# Costs and Benefits of Applying a Gender-Transformative Approach in Agriculture Programming:

## Evaluation of the EKATA Model in Burundi

**A Win-Win for Gender, Agriculture and Nutrition**
**Testing a Gender-Transformative Approach from Asia in Africa**

# Contents

## Executive Summary

Most countries in Sub-Saharan Africa (SSA), including Burundi, depend heavily on agriculture for people's livelihoods. Therefore, any effort aiming at improving and sustaining agricultural productivity is an important step towards improving the livelihoods of many households. In these countries, women are integral to agriculture and food systems (Doss, 2014). It is widely recognized that the "gender gap" imposes costs on the agriculture sector and that closing the gender gap would generate a significant gain for that sector and for global food security and well-being. Conventional approaches to gender mainstreaming and gender integration have focused on closing gender gaps in access to resources, information and technologies without addressing the underlying causes of gender inequality, including norms.

Gender-transformative approaches such as CARE's EKATA (Empowerment through Knowledge And Transformative Action) model address the underlying causes of inequality while building women's consciousness and solidarity. Between 2016 and 2019, CARE and partners in Burundi tested how the EKATA approach improves gender equality and how a focus on power relations and consciousness-raising may also yield sustainable effects on food security, nutrition and economic well-being, and changes in gender and social relations.

The Bill & Melinda Gates Foundation-funded project, "A Win-Win for Gender, Agriculture and Nutrition: Testing a Gender-Transformative Approach from Asia in Africa," was implemented in six communes and two provinces of Kirundo and Gitega in Burundi. The key research question was:

> **"What is the added value and what are the associated costs of applying a gender-transformative approach within a livelihoods intervention, in terms of accelerating lasting transformations in gender equality, food security and economic well-being?"**

The project tested the EKATA model against a conventional gender approach, called the Gender Light model. The Gender Light model is premised on the capacity of women to take individual actions, without leveraging the critical consciousness-raising and collective action component that may be crucial to the transformation of social norms and unequal power structures. The EKATA approach, on the other hand, aimed to significantly transform power relations within the household; fully engage men in sharing caregiving responsibilities; or enable women to gain control over valuable productive assets or to participate fully in the major household decisions and strategic life choices. In addition, there was a Control treatment.

The general objective of this study was to identify, quantify and value appropriate costs and benefits of each project treatment (EKATA, Gender Light, and Control) for informed decision making. The specific objectives were to: (i) Identify, quantify and value costs; (ii) identify, quantify and value benefits; and (iii) determine which treatment is more worthwhile for further investment to scale out. A cost-benefit analysis (CBA) methodology was used for the study. Data and information were collected through two main ways: a review of project documents and collection of primary data from farmers and partners who participated in the project. A rigorous sampling framework was developed with project implementing partners to ensure a comprehensive number and diversity of respondents. Primary data was collected from project partners, especially government departments, as well as other stakeholders. The main data collection tools used were focus group discussions (FGDs) and key informant interviews (KIIs) using checklists.

Four focus group discussions were held with farmers, and key informant interviews were carried out with CARE staff and partners. Data on agricultural benefits were derived from the project endline report.

The major costs and benefits were identified and monetized. The benefits of marketable goods and services from the project were estimated per farmer and multiplied by the market prices. In quantifying the non-market benefits such as empowerment, the beneficiaries were asked to state their 'willingness to pay' (WTP) to obtain the impact they had received based on financial measures. Data was analyzed by comparing costs and benefits of the three treatment arms by computing their respective net present value (NPV), cost benefit ratios (CBR) and returns on investment (ROI).

The results showed that EKATA was allocated the highest proportion of the budget (42%) followed by Gender Light (31%). Both the mean cost of implementing EKATA per farmer and value of benefits created by the project was highest in EKATA. The mean cost per participating farmer was US$306 compared to US$256 for Gender Light and US$271 for Control. The net present value of benefits for EKATA was US$3,275,088 compared to US$1,611,658 for Gender Light and US$382,996 for the Control group. Upon further analysis, EKATA emerged as the most profitable treatment in all the selected performance measures. Benefit-cost ratio analysis for EKATA was 5:1, which was the highest compared to 3:1 and 2:1 for Gender Light and Control, respectively. Using ROI criteria, again EKATA had the highest return of 410% compared to 270% in Gender Light and 30% in Control. On average, individual farmers were willing to pay US$600 per year in EKATA (US$50 per month) and US$384 per year (US$32 per month) in Gender Light to gain gender equality and empowerment from the project.

Evidence from this analysis shows that there is a business case for scaling up EKATA based on the demonstrated benefits arising from its use. There are systematic differences in costs and benefits of applying EKATA versus conventional gender approaches. Key lessons learned from this analysis is that future projects should develop Value for Money indicators at the start of intervention and continue to track them over the project period to make cost-benefit analysis a simple process. Further research is required to quantify and monetize the non-marketable costs and benefits of the project outcomes through social cost-benefit analysis.

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| **BCR** | Benefit-Cost Ratio |
| **BIF** | Burundian Franc |
| **CBA** | Cost-Benefit Analysis |
| **EKATA** | Empowerment through Knowledge and Transformative Action |
| **FAO** | Food and Agriculture Organization of the United Nations |
| **FGD** | Focus Group Discussions |
| **GL** | Gender Light |
| **Kg** | Kilogram |
| **KII** | Key Informant Interviews |
| **NPV** | Net Present Value |
| **ROI** | Returns on Investment |
| **SSA** | Sub-Saharan Africa |
| **VSLA** | Village Savings and Loan Association |
| **WTA** | Willingness to Accept |
| **WTP** | Willingness to Pay |

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# INTRODUCTION

## Background

Most countries in Sub-Saharan Africa (SSA), including Burundi, depend heavily on agriculture for people's livelihoods. Therefore, any effort aiming at improving and sustaining productivity in agriculture is an important step towards improving the livelihoods of many households. Women are integral to agriculture and food systems (Gates, 2014). It is widely recognized that a wide "gender gap" exists between men and women, which imposes costs on the agriculture sector, thus closing the gender gap would generate a significant gain for that sector and for global food security and well-being. Conventional approaches to gender mainstreaming and gender integration have focused on closing gender gaps in access to resources, information and technologies without addressing the underlying causes of gender inequality, including norms. In an attempt to fill the gender gap, CARE Burundi and partners, with funding from the Bill & Melinda Gates Foundation, implemented the project titled "A Win-Win for Gender, Agriculture and Nutrition: Testing a Gender-Transformative Approach from Asia in Africa," in six communes and two provinces of Burundi. However, the costs and benefits of the project were not known.

