

# ANNEX 3

Financial Assessment



# 2024

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**RE-GAIN: Scaling Solutions for Food Loss in Africa**

# Table of Contents

<b>1</b>	<b>Introduction.....</b>	<b>4</b>
1.1	Purpose and structure of the report.....	4
<b>2</b>	<b>Financial Analysis.....</b>	<b>5</b>
2.1	Background.....	5
2.2	Model and assumptions .....	7
2.3	RE-GAIN Programme Cost .....	10
2.4	RE-GAIN Programme Financial Cost Benefit Analysis (CBA) .....	12
2.5	Additionality and Catalytic Impact .....	17
<b>3</b>	<b>References .....</b>	<b>20</b>

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## LIST OF TABLES

Table 2-1 - Physical intervention demand per smallholder farmer household.....	8
Table 2-2 - Physical intervention effective market price subsidisation in % of market value. ....	8
Table 2-3- Physical intervention market value in US\$.....	9
Table 2-4 - Macro-economic assumptions in % .....	9
Table 2-5 – RE-GAIN Programme cost by component.....	10
Table 2-6: RE-GAIN Cost by Country in millions .....	10
Table 2-7 - Programme cost by country and intervention in US\$ million .....	11
Table 2-8 - Programme cost per year in US\$ million.....	11
Table 2-9: Ticket Size and terms.....	12
Table 2-2-10: Food loss reduction per country by crop % production .....	13
Table 2-11: Income with and without REGAIN in USD millions .....	14
Table 2-12: Net Cashflows “with” and “without RE-GAIN” .....	14
Table 2-13: Summary of REGAIN Programme discount rates .....	14
Table 2-14 NPV of the programme across countries (in USD millions) .....	16
Table 2-15: Impact of 0.5% change in discount rate on NPV .....	16
Table 2-16 - Beneficiaries reached over 5-year programme.....	17
Table 2-17 - Number of interventions enabled per country over 5-year programme.....	17
Table 2-18 - Market value of interventions enabled in US\$ millions .....	18
Table 2-19 - Catalytic Impact of RE-GAIN Programme - US\$ leveraged for every US\$1 spent.....	19

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## LIST OF FIGURES

Figure 1: Schematic Representation of Model 1.....	5
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Figure 2: Schematic Representation of Model 2 .....	6
Figure 3: Financial appraisal analytical framework .....	7

# 1 Introduction

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## 1.1 PURPOSE AND STRUCTURE OF THE REPORT

The purpose of this report is to analyse the RE-GAIN programme for its financial impact and the financial sustainability in different economic scenarios of the programme. This financial analysis looks at analysing – alongside the financial model in Appendix 1 – the financial ‘additionality’ and the ‘catalytic impact’ of the programme, **considering the programme’s goal of responding to the climate hazards and vulnerabilities affecting each country and the distinct challenges they pose for the selected crops, and to propose a set of solutions designed to address these concerns.** The analysis considers the country contexts, alongside the appropriateness of the solutions from an environmental, social, and financial perspective.

This report provides an overview of the key assumptions behind the model, as well as the key results of the analysis, including the exploration in different contexts.

This report should be analysed in combination with Part 2 of Annex 3, which provides an overview of the economic analysis of the RE-GAIN programme.

## 2 Financial Analysis

### 2.1 BACKGROUND

Smallholder farmers face several challenges to accessing effective agricultural practices and solutions to reduce food loss, including affordability, access to finance, market access, financial literacy and consumer awareness, as discussed in detail on Annex 2. Addressing these challenges and market failures requires a programmatic approach targeting various points along the agricultural value chain.

The RE-GAIN programme utilises a combination of ‘financial’ and ‘non-financial’ approaches to address these challenges and market failures to provide small-hold farmers with a set of physical solutions that target food loss reduction. Together, these approaches provide a top-down (financial) and bottom-up (non-financial) mechanism that address market failures and drive the adoption of sustainable agricultural practices and physical solutions. A detailed description of the programme design is available on Annex 2.

#### 2.1.1 Financial Approaches in the RE-GAIN programme

Financial approaches involve the application of financial models to address barriers to affordability, credit rationing, and access to finance identified in the RE-GAIN programme’s countries. Two types of financial models are proposed:

1. **Catalytic smart co-payments for smallholder farmers**, which aims to incentivize smallholder farmers to invest in FL-RS by subsidizing the cost of physical interventions, making them more affordable for the end consumer. This is presented on Model 1, presented in the image below and further discussed in detail on Annex 2.

