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IMPERIAL



# Entrepreneur-led climate adaptation in Kenya

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## Key Policy Recommendations

- **Regulate emerging climate adaptation sectors specifically and appropriately** to prevent over-regulation by multiple adjacent ministries which can hinder growth.
- **Subsidise training of vulnerable climate entrepreneurs on financial literacy** such that they can meet the bureaucratic requirements of commercial loan providers and remit taxes.
- **Mandate monitoring and evaluation of environmental and social impacts** among climate entrepreneurs to create an attractive environment for impact-driven investors.
- **Incentivise cooperation among businesses and specialisations** to consolidate value chains while minimising the logistical and talent-recruitment burden on each business.
- **Encourage responsiveness to consumer needs** in the climate adaptation sector through incentive and subsidy mechanisms to promote long-term business sustainability.



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## Summary

Low- and middle-income countries, on the front lines of climate change impacts, rely on entrepreneurs to provide critical adaptation services (eg in the agricultural and energy sectors). However, the perspectives, motivations, and approaches of climate entrepreneurs are minimally documented, which prevents replication of their effective strategies at scale. This study therefore investigates the experiences of climate adaptation entrepreneurs in Kenya. We find that entrepreneurs are motivated to address climate adaptation issues both due to market gaps and their own underlying ideals and values.

They report that their businesses are already creating simultaneous environmental, economic, and social impact at a small scale. However, they face a lack of appropriate finance and technical capacity to support scaled-up implementation of innovation-heavy emerging climate technologies. Due to a lack

of awareness among consumers and regulators, they report resistance to novel offerings and both over- and under-regulation (ie a lack of technology-specific regulation while being bound to outdated regulation in multiple adjacent sectors eg energy, agriculture, transport). Nevertheless, they see opportunities for their businesses to expand via increased supply chain synergies, circular economy strategies, and consumer-centric subscription-based business models. To tackle challenges while growing the sector, regulation specific to emerging climate adaptation sectors is needed to minimise friction and create appropriate technology push and demand pull. If entrepreneurs are trained in financial literacy and supported in monitoring and evaluation, they could attract long-term impact-driven investment. A cooperative and consumer-centric business approach is seen as the most likely to succeed, and specialisation throughout climate technology supply chains is seen as a way to accelerate progress.

## Introduction

Entrepreneurs are key players in enabling successful climate adaptation [1]. Their economically sustainable adaptation offerings are critical in low- and middle-income countries which are on the front lines of climate change and suffer adaptation deficits [2]. Despite this, their perspectives and approaches remain minimally studied [3], and little data are available on successful business models in this context [4]. It is important to fill this data gap such that their best practices can be supported and replicated at scale. This must account for diversity, both in: (i) the approaches taken to meet adaptation needs, which vary based on social, economic, historic, and political factors [5]; and (ii) entrepreneurs themselves, as marginalised entrepreneurs have diverse motivations and face atypical challenges [6].

This work focuses on Kenya, a country with significant private-sector focus within climate change policy. Kenya's Sessional Paper No. 3 of 2016 on climate change emphasises the opportunity of private sector engagement in climate change programmes and has the following key objective: "incentivize private sector involvement in building climate change resilience" [7]. The 2023 Amendment doubles down on this focus through specific provisions for carbon credits and markets [8]. Furthermore,

Kenya's National Climate Change Action Plan 2018-2022 called for capacity development in private sector organisations and vulnerable groups in climate change response and climate finance [9].

A large proportion of Kenya's private sector is driven by small- and medium-sized enterprises (SMEs), which generate approximately 30% of GDP [10], and agriculture, where climate adaptation is critical as evidenced in the Kenya Climate Smart Agriculture Strategy 2017-2026 [11]. The Government of Kenya is also placing significant focus on supporting entrepreneurs from marginalised demographics (eg women in the Kenya Industry and Entrepreneurship Project [12]). Given this significant policy focus on private-sector-led adaptation and diverse entrepreneurship, first-hand information from these entrepreneurs is critical to effective action.