There is increasing demand for cost-benefit analysis (CBA) from research managers in research institutions and funding organizations, as well as from researchers themselves. They want to use the techniques to reliably identify the projects that will maximize the research benefits under tightening budgets (Marshall and Brennan, 2001). Research managers also have a responsibility to maximize the net benefits from their research programs. Research managers are increasingly recognizing the advantages to be gained in attracting future funding from documenting the benefits of successful past projects or from being able to substantiate the benefits of projects for which funds are being sought. Such evaluation is also important for researchers who want continued funding for their research.

Evidence from the literature shows that CBA is a useful tool that development practitioners use to evaluate investment options such as suitability of policies (van Wee and Börjesson, 2015) and government and private projects (Boardman and Forbes, 2011). In principle, CBA captures all benefits due to an intervention, valuing them either at their market value or at the level of consumption that individuals are willing to forego to obtain them. Hence, it has its conceptual roots in welfare economics, which quantifies social welfare in terms of individuals' willingness-to-pay (WTP) to increase welfare (Park et al., 2018). Therefore, strict cost-benefit analysis not only increases transparency and engagement in the decision-making process, but also generates more useful information, which is important in ensuring the consistency, compatibility and rationality of decision-making results. Without CBA, resource-constrained policymakers will have limited evidence to guide their selection of efficient programs and policies, or to consider the cost implications of scaling, replicating or reproducing programs and policies found to be effective. As a result, they may rely on their instincts about what works or what does not work, or selectively choose projects that support their instincts or predetermined choices.

## Overview of cost-benefit analysis

CBA is both an evaluative and a planning tool. It seeks to answer the following questions: Has an intervention delivered the intended change for the resources invested? Would it be possible to generate more benefits for the same resources if another approach was chosen? In the future, should we choose to improve an intervention's approach or choose a different adaptation approach altogether? Based on CBA findings, it is thus possible to determine which interventions should be dropped in favor of other, more effective, interventions.

CBA has been used in many agricultural-related research and development projects to inform on project efficiency (e.g. Bizoza and de Graff, 2012; Pemsl, and Staver, 2014; Kuwornu, et al., 2018). The scale mostly considered in agriculture is at the field level and the focus is on components of the project (e.g., Bizoza and de Graff, 2012; Ng'an'ga, et al., 2017). The objective of the CBA at this level is financial analysis. It is used as a decision tool after computing all costs against benefits valued in local currency to come up with a net benefit or a net income (Gittinger, 1994). The aim of using financial CBA is to find out whether a given activity or project intervention is financially profitable for participants. An analysis at the field and project components levels, however, does not provide the big picture of the project as it only focuses on explicit costs and benefits. This study goes further to analyze project-wide costs and benefits, so as to provide the big picture view.

The CBA has also been applied in evaluating empowerment and gender equality and policies at different levels, e.g., plots, farms, watersheds and regions (Dietz and Hepburn, 2013). The uncertainty about the margin costs of empowerment is large, giving rise to debate on the uncertainties in the expected impacts of empowerment in the estimates and in ethical consideration (Tol, 2012; van Wee, 2012).

## Project overview

"A Win-Win for Gender, Agriculture and Nutrition: Testing a Gender-Transformative Approach from Asia in Africa" is a four-year research project implemented in six communes and two provinces of Kirundo and Gitega in Burundi. The aim is to test an innovative, gender-transformative approach for the agriculture sector that starts with developing critical consciousness and challenging discriminatory beliefs and social norms through a model of reflection, community dialogue and collective action. CARE and partners tested how this approach improves gender equality and how a focus on power relations and consciousness-raising may also yield sustainable effects on food security, nutrition and economic well-being. The project tested two key approaches: (1) a gender-transformative model (the Empowerment through Knowledge And Transformative Action or EKATA model) for gender equality; and (2) a typical gender-mainstreamed approach in the agriculture sector ("Gender Light" model), in which basic gender activities were integrated into a program that has a principal focus and measures of success on women's economic empowerment through agriculture and micro-enterprise development. The key research question was, "*What is the added value and what are the associated costs of applying a gender-transformative approach within a livelihoods intervention, in terms of accelerating lasting transformations in gender equality, food security and economic well-being?*"

The aim of the project was to challenge mainstream assumptions in the agriculture and food security sector that addressing women's economic empowerment and changing unequal access to material resources (with minimal gender-awareness messaging) is sufficient enough to catalyze significant social changes in gender equality. This assumption is dearly upheld by many development agencies because it allows for a "lighter," more cost-effective and potentially more replicable and scalable sectoral intervention, without the challenges and skills training associated with deeper political or social change. CARE's hypothesis is that an explicit and more intensive focus on gender can be a win-win for gender justice and improvements in agriculture productivity, income and food security.

The project had three main objectives:

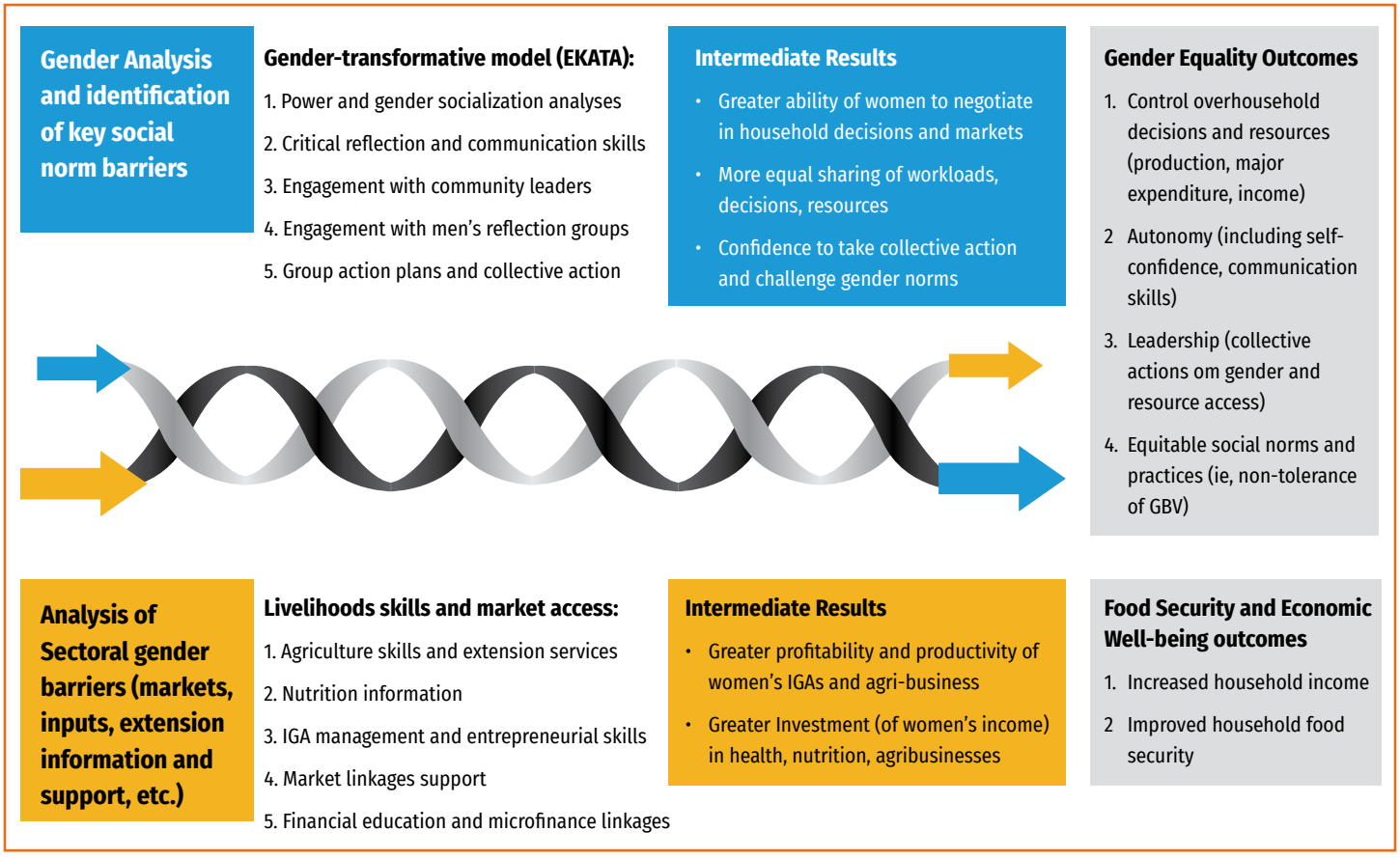
1. To contextually adapt EKATA, a proven and impactful gender-transformative approach, for use in a multi-sectoral agricultural intervention in Burundi.
2. To evaluate the differences in outcomes and processes of the gender-transformative EKATA approach compared against a standard Gender Light approach in the outcome areas of gender equality, food security and economic well-being.
3. To determine the differential costs and capacities required to support lasting transformations in gender equality and improved sectoral outcomes through a gender- transformative approach, as compared with the standard Gender Light model.

## Project theory of change

A gender-transformative approach such as EKATA, which addresses underlying social norms and gender inequalities and includes a fundamental element of critical reflection, power analysis and group solidarity, is expected to yield greater and more sustainable outcomes than the prevailing minimal gender-awareness messaging (Gender Light) model, not only in gender equality outcomes, but also in associated sectoral outcomes in food and livelihood security and economic well-being.

The Gender Light model, like most mainstream interventions in the sector, is premised on the capacity of women to take individual actions, without leveraging the critical consciousness-raising and collective action component that may be crucial to transformation of social norms and unequal power structures. In contrast to the EKATA approach, a Gender Light model is unlikely to significantly transform the power relations within the household; to fully engage men in sharing caregiving responsibilities; or to enable women to gain control over valuable productive assets or to participate fully in the major household decisions and strategic life choices.

**Figure 1: Project theory of change**



# OBJECTIVES AND METHODOLOGY

## Objectives of the study

The general objective of the study was to identify, quantify and value appropriate costs and benefits of each project treatment (EKATA, Gender Light and Control) for informed decision- making. The specific objectives were to: (i) identify, quantify and value costs; (ii) identify, quantify and value benefits; and (iii) determine which treatment is more worthwhile for further investment to scale out.

## Methodology

A mixed-method (qualitative and quantitative) approach was used for the study in March 2020. Gathering of data and information was conducted in two main ways: a review of project documents and primary data collection.

A desk review of relevant project documents (project proposal, technical reports [baseline report, annual reports, quarterly reports, monitoring and evaluation reports], financial reports and past studies) was conducted to help understand and identify costs and benefits and identify key themes and issues to be undertaken. The desk review was done to obtain information and understanding about the project as well as the framework of cost-benefit analysis. After desk review, the evaluation team came up with the scope in line with the objective of the study.

The preliminary literature review helped to map existing literature, studies, tools and manuals, in order to see what knowledge was already available concerning the project and similar projects. In addition, the literature review was meant to identify gaps and thus-far unanswered questions. The assessment reviewed the existing literature and key background documents, including program sources such as interim reports, as well as similar projects implemented by CARE and partners in the past. Our approach tested participatory and consultative techniques that tapped on stakeholder inputs to ensure the results reflected the desires of the organizations that the study affects.

The CBA utilized systematic data collection and sampling methods. A rigorous sampling framework was developed with project implementing partners to ensure a comprehensive number and diversity of respondents. The sampling frameworks were selected from the following: direct beneficiaries, wider members of the beneficiaries' communities, project implementers and government departments relevant to the project. The primary interviews with project stakeholders were conducted to collect information on achievements and impacts. The study undertook an in-depth interview to collect primary data from project partners and stakeholders by focus group discussions (FGD) and key informant interviews (KIIs) using checklists. Four FGDs, and 14 KIIs were held in the project study sites and at the project headquarters at CARE Burundi. The benefits of the project were calculated based on the number of project beneficiaries and the average gain per beneficiary. In a case where two household members were in the project, agricultural benefits and costs were estimated at the household level, while the other aspects such as empowerment were estimated at individual levels.

## Identification of costs

The focus of the cost analysis was on the definition of the boundary of the analysis and identification of costs. The classification of costs was adapted from J-PAL (2012). This tool is useful because it allows collection of program/project costs to illustrate how much a project/program would cost if it were to be replicated, and it facilitates more general comparisons between related projects. The major costs were:

i. **Program administration and staff costs**: This included the cost of all full-time staff who worked throughout any phases of the intervention and implementation and other costs and overhead related to program administration. These costs were allocated proportionally by the project implementers to reflect the real situation.
ii. **Targeting costs:** The costs incurred to target, identify and raise awareness among potential subjects as part of the intervention. Targeting/identification costs included costs of identifying *collines* within a specific communes which were eligible and met certain criteria. Also included were the costs of printing and distributing flyers or hosting information sessions.

iii. **Staff training:** Costs that were incurred to train staff involved in the intervention. This does not include training for enumerators who conducted surveys to collect data for program evaluation.
iv. **Participant training**: Costs incurred by the project to train participants or beneficiaries.
v. **Implementation and program material costs**: Costs of implementing the intervention. This included the cost of items distributed to participants, the cost of distributing the items, staff transportation to provide services/implement the program, or the cost of creating and maintaining technologies or resources developed for the intervention.
vi. **User costs:** This include the costs that the beneficiaries incurred as a part of the intervention. This includes the opportunity cost of participants' time and labor.
vii. **Monitoring costs**: Costs incurred to oversee and monitor program activities, or track program recipients or staff and their progress during the intervention.