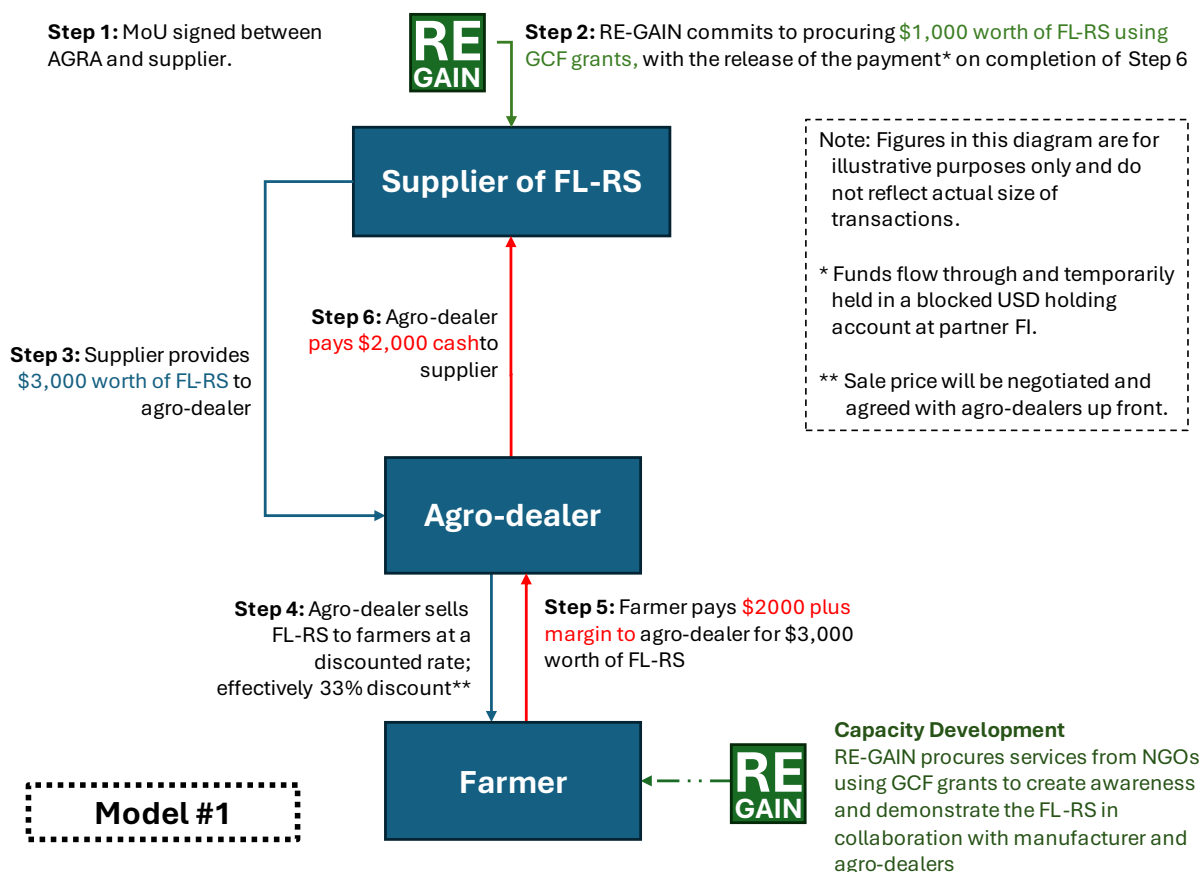


Figure 1 Schematic Representation of Model 1

2. **Catalytic smart co-payments for Agricultural MSMEs, including youth groups and cooperatives**, which are designed to address barriers related to collateral requirement , risk perception, and the lack of dedicated financial solutions available to MSMEs that want to invest in FL-RS that is offered to farmers through a fee for service model. These co-payments work by subsidizing and thereby reducing interest rates on loans for Agricultural MSMEs. This is presented on Model 2, presented in the image below and further discussed in detail on Annex 2.

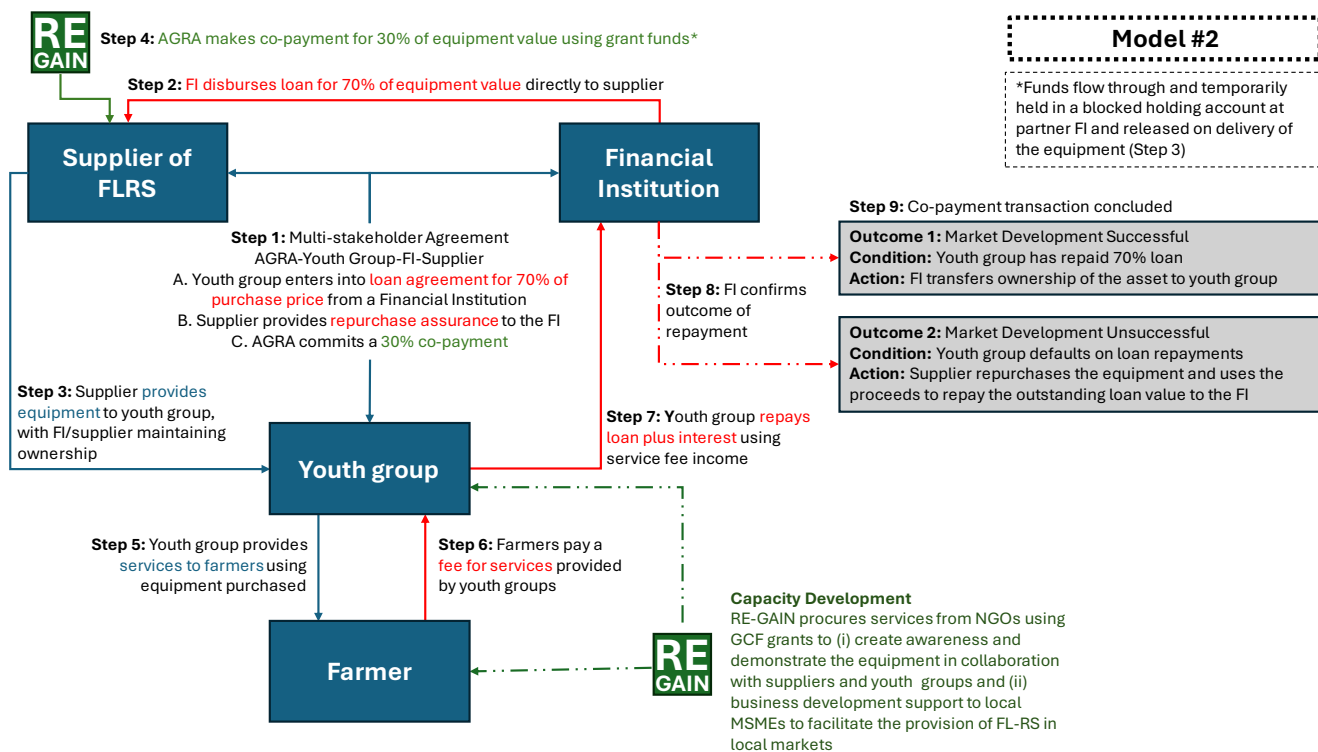


Figure 2 Schematic Representation of Model 2

This financial approach employs a top-down strategy to reduce barriers, ensuring that consumers can more easily access the food-loss reduction physical solutions.

