



# Empowering Rural Farmers and Restoring Soil Health

Reducing Organic Waste and Chemical Fertiliser Dependency in Morogoro

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Africa Harvest Enterprises (T) is located in the Morogoro region of Tanzania. The Africa Eco-Soil Project, implemented by Africa Harvest Enterprise (T), aims to fill the agricultural supply chain gap by providing high-quality organic inputs, improving soil health, and promoting environmental stewardship. In the Morogoro municipality, the primary socio-economic activities include agriculture, tourism, forestry, and industry<sup>1</sup>. This area is situated at the base of the Uluguru Mountains and is characterised by its arable land<sup>1</sup>.



**Implementing organisation:**

Africa Harvest Enterprises (T)

**Project name:** Africa Eco-Soil Project

**Location:** Morogoro, Tanzania

**Stage:** Implementing

**Food system focus:** Primary production

**Goal:** Provide small-scale farmers with affordable, effective, and sustainable organic farming inputs to increase their income and food security.

**Key words:** Organic Inputs, soil health, propagating solutions, community engagement

The agricultural sector in Tanzania accounts for 24% of the Gross Domestic Product (GDP), making it a major economic activity not only in the region but throughout the country<sup>2</sup>. Tanzania boasts a variety of climatic and geographical zones, allowing producers to grow different vegetables, fruits, coffee, and tea<sup>1,3</sup>. It is one of the largest coconut producers in Sub-Saharan Africa<sup>4</sup>, particularly along the coastal belt and in the regions of Morogoro, Mbeya, Dodoma, and around Lake Victoria<sup>4-6</sup>. Coconut production focuses on edible oil, but coconut tree leaves are also used for roofing houses, the milk is used as a beverage, and shells are used as firewood or fertilisers<sup>5,6</sup>. However, there are challenges in coconut production, including the large amounts of coconut waste generated and the poor management of disposal methods. Rapid urbanisation has also led to the clearing of coconut trees to accommodate other human activities, resulting in the deprivitisation of coconut plantations. Smallholder farmers dominate Tanzania's agricultural sector, cultivating 85-90% of the country's available land, with a focus on subsistence farming, which relies on low inputs and rain-fed methods<sup>7</sup>. However, many do still rely on expensive and environmentally harmful chemical fertilisers<sup>7,8</sup>.

The Africa Eco-Soil Project was created in response to the lack of access to organic inputs and declining soil quality within the Morogoro region. Many farmers are voicing concerns about soil degradation and reduced soil fertility. To restore their soils, farmers often gravitate towards and are advised to use chemical fertilisers, which are expensive and difficult to access in rural areas. Long-term use of these inputs can further degrade soil health, creating a negative feedback loop that leaves farmers increasingly dependent on them<sup>7-9</sup>. Around 90% of the fertilisers used yearly in Tanzania are chemically-based and imported<sup>8,16</sup>. The cost of imports results in high, unaffordable chemical fertiliser prices for many farmers. Organic inputs offer a sustainable alternative to chemical fertilisers by improving long-term soil health and reducing environmental risks<sup>10,11</sup>. Studies that account for the entire production-to-application



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process found that the shift towards organic fertilisers has substantial mitigation effects<sup>12,13</sup>. Research has also shown that, especially in dryland areas, organic fertilisers help reduce the overall global warming potential<sup>14</sup>. The Africa Eco-Soil Project addresses local concerns in Morogoro but also reflects the broader national challenges of accessing sustainable and affordable solutions for increasing soil fertility<sup>7</sup>. Currently, the lack of accessibility and affordability of both natural and chemical fertilisers in Tanzania hampers small-scale farmers' ability to increase crop yields and improve food security<sup>7,9,10</sup>.