## Identification of benefits

The benefits of the project were calculated based on the number of households and individuals benefitting from the project and the average benefits per household. Direct costs are often easier to estimate than benefits. The benefits of marketable goods and services from the project were assessed by estimating benefits per project beneficiary and multiplying by the unit market prices. For instance, the average rice production per household was used to estimate the benefits by multiplying the production (kg) per household by unit price. It is important to note benefits were computed even if the respondents did not sell the rice. The principle of opportunity cost was applied such that even if they did not produce rice they would have bought from the market at that price.

Contingent Valuation Method (CVM) is a technique of estimating the value that a person places on a good. The approach asks people to directly report their Willingness to Pay (WTP) to obtain a specified good, or willingness to accept (WTA) to give up a good, rather than inferring them from observed behaviors in regular marketplaces. Because it creates a hypothetical marketplace in which no actual transactions are made, CVM has been successfully used for commodities that are not exchanged in regular markets, or when it is difficult to observe market transactions under the desired conditions (Hanley et al., 1998). Although it is certainly possible to employ contingent valuation for commodities available for sale in regular marketplaces, many applications of the method deal with public goods, such as improvements in water or air quality, private non-market commodities such as reductions in the risk of death, or empowerment.

This study used WTP to value empowerment. In the economic theory, the equilibrium value of WTP and WTA are, in principle, equivalent so that the choice between the WTP and WTA measures reflects a choice between alternative welfare measures (i.e., compensating versus equivalent variation). Yet, it has been empirically shown that individuals tend to give higher estimates of WTA than of WTP. This is because people tend to demand higher monetary compensations to give up goods they have, than the price they say they would be willing to pay to buy the same goods they do not have. For this reason, the literature recommends the preferable use of WTP (European Union, 2015). Thus, this study mainly refers to the concept of WTP, which is more widely used in the practice of CBA. For CBA to capture all benefits due to an intervention, valuing them either at their market value or at the level of consumption that individuals are willing to forego to obtain them is crucial.

The respondents were smallholder male and female project beneficiaries who were dependent on agriculture for their livelihoods. Labour is an important resource at their disposal. The respondents were asked to state the maximum amount of money (Burundi Francs) they were WTP in order obtain the empowerment outcomes they had received from the project. Most respondents used the prevailing wage rate as the bench mark for estimating the opportunity cost of their labour and time such that if they did not participate in project activities, they would apply their time and labour elsewhere and obtain the prevailing market wage rates. Wage rate in a competitive market displays the true opportunity cost of labour. Empirically, to measure opportunity cost is difficult, and it remains a significant challenge to a community-based intervention project. However, the respondents estimated the number of days they had devoted on the project and the money they might have been paid in next best alternative activities. After detailed discussions, the respondents stated on average the opportunity cost of their participation in project empowerment activities per month.

## Analysis of costs and benefits

The CBA requires a comparison between the costs of an intervention and its benefits. To compare both sides of the equation it is necessary to express both in a common unit (money); there must be a "bottom line." This means translation of all impacts into money, regardless of whether these impacts are already expressed and measured in terms of their equivalent money value (such as change in income or production) or not (such as women's empowerment or general well-being of beneficiaries and other stakeholders). This is sometimes the most challenging part of the analysis.

In this study, the costs and benefits of the three treatment arms were compared by computing their respective net present value (NPV) and benefit cost ratio. The NPV is the difference between the present value of benefit cash flow and the present value of cost cash flow (Gittinger, 1994). NPV is calculated by equation (1):

$$NPV = PV(B_t) - PV(C_t) \quad (1)$$

where $PV(B_t)$ and $PV(C_t)$ are total present value of benefits and total present value of costs, respectively. The calculation of $PV(B_t)$ and $PV(C_t)$ are shown in equations 2 and 3, respectively.

$$PV(B_t) = \sum_{t=0}^{n} \frac{B_t}{(1+r)^t} \quad (2)$$

$$PV(C_t) = \sum_{t=0}^{n} \frac{C_t}{(1+r)^t} \quad (3)$$

where $B_t$ and $C_t$ are undiscounted costs and benefits at time t, respectively; t is the discount period; and r is the discount rate. A discount rate represents the opportunity cost of capital or the amount of interest due per period as a result of using capital and reflects the perceived riskiness of a cash flow in an investment. Discounting translates future costs and benefits into present values. As with other investment criteria, its choice entails possibly two types of errors in choosing a profitable project among others: A very high discount rate decreases the NPV and may lead to rejection of a project which might be a good one, and vice versa.

The decision criteria for NPV is that if NPV is greater than 0, the project is acceptable. A positive NPV indicates a positive net benefit. In case of mutual exclusiveness, the project with the highest (positive) NPV is favored, other things being equal. Another measure in project evaluation is the benefit-cost ratio, which is the ratio between PV (B) and PV (C). Finally, return on investment (ROI) was computed from the equation (2): NPV/ PV (C) X100. NPV and PV are defined above.

## Allocation of project budget by treatments

The distribution of the project budget during implementation of the project is presented in Table 1. The results show that EKATA was allocated the highest amount of the budget; US$1,175,924 compared to US$770,556 allocated to Control (See Appendix 1 for details).

This implies that implementations of EKATA is relatively expensive compared to Gender Light and Control.

**Table 1: Distribution of the project budget by treatments (US$)**

| Cost item | Control | Gender Light | EKATA | TOTAL |
|---|---|---|---|---|
| Program administration and staff costs | 338,984 | 373,108 | 477,680 | **1,189,772** |
| Capital equipment | 20,946 | 20,946 | 20,946 | **62,838** |
| Targeting costs | 153,572 | 169,814 | 248,135 | **571,521** |
| Participant training | 29,051 | 36,270 | 73,456 | **138,777** |
| Implementation and program material costs | 219,503 | 243,376 | 342,857 | **805,736** |
| Total from project | 762,056 | 843,514 | 1,163,074 | **2,768,644** |
| Beneficiary contribution | 8,500 | 9,150 | 12,850 | **30,500** |
| Total cost | 770,556 | 852,664 | 1,175,924 | **2,799,144** |
| Total # of participating farmers | 2,925 | 3,149 | 3,837 | **9,911** |
| Cost per farmer (US$) | 263 | 271 | 306 | **282** |

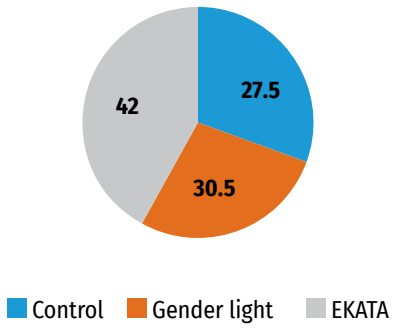
**Notes:**

1. Cost distribution by treatment (US$) 1 BIF=0.0005 US$;
2. Total project expenses exceed the budget allocated to the project because of addition of the opportunity cost of time and labor by the beneficiaries, valued at market rate.

