A farmer centric approach to the distribution of organic fertiliser in Kenya

Learning brief

biovision

Practical ACTION

1. The challenge of declining soil health

Soil health is defined as "the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans" **[1]**. Soil health in Kenya has been increasingly compromised over the years, largely due to continuous intensive agriculture, limited crop rotation and excessive reliance on chemical fertilisers **[2]**. These practices have led to nutrient depletion, increased soil acidity, reduced organic matter and diminished biodiversity in microbial communities, which are essential for nutrient cycling and soil structure maintenance **[3]**.

Degraded soils, with their poor chemical and physical properties, tend to be poorly responsive to mineral fertilisers, reducing fertiliser efficiency and land productivity **[4,5]**. Farmers, concerned with declining productivity, often apply ever increasing amounts of fertiliser, further contributing to soil acidity and leading to a vicious cycle of increasing costs of production, productivity stagnation or even decline and further soil health deterioration.

This situation is most prevalent in the heavily cropped south-western and central regions of Kenya, which are traditionally considered to be the country's breadbasket and thus crucial for the country's food security. The degradation of soil health therefore not only threatens agricultural productivity, but also the sustainability of Kenya's food system and future food security.

This situation is further complicated by the fact that, over the past few years, farmers have had increasing difficulty obtaining these inputs due to disruptions to supply chains and rapidly rising prices, which are a result of the COVID-19 pandemic and the war in Ukraine. The use of organic fertilisers, soil amendments and biofertilisers has significant potential for enhancing soil health. They can be defined as follows:

Biofertilisers are bacterial or fungal inoculants applied to plants with the aim of increasing the availability of nutrients and their utilisation by plants, regardless of the nutrient content of the inoculant itself. Biofertilisers may also be defined as microbial biostimulants that improve plant nutrition efficiency [6].

Soil amendment is any material such as lime, gypsum, sawdust, compost, animal manures, crop residue or synthetic soil conditioners that is worked into the soil or applied on the surface to enhance plant growth. Amendments may contain important fertiliser elements, but the term commonly refers to added materials other than those used primarily as fertilisers.[A]

Organic fertilisers are materials of animal or plant origin used to feed plants. They may be made from manure, guano, compost and residues of biogas production. Organic fertilisers can be of solid or liquid nature, containing organic carbon (Corg) and nutrients of solely biological origin. The minimum of nutrients should be at least 1% by mass of total nitrogen (N), 1% phosphorous (P_2O_5) and 1% potassium (K_2O).[B]

Optimum impact and scale can be achieved when an integrated approach is taken, combining farm management practices that support nutrient cycling and nitrogen fixation (e.g. integrating the use of manure and leguminous crops) with the use of externally sourced organic and biofertiliser.[C] In a recent scoping study of the organic fertiliser sector across Africa, Freyer et al conclude that "strategies for off-farm production of economically viable organic and biofertilisers that cover nutrient exports and losses and increase soil nutrient availability could form part of a wider solution to improve soil health in Africa" **[5]**. Such a wider solution realises that only a systemic approach that considers on- and off-farm interventions will lead to the desired results.

▲ **A** Some use of inorganic fertiliser might also be part of such an integrated solution in a transition phase. **B** Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No. 1069/2009 and (EC) No. 1107/2009 and repealing Regulation (EC) No. 2003/2003. Official Journal of the European Union, 25 June 2019, quoted from **[5]**. **C** Some use of inorganic fertiliser might also be part of such an integrated solution in a transition phase.

2. The status of the organic fertiliser sector in Kenya

History

The organic fertiliser (including soil amendments) sector in Kenya is considered "advanced" in Africa-wide commercial organic fertiliser sector [7]. Pioneer companies started operations from about 2010. Early followers started entering the market from about 2014, and companies started stabilising operations and exploring strategies for scale. The sector is now considered to be in a "gold rush" stage [7], with a lot of companies coming in to take advantage of a perceived significant market opportunity created by a combination of growing awareness of the deteriorating soils in Kenya and the rising price of inorganic fertiliser.