Tanzania has a long history of government interventions to make chemical fertilisers more affordable, dating back to the 1970s when subsidy programs were introduced to support farmers in accessing fertilisers<sup>16</sup>. A significant shift occurred in 2008 with the launch of the National Agricultural Input Voucher Scheme (NAIVS), supported by the World Bank, to directly subsidise small-scale farmers<sup>9,16</sup>. As NAIVS was phased out, the government introduced the Bulk Procurement System (BPS)<sup>7</sup>. This system aimed to lower fertiliser prices by leveraging bulk imports<sup>16,17</sup>. Most recently, the government has introduced a fertiliser subsidy for the 2022/23 season through the Tanzania Agricultural Inputs Support Project (TAISP), funded by the African Development Fund<sup>16</sup>. Despite these efforts to make fertilisers more affordable and accessible, the drawbacks of chemical fertilisers on soil health and water quality raise concerns about their long-term sustainability<sup>9,15</sup>. Impacts include nitrate leakage contaminating water supplies, phosphatase build-up creating imbalances in the

soil, and denitrification, which increases nitrous oxide emission, a highly potent greenhouse gas<sup>15,18</sup>. Further, climate events and stress increase the likelihood of adverse effects from chemical fertilisers. If used during drought conditions, the lack of rainfall leads to excess nitrogen, which can burn the seed and harm crop yields<sup>9,15</sup>, and rising temperatures within growing periods can also increase these risks. Using organic or natural fertilisers instead can circumvent and address the triple challenge of declining yields, high costs, availability issues, and the negative impact of chemical fertilisers<sup>10</sup>. Climate change has exacerbated these vulnerabilities by increasing the severity and frequency of extreme weather events over the past four decades<sup>15</sup>. To address these challenges and in the search for more sustainable production methods, there has been an ongoing shift towards organic practices not only locally but globally<sup>10,11</sup>.

The challenges around food production in Tanzania are further compounded by large post-harvest and distribution losses, of which 50% is fresh and nutritious food<sup>7</sup>. The losses often result from poor storage or handling infrastructure, contributing to increased organic waste and substantial economic losses<sup>7</sup>. Smallholder farmers, in particular, face challenges in storing their harvest and therefore tend to sell their crops right after harvest, limiting their ability to take advantage of higher prices later in the year.



## About the Africa Eco-Soil Project

The Africa Eco-Soil project aims to provide the Tanzanian market with organic inputs, including propagating solutions and organic fertilisers. It offers an alternative to the widely used chemical-based options currently dominating the market. The project, implemented by Africa Harvest Enterprises (T), was piloted in 2021 in Kiroka village, Morogoro, and is currently in its implementation phase. The project targets both small— and large-scale farmers in various subsectors of agriculture, including horticulture, nurseries, household gardens, forestry, and hydroponics. The project includes two complementary processes: coconut husk processing and organic waste composting. In Kiroka and the surrounding villages, the Africa Eco-Soil project reuses coconut husk waste from local coconut plantations to produce cocopeat, a sustainable growing medium used in agriculture and gardening. The project has implemented a community engagement program that allows individuals to collect and bring in coconut husks, generating an income for those in the local community.