Source: CARE Burundi project implementers and Accounts office

As expected, the highest proportion of the project budget was expended on the EKATA arm in terms of training and materials for implementation of the program. This was mainly due to higher intensity of additional gender equality and women's empowerment activities that were conducted in the EKATA, unlike in the other treatments. The EKATA arm had the highest average cost of US$306 per participating farmer, compared to US$271 for Gender Light and US$263 for Control. In terms of proportionate distribution of the budget, approximately 42% was applied on EKATA, 31% on Gender Light and 28% on Control, respectively (Figure 2).

***Figure 2:*** *Proportion (%) distribution of project budget by treatment arms*



## Comparison of costs and benefits of treatments

The fundamental concept that was taken cognizance of in the analysis is the 'counterfactual,' which is the economic term to describe 'what would have happened without our intervention' and this constituted the baseline for measuring changes. This means that when assessing the benefits of the project interventions, comparisons are made to a situation with the project intervention against an alternative situation without the intervention (the Control). Discounted measures of project were used for analysis since undiscounted measures of project worth are unable to take into consideration the timing of benefits and costs.

The value of benefits created by the project was highest in EKATA at US$3,275,088, which was about twice the value from Gender Light (US$1,611,658), and almost 8.5 times more than Control (US$382,996). Analysis of benefit-cost ratio (BCR) found that EKATA had a ratio of 5:1, which was the highest compared to 3:1 and 2:1 for Gender Light and Control, respectively. The criteria for a project or an intervention to be considered profitable is for the NPV to be greater than zero (>0) and the BCR to be greater than one (>1). The BCR tells how many dollars are generated by the intervention for each dollar invested. In this case, for example, the results indicate that for each dollar spent on EKATA, 5 dollars of benefits were generated by EKATA across a time span of the project.

Evaluating return on the investment, EKATA again had the highest return of 410% compared to 270% in Gender Light and 30% in Control. However, when comparing two or more projects, the project with the highest NPV, BCR and ROI is selected. Therefore, it is clear from the findings of this study that EKATA was the most profitable intervention based on the three evaluation criteria. The main factors that influence differences in benefits and costs of the treatment arms were the number of beneficiaries per treatment and the level of gains per beneficiary attributed to the project. It is important to mention that the Control group in this project was not a "real" control as it had interventions. Since the objective of the project was to test the added value of the EKATA gender-transformative model vis-a-vis a typical gender integration model, the control was an agricultural intervention in which there was no gender integration. This type of design is appropriate for development projects, as it has no "real" control. The control and treatments have incremental interventions and the design was therefore appropriate from an ethical perspective.

**Table 2: Benefits and costs (US$) by treatments**

| Costs and benefits | Year | | | | Total |
|---|---|---|---|---|---|
| | 2016 | 2017 | 2018 | 2019 | |
| **Control** | | | | | |
| Present value of benefits (NPV) | - | 354,526 | 308,284 | 268,073 | 930,883 |
| Present value of costs (PV) | 162,888 | 157,567 | 100,504 | 126,928 | 547,887 |
| Net present value (NPV): | -162,888 | 196,959 | 207,780 | 141,145 | 382,996 |
| Benefit-cost ratio: | | | | | 1.7 |
| Return on investment (NPV/PV costs) | | | | | 69.9 |
| **Gender Light** | | | | | |
| Present value of benefits (NPV) | 246,616 | 740,141 | 653,943 | 568,646 | 2,209,346 |
| Present value of costs (PV) | 138,176 | 189,708 | 127,190 | 142,614 | 597,688 |
| Net present value (NPV): | 108,439 | 550,433 | 526,753 | 426,032 | 1,611,658 |
| Benefit-cost ratio: | | | | | 2.6 |
| Return on investment (NPV/PV costs) | | | | | 270 |
| **EKATA** | | | | | |
| Present value of benefits (NPV) | 763,043 | 1,261,292 | 1,096,775 | 953,718 | 4,074,828 |
| Present value of costs (PV) | 98386 | 259895.8 | 232521 | 208936 | 799740 |
| Net present value (NPV): | 664,657 | 1,001,396 | 864,254 | 744,781 | 3,275,088 |
| Benefit-cost ratio: | | | | | 5.1 |
| Return on investment (NPV/PV costs) | | | | | 410 |

## Valuation of non-marketable project benefits

As expected, the implementation of the project induced a flow of benefits associated with externalities to the communities, such as improved participation of women and men in other community activities, resolution of gender-based violence in non-project households, and improvements in feeder roads through collective construction by direct beneficiaries of the project and other community members, and also improved political and social capital. Informal discussion showed that on average individual farmers were willing to pay US$600 in EKATA per year (US$50 per month) and US$384 per year (US$32 per month) in Gender Light. This was mainly associated with improved sharing of some household tasks and having input in productive decisions. In this study, the analysis of labor and employment as social externalities were not performed because most of the farmers used their own labor.

## Measuring empowerment and externalities

Past studies (Ackerman and Heinzerling, 2002) note that the inability to account for externalities in CBA can result in findings that are not objective. For example, empowerment of women may, for instance, generate positive social and political benefits, thereby enabling improvement of knowledge, technology diffusion, crop productivity and nutrition. It is therefore important to consider the value of externalities associated with implemented interventions when computing CBA. Such an approach is important because our aim is to promote gender equality and women's empowerment that yield desirable outcomes both on-farm and in communities. In addition, such an analysis can move valuation beyond financial aspects only (Chaudhury et al., 2016). Nevertheless, the valuation of nonmarket benefits is contentious because they are not traded in the market (Scrieciu et al., 2011).

In this study, we valued externalities for inclusion in discussions with stakeholders in the broader intervention process to identify externalities associated with the selected project activities. The changes in externalities and values were assessed through key informant interviews with experts and key informant farmers. The values associated with externalities of empowerment were computed by considering a value derived from the key experts and farmers. On average, all EKATA and Gender Light treatments had positive values. In both communities, collective actions such as construction of rural access roads and resolving community gender-based violence were frequently mentioned. Externality benefits associated with social and political capital was high for those in the EKATA treatment. Moreover, the resulting higher social capital due to the EKATA intervention could be due to increased interactions between farmers and development agencies.

