulatory Frameworks:** Build robust certification programs and national regulatory frameworks that ensure consistent quality across the organic fertilizer industry. Establishing partnerships with relevant ministries and adopting county-level agroecology best practices will build farmer confidence and foster market demand.
- **Align Regulatory Schemes with Agroecology:** Shift the focus from promoting imported chemical fertilizers to fostering domestic organic fertilizer production, supported by strategic bilateral agreements.

11. Addressing Financial Barriers

- **Develop Credit Support Mechanisms:** Implement credit support programs for organic fertilizer manufacturers and agro-dealers. Local financial institutions should also offer tailored financial education and literacy programs to farmers and manufacturers to enhance their access to funding.
- **Financial Literacy and Access to Capital:** Provide targeted financial education programs and patient investment capital to support long-term resilience and expansion of the organic fertilizer sector.

12. Investing in Long-Term Resilience and Support

- **Patient Capital and Strategic Investments:** Encourage long-term patient capital investment to support the growth of organic fertilizer production and adoption, allowing the sector to mature and achieve sustained impact.

By adopting these recommendations, Kenya can lay the groundwork for a thriving organic fertilizer industry that supports regenerative agricultural practices, enhances food security, and ensures sustainable economic growth.

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