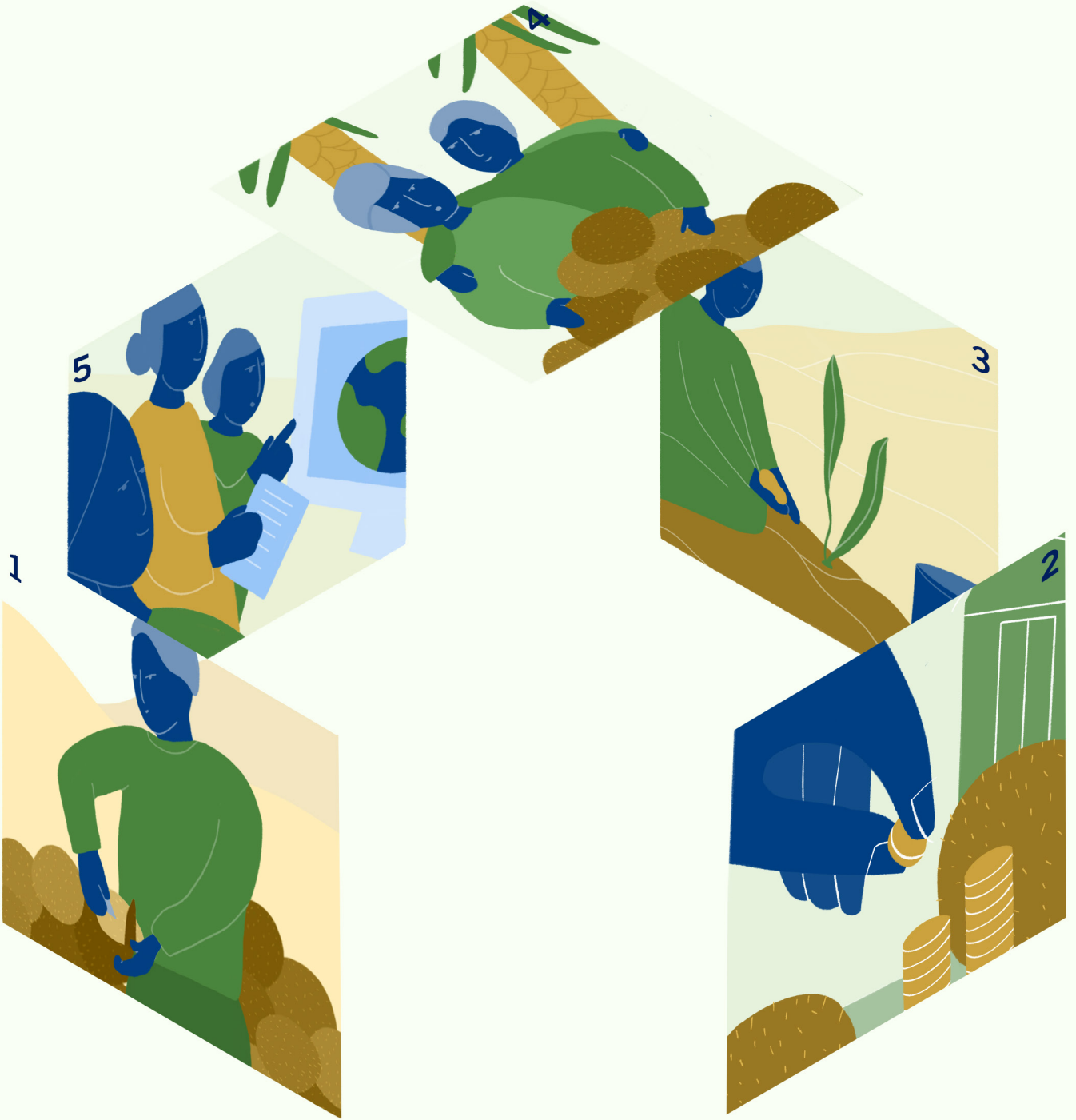
To further deal with the issues of food waste and the economic, environmental, and human health risks associated with using chemical fertilisers and inputs, the project also converts organic waste from local markets into organic fertilisers. They collaborate with the local government to access the waste, aiming to establish the necessary infrastructure and resources to collect it directly. The organic waste is collected from markets and composted at the initiative's facility, creating a nutrient-rich compost that benefits soil health. The project distributes its products through agro-input dealers, who purchase the products at wholesale prices and, in turn, sell them to farmers at retail prices. Over 200 farmers and 20 larger corporate clients in Tanzania have used the organic fertiliser. The production of cocopeat and organic fertiliser addresses waste management challenges while creating eco-friendly solutions for farmers and Tanzania's agricultural sector.