**This brief therefore aims to recommend interventions which can encourage diverse entrepreneur-led climate adaptation in Kenya.** It examines entrepreneur perspectives on opportunities and challenges in the climate sector, best practices for developing a thriving business in this space, and the motivations for engaging in it.



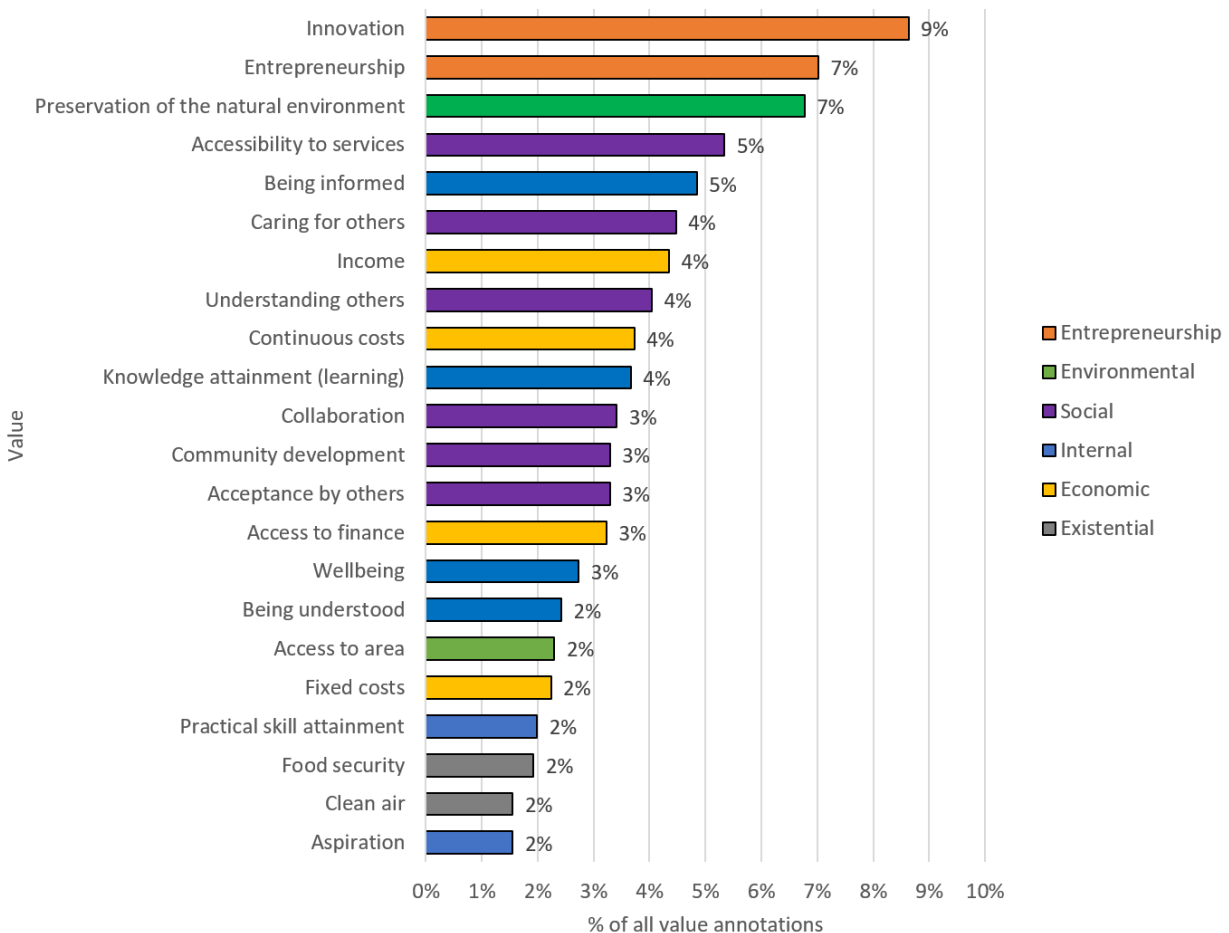
# Findings

## Motivations

The climate adaptation entrepreneurs we interviewed were motivated both by gaps in the market and the ideals they hold. They discussed how they perceive gaps and issues in current markets, and either know of existing solutions or want to create locally relevant and affordable solutions. Simultaneously, they expressed a desire to create a better life that aligns with their ideals and values. This broadly aligns with the international literature (ie [16]), which also finds entrepreneurs’ values to be a key motivator to engage in this field. The values most frequently discussed by entrepreneurs span social,