### 2.1.2 Non-Financial Approaches in the RE-GAIN programme

Non-financial approaches involve building technical capacity, providing education, and disseminating information to promote the adoption and proper use of food-loss reduction physical solutions. This is achieved through educational materials, workshops, and demonstrations conducted by village-based agents (VBAs). These interventions help overcome a number of barriers to adoption of food-loss reduction solutions, including information asymmetry and poor financial literacy, encouraging consumer uptake and supporting the market for financial solutions. This strategy is part of a bottom-up approach that educates consumers and generates market demand at the grassroots level.

The purpose of the financial appraisal section is to illustrate the financial impact and sustainability of the RE-GAIN programme and requires an assessment of the programme's 'additionality' amongst other things. A framework is used to illustrate the relationship between the programme's key activities and its capacity to generate "additionality" as well as its "catalytic impact", which can be measured through the number and market value of FL-RS enabled through the programme (Figure 2). Furthermore, the financial sustainability of the programme is assessed across varying macro-economic scenarios.

	Barriers		Interventions		Programme Inputs	Programme Outputs	Impact	Financial KPI	
Component 1	Socio-economic	<ul style="list-style-type: none"><li>• Low financial literacy</li><li>• Gender disparities</li><li>• Informal financial practices</li><li>• Geographic accessibility</li></ul>	Non-financial	<ul style="list-style-type: none"><li>• Capacity building</li><li>• Demonstrations – village-based advisors (VBAs)</li><li>• Information dissemination</li><li>• Policy development</li></ul>	<ul style="list-style-type: none"><li>• Technical capacity building</li><li>• Hiring VBA</li><li>• Material and marketing</li><li>• Workshops</li><li>• Policy development and advisory</li></ul>	<ul style="list-style-type: none"><li>• Increased awareness</li><li>• Increase demand for physical interventions</li><li>• Improved financial literacy</li><li>• Reduced policy barriers</li><li>• Improved channels to market</li><li>• Increased market linkages</li></ul>	<ul style="list-style-type: none"><li>• Technical capacity building</li><li>• Hiring VBA</li><li>• Material and marketing</li><li>• Workshops</li><li>• Policy development and advisory</li></ul>	Additionality	Cost (market value) of physical solution adopted for every US\$ 'subsidised'
Component 2	Financial	<ul style="list-style-type: none"><li>• Lack of collateral</li><li>• High interest rates</li><li>• Credit rationing</li><li>• Limited financial products</li></ul>		Financial	Model1& 2 - <b>catalytic smart grants for smallholder farmers</b>	Grant to manufacturers – (subsidy)		Reduced cost to consumer	Sustainability
Component 3	Institutional	<ul style="list-style-type: none"><li>• Risk perception,</li><li>• limited rural outreach,</li><li>• bureaucratic processes</li></ul>	Model 3 - catalytic smart grants for Agricultural MSMEs including youth groups and cooperatives		Credit enhancing grant to financial institutions – (subsidy)	Cheaper credit and reduced risk associated with lending to agricultural SMEs			

**Figure 2: Financial appraisal analytical framework**

## 2.2 MODEL AND ASSUMPTIONS

A model has been developed to illustrate the financial impact of RE-GAIN programme, including the programme's catalytic impact within the seven participating countries, namely: Burkina Faso, Ethiopia, Kenya, Malawi, Tanzania, Uganda, and Zambia, available in addition to this Annex 3. The Excel-based model applies best practices, and inputs are derived from the AGRA team, leveraging expert opinions and insights gained from current and past programs. Additionally, the model incorporates variable macroeconomic conditions unique to each of the seven countries.

### 2.2.1 Assumptions:

- The model accounts for inflation across each country based on the respective reserve banks' targeted inflation rates. While this may not reflect current inflation fluctuations, it assumes a long-term steady state.
- The cost per intervention is market-related and specific to each country.
- Beneficiaries are defined as smallholder farmers. Further information on the number of beneficiaries of the programme is available on the Supplementary Annex 1.
- The 'subsidisation rate' refers to co-payment made through the RE-GAIN's financial models. These values have been provided by AGRA based off expert experience.
- The model assumes that co-payments begins with the first demonstration, six months into the programme following initial set-up and trainings. It is further assumed that shareholders farmers either adopt the physical solutions immediately after a demonstration or 18 months following the first demonstration, this is based off experience and academic research (Julius Manda, 2024). Demonstrations are expected to occur annually for an average of two months during the harvest season.
- The average reach of a single VBA is estimated to be 200 smallholder farmer households per VBA, except for Kenya in which the pre-existing VBA network allows for a reach of 250 smallholder farmer households per VBA.
- A 3-digit country code has been used to identify each country as follows:
  - Burkina Faso - BUR
  - Ethiopia - ETH

3. Kenya - KEN
4. Malawi - MAL
5. Tanzania - TAN
6. Uganda - UGA
7. Zambia - ZAM

## 2.2.2 Demand:

The demand for each intervention is based on the assumed consumption of one unit of the physical solution per a specified number of smallholder farmer (SHF) households per year Table 2-1. In some cases, a single physical solution is shared among multiple farmers, which is represented by a value of less than one.