Companies

A 2023 TechnoServe/FCDO report estimated the total number of companies in the Kenyan bio- and organic fertiliser sector to be between 35 and 65 in 2022 [7].[D] In addition, there were a number of foreign companies, mostly from India, that imported into Kenya. The report segments the Kenyan companies by year of market entry (see **Table 1**) and total market share [7].

Table 1. Breakdown of organic fertiliser companies in Kenya

Company segment	Year of market entry	Total number*	Share of Kenya internal production**	Annual Kenya internal production (metric tonnes)***	Market value (USD million)
Pioneers	2010-15	3	80%	6400	24
Early followers	2014-18	5-10	10%	800	0.3
Gold rush phase	2019-22	25-50	10%	800	0.3

*Technoserve provides range of numbers for early-follower and gold-rush companies, as these are based on estimates. **Excludes importers of organic fertiliser. ***Excludes imports of organic fertiliser

Market size and growth potential of the sector and regional significance

TechnoServe's analysis also suggests that bio- and organic fertilisers had a market share of below 1% of the total fertiliser market (3 million USD; 8000 metric tonnes) in 2022, and that they could achieve a 12.5%–17.5% share of the fertiliser market by 2030, equating to a value of 45–75 million USD a year. The total market size for bio- and organic fertiliser was estimated to grow from around 8,000 metric tonnes in 2022 to 160,000–220,000 metric tonnes in 2030. Based on these figures and other analysis, the report concluded that **Kenya's role as a regional bio- and organic fertiliser hub is accelerating.**

Business models

Business models in the sector vary according to the degree of centralisation of production and the degree of specialisation in waste management. They range from companies that distribute nationally from centralised production facilities (e.g. Regen Organics) to those that have decentralised production units serving local areas (e.g. InsectPro), and from companies that operate their own waste management facilities to those that train others to collect waste for them and those that buy waste from specialised third-party waste facilities.

Future development of the sector

The TechnoServe study, the only full market systems assessment of the organic - and biofertiliser sector, conclude that there are three sets of constraints that need to be addressed in order for the sector to develop [7]. We are going to explore especially those that relate to last mile delivery issues to smallholder farmers in the remaining parts of the brief.

▲ **D** The TechnoServe estimation of the sector data is based on its survey of 30 companies- the most complete survey of this sector that is extremely dynamic at the moment. Furthermore, there is no register in which all companies in the sector are recorded.

Table 2. Constraints to the development of the organic fertiliser sector in Kenya

Efficacy and awareness barriers	Affordability and quality barriers	Availability and accessibility barriers
Limited understanding of the soil health problem and the role of organic fertiliser	High cost of waste management	Insufficient and inconsistent product availability for farmers
Deeply rooted farmer behaviour and high risk levels associated with starting the use of organic fertiliser		
Limited sectoral coordination and collaboration	High cost of R&D and equipment and limited access to capital	
Inadequate resources for extension		
Lack of scientific evidence on efficacy and lack of crop usage guidelines	Sub-optimal operations, including a lack of standardisation	
Lack of quality standards and compliance	Limited adoption due to product characteristics (e.g. bulkiness)	Limited adoption by agro-dealers and other intermediaries given the risk
Limited availability of soil information		

© Biovision

3. Last mile distribution models and farmer demand research

In 2024, Practical Action and Biovision collaborated to carry out research that explored some of the availability and accessibility issues noted in TechnoServe's assessment. This included an assessment of last mile distribution models and demand creation, carried out between late February and early April 2024, with field research from Sustainable Farming Services Africa.[E]

The research involved secondary data collection and interviews with a total of 12 key informants,[F] 23 organic fertiliser companies, 17 agro-dealers, 14 "lead farmers" (identified by existing farmer support organisations) and 136 farmers within 12 focus group discussions (FDGs). Agro-dealers and farmers were interviewed in Nairobi, Nakuru, Kiambu, Kisii, Nakuru, Kilifi and Kakamega.

A review of the company profiles shows that the majority of those involved in the research have less than 50 employees and a turnover of less than 10 million KES a year (approximately 75,000 USD[G] – see **Table 3**).

