Prosperous Land: Prosperous People:
Scaling finance for Nature-based Solutions in Kenya

Methodology document

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Introduction

This methodology document details the approach the study has taken to develop an investment pathway for land-based Nature-based Solutions (NbS) in Kenya. The analysis was structured around answering five key questions:

1) What is the cost-effective mitigation potential of NbS at country level?
2) What are the project- and jurisdictional-level costs and revenue potentials of different NbS measures?
3) What is the finance gap between current flows and what is needed?
4) Who are funders (public and private) and what are the financial mechanisms that will be most effective in unlocking the potential of different types of NbS activities in different country contexts?
5) What are the features of an enabling environment needed to bridge the finance gap?

The following note is structured according to the first four of these questions and describes the approach, data used and assumptions applied to calculate each step of the analysis.

1. Calculating the cost-effective mitigation potential of NbS at a country level

To understand the mitigation potential of NbS at a country level and how this could be scaled between 2020 and 2050, data from Roe et al. (2021)[1] and Roe et al. (2019)[2] was combined.

1.1 Estimating the average annual mitigation potential between 2020–2050

Roe et al. (2021) developed average annual mitigation potentials at a country level for the period 2020–2050 for 20 land-based NbS. This mitigation potential was compiled from "bottom-up" sectoral estimates and estimates from Integrated Assessment Models (IAMs). These technical estimates reflect the mitigation that could be delivered with available technologies, without considering other constraints.

The paper also provides estimates of the national cost-effective mitigation potential, which considers the mitigation potential that could be achieved at a cost of less than USD 100/tCO_2e. This is considered to be cost-effective as USD 100/tCO_2e sits centrally in the range of 2030 carbon price estimates and at the lower end by 2050, both under a 1.5˚C pathway. It is these cost-effective estimates which have been used for this analysis as they represent a more feasible mitigation potential.

1.2 Scaling the mitigation potential between 2020 and 2050

Roe et al. (2019) includes a roadmap of how the mitigation potential of each solution could scale over time from 2020 to 2050. This data was combined with Roe et al. (2021) to provide an estimate of the growth in annual cost-effective mitigation potential over time from 2020–2050. Table 1 details the estimated mitigation potential in each country, across snapshot years (2025, 2030, 2040, 2050).

NbS	2025	2030	2040	2050
Reduce deforestation	3.80	6.12	7.87	8.30
Reduce peatland degradation and conversion	0.37	0.59	0.76	0.80
Reduce mangrove loss	0.16	0.26	0.33	0.35
Forest management	-	2.14	3.82	3.90
Grassland and savannah fire management	-	0.01	0.01	0.01
Afforestation and reforestation	-	4.55	8.11	8.28
Peatland restoration	-	0.01	0.01	0.01
Coastal wetland (mangrove) restoration	-	0.02	0.03	0.03
Enteric fermentation	-	-	0.94	1.57
Manure management	-	-	-	0.01
Nutrient management	-	-	0.28	0.47
Rice cultivation	-	-	0.01	0.02
Agroforestry	-	4.49	8.02	8.18
Soil carbon croplands	-	3.87	6.93	6.86
Soil carbon grasslands	-	6.95	12.44	12.32

Biochar	-	1.81	3.24	3.21
BECCS	-	-	-	-
Food waste	1.53	2.67	4.00	4.44
Healthy diets	3.91	7.15	12.52	17.88
Clean cookstoves	-	0.49	2.59	5.18

Table 1: Annual cost-effective mitigation potential of land-based NbS up to 2050 (MtCO$_2$e per year)

2. Estimating the costs and revenues of NbS initiatives at a country level

A databook was created to compile the initiative-level estimated costs and revenues associated with rolling out the 20 land-based NbS measures, as defined by Roe et al. (2021), at a country level. Data was sourced through extensive consultation, real data from project developers or managers and literature review. As much information was compiled as possible, but the primary aim was to ensure all 20 solutions were captured from an initiative in the case study country itself. Where this was not possible, a suitable proxy was selected based on geographical proximity, similarity of the initiative and socio-economic status of the country.

The intention is for the databook to become a living database of the costs and revenues of NbS-enabling projects around the globe, offering detailed insights into the economics of implementing nature-based climate mitigation and unlocking essential co-benefits.

2.1 Data sources

The most complete data was leveraged from Food and Land Use Coalition (FOLU) relationships with organizations which were able to provide real cashflow data for existing initiatives. Additional data was gathered from publicly available databases and extraction of data from sources such as academic journals as well as reports or datasets from reputable institutions such as think tanks and governments. Data was sense-checked through an extensive consultation process with NbS experts.

In the case of two of the demand-side measures, the shift to healthy, sustainable diets and reducing food loss and waste, it was necessary to develop an alternative methodology since initiative-level data (such as the on-farm data used for agricultural solutions) was unavailable. These methods are detailed in section i) and ii).

2.2 Data collected

The databook records commercial and financial information about completed, currently operational or future initiatives that directly contribute to the 20 land-based mitigation measures. The following information was collected for each initiative:

- NbS name
- NbS category
- Country of implementation
- Cash flow category (costs or revenue)
- Sub-category of cost (detailed in Table 2)
- Project duration
- Period over which the cost is incurred
- Cost / revenue (USD per hectare or USD per tCO_2e)
- Total cost of the project
- Price year
- Total size of project (hectares)
- Data source

Cost information came in multiple forms, however. To get a complete, yet comparable understanding of project financials across the diverse spectrum of NbS, the following principles applied:

- Costs reflect the forest- or farm-level costs incurred when setting up an initiative and omit additional costs related to a certain form of investment, such as Measurement, Reporting and Verification (MRV) costs for carbon finance.
- Costs were split into the following categories: transaction, establishment, enabling, operational and opportunity costs (see Table 2 for more information).

- Revenue data was also collected when it was available. In some cases, proxy data has been used, e.g. to estimate revenue from carbon credits.
- Costs and revenues have been adjusted to 2020 values.
- Where information was not available on the years over which the cost was paid, assumed cashflow profiles were used for each measure.
- In instances where data was available in USD per hectare it has been converted to USD per tCO_2e using the mitigation density provided by Roe et al., 2021.

Cost/Revenue type	Category	Definition
Implementation	Establishment	These are the costs incurred to set up an initiative, such as: upfront labour, seeds, fertilizer, equipment hire or lease or purchase of land.
	Transaction	Costs incurred that support the initiative selection and investment process e.g. due diligence or legal fees.
	Enabling	Costs of activities that facilitate the deployment of an NbS activity at a scale typically going beyond an individual project (e.g. workforce upskilling).
Operation	Operations & Maintenance	The costs of operating and maintaining the NbS-enabling activities over time such as costs related to: ongoing labour, monitoring, seeds or fertilizer.
	Opportunity	The income private landowners would have received had the land set aside for NbS activities been used for something else, such as cropland or rangeland.
	Incremental	An increase in cost that occurs as a result of landowners transitioning from a conventional practice, towards a more sustainable NbS practice.
Revenue	Revenue	A source of income stream that comes from the implementation of a solution e.g. sale of a commodity.
	Incremental revenue	An increase or decrease in revenue that occurs as a result of landowners transitioning from a conventional practice, towards a more sustainable NbS practice.
	Carbon credit revenue	Income that is obtained from the production and then selling on of the carbon credits that are produced by a solution. These credits can either be reduction or removals based.

Table 2: Definition of the cost categories use in the databook

Opportunity costs have been calculated by considering the profits generated through production of the key commodity driver of habitat destruction. For example, the loss in profits from choosing to protect forests rather than using the land for unsustainable timber productions has been used for the opportunity cost for reducing deforestation.