**Table 2-1 - Physical intervention demand per smallholder farmer household.**

Intervention	Units	BUR	ETH	KEN	MAL	TAN	UGA	ZAM
Metal and plastic silos	unit per SHF	0.005	0.004	0.006	0.004	0.007	0.006	0.005
Mechanical multi-crop threshers	unit per SHF	0.002	0.002	0.002	0.001	0.003	0.002	0.002
Moisture meter	unit per SHF	4	3	4	3	6	5	3
Communal storage structures	unit per SHF	0.004	0.003	0.004	0.003	0.006	0.005	0.003
Storage protectants and control agents	unit per SHF	0.002	0.002	0.002	0.001	0.003	0.002	0.002
Tarpaulins and plastic sheets	unit per SHF	0.004	0.003	0.004	0.003	0.006	0.005	0.003
Hermetic bags	unit per SHF	5	5	11	4	14	12	5

## 2.2.3 Subsidisation rate:

The subsidisation rate represents the portion of the market value of a solution that is effectively subsidised by the financial models (Table 2-2). This is reflected as a % of the market value for both:

1. Catalytic co-payments for smallholder farmers –in the form of a ‘buy-x-get-x’ free model and applies only to ‘tarpaulins and plastic sheets,’ ‘metal and plastic silos’ and ‘hermetic bags’. For example, a 25% subsidisation represents a ‘buy-3-get-1 free’ model, as is the case for tarpaulins and plastic sheets.
2. Catalytic co-payments for Agricultural MSMEs - which seeks to subsidise a portion of the interest on loans applied to the remaining interventions, Metal and plastic silos, Mechanical multi-crop threshers, Moisture meters, Communal storage structures, and Storage protectants and agents. Note that for metal and plastic silos, the maximum cost eligible for subsidy is capped at US\$ 5,000.

**Table 2-2 - Physical intervention effective market price subsidisation in % of market value.**

Intervention	Units	BUR	ETH	KEN	MAL	TAN	UGA	ZAM
Model 1								
Tarpaulins and plastic sheets	% of market value	25%	25%	25%	25%	25%	25%	25%
Hermetic bags	% of market value	33%	33%	10%	33%	10%	10%	33%
Metal and plastic silos	% of market value	30%	30%	10%	30%	10%	10%	30%



Model 2								
Mechanical multi-crop thrashers	% of market value	30%	30%	10%	30%	10%	10%	30%
Moisture meter	% of market value	30%	30%	10%	30%	10%	10%	30%
Communal storage structures	% of market value	30%	30%	10%	30%	10%	10%	30%
Storage protectants and agents	% of market value	30%	30%	10%	30%	10%	10%	30%

## 2.2.4 Cost per intervention:

The cost per intervention is based on market research and represents the market value in that country at the time of modelling (Table 2-3).

**Table 2-3- Physical intervention market value in US\$**

Intervention	Units	BUR	ETH	KEN	MAL	TAN	UGA	ZAM
Metal and plastic silos*	US\$ per unit	15,000	20,000	15,000	20,000	15,000	20,000	15,000
Mechanical multi-crop threshers	US\$ per unit	4,000	4,000	4,000	4,000	4,000	3,800	4,000
Moisture meter	US\$ per unit	100	100	100	150	100	100	100
Communal storage structures	US\$ per unit	200	200	200	200	200	200	200
Storage protectants and control	US\$ per unit	20	20	20	20	20	20	20
Tarpaulins and plastic sheets	US\$ per unit	25	25	40	35	30	35	35
Hermetic bags	US\$ per unit	2	2	2	2	2	2	2

\*Note that the subsidy on metal and plastic silos is capped at \$5,000.

## 2.2.5 Macro-economic assumptions:

The model accounts for varying inflation conditions across each country. Although inflation can be unpredictable, the model adopts a conservative approach, assuming that medium to short-term inflation will remain within the mid-range of each country's targeted inflation rate as set by its sovereign monetary policy committee (MPCs) (Table 2-4). This is in line with forecasts from the IMF that suggest that regional inflation will stabilise as MPC's continue stable monetary policies (IMF, 2024).

**Table 2-4 - Macro-economic assumptions in %**

Intervention	Units	BUR	ETH	KEN	MAL	TAN	UGA	ZAM
Long term inflation rate	%	3.00%	15.00%	5.00%	26.00%	5.00%	5.00%	7.00%

## 2.3 RE-GAIN PROGRAMME COST

The model accounts for all programme costs over the 5-year period, covering both physical and non-physical interventions. The total cost of the programme is US\$ 105 million, comprising US\$ 97.41 million in core programme costs and US\$ 5.53 million in programme management and monitoring and evaluation costs.

The programme is expected to be funded by contributions from both the GCF and AGRA. Of the core programme budget of US\$ 97.45 million, the GCF is anticipated to contribute US\$ 69.79 (72%), while AGRA will contribute US\$ 27.66 (28%).

### 2.3.1 Cost by Component

The total RE-GAIN programme costs comprise three core programme components and a project management component. The cost of the models to finance the physical interventions is included in component 2 of the programme, while components 1 and 3 are made up of the cost of non-financial interventions (Table 2-5).

**Table 2-5 – RE-GAIN Programme cost by component**

Component		US\$ m
Component 1	Food Loss-Reduction Solutions (FL-RS) demand side development to increase the adoption of FL-RS by farmers	42.74
Component 2	FL-RS supply side development to increase availability and affordability of FL-RS .	Equipment co-payment
		Technical capacity
Component 3	Enabling environment to ensure sustainability of the FL-RS market	11.34
	<b>Total before project management costs</b>	<b>97.47</b>
M&E	Monitoring and evaluation	2.50
Programme Management	Programme Management	5.03
	<b>Total</b>	<b>105.00</b>

### 2.3.2 RE-GAIN cost by country

The cost per country over the 5-year programme is made up of component 1, components 2 – co-payments on equipment (or physical food-loss reduction solutions), component 2 – non-co-payment expenses, component 3 – institutional capacity building and policy setting, and programme management and monitoring and evaluation components, as presented in the table below.