Table 3. Profile of companies involved in research

Employee number	% and number
Less than 50	87% (20)
More than 50	13% (3)

Annual turnover		%
KES	USD	
< 1 million	< 7,415	22% (5)
1-10 million	$7,415 - $ 74,154	48% (11)
> 10 million	> 74,154	26% (6)

▲ **E** https://sustainablefarmingafrica.com/ Practical Action and Biovision Foundation acknowledge the contribution of Sustainable Farming Services Africa to the brief. **F** Informants were from the following organisations: Organic Fertilizer and Input Manufacturers Association of Kenya (OFIMAK), Practical Action, Resilient Agricultural Livelihoods (RAY) project, International Centre of Insect Physiology and Ecology, Ecospray, Farm Africa, CABI, SNV, Egerton University and Technoserve. **G** Currency conversion correct as of 3 May 2024.

4. Last mile constraints in organic fertiliser distribution

Supply and agro-dealer returns

Traditionally, agricultural inputs in Kenya are sold through a network of small agro-dealers, located in rural areas, who are supplied by larger, regional hub agro-dealers who buy directly from input suppliers and producers.[H] However, our study showed that the smallholder farmer perception is that the availability of organic fertilisers in agro-dealer shops is low: 9 out of 11 responses by lead farmer and 8 out of 14 recorded in FGDs with smallholder farmer groups ranked unavailability of organic fertiliser at agro-dealers as the key constraint faced by farmers in accessing organic fertilisers. This is corroborated by information from agro-dealers in the qualitative interviews, whose cited the low demand they perceive from farmers (10 mentions) and the implied low sales returns (2 mentions; see **Figure 1**) as the key reasons for either not stocking or only stocking low quantities of organic fertilisers.

The perceived risk of low sales returns can be seen from the ranking of organic and inorganic fertilisers according to their profitability by agro-dealers: 10 out of the 12 agro-dealers that actually stocked organic fertilisers believed inorganic fertilisers to be more profitable for them due to the scale of sales possible. This might explain the stories of agro-dealers purposively not selling organic fertiliser, even when they stock it, and instead encouraging farmers to buy a conventional fertiliser instead.

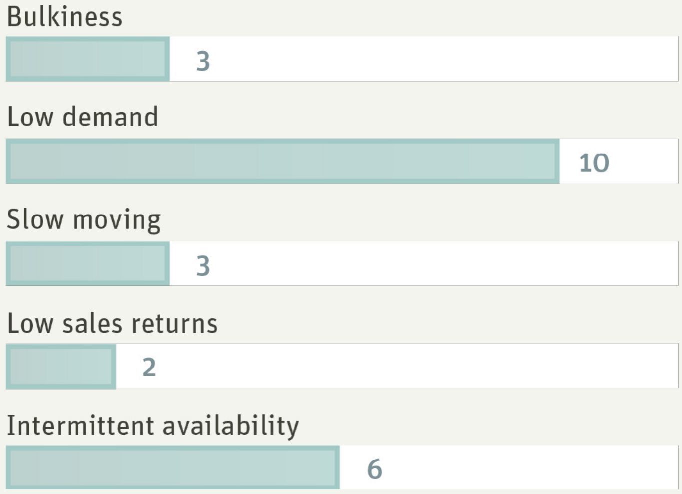
Farmer demand

Although a considerable proportion of smallholder farmers have a positive impression of organic fertiliser per se, demand for commercially produced organic fertiliser is constrained by farmers' ability to access information about organic fertiliser products, their permanent exposure to the promotion of inorganic fertiliser and the availability issues of organic fertiliser.

The concept of organic fertiliser and soil health is not new to farmers in Kenya. Almost 70% of farmers in our survey have experience of using manure and compost produced from farm and household waste. Farmers express a preference for such organic inputs when compared to inorganic inputs. 50% of lead farmers in our study and 83% of the members of the FGDs, expressed a belief that these types of organic fertiliser perform better than inorganic fertilisers. The positive aspects of these home-made fertilisers that were cited by farmers included enhanced soil fertility, healthier crops and less need to use inorganic fertiliser.