## LIMITATIONS AND GAPS IN COST-BENEFIT ANALYSIS

It is widely recognized that assisting research managers in making decisions about how to allocate resources among possible research projects is a complex exercise. Identification and measurement of benefits from a specific research project is also a complicated exercise. Literature on CBA notes a number of concerns related to methodological issues such as data quality, uncertainty, discount rate, valuation and equity (UNFCC, 2011). In this study, the uncertainty relating to data was addressed through triangulation of information from farmers, community leaders, extension staff and project implementers through focus group discussions and individual in-depth interviews. The question of what would have happened in the farming communities in the absence of the project was asked to farmers, although most farmers did not conceptualize it well and had little understanding. The farmers used the "without intervention" situation (as the baseline) when estimating the non-marketable costs and benefits associated with the project activities. However, during the analysis, comparisons were made between treatment and Control.

The choice of discount rate is another important gap. Due to the sensitivity associated with the choice of discount rates, we applied the average interest rate charged by commercial banks in Burundi over the project life as the discount rate, which was 15%. Prices over the period of analysis were assumed to be constant; this is a limitation that can be addressed with an in-depth study focused on market dynamics. The CBA results in this study were validated with project implementers as a step towards including CBA in the broader participatory process for making decisions based on the new evidence produced in this report.

Despite consensus on the utility of cost benefit estimates, it is rare to see cost data publicly available, whether in peer-reviewed research publications, project completion reports, or process evaluations (World Bank, 2019). The major challenge is the limited accessible guidance on cost capture. This includes collection of sufficiently detailed financial and programmatic data to use in cost-benefit analysis. In order to get cost data that is sufficiently disaggregated and project-specific, it should be captured in real time – that is, throughout project implementation, not after the intervention is completed.

Incorporating less-tangible benefits into a CBA is very challenging because there are no straightforward indicators allowing these qualitative changes to be translated in quantitative terms, which is a requirement for inclusion in a CBA. Due to these factors, adoption of BCA has been hampered by the perception that it provides unreliable information. It is therefore important that analysts and decision-makers are aware of the limitations of the process, to avoid unreasonable expectations which lead to disappointment. A limitation is that the data is never perfect. This limitation is not a case for discrediting BCA, but rather for using it properly.

## CONCLUSIONS AND RECOMMENDATIONS

Evidence obtained from this analysis shows that there is a business case for scaling up EKATA based on the demonstrated benefits arising from its use. There are systematic differences in costs and benefits of applying EKATA versus conventional gender approaches. Although EKATA consumed the highest financial input of about US$1,175,924, compared to US$770,556 used on Control, it also generated more benefits. About 42% of the budget was applied on EKATA compared to 31% and 28% of the budget applied to Gender Light and Control, respectively. Similarly, EKATA had the highest average cost of US$306 per participating beneficiary farmer compared to US$263 per farmer in Control and US$271 for Gender Light treatments.

The value of benefits (NPV) created by the project was highest in the EKATA treatment. The NPV of benefits for EKATA was US$3,275,088, compared to US$1,611,658 for Gender Light and US$382,996 in the Control group. The EKATA NPV was about twice the value from Gender Light (and almost 8.5 times more than in Control). Benefit-cost ratio for EKATA was 5:1, which was the highest compared to 3:1 and 2:1 for Gender Light and Control, respectively. Evaluating return on investment shows that EKATA had the highest return of 410% compared to 270% in Gender Light and 30% in Control. Based on the three criteria (NPV, Benefit Cost ratio and ROI), EKATA emerged as the most profitable treatment.

The key externalities generated from the implementation of EKATA were improved participation of women and men in other community activities, resolution of gender-based violence in non-project households and improvements in feeder roads through collective construction by groups of project members, and also improved political and social capital. On average individual farmers were willing to pay US$ 600 per year in EKATA (50 US$ per month) and US$384 per year (32 US$ per month) in Gender Light to gain gender equality and empowerment from the project. There was some differences in WTP between men and women. Overall, men in both treatment arms were WTP relatively lower for empowerment compared to women, hence their relatively low valuation of empowerment. Women on average were WTP $ 54 per month compared to $ 48 per month for men. For Gender Light, women were willing to pay on average $ 35 per month whilst men were willing to pay $ 29. However, there need for methodological development to enable accurate empirical analysis of social benefits of a project such as empowerment.

From the findings of this study we recommend scaling out of EKATA model. However, adaptations should be made to reduce costs of implementation. The key lesson learnt is that dis-aggregated data for cost benefit analysis was not readily available. Future projects should develop Value for Money indicators at the start of intervention and continue to track them over the project period to make cost benefit analysis a simple process. Further research is required to quantify and monetize the non-marketable costs and benefits of the project outcomes through social cost benefit analysis.

## REFERENCES


Ackerman L. and Heinzerling L. (2002). Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection. Univ. PA. Law Rev. 150:1553. doi:10.2307/3312947

Birol E; Koundouri P; Kountouris Y. (2010). Assessing the economic viability of alternative water resources in water-scarce regions: Combining economic valuation, cost-benefit analysis and discounting. Ecol.Econ. 69:839–847. doi:10.1016/j.ecolecon.2009.10.008

Bizoza A.R. and Graaff, J.de. (2012). Financial cost-benefit analysis of bench terraces in Rwanda. Land degradation & Development. 23: 103-115.

Chaudhury AS; Helfgott A; Thornton TF; Sova C. (2016). Participatory adaptation planning and costing. Applications in agricultural adaptation in Western Kenya. Mitigation and Adaption. Strategies . Glob. Change.21:301–322. doi:10.1007/s11027-014-9600-5

Dietz S; Hepburn C. (2013). Benefit-cost analysis of non-marginal climate and energy projects. *Energy Economics.*40:61–71. doi:10.1016/j.eneco.2013.05.023.

European Union ( 2015). Guide to Cost-Benefit Analysis of Investment Projects*. Economic appraisal tool for Cohesion Policy 2014-2020.* European Union

Gittinger, J.P. (1994). *Economic Analysis of Agricultural Projects*. Third. Economic Development Institute of the World Bank, Baltimore: John Hopkins University Press. ISBN 0-8018-2912-7. Boardman AE; Forbes D. 2011. A Benefit-Cost Analysis of Private and Semi-Private Hospital Rooms. *Journal of Benefit-Cost Analysis.* 2. doi:10.2202/2152-2812.1050

Gates, M.F (2014). Putting women and girls at the center of development. Science. 345, 1273–1275.