For the agricultural solutions, costs of NbS practices have been compared to typical business as usual (BAU) agriculture or forestry, in order to understand what the additional cost or cost savings are over and above the costs being paid today. For instance, in the sustainable rice cultivation initiative the costs and revenues associated with lower input farming was compared to traditional rice farming. This allows for the analysis of what finance is required over and above what is going into conventional practices today.

2.2.1 Food loss and waste

Roe et al. (2021) defines reduce food loss and waste as:

> *"Emissions reductions from diverted agricultural production (excluding land-use change) from reduced food loss and wastage from all stages of production, distribution, retail, and consumption through the implementation of measures such as improved storage and transport systems, generation of public awareness, and changing consumer behaviors."*

In Kenya, there is not enough evidence on the precise interventions that are needed to reduce food loss and waste to the levels required. Therefore, it was necessary to focus on interventions from other countries which could be converted to a cost in Kenya. This calculation used data from the USA on food loss and waste interventions and the steps were as follows:

a) **Estimating the average cost of interventions at each stage of the supply chain.** Data from the ReFED Solutions Database[3] was used to create a long list of the cost of different food loss and waste interventions in the USA. These solutions included consumer education campaigns, decreased transit time and food temperature monitoring. The solutions were grouped by supply chain section and filtered to the most efficient solutions based on cost (less than USD 100 per tCO_2e) and mitigation potential (greater than 2 $MtCO_2e$). All solutions in the production stage were filtered out. An average cost was then calculated across the solutions in each supply chain stage. This yielded costs at the distribution, storage and processing stage to be USD 18 per tCO_2e on average and USD 14 per tCO_2e at the consumption stage. No cost estimate was made for the production stage.

b) **Calculating the total cost of initiatives to reduce food loss and waste**. A weighted average of the ReFED costs was taken based on the proportion of food loss and waste experienced in each section of the supply chain in sub-Saharan Africa.[4] This estimated a cost of USD 11 per tCO_2e to reduce food loss and waste in Kenya.

	Production	Distribution, storage and processing	Consumption
Proportion of food loss and waste	36%	59%	5%
Cost (USD/tCO_{2e})	N/A	18	14
Interventions	N/A	Assisted distressed sales, temperature monitoring	Buffet signage, consumer education campaigns, standardize date labels, improving food rescue

Table 3: The mitigation potential and split of food waste across the supply chain in Kenya and the cost of reducing food loss and waste in the USA.

2.2.2 Shifting to healthy, sustainable diets

Roe et al. (2021) defines the shift to a sustainable healthy diet as:

> *"Emissions reductions from diverted agricultural production (excluding land-use change) from the adoption of sustainable healthy diets: (a) maintain a 2250 calorie per day nutritional regime; (b) converge to healthy daily protein requirement, limiting meat-based protein consumption to 57 grams/ day; and (c) purchase locally produced food when available."*[5]

There is not yet sufficient evidence as to the specific interventions needed to shift diets in the case study countries, but the emerging evidence suggests a range of interventions are needed.[6] As such, within the constraints of the project it was not possible to develop a methodology that addressed every possible and necessary action. Instead, efforts were focused on interventions a) for which data could more easily be accessed, and b) that address changing the demand for sustainable diets, rather than just the production of more sustainable foods and ingredients. This was because it is assumed that the supply side is covered by the agricultural NbS (improved rice cultivation, agroforestry and improved soil carbon sequestration in grasslands in particular). The final shortlist of interventions to be costed was informed by interviews with key experts and comprises:

a) The cost of shifting public sector procurement to align with a healthy, sustainable diet.
b) The cost of launching public awareness campaigns designed to promote sustainable diets.
c) The cost associated with the growth of the alternative protein market over the next 30 years.
d) National health cost savings that result from the shift to sustainable diets.

a) Shifting public sector procurement

The following steps were taken to calculate how much it would cost to shift public sector procurement to sustainable diets:

- **Calculating the average cost of food per public sector meal in the UK**
  The number of meals provided by the public sector, and the amount spent on those meals, was estimated based on data found for the UK (data specific to Kenya was not available).[7] This study outlines the UK's public sector food spend and the number of meals this corresponds to. This allowed for the calculation of the cost per individual meal at USD 0.48.

- **Calculating the average cost per public sector meal in the case study country**
  The UK cost per meal was then converted to an estimate for each modelled country using a food price adjustment (comparing the food prices from the FAOSTAT database).[8]

- **Estimating the public food spend in the case study country**
  The cost per meal in the case study country was multiplied by the number of public sector meals provided in that country to yield the total public food spend. The number of public sector meals was based on the estimated number of meals served in state schools,[9] military personnel,[10] in prisons[11], and to the remaining public sector.[12]

- **Estimating the increase in cost associated with shifting to a healthy, sustainable diet**
  In alignment with Roe et al. (2021), information on diets was taken from Bajželj et al.[13] This study defines 12 regional diets both today (2014) and in the future (2050), breaking the future diet into a current trends projection and a healthy diets projection. The FAOSTAT Producer Prices database was used to calculate the cost of each diet in each country by averaging prices across each food group in the Bajželj diet scenarios.[14] These food prices were then used to calculate the cost of the current regional diets and the cost of a healthy, sustainable diet. The cost of shifting to the improved diet was therefore the difference between the two.

Country	Relative cost conversion	Number of public sector meals (billion)	Relative cost of a sustainable diet
Kenya	0.83	1.2	+29%

Table 4: Estimated food prices relative to the UK, number of public sector meals served each year in each country and the cost of a sustainable diet relative to the current diet in each country.

b) Public awareness campaigns

The second intervention explored was the cost of running a public awareness campaign regarding plant-based and reduced-meat diets. Due to the availability of data, the UK served as a reference case.[15] It was found that a UK public health campaign cost USD 7 million.[1] To estimate the equivalent costs in another country, GDP[16] and population size[17] were used to form a conversion (see Table 4).

Country	GDP conversion	Population conversion
Kenya	3%	75%

Table 5: GDP and population conversions, using the UK as the reference case, used to estimate the public awareness campaign costs in the case study countries.

c) Cost associated with the growth of the alternative protein industry

As identified in FOLU's *Tipping Points* paper, alternative proteins, both in their raw plant-protein form and the meat mimicking form will be critical products to shift consumer demand to a reduced meat, plant-based diet. [18] For this industry to expand to the scale necessary to support this shift in consumption, there will be a substantial need for investment in the infrastructure associated with processing and manufacturing alternative proteins.

- **Estimating the global investment need into alternative proteins by 2050**
  The Good Food Institute's *2021 State of the Industry Report* was used to estimate the global market size for meat and dairy alternative proteins over each decade to 2050.[19] The proportion of the revenues which would need to be reinvested to support continued market expansion to 2050 was then estimated based on the capital expenditure (CAPEX) investment as a share of revenues from FOLU's *Growing Better* report.[20]

- **Calculating the country-level investment need until 2030**
  To determine how much of this global investment would be borne by individual countries, the investment was split by projected GDP in the 2020s, assuming that the cost will be borne initially by countries with the financial capacity to scale alternative protein production.

- **Calculating the country-level investment need from 2030–2050**
  From 2031, it is assumed that the investment made by each country will transition towards the proportion of global cost-effective mitigation potential (as defined by Roe et al. 2021) that country represents. This means that by 2050, if Kenya makes up 1% of global cost effective mitigation potential for shifting to sustainable diets, it will bear 1% of the cost of diversifying the global protein supply.