## How does the Africa Eco-Soil Project contribute to transformative change?

The initiative has contributed to several dimensions recognised as enabling transformative potential. However, while their current actions address all of the framework's dimensions, this is manifested to varying degrees as their work focuses more on some dimensions than others. Importantly, the five dimensions of transformative potential we use in this analysis are not static, and actions that fall within one dimension can support others and even be prerequisites for them. This is reflected in how various factors can drive transformations<sup>19-23</sup>. Through the Postharvest Innovation Centre, MAVUNOLAB focuses mainly on challenging existing power structures and norms while fostering and building the relationships and collaborations needed to support this work. The following sections will explore how the initiative takes action within its context and how its activities might contribute (or not) to the five dimensions of transformative potential.



Fig 1 Framework: Seeds transformative potential



## **Navigating a context that can enable or constrain action**

### **1. Aligns with local and broader contexts**

The Africa Eco-Soil Project aligns with the local context right from its inception. Through engaging with local farmers and community members of the region, the initiative gained an understanding of the everyday challenges faced in horticulture and agriculture more broadly. One key issue that emerged from those interactions was the difficulty in accessing organic and affordable farming inputs. This was found to be something that many people in the region wanted, but it was challenging to obtain. In response to this finding, the initiative conducted a systematic assessment of local challenges, specifically in Kiroka Village and its surrounding areas. They identified a large volume of waste generated by nearby coconut plantations, specifically coconut husks, which are often left unused. Recognising their potential, the initiative started using the husk as a key ingredient in their produced growing medium, coco-peat. The initiative established its production site near the coconut plantations and prioritised creating part-time job opportunities for local community members, allowing them to help collect coconut husks and be part of the production process of turning the husks into coco-peat.

In their systemic level analysis of the local food system, they identified another untapped resource: food waste from local markets. During a market visit, the initiative identified the scale and potential of this overlooked issue and began incorporating market food waste into the production of organic, affordable fertiliser. By doing this, the innovation aligns not only with local needs but also addresses the broader issue of declining soil fertility. In parallel, the initiative draws attention to the region's broader waste management issues.

The recycling industry in Tanzania is still in its infancy, but it shows considerable potential. While infrastructural challenges remain, the initiative is actively collaborating with partners to address these gaps. In support of its own objectives and the local government's efforts to improve and develop the sector, the initiative provides its expertise in waste management and recycling to help shape policies grounded in local realities. As awareness of sustainable practices increases, an increasing number of farmers, companies,

and investors in Tanzania become more open to organic farming. The shift creates enabling conditions for the initiative, restating its relevance and impact in a fast-paced sector.



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“We got into thinking, what can we do with this waste? It's a resource, and we waste it through food waste. So what can we do about it to come up with something that can actually be of use and also impactful... That's how the idea came to life. It was a very, very simple trip. We got an epiphany that we can create something and actually develop something basically out of nothing..”

**Africa Harvest Enterprises (T)**

### **2. Is enabled by resources and support**

Funding is an external resource that has both enabled and restricted the initiative. One of the initiative's biggest challenges has been attaining stable access to funding for innovation and scaling. Despite the challenges, funding to proceed with their implementation phase, project development, and the setup of their current infrastructure has been secured through various donors and partnerships. External funding has enabled them to establish their factory in Kiroka Village on a one-and-a-half-acre plot and invest in the necessary machinery and tools to produce coconut peat. Additionally, securing patient capital has allowed the initiative to plan long-term. To lessen their dependency on external funding, they seek traditional business loans and venture capital once their cash flow is steady enough. They are also already reinvesting much of the revenue generated from the company to keep developing and strengthening their initiative.

The team, with its various capacities, skill sets, and experiences, is a key internal resource for the project. Team members also contribute to less tangible assets. For instance, their resilience in navigating their journey thus far creates an internal culture of hope and determination. In their efforts to access external resources, they have leveraged their diverse internal capacities, including relationship-building with the community, NGOs, and local government.



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“Some of them [farmers] noticed the changes [climatic change effects], but they didn't actually understand what causes all these problems... So we had to go back. We had to teach them. We had to provide these extension services and trainings. We had to provide on-farm demonstrations and show them how they can actually adopt these sustainable agriculture practices and actually eventually promote sustainable farming.”