Hanley, N., MacMillan, D., Wright, R., Bullock, C., Simpson, I., Parisson, D. and Crabtree, B. (1998). Contingent valuation versus choice experiments: Estimating the benefits of environmentally sensitive areas in Scotland. *Journal of Agricultural Economics*, 49(1), 1-15.

J-PAL (Abdul Latif Jameel Poverty Action Lab) (2012).J.J-PAL's cost-effectiveness classifcation methodology (http://www.povertyactionlab.org/publication/cost-effectiveness). Cited 30th May, 2020._

Kuwornu, J. K.M. Oduro, E., Amegashie, D.P.K., Fening, Ken., Yangyouru, M., MacCarthy, D. S. Amoatey C. and Datta, A (2018). Cost-Benefit Analysis of Conventional and Integrated Crop Management for Vegetable Production, *International Journal of Vegetable Science,* 24:6, 597-611, DOI: 10.1080/19315260.2018.1457585

Marshal, G.R. and Brennan, J.P (2001). Issues in benefit-cost analysis of agricultural research projects. *The Australian Journal of Agricultural Resource Economics* 45 (2): 195-213.

Ng'ang'a SK; Notenbaert A; Mwungu CM; Mwongera C; Girvetz E. 2017. Cost and benefit analysis for climate-smart soil practices in Western Kenya. Working Paper. CIAT Publication No. 439. International Center for Tropical Agriculture (CIAT), Kampala, Uganda. 37 p. Available at: http://hdl.handle.net/10568/82618

Park, M., Jit, M. and. Wu, J.T (2018). Cost-benefit analysis of vaccination: a comparative analysis of eight approaches for valuing changes to mortality and morbidity risks, *BMC Medicine* (2018) 16:139

Pemsl, D.E. and Staver, C. (2014). Strategic Assessment of Banana Research Priorities. Lima (Peru). CGIAR Research Program on Roots, Tubers and Bananas (RTB). RTB Working Paper 2014-2. Available online at: www.rtb.cgiar.org

Scrieciu S., Barker T. and Ackerman F. (2011). Pushing the boundaries of climate economics: critical issues to consider in climate policy analysis. Ecol. Econ. doi:10.1016/j.ecolecon.2011.10.016

Tol RSJ (2012). A cost-benefit analysis of the EU 20/20/2020 package. Energy Policy 49:288–295. doi:10.1016/j.enpol.2012.06.01

UNFCC (2011). Assessing the cost and benefits of adaptation options: an overview of approaches. In: The Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change. p. 46.

van Wee B; Börjesson M (2015). How to make CBA more suitable for evaluating cycling policies. Transp. Policy 44:117–124. doi:10.1016/j.tranpol.2015.07.005.

World Bank (2019). Capturing cost data. SIEFimpact@worldbank.org (Accessed 15 May, 2020).

# APPENDIX 1: Project cost structure and calculations of costs and benefits

## 1.Control

| | 1 | 2 | 3 | 4 | |
|---|---|---|---|---|---|
| | 2016 | 2017 | 2018 | 2019 | Total |
| **Program administration and staff costs** | | | | | |
| Personnel costs | 37,877 | 42,823 | 49,825 | 59,447 | 189,972 |
| Monitoring and evaluation | 2,090 | 2,090 | 2,090 | 2,090 | 8,360 |
| Consultancies | | 10,929 | 28,232 | 45,195 | 84,356 |
| Travel | 9,417 | 8,462 | 7,853 | 30,564 | 56,297 |
| ***Capital equipment*** | 10,053 | 10,893 | | | 20,946 |
| **Targeting costs** | | | | | |
| Sensitization and targeting | 6,800 | | | | 6,800 |
| Staff training | 34,993 | 54,993 | 14,993 | 34,993 | 139,972 |
| **Participant training** | | | | | |
| Training of farmers | 11,621 | 8,715 | 5,810 | 2,905 | 29,051 |
| **Implementation and program material costs** | | | | | |
| Cost of materials distribute and distribution costs | 2,085 | 4,170 | | 2,085 | 8,340 |
| Support to farmer groups (SUBAWARD) | 69,886 | 63,307 | 42,050 | 42,719 | 217,963 |
| **Beneficiary costs** | | | | | |
| Beneficiary contribution of labor and time | 2,500 | 2,000 | 2,000 | 2,000 | 8,500 |
| **Total (USD)** | **187,322** | **208,383** | **152,853** | **221,998** | **770,556** |
| Present value of costs | 162,888 | 157,567 | 100,504 | 126,928 | 547,887 |
| | | | | | |
| **BENEFITS** | | | | | |
| 1.YIELD (kg/acre) | | 2,269 | 2,269 | 2,269 | 6,807 |
| 2.PRICE per kg of rice | | 1,210 | 1,210 | 1,210 | 3,630 |
| 3. Revenue/acre (1*2) | | 2,745,490 | 2,745,490 | 2,745,490 | 8,236,470 |
| 4. Total area under rice (ACRE) | | 341.55 | 341.55 | 341.55 | 1,025 |
| 5. #beneficiaries | | 2,925 | 2,925 | 2,925 | 2,925 |
| 7. #beneficiaries who adopted varieties 51.9 % | | 1,518 | 1,518 | 1,518 | 1,518 |
| 6. Revenue/beneficiary (4*5) | | | | | 1,853,206 |
| 8. TOTAL Monetary REVENUE (3*4*7) | | 937,722,109.50 | 937,722,109.50 | 937,722,109.50 | 2,813,305,319 |
| 9 OTHER BENEFIT (Empowerment) | | | | | |
| 10. Value of benefits (USD): 1 BIF=0.0005 USD); | | 468,861 | 468,861 | 468,861 | 1,406,653 |
| 11.Present value of benefits | | 354,526.32 | 308,283.75 | 268,072.83 | 930,882.90 |
| 12: Net present value: | (162,888.43) | 196,959.13 | 207,780.11 | 141,144.85 | 382,995.65 |
| 13: Benefit cost ratio: | | | | | 1.70 |

**Notes:**

1. Mean WTP for empowerment was US$600 per person per year in EKATA and US$384 per person per year for Gender Light; and none was estimated for Control.
2. Agricultural benefits started in the second year and only empowerment benefits were reported in the first year.
3. For the first year of the project, the empowerment was only obtained in last 6 months of the year.
4. Yield was assumed to be constant from year 2 to year 4.
5. Discount rate is the mean interest rate of 15% as per the Bank of Burundi during the study period.