**Table 2-6: RE-GAIN Cost by Country in millions**

Intervention	BUR	ETH	KEN	MAL	TAN	UGA	ZAM	Total	%
Component 1	6.08	6.10	5.90	6.11	6.09	6.12	6.18	42.64	41%
Component 2 (co-payment)	4.68	4.68	4.68	4.68	4.68	4.68	4.68	32.76	31%
Component 2 (non-co-payment expenses)	1.52	1.52	1.41	1.54	1.54	1.54	1.58	10.67	10%
Component 3	1.63	1.63	1.55	1.63	1.64	1.64	1.66	11.38	11%
Monitoring and Evaluation	0.23	0.53	0.53	0.23	0.23	0.23	0.53	2.51	2%
Programme Management	0.72	0.72	0.72	0.72	0.72	0.72	0.72	5.04	5%
Total	14.86	15.20	14.83	14.92	14.90	14.93	15.37	\$105.00	100%

### 2.3.3 Physical food-loss reduction solutions cost by country

The cost per country is representative of the cost of co-payments made by REGAIN for the purchase of equipment over the 5-year programme (Table 2-7). The majority 92% of co-payments are on tarpaulins and metal and plastic silos, solutions that reach multiple SHF.

**Table 2-7 - Programme cost by country and intervention in US\$ million**

Intervention	BUR	ETH	KEN	MAL	TAN	UGA	ZAM	Total	%
Financial interventions									
Metal and plastic silos provided	\$1.99	\$2.53	\$0.72	\$2.38	\$0.92	\$1.03	\$1.75	\$11.31	35%
Mechanical multi-crop thrashers provided	\$0.20	\$0.16	\$0.07	\$0.13	\$0.09	\$0.07	\$0.17	\$0.91	3%
Tarpaulins and plastic sheets provided	\$2.13	\$1.70	\$3.69	\$1.93	\$3.43	\$3.38	\$2.47	\$18.73	57%
Moisture meter provided	\$0.01	\$0.01	\$0.00	\$0.01	\$0.00	\$0.00	\$0.01	\$0.05	0%
Communal storage structures provided	\$0.01	\$0.01	\$0.00	\$0.01	\$0.00	\$0.00	\$0.01	\$0.05	0%
Storage protectants and control agents provided	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.01	0%
Hermetic bags provided	\$0.34	\$0.27	\$0.18	\$0.22	\$0.23	\$0.19	\$0.28	\$1.71	5%
Total	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$4.68	\$32.76	100%

### 2.3.4 Cost per year

The cost per year represents the programmes total cost per annum and is impacted by the phased approach to implementation and effects of inflation (Table 2-8).

**Table 2-8 - Programme cost per year in US\$ million**

Country		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Burkina Faso	BUR	\$3.20	\$3.66	\$3.51	\$3.07	\$1.43	\$14.86
Ethiopia	ETH	\$3.19	\$3.68	\$3.61	\$3.22	\$1.51	\$15.20
Kenya	KEN	\$3.18	\$3.64	\$3.50	\$3.08	\$1.43	\$14.83
Malawi	MAL	\$3.08	\$3.57	\$3.56	\$3.23	\$1.47	\$14.92
Tanzania	TAN	\$3.18	\$3.63	\$3.50	\$3.10	\$1.48	\$14.90
Uganda	UGA	\$3.18	\$3.63	\$3.50	\$3.11	\$1.51	\$14.93
Zambia	ZAM	\$3.28	\$3.74	\$3.61	\$3.20	\$1.54	\$15.37
Total		\$22.29	\$25.55	\$24.79	\$22.01	\$10.37	\$105

## 2.4 REGAIN PROGRAMME FINANCIAL COST BENEFIT ANALYSIS (CBA)

The long-term financial cost-benefit analysis (CBA) is based on market prices and focuses solely on the financial costs and benefits of the RE-GAIN programme to its primary beneficiaries, shareholder farmers, excluding any broader economic externalities. The financial CBA assesses the investment case for RE-GAIN by evaluating net cash flows and net present value across each of the seven countries involved in the programme over the next 10 years.

### 2.4.1 Financial cost

Two cost scenarios are considered: one in which all costs incurred by both smallholder farmers and the RE-GAIN program are included, and another in which only the costs borne by smallholder farmers are considered.

#### 2.4.1.1 Costs accruing to small hold farmers

Under Model 1, which includes equipment such as tarpaulins, plastic sheets, and hermetic bags, farmers are expected to purchase these items outright without the need for financing. This is due to the anticipated trickle-down effect from RE-GAIN's co-payment to suppliers. As a result, the cost of these interventions to farmers over the first five years is calculated as the market value of food loss reduction equipment minus RE-GAIN's co-financing portion. The average cost per beneficiary varies by country, depending on prevailing market rates and estimated inflation (Table 2-9).

Under Model 2, which includes metal and plastic silos, mechanical threshers, moisture meters, and communal storage structures as control measures, equipment costs are anticipated to be financed through microlending schemes. The average loan amount per beneficiary under this model is between \$81 and \$656, with lending terms aligned to prevailing interest rates and conditions typical of similar microfinancing programs (Table 2-9).