**Africa Harvest Enterprises (T)**

They also ensure that support from one funder is strategically used to build trust with another funder. For example, securing support from larger international NGOs, such as the UNDP, has proven beneficial in accessing further resources. The combination of credibility gained from their current funders and the new opportunities that this exposure presents creates ripple effects. The Fungo Innovation Program, run by the UNDP, is one such opportunity that has provided a network and platform for the initiative, using collaboration as a strategy to access resources and support.

The initiative also provides resources to the community and the farmers who use their

products. They generate short-term job opportunities at their facility and through their waste collection services. They have established a community engagement program that allows community members to collect waste and earn revenue. Additionally, by working with local farming cooperatives, they create capacity-building and training opportunities for local farmers. This includes education about their products, climate change, and the importance of soil health. Through this collaboration with farming cooperatives, a permanent fixture in communities, the initiative ensures that the necessary support and resources remain consistently available. This approach enables farmers to apply their products and new methods in practice, rather than only learning about them through reading or discussion.

### ***Actions employed to navigate the initiative's context***

#### **3. Builds and fosters relationships and collaborations**

The Africa Eco-Soil project has established relationships and collaborations across multiple scales, including peer-to-peer, cross-sectors, and cross-scale. Farmers in the Morogoro region have had a negative experience with chemical fertilisers, partly because they are difficult and expensive to obtain, and partly because farmers have observed their harmful effects on soil quality. As a result, the community was initially wary of the Africa Eco-Soils project, out of concern that their fertiliser would have similar negative effects. The project shifted these perceptions by building trust with farmers through demonstrating the positive impacts of the organic fertiliser on soil health at their demonstration farms. Using on-farm demonstrations, the initiative could create a firsthand understanding of the product's value with limited risk to the farmers themselves, building a foundation for a stronger relationship. The Africa Eco-Soil project collaborates with farming cooperatives, providing training and knowledge building on sustainable farming practices to farmers who are part of the organisation. As the communities themselves did not initiate this project, collaboration with the farming cooperatives is key, as it makes entry into communities easier due to pre-established, trusted relationships within these groups.

The initiative collaborates across multiple sectors, including local government, as well as

international and national NGOs. In Tanzania, municipal tenderers are responsible for waste collection. The initiative must work closely with these tender holders to access organic waste from local markets. While the local government accepts the project and its goals, the project faces logistical challenges due to limited resources, such as the availability of trucks for large-scale waste collection. This lack of resources creates dependencies on other stakeholders, slowing the waste collection process. The recycling sector is still in its



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“...there are some people in the government who can actually support us, and especially the people who are actually seeing what we are doing. So the local government is actually seeing what we’re doing. They see that it’s very impactful, and they’re the ones who are advocating for us. You know what, this can be something that is really good and can be taken to higher levels. Of course, there are some others who don’t see what’s happening on the ground as well. It’s very hard to convince them. It’s very hard to... get into the final processes of policies. It’s a typical, typical government issue..” **Africa Harvest Enterprises (T)**

infancy within the country. As a result, there are few policies or regulations specifically for recycling- or upcycling-focused businesses, and few frameworks to guide green enterprises. There is a push from the government to engage stakeholders to create supportive policies for green start-ups. The initiative has potential opportunities to shape new policies in this sector, as local governments recognise startups as valuable sources of information and guidance for structuring future policies.

The initiative has relationships with the government primarily on the local level, as they are closer to the communities and better positioned to understand local challenges and opportunities. Higher levels of government have been more challenging to engage with due to their disconnect from community issues, thereby limiting their sphere of influence on the final stages of policy-making on matters directly related to community concerns and potential opportunities. Like community members, the local government is more inclined to collaborate with the initiative or similar organisations once it observes concrete project outcomes. The initiative has recognised that working alongside the larger international NGOs has helped them gain credibility among local actors. The initiative uses its relationships with larger organisations to gain credibility and secure government engagement. The initiative is also involved in programs hosted by international organisations, such as the UNDP, and uses these spaces to network and engage with like-minded individuals. These collaborative spaces have created opportunities for the initiative to scale its project to nearby regions.