## 2. Gender Light

| | 1 | 2 | 3 | 4 | |
|---|---|---|---|---|---|
| | 2016 | 2017 | 2018 | 2019 | SUB-TOTAL |
| **Program administration and staff costs** | | | | | |
| Personnel costs | 32,085 | 57,582 | 55,361 | 66,052 | 211,080 |
| Monitoring and evaluation | 3,001 | 3,001 | 3,001 | 3,001 | 12,003 |
| Consultancies | | 12,143 | 31,369 | 50,217 | 93,729 |
| Travel | 9,417 | 8,462 | 7,853 | 30,564 | 56,297 |
| *Capital equipment* | 10,053 | 10,893 | | | |
| **Targeting costs** | | | | | |
| Sensitization and targeting | 7,145 | | | | 14,290 |
| Staff training | 38,881 | 38,881 | 38,881 | 38,881 | 155,524 |
| | | | | | |
| **Participant Training** | | | | | |
| Training of farmers | 9,068 | 12,068 | 6,068 | 9,068 | |
| **Implementation and program material costs** | | | | | |
| Cost of materials distribute and distribution costs | 2,085 | 2,085 | 2,085 | 2,085 | 8,340 |
| Support to farmer groups (SUBAWARD) | 44,318 | 103,675 | 46,723 | 47,465 | 197,863 |
| **Beneficiary costs** | | | | | |
| Beneficiary contribution of labor and time | 2,850 | 2,100 | 2,100 | 2,100 | 9,150 |
| **TOTAL COSTS (USD)** | **158,903** | **250,889** | **193,440** | **249,433** | **852,664** |
| Present value of costs | 138,176.38 | 189,707.82 | 127,189.84 | 142,613.85 | 597,687.89 |
| | | | | | |
| BENEFITS | | | | | |
| 1.YIELD (kg/acre) | 1,880 | 1,880 | 1,880 | 1,880 | |
| 2.PRICE per kg of rice | | 1,210 | 1,210 | 1,210 | 1,210.00 |
| 3. Revenue/acre (1*2) | | 2,274,800 | 2,274,800 | 2,274,800 | |
| 4. Total area under rice (ACRE) | 361.90 | 361.90 | 361.90 | 361.90 | 341.55 |
| 5. #beneficiaries | 2,925 | 2,925 | 2,925 | | 2,925 |
| 7. #beneficiaries who adopted varieties (50.5 %) | 1,477 | 1,477 | 1,518 | 1,518 | |
| 6. Revenue/beneficiary (4*5) | | | | | |
| 8. TOTAL Monetary REVENUE (3*4*7) | | 823,240,167.75 | 823,250,120.00 | 823,250,120.00 | |
| 9. OTHER BENEFITS (Empowerment) | 567,216,000 | 1,134,432,000 | 1,165,881,600 | 1,165,881,600 | |
| TOTAL BENEFITS (Burundi Franc (BIF)) | 567,216,000 | 1,957,672,168 | 1,989,131,720 | 1,989,131,720 | |
| TOTAL BENEFITS (USD): 1 BIF=0.0005 USD) | 283,608.00 | 978,836.08 | 994,565.86 | 994,565.86 | 3,251,575.80 |
| Present value of benefits (USD) | 246,615.65 | 740,140.71 | 653,943.20 | 568,646.26 | 2,209,345.81 |
| NET Present Value (NPV) (USD) | 108,439.28 | 550,432.88 | 526,753.36 | 426,032.41 | 1,611,657.93 |
| Benefit cost ratio: | | | | | 2.59 |

## 2. Ekata

| | 1 | 2 | 3 | 4 | |
|---|---|---|---|---|---|
| | 2016 | 2017 | 2018 | 2019 | TOTAL |
| **Program administration and staff costs** | | | | | |
| Personnel costs | 40,322 | 68,200 | 99,350 | 94,675 | 302,548 |
| Monitoring and evaluation | 3,764 | 3,764 | 3,764 | 3,764 | 15,056 |
| Consultancies | | 17,405 | 44,963 | 71,977 | 134,344 |
| Travel | | 9,417 | 8,462 | 7,853 | 25,732 |
| **Capital equipment** | 5,053 | 10,893 | 5,000 | | |
| **Targeting costs** | | | | | |
| Sensitization and targeting | 6,304 | 6,304 | | | 25,217 |
| Staff training | 25,729 | 55,729 | 85,729 | 55,729 | 222,918 |
| **Participant Training** | | | | | |
| Training of farmers | 3,364 | 18,364 | 33,364 | 18,364 | |
| **Implementation and program material costs** | | | | | |
| Cost of materials distribute and distribution costs | 1,085 | 2,085 | 3,085 | 2,085 | 8,340 |
| Support to farmer groups (SUBAWARD) | 23,523 | 148,601 | 66,969 | 108,033 | 347,126 |
| Beneficiary contribution of labor and time | 4,000 | 2,950 | 2,950 | 2,950 | 12,850 |
| **TOTAL COSTS (USD)** | **113,144** | **343,712** | **353,636** | **365,431** | **1,175,924** |
| Present total costs (USD) | **98,386** | **259,896** | **232,522** | **208,936** | **799,740** |
| | | | | | |
| BENEFITS (BIF) | | | | | |
| 1.YIELD (kg/acre) | | 2,306 | 2,306 | 2,306 | 2,306 |
| 2.UNIT PRICE | 1,210 | 1,210 | 1,210 | 1,210 | 1,210 |
| 3. Revenue/acre (1*2) | | 2,790,260 | 2,790,260 | 2,790,260 | 2,790,260 |
| 4. Average rice area/household (ACRE) | 0.475 | 0.475 | 0.225 | 0.225 | 0.225 |
| 5. Revenue/beneficiary (4*5) | | 627,809 | 627,809 | 627,809 | 627,809 |
| 6. #beneficiaries | 2,925 | 2,925 | 2,925 | 2,925 | 2,925 |
| 7. #beneficiaries growing rice at 62.4% | | 1,825 | 1,825 | 1,825 | 1,825 |
| **8.** TOTAL Monetary REVENUE (5*7) | | 1,145,876,074.20 | 1,145,876,074.20 | 1,145,876,074.20 | |
| **8. OTHER BENEFITS** | 1,755,000,000 | 2,190,240,000 | 2,190,240,000 | 2,190,240,000 | |
| TOTAL BENEFITS (Burundi Franc (BIF)) | 1,755,000,000 | 3,336,116,074 | 3,336,116,074 | 3,336,116,074 | |
| TOTAL BENEFITS (USD): 1 BIF=0.0005 USD) | 877,500 | 1,668,058 | 1,668,058 | 1,668,058 | 5,881,674 |
| Present value of benefits (USD) | 763,043 | 1,261,292 | 1,096,775 | 953,718 | 4,074,828 |
| NET Present Value (NPV) (USD) | 664,657 | 1,001,396 | 864,254 | 744,781 | 3,275,088 |
| Benefit cost ratio: | | | | | 5.10 |