**Table 2-9: Ticket Size and terms**

	BUR	ETH	KEN	MAL	TAN	UGA	ZAM
Model 1							
Average ticket size	\$105	\$468	\$1,273	\$291	\$660	\$912	\$73
Model 2							
Average ticket size	\$81	\$552	\$611	\$294	\$418	\$656	\$44
Loan term (months)	18	18	18	18	18	18	18
Rate*	15%	17%	15%	26%	18%	26%	28%

\*Refer Table 2-13 for cost of finance rationale

Following the successful implementation of RE-GAIN, it is expected that the food-loss reduction equipment market has been developed and beneficiaries will continue to use the equipment for the foreseeable future. Additionally, provision is made for compounded annual growth rate (CAGR) in this market post RE-GAIN (years 6-10) that accounts for natural rate of adoption by new beneficiaries as well as drop out of existing beneficiaries. This has been estimated at a conservative 1%.

## 2.4.2 Financial/ Cashflows

The adoption of food loss reduction equipment and solutions for preserving crop quality during harvesting, post-harvest handling, and storage is expected to prevent post-harvest losses. This increase in the quantity of produce available for sale results in cashflow increases to beneficiary households, as shown in the table below.

**Table 2-2-10: Food loss reduction per country by crop % production**

	BUR	ETH	KEN	MAL	TAN	UGA	ZAM
Without RE-GAIN							
Cowpea	7%						
Rice	30%				11%		
Teff		43%					
Wheat		7%					
Beans			28%			48%	
Maize			18%	26%	31%	18%	27%
Groundnuts				91%			
Soybean							20%
With RE-GAIN							
Cowpea	6%						
Rice	23%				9%		
Teff		34%					
Wheat		6%					
Beans			22%			38%	
Maize			14%	21%	25%	15%	22%
Groundnuts				72%			
Soybean							15%
Net reduction in food loss							
Cowpea	1%						
Rice	7%				2%		
Teff		9%					
Wheat		1%					
Beans			6%			10%	
Maize			4%	5%	6%	3%	5%
Groundnuts				19%			
Soybean							5%

Additional cash inflows to beneficiaries (smallholder farmers) is measured as the increase in annual income per beneficiary as a result of more crop available. This benefit is cumulative over the programme duration and 5 years thereafter, assuming that once food loss reduction interventions are adopted, beneficiaries continue to use the intervention. The additional income per beneficiary ranges per country and the basis and rationale can be found in table 53 in Annex 3 Part B Economic Evaluation and summarised below (Table 2-11).

**Table 2-11: Income with and without REGAIN in USD millions**

	BUR	ETH	KEN	MAL	TAN	UGA	ZAM
Total SHF Income without RE-GAIN	\$690.68	\$660.23	\$787.54	\$215.94	\$913.44	\$428.87	\$308.58
Total SHF Income with RE-GAIN	\$739.74	\$710.18	\$834.49	\$251.39	\$945.93	\$470.99	\$329.90
Additional cash inflows	\$36.47	\$37.72	\$26.82	\$23.09	\$10.73	\$20.05	\$8.56

### 2.4.3 Net Cashflows

The programmes net cashflows are determined by assessing the net cashflows “without RE-GAIN” – which accounts for only the income accruing to beneficiaries under current food loss rates, and “with RE-GAIN” – which accounts for the income accruing to beneficiaries under improved food loss rates less the cost of financing interventions. The resulting net undiscounted cashflows under the baseline assumptions are all positive (Table 2-12).

**Table 2-12: Net Cashflows “with” and “without RE-GAIN”**

	BUR	ETH	KEN	MAL	TAN	UGA	ZAM
<b>“without RE-GAIN”</b>							
Household Income	\$690.68	\$660.23	\$787.54	\$215.94	\$913.44	\$428.87	\$308.58
Less:							
Cost of Equipment*	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net inflows	\$690.68	\$660.23	\$787.54	\$215.94	\$913.44	\$428.87	\$308.58
<b>Including the cost of the RE-GAIN</b>							
Household Income	\$739.74	\$710.18	\$834.49	\$251.39	\$945.93	\$470.99	\$329.90
Less:							
Cost of Equipment*	\$12.59	\$12.23	\$20.14	\$12.36	\$21.76	\$22.07	\$12.76
Net Gain/Loss	\$727.15	\$697.95	\$814.35	\$239.03	\$924.17	\$448.93	\$317.14

\*Cost of equipment to beneficiaries including financing costs under model 2.

### 2.4.4 Baseline Discount rates

The project’s net cash flows over the next 10 years are discounted to calculate the net present value (NPV), applying a country-specific discount rate that aligns with market related cost of finance from the perspective of the beneficiaries—in this case, smallholder farmers. Social discount rates are excluded, as these are addressed separately in the economic appraisal.

The country-specific rate accounts for contextual factors, including the prevailing risk-free rate (based on 182-day national treasury notes), current risk premiums, cost of finance, market analysis of existing agro-financing products, and local lending regulations that may impose debt ceilings or similar constraints.

**Table 2-13: Summary of REGAIN Programme discount rates**

	BUR	ETH	KEN	MAL	TAN	UGA	ZAM
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Discount rate	15%	17%	15%	26%	18%	26%	28%

### **Burkina Faso:**

As part of the West African Economic and Monetary Union (WAEMU), a maximum interest rate cap of 27% for microfinance loans across member states is enforced. Treasury bills (risk-free rate proxy) were 6.7% as of January 2024, and average monthly lending rate is approximately 7% (IMF, 2024). Research indicates that interest rates for microfinance in the agricultural sector, such as this provided by CORIS Bank, are closer to 15%. Based on this a discount rate of 15% for Burkina Faso is considered reasonable. Implications of fluctuation in these rates will be assessed in the sensitivity analysis.