[1] It was also found that USD 194 million was spent on advertising by crisps, confectionary and sugary drinks brands in the same year, which implies that the costs identified here for a public awareness campaign are likely to be an underestimate of what is needed.

d) Health cost savings from reducing excessive meat consumption

For countries with excessive meat consumption, it has been found that there can be public health cost savings due to a reduction in the number of red and processed meat related illnesses.[21,2] This data was used to estimate the public health cost savings which could be delivered per year by shifting to a healthy and sustainable diet. It is important to note that in Kenya, due to the fact that the average diet currently consumes less meat than the diet outlined in Bajželj et al.,[22] there are no health costs associated with a reduction of meat consumption.

2.3 Changing costs and revenues over time

The analysis considered the evolution of NbS costs and revenues over time, as a way of portraying the changes likely to occur as typically seen when new sectors grow, expand and strengthen over time. This generally results in an annual decline in costs, increase in opportunity costs and inflation of revenues. The approach taken to estimate the percentage change per cost and revenue category is detailed below:

2.3.1 Establishment, enabling and O&M costs

The change in establishment, enabling and O&M costs was estimated from consultation with energy and land use experts and drew upon the Energy Transition Commission's analysis of decarbonization pathways and associated requirement for carbon dioxide removals.[23] The change was assumed to be the same for each country. The following principles underpinned the assumptions:

- Establishment costs for technology-dependent solutions, e.g. clean cookstoves, will decrease to 2050 due to economies of scale and reducing technology costs. This also included cost decreases associated with inputs.
- Establishment costs for solutions with large land dependencies would increase as cheaper land would get used up first, leaving land harder to reach or develop.
- Enabling costs would decrease to 2050 as NbS practice become more common place and therefore require less farmer training.
- O&M costs were assumed to decrease as a result of efficiency improvements and reducing technology costs, e.g. monitoring soil organic carbon.

2.3.2 Opportunity costs

Solutions which have opportunity costs associated with them, involve transitioning the land away from the production of a commodity and towards the protection, management or restoration of forests, mangroves and peatlands. The opportunity cost is therefore the loss in profits from implementing the NbS rather than producing the commodity. For each relevant solution, the most common commodity driving ecosystem damage was selected and the future change in price of that commodity estimated (see Table 6). A summary of the methods used are below:

NbS	Commodity	2025	2030	2040	2050
Reduce deforestation	Timber	110%	120%	120%	120%
Reduce mangrove loss	Key crops (sugarcane, maize)	108%	115%	130%	145%
Reduce peatland degradation and conversion	Key crops (sugarcane, maize)	108%	115%	130%	145%
Forest management	Timber	110%	120%	120%	120%
Afforestation and reforestation	Timber	110%	120%	120%	120%

[2] Given that the shift in meat consumption outlined in this paper is less than the one modelled in the Roe et al. study, we consider these figures to be a potentially conservative estimate.

Coastal wetland (mangrove) restoration	Timber	110%	120%	120%	120%
Peatland restoration	Key crops (sugarcane, maize)	108%	115%	130%	145%
Rice cultivation	Rice	106%	112%	126%	139%
Agroforestry	Coffee	106%	113%	128%	143%
Soil carbon croplands	Rice	106%	112%	126%	139%
Soil carbon grasslands	Beef	105%	110%	109%	109%

Table 6: The opportunity cost change of NbS initiatives in Kenya from 2025–2050.

- The change in cost of timber was estimated from the price increase related to the higher price that could be demanded if farmers were to produce certified (Forest Stewardship Council) wood. Estimates suggest a 20% price premium on average.[24]
- The change in the cost of land-based agricultural commodities was based on price projections from the IFPRI IMPACT model's Reference scenario[25] to understand how commodity prices would change to 2050 in each country. The world average price change in 2030 and 2050 compared to 2010 for each commodity was used to calculate the price change relative to 2020 for our four snapshot years.

2.3.3 Revenue from carbon credits

The change in revenue potential from carbon credits was inferred from carbon price projections made by Climate Focus in their medium price scenario.[26] This analysis considered the percentage increase in price compared to 2024 (as this was greater than the 2020 base carbon prices used).

	2025	2030	2040	2050
All solutions	129%	171%	257%	321%

Table 7: The increase in revenue from carbon credits from 2025–2050.

2.3.4 Non-carbon revenue

The change in non-carbon revenue streams to 2050 was estimated through expert judgement. This was based on:

- Whether there was a revenue stream associated with the archetype initiative.
- The breadth of commercially viable business models for the solution and therefore, if there could ever be a revenue stream associated with that solution.
- Whether the viable business models could generate high (>10%), medium (>5%) or low (>0.1%) returns (see section 5.1 for how this was used).

3. Calculating the investment gap between what finance currently flows into NbS and what is required by 2050

The total investment required over four snapshot years (2025, 2030, 2040 and 2050) to achieve the cost-effective mitigation potential for each solution was estimated by combining the cost-effective mitigation potential and the initiative cost per tCO_2e in each year. By considering the current flows of finance into NbS in that country, the investment gap is calculated. The diagram below depicts these steps and the key inputs and outputs of the analysis:

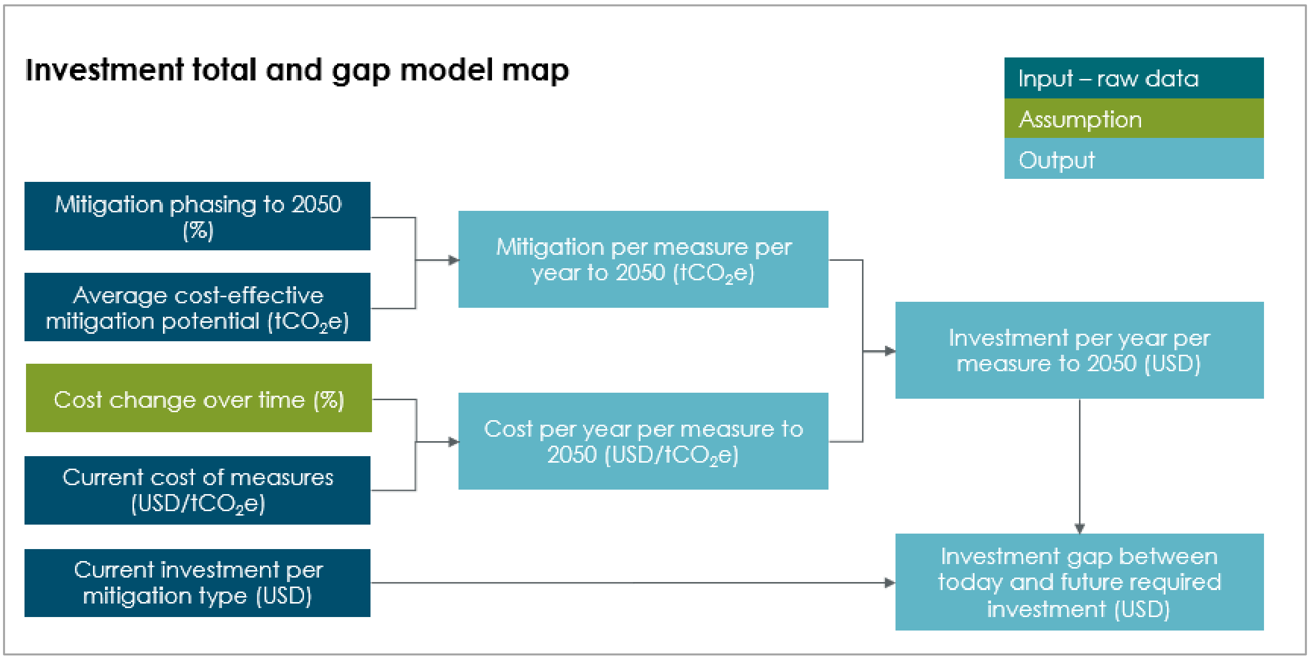

Figure 1: A model map depicting the key inputs and outputs of the investment total and gap analysis.