environmental, economic, personal/internal, and existential concerns (see Figure 2). Aside from innovation and entrepreneurship, which are considered separately as explicitly entrepreneurial values, preservation of the natural environment, accessibility to services, being informed, and caring for others are some of the key values discussed in relation to their businesses. These results indicate a mix of “climate opportunists” (with short-term economic motivations), “traditional entrepreneurs” (with long-term socio-environmental motivations), and “integrative entrepreneurs” (with mixed motivations) throughout the sample [16].

**Figure 2: Values discussed by entrepreneurs during interviews in relation to their business impact and motivation. These have been inductively categorised into explicitly entrepreneurial, social, environmental, internal, economic, and existential value groups.**



## Impact Potential

**Climate adaptation entrepreneurs reported that they are already creating simultaneous economic, environmental, and social impact.**

Various interviewees had different perspectives regarding their economic impact, which included creating affordable and quality goods, increasing the agricultural output of their clients, promoting resilience in agricultural businesses, and providing second income sources (eg by providing tools such as e-bikes which can become income generating tools for climate-vulnerable farmers). Environmentally, they claimed to be reducing pollution, conserving water and forests, decreasing food and water wastage, managing waste, and reducing overall greenhouse gas emissions. Socially, they stated that their products increase income by improving farm yields, promoting inclusion of youth and low-income earners in the workforce (eg through farming education), providing solutions which serve the underprivileged in society (eg rural farmers), educating their clients on climate change, and providing affordable and clean energy.

*“ We see amazing results with the fertiliser, like people double or triple their output for a year, as well as reduce the use of pesticides ”* (R17, Biotechnology)

*“ By providing better prices for the fisher-folks, then increasing their climate resilience because there's a lot more income they may be able to diversify to other economic activities and reduce their total reliance on just fishing as a source of income ”* (R1, Renewable Energy)

*“ The first impact we have made is on the environment, and no pollution, no noise pollution or air pollution, removing carbon from the atmosphere ”* (R7, E-mobility)

*“ Well, saving forests is the main impact. So, for us, we are providing a cooking solution or an energy solution that will stop people from cutting down trees ”* (R12, Waste Management)

## Challenges to growth

**Climate adaptation entrepreneurs reported difficulties in accessing appropriate finance to grow their businesses.** In innovative market segments, patient capital, grants, and loans are needed, as research and development must often precede deployment so immediate returns cannot be expected. Entrepreneurs reported that such patient capital is not readily available. Impact investors and venture capitalists are one option, but securing these funds requires business acumen (ie the knowledge on how to write a proposal or create a pitch) and financial literacy, which entrepreneurs reported may be lacking. Additionally, such investors tend to invest in large businesses and not small entrepreneurs. There appears to be a missing middle between seed-scale grants and commercial finance options.

*“ Capital is not cheap, capital is not readily available, and capital may sometimes not be patient ”* (R1, Renewable Energy)

*“ The main reason we did not go with the loan option is that this money is not going towards purchasing something that will bring money back directly. That money is going towards research and development and testing of something, such that we're able to get financing and be able to significantly develop these devices ”* (R2, Renewable Energy)

*“ The youths and the women who are disadvantaged, unless they are in those government initiatives for disability, they won't get the financing. Because the financing is based on the company, the financial documents that you have. You need to submit bank statements ”* (R3, Renewable Energy)

**They also reported challenges in attracting the technical capacity to grow their businesses.**

The entrepreneurs we spoke with came from various backgrounds, such as technical fields,

business, or on-the-ground workers (eg in agriculture). They indicated that this is typical in the sector. Novel climate technologies often require specialised and uncommon skill sets; they indicated that, if you hold those skill sets, you probably also lack the required business/human resources acumen to run the company.