### **Ethiopia:**

Ethiopia does not have a legal interest rate ceiling for microloans. Treasury bills (risk-free rate proxy) were 6.7% as of January 2024, and average monthly lending rate is approximately 7% (IMF, 2024). A study of rural group-based loan from 13 Ethiopian based microfinance institutions (MFIs) indicated that the average lending rate for these types of instruments was 17% (Diriba, 2024). This is well above the current risk-free rate of 7.99% (National Bank of Ethiopia, 2024).

### **Kenya:**

In August 2016, Kenya's parliament enacted the Banking (Amendment) Act 2015. This law set the maximum interest rate chargeable for a credit facility at "no more than 4%, the base rate set and published by the CBK" (CBK, 2016). The five-year average base interest rate is 8.69% with current risk-free rates being 14.43% (CBK, 2024). To remain conservative a discount rate of 15% is applied.

### **Malawi:**

Interest rates in Malawi for microfinance are not specifically capped. Malawi Agriculture and Industrial Investment Corporation (MAICC) have indicated an estimated annual interest rate of 26%. The current risk free rate (91-day treasury bill) is 16% and this estimation is therefore considered conservative (RBM, 2024).

### **Tanzania:**

Tanzania does not impose a specific interest rate cap on microloans. MFI such as Equity for Tanzania and PASS leasing indicate an estimated annual interest rate of 18% for agricultural microfinancing. The current risk free rate (91-day treasury bill) is 5.94% and the estimated microfinancing lending rate is therefore considered conservative (BOT, 2024).

### **Uganda:**

Uganda does not have a legal interest rate ceiling for microloans. MFI such as Stanbic Bank and KCB offer agricultural loans at an estimated annual interest rate of 18%. The current risk-free lending rate is 13%, and interest spreads on loans in the private sector were estimated at 16% in October 2023 (IMF, 2024). An estimated discount rate of 18% for microfinancing loans in the agricultural sector is therefore reasonable.

### **Zambia:**

Zambia does not impose a legal interest rate ceiling for microloans. Microfinancing for the agricultural sector provided by microfinance institutions (MFIs) such as AgriLeaseCo and Zanaco is estimated to be around 28%. Currently, Zambia's risk-free rate stands at 10%.

## 2.4.5 Net Present Value and Financial Internal Rate of Return (FIRR)

Based on the above assumptions, the following NPV and FIRR has been determined in each of the 7 countries, and presented in the table below. Due to the financial analysis being based on increase in income to SHF “with” and “without” the RE-GAIN, the NPVs are all positive for scenarios. However, the higher NPV under the “with RE-GAIN” scenario indicated that there is a business case for investment in the programme.

**Table 2-14 NPV of the programme across countries (in USD millions)**

	BUR	ETH	KEN	MAL	TAN	UGA	ZAM
Without RE-GAIN							
Discount rate	15%	17%	15%	26%	18%	26%	28%
NPV	360.30	319.24	410.83	76.17	425.58	151.28	102.03
IRR	n/a	n/a	n/a	n/a	n/a	n/a	n/a
With RE-GAIN							
Discount rate	15%	17%	15%	26%	18%	26%	28%
NPV	377.03	335.19	421.12	81.81	426.32	153.63	102.12
IRR	n/a	n/a	n/a	n/a	n/a	n/a	n/a

## 2.4.6 Sensitivity Analysis

Given the subjectivity of the discount rate and the investment case's reliance on key indicators like net present value, a sensitivity analysis has been conducted to account for variations in the discount rate. The results presented in the table below show that all countries, except Kenya, are relatively resilient to changes in the discount rate.

**Table 2-15: Impact of 0.5% change in discount rate on NPV**

	BUR	ETH	KEN	MAL	TAN	UGA	ZAM
Baseline	15%	17%	15%	26%	18%	26%	28%
With RE-GAIN							
% Change							
-2.00%	\$408.04	\$391.68	\$455.92	\$132.82	\$517.61	\$249.46	\$176.73
-1.50%	\$399.97	\$383.93	\$446.86	\$130.14	\$507.33	\$244.43	\$173.19
-1.00%	\$392.11	\$376.39	\$438.05	\$127.53	\$497.33	\$239.54	\$169.74
-0.50%	\$384.47	\$369.05	\$429.47	\$125.00	\$487.60	\$234.78	\$166.38
0.00%	\$377.03	\$361.91	\$421.12	\$122.54	\$478.13	\$230.15	\$163.12
0.50%	\$369.79	\$354.96	\$412.99	\$120.14	\$468.91	\$225.64	\$159.94
1.00%	\$362.74	\$348.20	\$405.08	\$117.80	\$459.94	\$221.25	\$156.85
1.50%	\$355.87	\$341.61	\$397.38	\$115.53	\$451.20	\$216.98	\$153.84
2.00%	\$349.18	\$335.19	\$389.88	\$113.31	\$442.69	\$212.82	\$150.91
2.50%	\$342.67	\$328.94	\$382.57	\$111.16	\$434.40	\$208.77	\$148.05



## 2.5 ADDITIONALITY AND CATALYTIC IMPACT

The additionality of the RE-GAIN programme is demonstrated by its ability to overcome the financial and non-financial barriers identified in the analysis framework. Through the proposed financial interventions, the RE-GAIN programme subsidizes a portion of the costs or financing costs related to essential food loss reduction physical interventions. This is complemented by non-financial interventions that enhance the adoption of physical solutions, educate farmers on best practices, promote financial literacy, and improve market access.