This demonstrates a positive perception of the role

Figure 1. Reasons agro-dealers stock low levels of organic fertilisers



of organic inputs amongst small farmers, which could provide a foundation for the promotion of commercial organic fertilisers. However, at the moment this positive perception does not translate into demand that makes commercial organic fertiliser markets for smallholders dynamic. For example, only 6.4% of the farmers interviewed had any experience of the use of commercial organic fertiliser. Based on our farmer survey and other sources the reasons behind this are:

- **Lack of farmer awareness:** Less than 20% of the farmers interviewed had detailed knowledge of commercial organic fertilisers. Most lack knowledge of the types of commercial product available, how to get them and how to use them.
- **Mindsets:** Inorganic fertilisers have created an expectation amongst farmers of immediate impact on productivity. In contrast, most organic fertilisers take time to bear fruit and the full benefits may take several years to be seen. Unless farmers adapt expectations, demand will always favour inorganic inputs.

This, in turn, leads to a vicious cycle or negative feedback loop between smallholder demand and availability of supply of organic fertiliser to smallholders:

- **Without sufficient demand, there will be no consistent and sufficient supply**
- **Inconsistent supply constrains smallholder demand development**

Agro-dealers and smallholders find themselves, so to speak, stuck in a "chicken and egg" situation. If this is to be resolved in the long run, work needs to be done at both ends, and demand and supply issues have to be addressed at the same time.

▲ **H** This assessment explored conventional distribution models. It did not explicitly explore the emerging potential of ICT-based distribution models, such as internet-based platforms (see for example https://www.saferinputs.koan.co.ke). However, some strategies for improving the efficiency of distribution that use ICT are suggested.

5. Sub-optimal smallholder organic fertiliser markets

Sectoral Constraints

Last mile distribution challenges are not limited to the incentives of agro-dealers and the factors constraining smallholder demand discussed above. Key sectoral constraints also involve input producers and thereby the entire supply chain of organic fertilisers. These are discussed in **Table 4**[I].

Many of these constraints are related to challenges in the production process for organic fertiliser, but they also ultimately have a negative impact on demand. Issues such as product consistency, product differentiation and product bulkiness require solutions in the sphere of R&D and governance.

This emphasises that demand creation will not be achieved purely through activities targeting farmers. A holistic approach that also addresses sectoral constraints is needed.

Relative weight of sectoral constraints

The interviewed input producers and retail agro-dealers also identified a number of sectoral constraints on the development and scale of last mile distribution models. These are noted in **Table 5**.

Table 4. Factors holding back smallholder demand for organic fertiliser

Demand constraint		Detail
Product characteristics	Lack of differentiated produce	Inorganic inputs have been developed to deal with different types of soil conditions, different stages of growth and different crops. In comparison, organic fertiliser currently still has less variety and is more generic. Farmers note this and it raises questions for them as to the effectiveness of organic fertilisers.
	Lack of product consistency	The combination of production processes that have not yet developed consistency and a lack of quality standardisation, mean that some organic fertilisers vary in their composition from batch to batch. In addition, a recent exposé of "fake" organic fertilisers in the market has contributed to undermining farmer confidence in products.
	Bulkier product	Organic fertiliser is bulkier than its inorganic counterpart and therefore difficult to transport and store.
Product cost	Cost	Organic inputs are commonly perceived to be more expensive. However, this may be due to a lack of knowledge on how to use organic inputs effectively on the part of the farmers. TechnoServe research suggests that, in the long run, organic fertiliser can be cheaper than subsidised inorganic products.
Product alternatives	Competition	Aggressive marketing of inorganic inputs, including incentives such as subsidised prices, dissuade farmers from trying new alternatives.

Table 5. Distribution challenges – agro-dealers and input producers

Input producers	Agro-dealers
Low awareness and demand from farmers and agro-dealers	Low demand from farmers for organic fertiliser
High distribution costs	Bulkiness of the product
Lengthy and costly product certification	Intermittent availability of the product
Logistical challenges in supply chain	
Lack of investment into supply chain	
Low production capacity	

Based on the constraints identified by agro-dealers and input suppliers, a prioritisation exercise that helps to understand their relative significance was done. In preparation, the constraints from **Table 5** were grouped into four sub-headings:

- **Information and knowledge:** These constraints relate to levels of farmer demand and agro-dealer knowledge and attitudes within the system.
- **Infrastructure and logistics:** These constraints relate to aspects such as transport, and storage capacity and logistics.