3.1 Estimating required flows of finance into NbS by 2050

In line with Roe et al., (2019), this study assumes that initiatives do not all start today. Therefore, the first step was to estimate the initiative costs which would be borne for initiatives starting in each snapshot year, i.e. the year 1 costs of implementing a clean cookstoves project in 2030 is likely to be cheaper than 2025 due to reducing technology costs. This was calculated by multiplying the cost of each solution in each year of the 30-year initiative from the databook, by the assumed change in cost in each snapshot year.

These costs were multiplied by the mitigation potential generated through projects in each project year and each snapshot year to calculate the total investment need in each snapshot year.

3.2 Estimating the existing flows of finance into NbS

In order to estimate the investment gap, the current finance flows into NbS were analysed. This used publicly available data published by government agencies, NGOs and private consultancies. Based on the availability of data a range of information from 2018–2021 was used. Once relevant data was identified, investments were aligned with the relevant NbS categories. The investments were then further split between public and private finance flows by identifying instruments used to disperse finance.[3] Findings were validated by consulting subject matter experts.

3.2.1 Current finance flows from the voluntary carbon market (VCM)

Firstly, the analysis estimated the finance flows from the Voluntary Carbon Market (VCM) in each country. 2021 VCM issuance figures were used to provide a recent reflection of the growing VCM. The Gold Standards and VCM database were used to gather the total number of issuances[27,28] and the *Ecosystems Marketplace: State of the Voluntary Carbon Markets 2021 Instalment 1* report was used for average credit price per tonne.[29] For each country, project issuances were multiplied by the relevant category average prices to provide a total estimate of finance flows for 2021. Prices and relevant categories can be found in Table 8.

Category	Project	USD
Forestry and Land Use	REDD+	4.4
	Afforestation	8.1
Agriculture (Grassland and Rangeland Management		1.3

Table 8: Average credit price per tonne August 2021.

3.2.2 Non-VCM finance flows in Kenya

The second step was to look at the wider flows of finance into NbS in Kenya. This was largely based upon data provided in *The Landscape of Climate Finance in Kenya (TLCF)* report by the Republic of Kenya's Department of National Treasury and Planning.[30] This report looks at the progress made by the Republic of Kenya on their Nationally Determined Contributions (NDCs) and is partially based on the National Climate Change Action Plan (NCCAP) (2018–2022) by assessing the 2017/18 fiscal year flows of finance.

Only investment in activities relevant to NbS measures were taken into consideration for this methodology. Further, dependent on the availability of data, public and private investments relevant to NbS measures are also included. The NCCAP does not include any activities relevant to BECCS. Therefore, no public or private flows of finance for BECCS measures were collected.

The Landscape of Climate Finance in Kenya report estimated an overall spending of agriculture, forestry and other land use (AFOLU) at USD 6.63 million, with forestry accounting for USD 31.55m. However, the report did not provide a breakdown by specific NbS activities. To make an estimate of the breakdown by activity, the NCCAP was used.[31] This outlined the percentage split of finance for AFOLU activities and was applied to the reported fiscal year 2017/18 spending for each activity.

To then further breakdown the finance flows by source, the total reported breakdown of AFOLU public and private flows from the TLCF in Kenya was applied to the total relevant NbS spending. For example, private finance accounted for 21% of AFOLU finance flows. Within private finance, Kenyan banks contributed 15%, listed companies 2.2%, non-listed companies 2.2% and international grants 1.4%. This breakdown was applied to NbS level spending.

[3] A key limitation of this piece of analysis relates to the lack of data on private finance flows into NbS in Kenya. It is assumed that the figure presented will be an underestimate.

The results of these calculations can be seen in Table 9, which shows the estimates for finance flowing into various NbS categories by the different type of investor.

Source of finance	Total USD million	Proportion of total
Private international grants	<1	1%
Domestic private sector – non-listed companies	1	1%
Domestic private sector – listed companies	1	1%
Domestic banks	9	10%
Public international equity	<1	1%
Public international grants	4	4%
Public international debt	14	16%
Public government budget	30	33%
Voluntary Carbon Markets	30	33%

Table 9: NbS finance flows for Kenya 2018–2021. Figures in million USD.

3.3 Estimating the gap in finance flows into NbS by 2050

The finance gap was estimated between the calculated investment requirement across the four snapshot years and the current finance flows per NbS category. It was also possible to further break this down for the agricultural measures, by considering what proportion of the investment would require new sources of finance and how much already exists within investments into current business-as-usual agricultural practices. This was calculated by taking away the total incremental cost needed in each snapshot year and the total current finance from the investment total.

4 Estimating a feasible investment pathway for financing NbS until 2050

Once the total investment need to 2050 was calculated, the next stage of the analysis looked to develop a potential investment pathway for financing each solution between 2025 and 2050. This involved matching NbS business models to financial instruments which could be used to fund them, and then matching instruments to public and private investors.

4.1 Defining financial instruments which could finance NbS

The first stage required determining which financial instruments could be used to finance NbS initiatives and what their typical characteristics would be. Profiles were compiled through a combination of literature review and expert consultation. The factors used to create the profiles can be seen in Table 10 and the profiles in Table 11.

The instruments considered were:[4]

- Grants
- Equity
- Concessional debt
- Non-concessional debt

Factor	Definition	Category	Maximum threshold
Investment risk	the ratio of start-up costs (transaction, establishment and enabling costs) over the total cost of the initiative in any given year.	Any	None
		High	80%
		Medium	65%
		Low	50%
Risk/return profile	the number of standard deviations the revenue generated by an initiative is in a given year.	Any	None
		High	2
		Medium	1
		Low	0.5
Return expectations	compares to the returns generated by the initiative being considered. This comparison is conducted with multiple timeframes in mind, for investments of 0–5 years, 5–10 years and 10–15 years.	Any	None
		High	9%
		Medium	5%
		Low	0.1%

Table 10: The factors used to define the financial instruments and their thresholds.

[4] Beyond value-chain mitigation (BVCM) also appears in Table **1** and as an investor in the results, but is not defined or considered in the same way. Instead, the methodology for determining investment from BVCM was developed separately and its contribution to NbS investment taken as an input in the models. See page **19** for more on this methodology.

Instrument	Investment risk	Risk/return profile	Return expectations
Grant – finance that does not seek a financial return on investment. Supply-chain finance is a subset of this instrument, where AFOLU sector corporates are disbursing grant finance to their supply-chain.	Any	Any	None
Equity – finance that purchases a stake in the initiative, with high return expectations and a high appetite for risk.	Any	High	High
Concessional debt (CD) – debt finance that has return expectations below the market rate, and so is a comparatively 'cheap' form of finance for initiatives. Can be used to de-risk investments.	Medium	Medium	Low
Non-concessional debt (NCD) – traditional debt finance at market rates.	Medium	Low	Medium
Beyond value-chain mitigation – finance from corporates outside of the AFOLU sector seeking mitigation outcomes, not a financial return on investment.	Any	Any	None

Table 11: Key information on the instrument profiles developed through literature review and interviews.

4.2 Defining investors which could finance NbS

The next step was to determine which investors could use each financial instrument and what their typical characteristics would be. These profiles were compiled through a combination of literature review, interviews and a survey sent to investors, all to try to understand their particular investment priorities. The factors used to create the profiles can be found in Tables 12–15, whilst the profiles are in Table 16.