“ Well, the biggest risk is the limited knowledge base that we have with the current team. So yes, we have an agronomist, yes, we have someone handling the production process ... My colleague co-founder is a biosystems engineer ... but there's always things that are really beyond our scope of knowledge ” (R4, Biotechnology)

**A perceived lack of awareness across consumers and regulators leads to hesitancy to change, over- and under-regulation, and bureaucratic issues.** Entrepreneurs reported that consumers had both health and safety concerns about some technologies as well as a reluctance to change their daily habits. Regarding regulation, climate adaptation offerings are often in novel sectors which lie at the intersection of multiple traditional portfolios. As an example, e-mobility is governed by both existing energy policy and transport policy, yet neither adequately addresses e-mobility specifically. As such, the entrepreneurs reported frustration that they should somehow meet both sets of requirements, while also lacking guidance on sector-specific elements. This suggests a potentially unbalanced policy mix [17].

“ Is this thing safe? Can I use biogas that has been produced from poop? How safe is this water if I am eating vegetables that have been grown from recycled water? So, it is a big risk in terms of how people will accept these projects ” (R5, Waste Management)

“ People like to stick to their routine. So, getting a new product into that routine is not easy ” (R6, Biotechnology)

“ Our solutions are environmental, and issues to do with the environment are highly legislated ... But sometimes these policies become a hindrance in terms of our development ... some of the technologies that we're dealing with are new to some of the people that are supposed to be giving us okay ” (R5, Waste Management)

### Solutions and opportunities

**Climate adaptation entrepreneurs saw opportunities for market expansion via value chain synergies and circular economy strategies.** These entrepreneurs often find themselves fulfilling all aspects of their respective supply chains. They reported that they must act as the importer, distributor, maintenance officer, and infrastructure specialist. They highlighted inefficiencies in that, and would prefer cooperation and specialisation across businesses in the adaptation sector to avoid duplication of efforts. For instance, by adopting common import routes, or splitting electrical supply from sales of an energy-enabled adaptation technology, they perceived that each function could be met more effectively. Similarly, they discussed opportunities for circularity of waste (eg in agriculture, waste management, and biogas) to provide additional revenue streams.

“ I believe the best thing is to embrace a circular model where you are trying to make sure that nothing goes to waste, that everything has a use in the process or is able to be sold as a product so that you're able to close the loop and reduce your exposure as an entrepreneur ” (R18, Biotechnology)

“ If people started working together instead of against each other. So that you can make sure the whole industry or the whole value chain can benefit. But then you work on the whole value chain together, and you don't work as separate individuals. So, if you look at the value chain of whatever it is, every key player, every company

*within that value chain should work together. Because I think if you work together, you can solve a lot of problems that are there* ” (R17, Biotechnology)

*“ Like now a lot of the organic waste is dumped. And there are already more and more movements on like, what can we do with the waste? ”* (R17, Biotechnology)

**Entrepreneurs reported that the most promising business models in this sector are needs-based, relying on collaboration and integrated approaches, and involve pay-as-you-go models.** Entrepreneurs repeatedly highlighted that business models guided by consumer needs were the most effective, and that it is critical to the long-term sustainability of the business to solve a consumer problem. The entrepreneurs emphasised the importance of collaboration to business success, including with other businesses, NGOs, and with government via public-private partnerships. Finally, they highlighted that a subscription-based or pay-as-you-go model is most effective in providing consistent revenue while promoting affordability for the consumer.

*“ In the end, you need to solve a problem for a customer. That's the most sustainable kind of business ”* (R7, Food Retail)

*“ When setting up, the infrastructure is capital intensive and expensive ... so getting into a partnership with the government will give you an avenue where you have the infrastructure and you don't have to cater for a lot of the capital costs that are involved in setting up processing facilities ”* (R8, Agriculture)

**To address skills and knowledge gaps, supportive business and innovation ecosystems are seen to be essential.**

Entrepreneurs highlighted training, coordination, and funding channels in novel sectors as key gaps; supportive ecosystems can help with these aspects.