▲ **I** Some of the information in the table has been compiled from a previous assessment of the sector by Practical Action and Biovision. While this brief focuses on the last mile distribution of organic fertiliser and the challenges and opportunities in it, **Table 2** provides a summary of constraints to the entire organic fertiliser sector.

- **Financial:** These constraints relate to the costs of production, distribution, marketing and so on.
- **Enabling environment:** These constraints relate to issues such as certification and cross-sectoral coordination.

Table 6 shows the number of respondents raising concerns about each of these headings.

Table 6. Aggregated last mile distribution model challenges

Challenge categories	Input suppliers	Agro-dealers	Average	Rank
Infrastructure and logistics	17	9	13	1
Information and knowledge	12	13	12.5	2
Financial	3	2	2.5	3
Enabling environment	3	-	1.5	4

Two issues come out as the critical issues holding back the development of effective last mile distribution models: knowledge, which translates into lack of demand from farmers, and product logistics (bulkiness, transport and storage).

Issues of finance score surprisingly low. This is not to suggest that they are insignificant but at the moment, they are overwhelmed by the significance of low demand and logistical challenges.

Underlying dynamics in the organic fertiliser market for smallholders

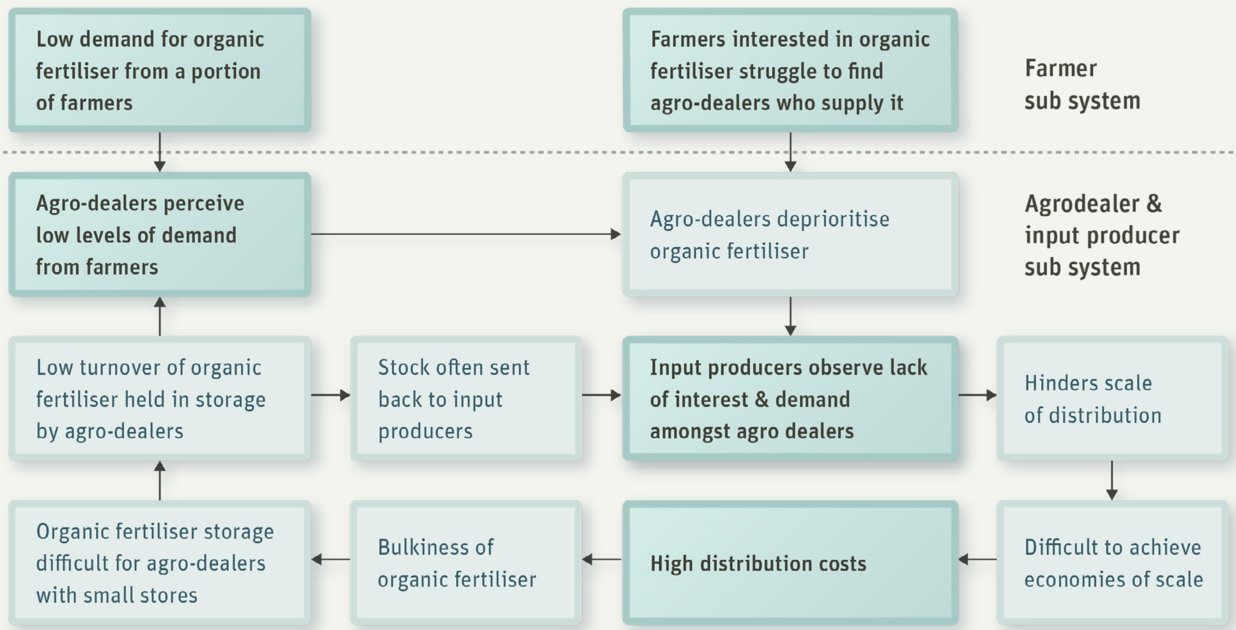
While low demand and sales are the dominant constraints mentioned, they are inter-connected with others, leading to, or reinforcing, other constraints (see **Figure 2**):[J]

- Retail agro-dealers perceive low levels of demand from farmers and as a result, organic fertiliser is not prioritised.
- Input producers observe a lack of interest and demand amongst agro-dealers as a result.
- This hinders the scale of distribution. It can be assumed that it makes achieving economies of scale difficult and, along with the bulkiness of the product, contributes to high distribution costs.
- The bulkiness of the product makes storage difficult for agro-dealers with small stores. This is worsened by the low demand and consequently the low turnover of products held in storage. This results in stock often being sent back to input producers.
- As a result, the supply of organic fertiliser to agro-dealers is never regularised and the stocks held by agro-dealers are inconsistent. Intermittent availability may also be connected to challenges with certification, which delay products reaching the market.