The investors considered were:[1]

- Domestic government
- Domestic and international corporates
- Development finance institutions
- Pension and sovereign wealth funds
- Insurance companies
- Retail and commercial banks
- Credit unions
- Trading houses and brokers
- Private equity funds
- Venture capital and angel investors
- Impact investors
- Philanthropies and high net-worth individuals

The different categories by which each investor was defined were:

- **Risk appetite:** a combination of investment risk, defined above, and country feasibility, based on the methodology developed by Climate Focus.[32]

Risk appetite	Investment risk – maximum threshold	Country feasibility – minimum threshold
Low	5%	75
Medium	10%	50
High	None	None

Table 12. Minimum and maximum risk appetite thresholds for investors.

- **Length of investment:** describes how long an investor is willing to hold an investment for. Timeframes considered are 0–5 years, 5–10 years and 10–15 years, or a combination of the three.

- **Return expectations:** compares the return expectations of an investor with the returns generated by the initiative being considered.

Return category	Minimum threshold
Any	None
High	10%
Medium	5%
Low	0.1%

Table 13: Minimum return expectations for investors.

- **Size of investment:** the range of investment sizes this investor can make. The minimum investment size classes used in the model are (in million USD): 0, 1, 5, 10, 20 and 30. The investment size is dependent on the initiative size (i.e. whether implementing a particular NbS on a small, medium or large farm).

	Size	Size(ha)	Proportion of total
Farm size (ha)[33]	Small	2.5	66%
	Medium	48	19%
	Large	200	15%
Herd size (head of cattle)[34]	Small	4	68%
	Medium	10	19%
	Large	30	12%
Project size (ha)	Small	421	25%
	Medium	6049	50%
	Large	35100	25%

Table 14: Spread of farm, herd and project sizes in Kenya.

Project aggregation

Assumptions have been made about how the initiatives could be aggregated together to provide investors with a package of solutions that can be financed through a sole investment. This allows investors to overcome the issue of prohibitively small investment sizes. No assumptions are made about how small, medium and large initiatives themselves may change in size over the course of the transition.

The increasing trend of aggregation can be seen in Table 18, with indications of the corresponding aggregator's size taken from Kenya. The result of this is that by 2050, 94% of farm and improved forest management initiatives sit within an aggregator.[5]

Year	Number of aggregators	Proportion of initiatives per aggregator	Size of each type of aggregator in Kenya		
			Arable farm area (ha)	Pastoral farm (# animals)	Ecosystem project area (ha)
2025	0	0.0%	0	0	0
2030	10	0.1%	4,430	15,775	137,690
2040	25	1.0%	44,300	157,748	1,376,900
2050	47	2.0%	88,600	315,496	1,376,900

Table 15: Table identifying the number of aggregators in each snapshot year, and the proportion of initiatives that exist within each aggregator.

- **Requirements on maturity of investment:** it was understood that different investors were comfortable with or able to invest in initiatives at different stages of the business' lifetime. The maturity was defined as follows:

Business maturity	Definition
Start-up	Only costs incurred, no revenues yet generated.
Pre-seed	Revenues generated annually, but still less than annual costs.
Growth	Annual revenues surpass annual costs.
Mature	The business breaks-even, with cumulative revenues surpassing cumulative costs.

Table 16: Investment stage maturity considered by investors.

[5] Aggregators could come in many forms – for example, this research has highlighted cooperatives, landscape-level carbon projects and supply chain investments that all achieve a level of aggregation.

- **Importance of other "core" benefits:** it was understood that some investors consider non-financial returns (e.g. social and environmental) when making decisions, including:
    - Human development/poverty alleviation outcomes
    - Climate adaptation and resilience
    - Biodiversity
    - Health/nutrition
    - Food security
    - If the solution is able to generate carbon credits

Investor category	Size of investment (USD amount)	Length of investment	Return expectations	Requirements on maturity of investment	Importance of "core" benefits	Instruments				
						Grants	Equity	CD	NCD	BVCM
Government of Kenya	Any	Less than 10 years	Any	None	High	✓		✓	✓	
Domestic and international corporates	Any	Any	Any	None	High	✓	✓	✓	✓	✓
Development finance institutions	Any	Any	Any	Up to, but not including, maturity	High	✓		✓	✓	
Pension and sovereign wealth funds	> USD 5 million	Any	Low	Growth and mature stages	High		✓	✓	✓	
Insurance companies	> USD 5 million	>5 years	Medium	Growth and mature stages	Low			✓	✓	
Retail and commercial banks	< USD 30 million	>5 years	Medium	None	Low			✓	✓	
Credit unions	< USD 20 million	<10 years	Low	Up to, but not including, maturity	Medium			✓	✓	
Trading houses and brokers	> USD 1 million	< 5 years	Medium	Growth and mature stages	Low		✓		✓	
Private equity funds	> USD 5 million	<10 years	High	From pre-seed to mature	Low		✓			
Venture capital and angel investors	<USD 30 million	< 5 years	High	Start-up and pre-seed	Low		✓			
Impact investors	< USD 30 million	< 10 years	Low	From pre-seed to mature	High		✓	✓	✓	
Philanthropies (incl. high net-worth individuals	< USD 10 million	All time horizons	Any	Start-up and pre-seed	High	✓		✓	✓	

Table 17: Key information on the investor profiles developed through literature review, surveys and interviews.

4.3 Assessing the alignment of each instrument and investor to NbS

Given the definitions of each instrument and investor, the analysis was designed to give a score that indicates how aligned an instrument or investor may be with each NbS. This takes into account both the snapshot year (e.g. 2025, 2030, 2040 or 2050), and the breadth of initiatives that there may be in that year. For example, in 2025, there will be five years' worth of initiatives; ones that were started in 2020 and are now five years old through to ones started in 2024 that are only one year old. In 2050, there will be 30 years' worth of initiatives, from those started in 2020 which are now 30 years old, to those started in 2049 which are only one year old.

4.3.1 Scoring instruments

The instruments were scored across the three factors, with failure in any one category enough to deem that an impossible combination. To take an example, if a biochar initiative in year 1 scored within the acceptable range for investment risk, risk/return and return on investment for an equity investment, then that will result in a score of 1. If it failed in one or more of the categories, this combination would score 0. The matching exercise was conducted three times, for the three different timeframes considered: 0–5 years, 5–10 years and 10–15 years. Thus the summary of the exercise would give a score from 0–3 for each combination of instrument and initiative. The scores were then summed across the number of initiatives in that year (e.g. across all five years' worth of initiatives in 2025), giving a final score indicating the alignment of an instrument with a specific NbS in each snapshot year.

4.3.2 Scoring investors

A similar exercise was conducted for investors. Here, only a selection of the defining categories were deemed important enough to nullify an investment – these are referred to the 'no-go categories', and are:

- Ticket size
- Return on investment
- Project maturity
- Investment risk

All of these were assessed with the investor's investment time horizon in mind. For example, when assessing ticket size we considered investments that lasted for between 0–5 years, 5–10 years and 10–15 years.

4.4 Calculating a potential investment pathway for NbS

The total investment requirement first removes the proportion of the financing which might come from corporates engaged in beyond value-chain mitigation (as this is deemed to be a "feasible" estimate). The remaining investment then used the alignment calculated above to determine the contribution of each other instrument and investor. This was combined with assumptions on: how initiatives aggregate over the next 30 years, investors' spending limits, GDP growth (both domestically and internationally) and the priority assigned to different instruments and investors. The result was a potential investment pathway for NbS between 2025 and 2050. Figure 2 shows a model map depicting the key inputs, assumptions and outputs of this analysis.