The additionality of the programme is demonstrated by the number of direct beneficiaries who adopt the physical solutions provided. These beneficiaries would not have had access to these interventions without the RE-GAIN programme, and their adoption is a direct result of the programme's physical and non-physical solutions. The catalytic impact is measured by the equivalent cost to the beneficiary (market value) of each physical intervention delivered for every US\$1 subsidized.

### 2.5.1 Beneficiaries reached

The base case scenario indicates that with a programme budget of US\$ 105 million, of which US\$ 32,76 million (US\$ 4,68 million per country) is dedicated to co-payments, RE-GAIN can reach 1 064 251 smallhold farmer households over the course of the 5 -years programme (Table 2-16).

*Table 2-16 - Beneficiaries reached over 5-year programme.*

Country		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Burkina Faso	BUR	15 433	23 149	23 149	15 433	-	77 164
Ethiopia	ETH	15 433	23 149	23 149	15 433	-	77 164
Kenya	KEN	19 253	28 879	28 879	19 253	-	96 264
Malawi	MAL	15 433	23 149	23 149	15 433	-	77 164
Tanzania	TAN	15 433	23 149	23 149	15 433	-	77 164
Uganda	UGA	15 433	23 149	23 149	15 433	-	77 164
Zambia	ZAM	15 433	23 149	23 149	15 433	-	77 164
Total		111 850	167 774	167 774	111 850	-	559 248

### 2.5.2 Catalytic impact

The catalytic impact of the RE-GAIN programme can be measured in its ability to overcome the barriers and market failures and enable the adoption of physical solutions. This can be assessed in three ways: the total number of interventions enabled; the total market value of interventions enabled; and the market value (in US\$) of physical interventions for every US\$ 1 spent.

#### 2.5.2.1 Total number of interventions enabled

The RE-GAIN programme will enable the following number of interventions per country (Table 2-17):

*Table 2-17 - Number of interventions enabled per country over 5-year programme.*

Intervention	Unit	BUR	ETH	KEN	MAL	TAN	UGA	ZAM	Total
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Metal and plastic silos	Unit	422	338	458	273	567	478	350	2 886
Mechanical multi-crop thresher	Unit	158	127	172	102	213	179	131	1 082
Moisture meter	Unit	317	253	343	205	426	359	262	165
Communal storage structures	Unit	317	253	343	205	426	359	262	2 165
Storage protectants	Unit	158	127	172	102	213	179	131	1 082
Tarpaulins and plastic sheets	Unit	316 670	253 366	343 498	204 868	425518	358612	262187	2164718
Hermetic bags	Unit	422 226	380 049	858 746	307 302	1 063 794	896 529	393 280	4 321 926
Total		740	634	1 203	513	1 491	1 256	656	6 496
		268	512	733	058	156	695	603	025

### 2.5.2.2 Market value of interventions enabled

The base case scenario predicts that the RE-GAIN programme will enable over US\$ 144.95 million in physical interventions over the course of the 5-year programme. This refers to the total pre subsidised market value of interventions enabled by RE-GAIN's financial and non-financial solutions.

**Table 2-18 - Market value of interventions enabled in US\$ millions**

Intervention	Unit	BUR	ETH	KEN	MAL	TAN	UGA	ZAM	Total
Metal and plastic silos	US\$ m	\$6.77	\$10.38	\$7.38	\$9.32	\$9.17	\$10.28	\$5.96	\$59.26
Mechanical multi-crop thresher	US\$ m	\$0.68	\$0.78	\$0.73	\$0.70	\$0.92	\$0.74	\$0.61	\$5.16
Moisture meter	US\$ m	\$0.03	\$0.04	\$0.04	\$0.05	\$0.05	\$0.04	\$0.03	\$0.28
Communal storage structures	US\$ m	\$0.03	\$0.04	\$0.04	\$0.04	\$0.05	\$0.04	\$0.03	\$0.26
Storage protectants	US\$ m	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.05
Tarpaulins and plastic sheets	US\$ m	\$8.45	\$9.76	\$14.71	\$12.26	\$13.73	\$13.51	\$10.44	\$82.84
Hermetic bags	US\$ m	\$1.01	\$1.17	\$1.84	\$1.05	\$2.29	\$1.93	\$0.89	\$10.19
Total		\$16.99	\$22.18	\$24.74	\$23.43	\$26.21	\$26.55	\$17.97	\$158.05

### 2.5.2.3 US\$ in interventions enabled for every US\$ 1 in core programme expenditure

The base case scenario demonstrates that with a core programme budget of US\$97.45 million allocated to both physical and non-physical solutions, the RE-GAIN programme can generate an additional US\$ 1.38 in market value for every US\$ 1 invested through the proposed financial interventions. When focusing specifically on physical solutions, this leverage increases to an average of US\$ 4.82 for every dollar spent. For non-physical solutions, the leverage is lower, with an average of US\$ 2.30 per dollar spent. This lower leverage for non-physical solutions is due to the higher costs associated with creating an enabling environment and addressing non-financial barriers and market failures within the agricultural value chain. (Table 2-19).

**Table 2-19 - Catalytic Impact of RE-GAIN Programme - US\$ leveraged for every US\$1 spent.**

Intervention	unit	BUR	ETH	KEN	MAL	TAN	UGA	ZAM	Average
Financial interventions	US\$ leveraged	\$3.63	\$4.74	\$5.29	\$5.01	\$5.60	\$5.67	\$3.84	4.82
Non-financial interventions	US\$ leveraged	\$1.73	\$2.27	\$2.51	\$2.42	\$2.64	\$2.69	\$1.84	2.30
Combined interventions	US\$ leveraged	\$1.17	\$1.53	\$1.70	\$1.63	\$1.80	\$1.83	\$1.24	1.56

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