As with the market between agro-dealers and smallholders, the market between input producers and agro-dealers is stuck in a vicious cycle. Both cycles impact on each other.

In the following section, we will provide our analysis of potential interventions to address the demand side challenge in the organic fertiliser sector.

Figure 2. Organic fertiliser subsector: relationships and feedback effects



6. Stimulating demand for organic fertiliser

Organic fertiliser distribution models can be categorised into two types: business-to-commercial intermediary and business-to-farmer intermediary (see **Table 7**).[K]

Table 7. Categorisation of distribution models

Business-to-commercial intermediary	Business-to-farmer intermediary

An organic fertiliser company supplies products through specialist agents, who have distribution of agri-inputs as their core business:
• An agro-dealer network (see first paragraph of Section 4. Last mile constraints in organic fertiliser distribution) is the most common supply channel in this model
• Retail agro-dealers that are the commercial entities mainly responsible for last mile distribution:
  • are located in towns or villages;
  • have intermittent, transactional relationship with farmers.
	An organic fertiliser company supplies products to intermediaries embedded within farming communities:
	• Intermediaries may earn income from the sale of products (e.g. commission)
	• Intermediaries have an ongoing and intensive relationship with farmers
	This model can have a variety of structures (e.g. cooperatives, farmer service centres (FSCs)/village-based agents and NGOs) and also includes direct selling to individual farmers (e.g. large farms).

Table 8 indicates the importance of each distribution model in the input company sample of our research (see **Table 3** above). It shows the percentage of each distribution model within each of the company turnover categories identified there.

Table 8. Distribution models and company size

Annual turnover (KES)	Distribution model used	% of size category
< 1 million	Farmer intermediary	100%
1 – 10 million	Farmer intermediary	46%
	Farmer and commercial intermediary	36%
	Commercial intermediary	18%
> 10 million	Farmer and commercial intermediary	83%
	Commercial intermediary	17%

Table 8 suggests that farmer intermediary models are important for all business sizes, but that commercial intermediary models increase in importance as the size of the business increases. Smaller companies only use farmer intermediary models and commercial intermediary models never dominate in any company category.

The role of organic input producers and agro-dealers in demand creation

Organic input producers observe that incidences of high demand for organic fertiliser are a result of the following conditions and activities:

- Farmer training and field days that allow direct and regular contact with farmers. Amongst organic input companies, farmer training is the most common marketing approach, dwarfing other approaches.
- First-hand exposure for farmers that demonstrates the efficacy of organic fertilisers compared to conventional inputs.
- Locations where organic markets are developing for specific crops.

Whilst it is common for input producers to support this type of demand creation, our research suggests that it is less common for agro-dealers to do this. This is the result of a number of factors:

- Currently, agro-dealers invest very little into the promotion of organic fertilisers. The most common

◄ J The inter-relationships in the inorganic fertiliser subsector, some of which are implied in the longer list of constraints in **Table 4**, are not considered further, as they are not relevant for the analysis and conclusions of this brief. ▲ K The categorisation used is similar but not totally overlapping with the business-to-business and business-to-customer classification. The adapted categorisation is used to bring out more explicitly differences in intermediaries' mode of engaging with farmers. Also, the Technoserve assessment suggested that commercial intermediary models, specifically via large agro-dealers and farm aggregators, were increasing in significance because of the cost of direct engagement via business-to-customer in the traditional sense. However, this assessment suggests that distribution via large agro-dealers and produce aggregators is not yet the dominant model.

way in which they encourage organic fertiliser use is simply through direct interaction (e.g. over the counter conversations). However, this is insufficient to bring about the mindset change required for demand to increase.