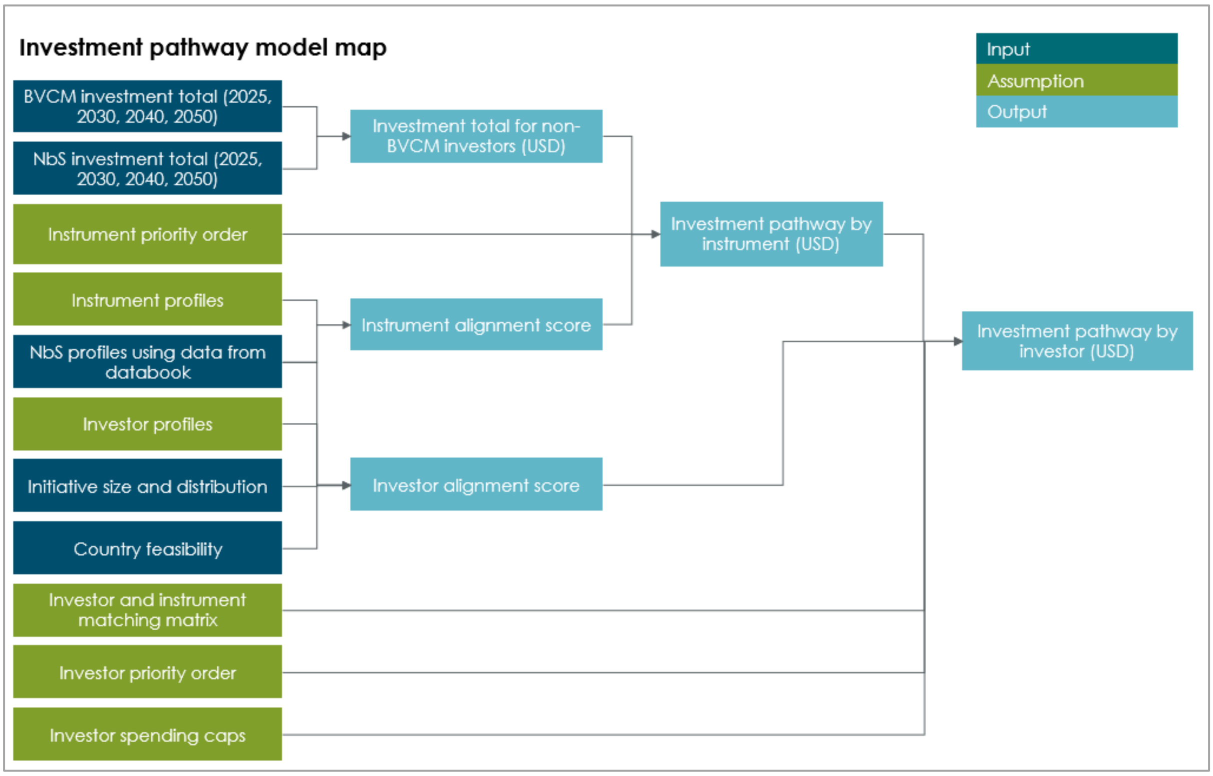

Figure 2: Model map displaying how the different inputs and assumptions combine, resulting in the investment pathway output.

4.4.1 Beyond value-chain mitigation (BVCM) investment

A portion of future investment in NbS will come from corporates which wish to neutralize their residual emissions at their net-zero target date or contribute to societal net-zero by engaging in mitigation outside of their own value chain (beyond value-chain mitigation or BVCM). This investment could be channelled through the carbon markets, however not exclusively. The demand for BVCM is likely to be related to the uptake of science-based and net-zero targets and therefore, this analysis estimates the demand for BVCM investment in NbS by considering:

a) The cumulative emissions of companies between 2020 and 2050 globally, assuming they set science-based targets (SBTs) – as defined by the Science Based Targets initiative (SBTi) – by 2030 and achieve net-zero emissions by 2050.
b) The percentage of these remaining emissions that will be matched by an equivalent tCO_2e of BVCM between 2020 and 2050.
c) The average proportion of BVCM which will be directed to NbS globally (splitting solutions by emissions reduction and emissions removal measures).
d) The proportion of this global demand which will lead to investment in NbS in Kenya.

a) Estimating the cumulative emissions of companies between 2020 and 2050 globally

According to the SBTi 2021 progress report, as of the end of 2021, 27% of "high impact companies" had set SBTs.[35] The assumption was made that this adoption rate was applicable to all companies, i.e. beyond high impact companies (excluding small- to medium-sized enterprises and financial institutions). Historic adoption rates were then mapped onto a bell curve, following the diffusion of innovation theory's distribution of adoption, to estimate the number of companies that would set SBTs and when.[36] It was assumed that all companies would set a SBT by 2030 due to regulatory requirements. The result was that, by 2030, 6651 companies, excluding small- to medium-sized enterprises and financial institutions, will have set a target.

The companies were then grouped into 16 cohorts based upon which year they had set their SBT. Cohort 1 being companies that had set their SBT in 2015, cohort 2 being companies that had set their SBT in 2016 and so forth, until cohort 16, who set their SBT in 2030. The emissions of each cohort were calculated using the average scope 1 and 2 emissions of the high impact companies who have set targets to date (2.5 million tCO_2e),[37] using high impact companies as a proxy for all companies due to the assumption that companies who have set targets thus far will be weighted towards lower impact ones. Scope 3 emissions were not included to avoid double counting.

The emissions of the companies over time were estimated, assuming a 90% reduction from 95% of scope 1 and 2 emissions by 2050 from the year they set their SBT, keeping 5% stable over time to be conservative.[38] The cumulative emissions of companies that set SBTs can be seen in Figure 3, with the cumulative emissions peaking at 12.6 $GtCO_2e$ in 2025 before declining to 2.4 $GtCO_2e$ in 2050.

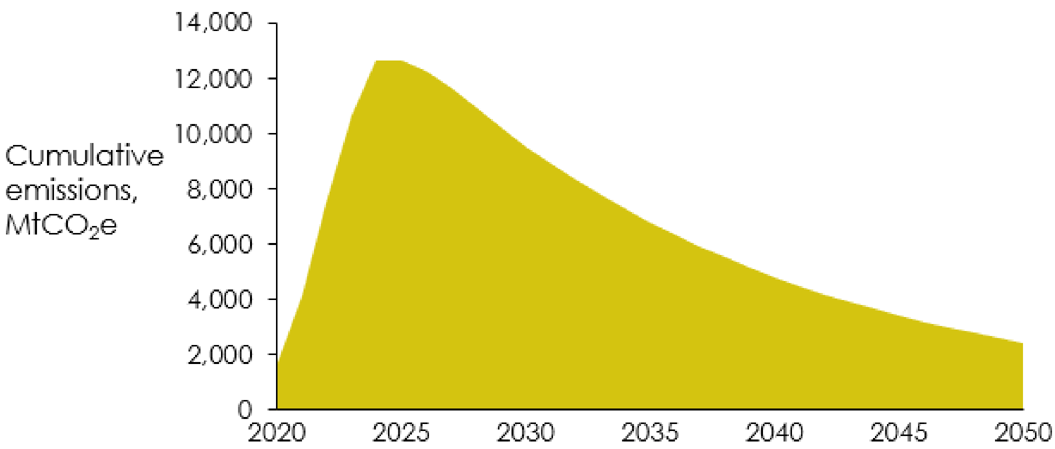

Figure 3: Translation of projections into estimated scope 1 and estimated scope 1 and 2 emissions covered by SBTi companies to 2050

b) The percentage of remaining/unabated emissions that will be counterbalanced through an equivalent tCO_2e of BVCM between 2020 and 2050.