#### 4. Enables changes in power structures and norms

Through active self-reflection, the initiative has fostered a capacity for introspection regarding the power structures and norms inherent in its project. This is reflected in its efforts to implement Environmental, Social, and Governance (ESG) policies within the project, and in their strive to achieve gender balance within the team.

Looking outward, the chemical fertiliser industry is a dominant force in Tanzania. The chemical fertiliser industry holds power due to its influence over agricultural practices, supply chains, and policies, owing to its strong presence and resources. The Africa Eco-Soils project has encountered resistance from larger chemical fertiliser companies as it progresses and gains traction. The project disrupts established norms in the chemical fertiliser sector by creating a fertiliser that is often cheaper, easily accessible locally, and environmentally friendly. In this way, its success challenges larger-scale actors as they recognise the project’s competitive advantage. By making organic fertiliser accessible to rural small-scale farmers, the project empowers them. Farmers often have limited fertiliser options and bear the heaviest burden of high chemical fertiliser prices, while also facing reduced soil

health. Consequently, using organic fertilisers strengthens rural small-scale farmers by positively impacting their soils. This enables them to achieve higher yields and produce quality food to both sell and keep.



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“Most of them are living in rural settings. Poverty is their life. So they are looking for something that is cheap, that they can use to produce their food with. So that they can produce their yields in a very high quantity.”

**Africa Harvest Enterprises (T)**

## 5. Supports learning and systems understanding

The initiative found that many farmers noticed and voiced concerns about environmental changes, such as soil degradation. However, they did not understand the potential causes of these changes, including climate change and unsustainable inputs. In response, the initiative established targeted education initiatives to engage farmers in exploring system-level issues. This included creating a broader understanding of sustainable agriculture and positioning its products in relation to topics such as climate change, chemical fertilisers, organic waste, and their effects. The initiative implements this by providing extension services and training to create structured support systems that enhance farmers' knowledge and skills. This awareness-building, carried out through extension services and training offered by cooperatives, empowers farmers to gain a comprehensive understanding of the challenges they may face. The initiative gathers feedback through customer



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“Once we introduced this solution, it was, it was, of course it was a bit sceptical for others because they thought that the organic fertilisers are also have some sort of chemicals, but no, we had to sit down and actually provide a sort of a knowledge and extension services to these farmers, that this is an improved version of organic fertilisers.”

**Africa Harvest Enterprises (T)**

surveys and oral feedback to build a database on the product's efficiency. This information is used to understand farmers' challenges and improve the product and the services it provides.

Transformative potential of the initiative...

## 1. Aligns with local and broader contexts

### **Aligning with the local context**

- Products are developed after consultation with local farmers, addressing the challenges of accessing organic and affordable agricultural inputs
- Uses local organic waste, such as food waste from local markets and coconut plantation waste, as key input for organic fertiliser
- Short-term jobs were created when the initiative established a production site near the area where the initiative collects coconut waste.

### **Aligning with broader policy and social trends**

- Leveraged the growing global and regional demands for organic and sustainable farming by positioning their products within expanding markets for organic agricultural inputs
- Provides knowledge on organic agriculture to local governments, which can influence policy-making

## 2. Is enabled by resources and support

### **External resources and support**

- Receives funding from multiple international NGOs

### **Internal resources and support**

- Factory in Kiroka Village and a one-and-a-half-acre plot
- Machinery and tools for coconut and organic material preparation
- Team members with individual sets of expertise and knowledge
- Funds generated by the project are re-invested into the project

### **Resources and support provided by the initiative:**

- Provide training and capacity building on sustainable agriculture through collaborations with farming cooperatives



Transformative potential of the initiative...