*“ The e-mobility concept is still new to people in Kenya ... Mostly, this is used in European countries. So we don't have enough people here who have the right skill set. So having to find people so that you can create a team is not as smooth as it would be if it was something that existed before ”* (R6, E-mobility)

## Recommendations

Based on the identified challenges to growth and potential solutions, a number of policy interventions are recommended which may support diverse entrepreneur-led climate adaptation in Kenya. These include technology-push, demand-pull, and systemic instruments [17].

The largest challenge identified by entrepreneurs was a lack of appropriate finance. To address this challenge, technology-push instruments, such as **grant schemes to scale climate adaptation businesses**, may prove useful to directly fill the finance gap. These should be designed to fill the

“missing middle” between seed-scale grants and large-scale commercial lenders. At the same time, systemic interventions such as **subsidised financial literacy training for climate entrepreneurs**, could help to facilitate access to resources which can further push technology development. As vulnerable entrepreneurs who run largely informal businesses often do not have the skills required to interact with formal finance systems or to motivate impact investors (eg in record-keeping or financial reporting), training these entrepreneurs on these topics could improve finance access. In a similar vein,

**regulation mandating impact monitoring among climate entrepreneurs** could

encourage impact investment. Impact investors can fill some of the missing finance gap, as they are less focused on immediate returns and more focused on social/environmental benefits. However, they require strong evidence of impact to justify investment. Enforcing rigorous impact monitoring could provide an attractive environment for impact investment.

Another challenge identified by entrepreneurs was a simultaneous lack of technical capacity and expectation to fulfil all the roles across supply chains. To address this challenge, policies could be implemented to **incentivise cooperation across companies and encourage specialisation**. For instance, systemic instruments could be implemented which provide import tax breaks for companies who

use a common importer as opposed to setting up multiple technology import arrangements. This has the potential to alleviate some capacity constraints, as small-scale companies will not need to attract so many kinds of specialised talents to fulfil entire supply chains, increasing their business efficiency.

Entrepreneurs reported that consumer-centric business models are seen as most effective in this sector. To **push businesses to respond to consumer needs**, breaks may be given to businesses which support documented climate challenges at a local level. Meanwhile, uptake of these products or services could be **subsidised at the household level**, creating a demand pull. These breaks and subsidies should be calibrated to provide appropriate technology push and demand pull to fulfil needs without saturating the market or discouraging novel and creative climate adaptation business.

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*Annex: Characteristics and pseudonyms of the entrepreneurs included in the study.*

#	Participant	Business	Products
1	Kithika	Renewable Energy	Ice and cold storage
2	Bahati	Agriculture	Drip irrigation technology, training smart agriculture
3	Amani	E-mobility	Electric vehicles
4	Dala	Agricultural Retail	Agro-inputs, eg technology, information for farmers
5	Emeka	Renewable Energy	Electric vehicles; solar systems
6	Matheka	E-mobility	Battery swapping service and electric bikes
7	Sahara	E-mobility	Electric buses and financing
8	Biko	Waste Management	Biogas technology
9	Duma	Agriculture	Vegetables
10	Asha	Agriculture	Virtual produce aggregation and information for farmers
11	Gitonga	Renewable Energy	Energy management systems and solar technology
12	Lule	Waste Management	Biogas systems
13	Gathii	Food Retail	Retail logistics, groceries
14	Juma	Water Management	Prepaid water systems
15	Kiio	E-mobility	Electric bicycles
16	Ekwee	E-mobility	Electric motorbikes
17	Ngina	Biotechnology	Fertiliser and insect protein, eg crickets and black soldier flies
18	Sulati	Biotechnology	Fertiliser and insect protein, eg black soldier flies,
19	Luna	Renewable Energy	Solar systems, smart monitoring devices
20	Mwendwa	Agriculture	Beehives, honey
21	Sauda	Waste Management	Art
22	Mueni	Agriculture	Eggs