It was assumed that cohorts that set SBTs in similar years follow similar BVCM journeys, in that they invest into mitigation beyond their value chains to match comparable percentage of their remaining/unabated emissions in the years after they set their SBT. The key assumptions underlying the percentage calculations were that:

- Earlier cohorts delay their BVCM investments, with the cohorts from 2015 to 2025 not investing in BVCM in the first three years after setting their SBT. The assumption being that societal shifts and pressure means cohorts post-2025 are incentivized to begin investment into BVCM at the latest two years after they set their emission reduction SBT.
- Once companies begin investing in BVCM they aim to achieve the Voluntary Carbon Market Initiative (VCMI) Bronze award, which (according to the VCMI provisional Claims Code of Practice) requires companies to invest in delivering BVCM equivalent to 20% of their unabated tCO_2e scope 1 and 2 emissions.[39]

- In 2030, the VCMI Bronze award will have ratcheted ambition, now requiring all companies to invest in delivering BVCM equivalent to 50% of their unabated tCO_2e scope 1 and 2 emissions.
- By 2040, the VCMI Bronze award will have ratcheted further, now requiring all companies to invest in delivering BVCM equivalent to match 75% of their unabated tCO_2e scope 1 and 2 emissions.
- Later cohorts adopting SBTs are considered as "laggards" (as per the diffusion of innovation adopter categories) and as such are less incentivized to voluntarily invest in BVCM.

These percentages were applied to the emissions of each cohort to calculate the tCO_2e mitigation being delivered through corporate BVCM investments to 2050. An adjustment was made to the demand in 2020 and 2021 to ensure that the demand data figures for carbon credits, which were 188 and 319 $MtCO_2e$ respectively,[40] in line with what had actually occurred in those years.

2020 Cohort		2025 Cohort		2030 Cohort	
Years post target being set	**Emissions balanced by BVCM**	**Years post target being set**	**Emissions balanced by BVCM**	**Years post target being set**	**Emissions balanced by BVCM**
1–3	0%	1–3	0%	1–10	50%
4–10	20%	4–5	20%	11–19	75%
11–14	50%	6–14	50%	20+	100%
15+	100%	15–20	75%		
		21+	100%		

Table 18: Percentage of emissions balanced by BVCM over time by cohort.

c) The average proportion of corporate investment into BVCM which will be directed to NbS globally

Current data and future assumptions about NbS in the carbon market were used as a proxy for future BVCM investment (noting that BVCM investments can be channelled via mechanisms other than the carbon market). Assumptions were made based on categorizing the carbon market into four groups; NbS removal credits, NbS reduction credits, non-NbS reduction credits and non-NbS removal credits.

In 2020, 8% of the carbon market demand was for removals and 92% was for reductions.[41] It was assumed that this 8% would follow a compound annual growth rate to reach 100% removal credits by 2045, with these removals credits being a mixture of NbS and non-NbS credits at this point in time. This is in line with IPCC guidelines which require significant amounts of carbon dioxide removals in the 2040s and 2050s for society to reach net-zero CO_2 emissions by mid-century.[42,43]

In 2020, NbS made up 33% of the demand for reduction credits and it was assumed that 100% of reductions credits will be NbS in 2040. This is based on the assumption that renewable energy generation emissions reduction credits will no longer be considered additional in lower income countries, as we have already seen in higher income countries under Verra and Gold Standard.[44,45]

Data from ETC (2022) was used to project the percentage split between NbS and non-NbS removals from 2020–2050, to calculate the removal credit percentage split over time.[46]

Combining the current trend data with future projections, allowed for the estimation of the global investment into BVCM split by NbS and non-NbS and removals and emission reductions between 2020 and 2050.

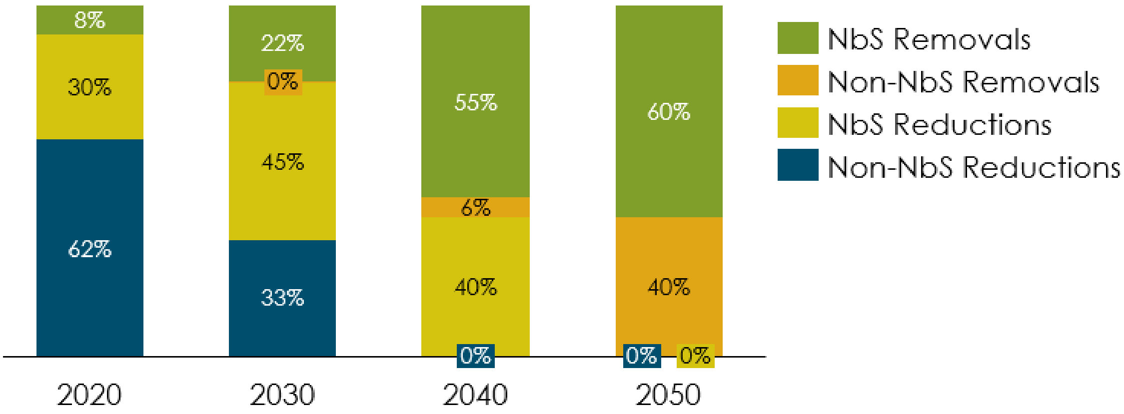

Figure 4: Percentage breakdown of four categories over time.

d) The proportion of global demand which will lead to investment in NbS in Kenya

The final step was to apportion the global investment into BVCM down to a country level. It was assumed that country-level demand for BVCM correlates with the mitigation potential of NbS. Therefore, using the cost-effective mitigation potential identified in Roe et al. (2021), the global BVCM demand was apportioned to Kenya based on its share of global mitigation potential.

Kenya's land-based emissions reduction and removal solutions make up 0.2% and 0.4% of the global total of the reduction and removal solutions respectively. Using this percentage, the global demand was apportioned down to Kenya, estimating the total demand for Kenyan reduction and removal mitigation from BVCM (in $MtCO_2e$). The demand was then attributed to the individual solutions based upon the percentage each solution made up of the total reduction or removal mitigation potential for each year.

The percentage the BVCM demand made up of the total mitigation potential of each solution was multiplied by the total investment requirement for each NbS to reach the BVCM investment requirement by 2050.

4.4.2 Key assumptions used to develop the investment pathway

The BVCM investment was subtracted from the total investment in each snapshot year and the remaining investment attributed to each investor based on alignment. The following assumptions were made to support this matching process:

a) Matching investors to instruments

Informed by discussions with investors and other financial experts, the instruments that investors are able to adopt were defined as shown in Table 19 below.

	Grant	Equity	CD	NCD
National, local and municipal governments	1	0	1	1
Development finance institutions	1	0	1	1
Public/private pension or sovereign wealth funds	0	1	1	1
Private/listed business	1	1	1	1
Insurance companies	0	0	1	1
Retail and commercial banks	0	0	1	1
Philanthropies (incl. high net-worth individuals)	1	0	1	1
Credit unions	0	0	1	1
Trading house and brokers	0	1	0	1
Private equity	0	1	0	0
VC and angel investors	0	1	0	0
Impact investors	0	1	1	1

Table 19: Investor/Instrument matrix that defines which instruments investors are capable of employing. 1 signifies an investor can use that instrument, whilst 0 means they cannot.

b) Instrument and investor priority

The order in which investors and instruments are considered in the analysis impacts the level to which an investor's preferences are taken into account. For example, investors who are considered early on in the split are more likely to have an assigned portfolio of investments that is strongly aligned with their investment priorities. For investors that are assigned a low priority, their investment portfolio will be strongly influenced by the remaining investment need, not just their own priorities.