### 3. Builds and fosters relationships and collaborations

#### **Peer-to-peer relationships and collaborations**

- Collaborates with farming cooperatives that provide training and knowledge-building around sustainable farming
- Strategically uses relationships with cooperatives to help strengthen relationships with the farmers, leveraging their established trust to build trust for their innovation

#### **Cross-scale collaborations**

- Distribute their products through collaborations with agro-input dealers
- Collaborates with partners that provide in-kind resources to farmers on the initiative's behalf

- Utilises already existing collaborations with larger, already known actors in the area to gain credibility among local actors
- Is aware of similar initiatives in their sector and scopes out who they could build potential partnerships with in the future
- By letting individuals and farmers test fertilisers and substrates before committing to a purchase, they build trust with their customers and farmers
- Work actively to foster their existing relationships and collaborations through continuous communication with their partners.

### 4. Enables changes in power structures & norms

#### **Internal power dynamics and norms**

- Plans for affirmative action for gender equality in the workplace
- Demonstrated commitment to ESG principles

#### **Challenging the status quo of large actors dominating the sector**

- Developed an organic fertiliser, which is an alternative to chemical fertilisers. The organic fertiliser is cheaper and more locally accessible, which challenges the dominance of the chemical fertiliser industry and their significant influence over agricultural practices, supply chains, and policy



*Transformative potential of the initiative...*

## 5. Supports learning & systems understanding

### ***Training and capacity building***

- Provides training and capacity building for farmers through farming cooperatives, focusing on practical skills and building a broader understanding of climate change, organic fertiliser, and chemical inputs.



## Pathways forward

Africa Harvest Enterprise (T) has created an affordable, locally produced, accessible, and ecologically sensitive organic fertiliser and growing mediums. They operate within a challenging environment characterised by entrenched power structures of larger chemical fertiliser companies and a lack of sector-supportive government policies. Positioned against the chemical fertiliser industry, the project operates at the margins of dominant systems, demonstrating its potential to disrupt the status quo<sup>24</sup>. The strong reactions from the chemical fertiliser industry and local government interest in collaborating with Africa Harvest highlight its disruptive potential. Research on the contribution of local-scale initiatives to wider transformations has indicated that a single initiative acting alone rarely triggers systemic change<sup>25</sup>. For meaningful and widespread change, it is essential to build strong partnerships across different scales and sectors<sup>26</sup>. The initiative has already made strides in this regard, forming connections with international NGOs that helped build government trust and interest in their work. These strategic partnerships are crucial for legitimising the Africa Eco-Soil Project's efforts and enhancing its overall impact.

Currently, the project faces several challenges in achieving its goal of operating a fully green facility. The rural setting of their operations has made it difficult to access green energy, resulting in reliance on diesel generators for their processing and production lines. The initiative aims to utilise any additional funding or profits to transition away from fossil fuels towards renewable energy sources. In the same vein, they wish to address their packaging: cocopeat and fertilisers are sold in polyethylene bags, a packaging material associated with ecological

drawbacks<sup>27,28</sup>. Another challenge when scaling their operations is acquiring funding for the next steps, where relying on donor funding limits the organisation's current capacities. The initiative is asked to prove the impact of their solution to secure external funding, but to do so, they need financing to be able to test their solution, creating a catch-22.

While the initiative faces challenges, its novelty creates a window of opportunity. In the absence of policy infrastructure, the initiative has the opportunity to potentially shape policy frameworks within this sector to create a more inclusive environment for similar initiatives. By collaborating with local governments, which operate closely with communities' lived realities, the initiative can work towards institutionalising their practices through emerging policy, while building a network of partners focused on agroecological alternatives. One potential avenue could be to offer training or capacity building for government officers to strengthen their knowledge of organic fertilisers and sustainable farming. By building broader networks of support from the government, international NGOs, agricultural cooperatives, farmers, and like-minded initiatives, the potential for increased resource generation, knowledge exchange, and capacity to address challenges can ultimately enable them to create a transformative impact on their broader system<sup>22,29</sup>.



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