- Because agro-dealers perceive demand to be so low, it is not economically rational for them to invest resources in the promotion and storage of organic fertilisers.
- In our survey, less than 10% of smallholder farmers go to agro-dealers for significant agronomic advice. In comparison 28–33% of farmers get significant advice mostly from extension services, and 25–35% get significant advice mostly from fellow farmers. These are trusted long-term contacts from whom farmers will get advice relating to significant changes to the farming system, such as the adoption of organic fertiliser. In contrast, agro-dealers are used as a source of advice on specific products (e.g. specifications, how to use them and so on).

This leads to the conclusion that agro-dealers are not key actors in demand creation, but once demand exists, they can play a significant role in ensuring that demand is met and that the right products are used and used effectively.

Implications for distribution models

These conclusions shed light on the significance of farmer intermediary models (see **Table 7**), including those that involve the use of FSCs and community agents. At a time when demand creation is needed to stimulate the development of the sector, farmer intermediary models, despite being more costly, offer the intensive engagement needed. Once demand is higher, their importance may diminish, and commercial intermediary models, offering economies of scale through existing agrovet networks, will take on greater importance.

Strategies for supporting improved distribution and generating demand for organic fertiliser are explored in **Table 9**. Given the significance of farmer intermediary models, at least in the short term, there is a focus on strategies that improve their efficiency and make them more financially viable.

Table 9. Intervention areas to support demand creation and improve distribution

Intervention theme	Intervention details
Subsidies and customer incentives (enabling policy)	Temporary support to input producers that reduces the cost of farmer intermediary models can be justified on the understanding that, once demand rises sufficiently, more financially sustainable and scalable models, such as through agro-dealer distribution networks, will be feasible.
	The inclusion of organic fertilisers within government subsidy programmes would level the playing field and reduce the market distortion from “inorganic only” subsidies. More competitive prices will reduce the risk to farmers of trying out organic fertiliser.
	Customer incentives could be improved through the bundling of organic fertiliser with other products and services. For instance, organic fertiliser could be bundled alongside credit or other agricultural inputs. It might make more sense to many farmers to buy fertiliser alongside other inputs in this way, rather than as a stand-alone purchase. This requires partnerships with other input and service providers.
Developing markets that incentivise adoption (partnerships and farmer behaviour change)	Partnerships with initiatives developing organic markets, such as Participatory Guarantee Systems (PGS), could be an interesting business-to-farmer intermediary approach, which brings a number of benefits supporting uptake: • Collaboration with a service organisation capable of simulating farmer behaviour change • Economic incentives (e.g. better market access, premium prices) for the use of organic inputs by farmers
Delivering effective extension and advice	Despite the decline in their coverage, our research suggests that extension workers are still influential with farmers. Extension workers have a long-term relationship with farmers that could be conducive to encouraging the adoption of organic fertiliser. Partnerships between organic input companies and extension services could be a positive part of a mix of strategies to reach farmers.
Promoting and improving the efficiency of farmer intermediary distribution (partnerships and farmer behaviour change)	FSCs and similar approaches, such as village agents, offer potential to take a business approach as they are already linked to input producers, NGOs and initiatives via partnerships, whilst maintaining close relationships with farmers that support behaviour change. Improving the capacity and efficiency of such models would yield significant benefits in the area of encouraging the adoption of commercial organic fertiliser as an alternative by farmers. Areas of focus could include improvements to: • Their business management capacity through the formalisation of business structures and development of improved business skills; • Distribution efficiency (e.g. through the use of phone networks to support aggregation and timeliness of orders); • Product offerings (e.g. through connections to other suppliers, allowing bundling, etc.)

Case study - Koppert and farmer service centres (FSCs)

Koppert are one of the largest producers of organic inputs in Kenya, with an annual turnover from bio inputs (including bio pesticides) of 100 million KES and working with about 50,000 smallholder farmers. They produce organic fertilisers, bio-stimulants and bio-foliar fertilisers.

Koppert distribute products in two main ways:

- Through agro-dealer networks
- Through FSCs, in collaboration with other organisations such as Syngenta Farmer Hubs and the Farm to Market Alliance.