The instruments were prioritized based on the highest applicability to multiple solutions. This is because grants are able to finance all solutions, whilst only some solutions generate the returns necessary for equity instruments. The prioritization is as follows:

1. Grant
2. Concessional-debt
3. Non-concessional debt
4. Equity

The order selected for the pathway places the investors who have tightest investment caps first:

1. Philanthropies (incl. high net-worth individuals)
2. Private/listed business
3. National, local and municipal governments
4. Development finance institutions
5. Credit unions
6. Impact investors
7. Retail and commercial banks
8. Public/private pension or sovereign wealth funds
9. VC and angel investors
10. Trading house and brokers
11. Insurance companies
12. Private equity

c) Investor spending cap

For certain investors, it was necessary to consider what is the maximum feasible investment to be expected. These investors were:

- Philanthropies and high net-worth individuals
- Domestic government
- Development finance institutions
- AFOLU sector companies

For philanthropies, government and development finance institutions the spending caps were informed by current spending and expected GDP growth. For AFOLU sector companies, the analysis used to determine the share of investment that they are responsible for given their value-chains was used as the upper-bound of their investment, i.e. companies would not invest more than that which they were responsible for. Table 18 shows the GDP growth assumptions used to scale current spending caps into the future.[47]

Country	GDP growth rate
International	3%
Kenya	5%

Table 20: Annual GDP growth rate both domestically and internationally.

Philanthropies

Country		Current spending	Proportion spent on NbS
Kenya[48]	Domestic	USD 1,318,439	29%
	International	USD 232,876,936	

Table 21: Information used to estimate the spending gap of philanthropies in Kenya.

Domestic governments[49]

Country	Current spending	Proportion spent on NbS			
		2025	2030	2040	2050
Kenya	USD 13,374,843,690	7%	12%	13%	11%

Table 22: Information used to estimate the spending cap of the Government of Kenya.

The proportion spent on NbS was adjusted to ensure that in each snapshot year, all the cost of the transition had been accounted for. Domestic governments are key investors capable of closing finance gaps with small changes in the underlying assumptions because they are strongly incentivized by the benefits delivered through NbS, have relatively large budgets and are able to use both grants and debt.

Development finance institutions[50]

Country	Current spending (USD)	Proportion spent on NbS			
		2025	2030	2040	2050
Kenya	USD 3,907,860,107	30%	45%	50%	55%

Table 23: Information used to estimate the spending cap of DFIs.

Similar to the adjustments made with domestic government spending, the proportion spent on NbS in each year was adjusted to ensure that the cost of the transition had been accounted for. The proportion was kept consistent across countries.

Agriculture, Forestry and other Land use (AFOLU) sector companies

The AFOLU sector is also defined as the Forest, Land and Agriculture (FLAG) sector by the SBTi. The maximum spend that the AFOLU sector would spend was calculated by estimating the proportion of the mitigation potential of each solution in each case study country which falls within the value chain of corporates, in line with the GHG Protocol definitions.[51] This was estimated by linking each solution to the most relevant commodity associated with the conventional alternative to the NbS (for example, in Kenya, shifting agriculture is the major driver of deforestation). It was then necessary to understand what percentage of this commodity is sold to market in the case study countries on average, and not consumed on farm. This proportion was assumed to enter into company value chains and therefore become the responsibility of these companies; therefore in the deforestation example, the proportion of shifting agriculture falling within AFOLU sector corporate value chains was assumed to be the responsibility of these corporates to protect from deforestation. As international and domestic AFOLU sector corporates seek to set SBTs and net-zero strategies, they will need to decarbonize and sequester emissions within their value chains – including through implementing NbS.

Data to inform these calculation assumptions varied by solution. The approach taken for each solution in Kenya can be found below. The 20 solutions have been sorted into 11 groups based upon the linked commodity:

a) **Reduced enteric fermentation, manure management and enhanced soil carbon grasslands**
Dairy was selected as the commodity most closely matched to these solutions given that the major source of enteric and manure emissions is from cattle, which take up the majority of Kenya's pastureland. 75% of Kenya's agricultural output is produced by smallholders and the assumption is that this figure is the same for the dairy industry.[52] 49% of dairy produced by smallholders is consumed on farm, meaning that the remaining 51% is sold to markets and enters into company value chains.[53] It is assumed that all the dairy produced by the 25% of famers who are non-smallholders is sold into market. This means that 63% of dairy produced in Kenya can be linked to company value chains.

b) **Nutrient management, enhanced soil carbon sequestration in croplands and biochar from crop residues**
These solutions are associated with crop production. Peatland degradation has also been included for Kenya, due to the link between food production and peatland degradation in Sub-Saharan Africa.[54] Due to data availability maize and kale were used as the commodity proxy. Using a similar methodology as outlined above, it was calculated that 46% of the mitigation potential linked to these solutions would be linked to company value chains in Kenya.[55]

c) **Shift to sustainable and healthy diets, reduced food loss and waste and agroforestry**
These solutions are directly linked to both livestock and crop-based farmland, with agroforestry potentially involving both crop-based and livestock-based systems, and with food loss and waste and the shift to sustainable and healthy diets occurring for all types of agricultural produce. Therefore, dairy, kale and maize were used as proxies, leading to an average of 50% of these agricultural products going to market in Kenya.[56]

d) **Sustainable rice cultivation**
It was not possible to find what percentage of rice produced in Kenya goes to market and therefore Benin was used as a proxy. In Benin, 23% of rice farming is subsistence based,[57] and so it was assumed that 77% of the mitigation from sustainable rice cultivation can be linked to company value chains in Kenya.

e) **Reduce mangrove loss**
According to Ministry of Environment, Natural Resources and Regional Development Authorities the main driver of mangrove degradation in Kenya is caused by the use of mangrove poles for either fuelwood or building materials.[58] These products are consumed at a local and subsistence level and thus it was assumed that 0% of the reduce mangrove loss mitigation potential is linked to company value chains in Kenya.

f) **Peatland restoration, afforestation and reforestation and coastal wetland restoration**
According to Roe et al. (2021), all these restoration activities occur on previously degraded land. Therefore, the assumption was made that 0% of the mitigation potential linked to these solutions will be within company value chains as degraded and unproductive land would not be located within the value chains of AFOLU sector corporates.

g) **Clean cookstoves**
The assumption has been made that implementation of clean cookstoves will solely occur at a household level and will thus not be linked to company value chains.

h) **Grassland fire management**
Lipsett-Moore et al. (2018), which is the basis for the mitigation potential of grassland fire management in Roe et al. (2021), solely looks at the potential of this mitigation measure within protected areas.[59] Given that protected areas are unlikely to fall within company

value chains, it is assumed that 0% of the mitigation potential is the responsibility of AFOLU-sector corporates.

i) BECCS

The assumption has been made that BECCS will likely be financed by companies looking to produce bioenergy. Therefore, the conclusion is that 100% of the mitigation potential from BECCS will be linked to company value chains. However, there is no mitigation potential for BECCS in Kenya.

j) Improve forest management

Rather than linking to a specific commodity, this approach tied to the percentage of forested land within company value chains. In Kenya, 4% of the total forested areas are plantations, with the assumption being that this 4% of land is located within company value chains.

k) Reduce deforestation

In Kenya, the key drivers of deforestation over the last five years were: shifting agriculture (94%), urbanization (2%), wildfires (2%), commodity-driven deforestation (1%) and forest management (1%).[60] Assuming that deforestation that is linked to commodity production sits within company value chains, 1% of deforestation will be linked to company value chains in Kenya. Shifting agriculture is defined as the loss of tree cover for the short-term cultivation of subsistence crops, with the assumption being that this is solely linked to subsistence farming. 34% of Kenyan smallholder farmers' produce goes to market meaning that an additional 32% of deforestation can be linked to company value chains. This gives the total value of 33% of the mitigation potential for reduce deforestation in Kenya falling within the value chains of AFOLU sector corporates.

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