The FSC model involves entrepreneurs within local communities who act as a link between input, output and service producers and farming communities. They connect farmers with other value chain actors and build trust and transparency. They receive income linked to the sale of inputs and this is dependent on them providing effective services to farmers.

Of the two approaches, the FSC is the most effective because it allows a focus on specific crops and is an easier route to influencing farmers. The biggest challenge noted with the agro-dealers distribution route is that they tend to focus on the products that can sell more, and this inevitably leads to a heavy focus on inorganic inputs.

7. Conclusion

Our research illustrates the inter-connectedness between demand and supply constraints. Supply constraints lead to demand constraints by increasing the cost and reducing the availability of, and trust in, organic fertiliser products. Demand constraints contribute to supply constraints by limiting the development of consistent supply and increasing risks for retailers such as agro-dealers.

Improvements in standards and consistency, through improved regulatory and certification processes, would support improved demand and would be a necessary prerequisite for accurate guidance on organic/inorganic mixing. Likewise, developments in products that reduce bulkiness would aid constraints for all actors – input producers, agro-dealers and farmers, reduce logistical challenges and improve demand. This shows that a **market systems perspective, based on an understanding of how these issues relate to each other, is required for any interventions in the sector.**

The development of any market can only take place when there is sufficient demand for the product. A huge amount of demand creation is needed if the organic fertiliser sector is to develop and smallholder farmers are to benefit. But demand creation must not be seen as being simply about providing information and explaining the benefits of organic fertiliser. It is also about **shifting attitudes and mindsets**, created by years of exposure to inorganic inputs and their marketing, and doing this requires a long-term experiential engagement based on trust.

This explains why distribution models that involve closer engagement with farmer intermediaries, such as FSCs, remain important, despite the fact that they are costly. In the medium term, once demand is sufficiently high, the risks for agro-dealers will be reduced and this sort of farmer intermediary approach may be less necessary. In the meantime, there is value in developing strategies to reduce the costs and improve the efficiency of farmer intermediary approaches. Key in this will be partnerships, between input producers, donors, government, and international and local NGOs.

References: **[1]** https://www.fs.usda.gov/nac/topics/soil-health.php#:~:text=Soil%20health%20is%20defined%20as,go%20far%20beyond%20crop%20production. **[2]** Africa Fertilizer/IFDC. 2018. Africa Fertilizer Summit 2018. International Fertilizer Development Center (IFDC). **[3]** Bationo, André, Boaz Waswa, Job Kihara, Joseph Kimetu, Shamie Zingore, Roberto Laouali, John F. M. Kienzle et al. 2006. Advances in integrating nutrient management and conservation technologies in the West African Sahel. Nutrient Cycling in Agroecosystems 76, no. 2-3: 193-206. https://cropnuts.com/fertiliser-efficiency-soil-ph accessed 1 May 2024. **[4]** Falconnier, G. N., Cardinael, R., Corbeels, M., Baudron, F., Chivenge, P., Couëdel, A., Ripoche, A., Affholder, F., Naudin, K., Benaillon, E., Rusinamhodzi, L., Leroux, L., Vanlauwe, B. and Giller, K. E. 2023. The input reduction principle of agroecology is wrong when it comes to mineral fertilizer use in sub-Saharan Africa. Outlook on Agriculture, 52(3), 311-326. https://doi.org/10.1177/00307270231199795. **[5]** Freyer, B., Ellssel P., Nyakanda, F. and Saussure, S. 2024. Exploring the off-farm production, marketing and use of organic and biofertilisers in Africa: A scoping study. Report to the European Commission. DeSIRA-LIFT. **[6]** du Jardin, P. (2015). Plant biostimulants: Definition, concept, main categories and regulation. Scientia horticulturae, 196, 3-14, quoted from Freyer, B., Ellssel P., Nyakanda, F. and Saussure, S. 2024. Exploring the off-farm production, marketing and use of organic and biofertilisers in Africa: A scoping study. Report to the European Commission. DeSIRA-LIFT, p.iv. **[7]** CASA, Scalable alternatives to inorganic fertiliser, Final report, April 2023, FCDO / Technoserve.