

case
study



Pathways to a climate resilient future: **a community-based cost benefit analysis of a food security project in Ethiopia**

Overview

In recent years, climate change impacts have created grave new threats to rural livelihoods. Drought has become more frequent, while erratic rainfall (e.g., late onset, early cessation, irregular timing and intensity) and periodic flooding are dangerous new problems. Climate change will continue to intensify the environmental and socioeconomic drivers of food insecurity, posing formidable threats to food supplies and livelihoods.

As a frontline actor in addressing the humanitarian consequences of climate change, the International Federation of Red Cross and Red Crescent Societies (IFRC) continues to develop specific, practical interventions to boost the resilience of vulnerable communities while enhancing their food security.

Community-based cost-benefit analysis (CBA) is an evidence-based tool which can effectively be used to ascertain the value and impact of integrating resilience-building interventions in food security programming. The merit of the CBA is that it provides a powerful way to describe and communicate a project's benefits. It is an invaluable tool for evaluating program-

ming as well as guiding the design of future interventions. CBAs produce a rich body of evidence on what works where, limits to existing interventions and needed adjustments to better address emerging risks.

As such, the following case study provides an overview of a CBA that was conducted by the IFRC to provide a quantitative analysis to complement the qualitative benefits of the food security project which was implemented in Ethiopia.

Specifically, the community-based CBA was conducted on the South Wollo Food Security Project. The four-year project, launched by the Ethiopian Red Cross Society, aimed to simultaneously address acute hunger and foster longer-term food security and climate resilience for small-scale farmers in the Ethiopian highlands. The CBA aimed to assess how the project:

- delivered on building key aspects of resilience
- benefit-cost ratio it secured

General context

South Wollo is an administrative zone of Amhara Region located in the rugged highlands of northern Ethiopia. Most of

the population earns their livelihoods via small-scale farming. It is a place where a large proportion of the population has experienced food insecurity for years due to falling agricultural productivity coupled with repeated shocks, notably periodic drought. Drought events have been linked to crop failure and the emaciation or death of livestock. Food insecurity is reflected in the humanitarian assistance regularly provided to these communities over the past several decades in order to avert famine. Environmental degradation, population growth and climate change continue to pose significant challenges to the populations' traditional livelihoods. Provision of emergency food aid is no longer a viable option as it leads to periodic dependency.

Therefore, the Ethiopian Red Cross Society launched the South Wollo Food Security project in 2000. A 'twin-track' approach was adopted for the four-year project:

- Immediate relief to meet acute food needs was provided through cash or food parcels directly to communities.
- Concurrently, longer-term sustainability and resilience objectives were met by activities that served to rehabilitate the local environment, diversify livelihoods and foster market engagement.

The project was principally a cash-for-work scheme that provided vulnerable communities with cash payments in exchange for labour on public works activities from 2000 to 2004. Its public works activities included rehabilitation (e.g., terrace construction, tree planting, enclosures of degraded common lands), water development (borehole construction, defences for natural springs, rainwater harvesting), and roads (construction, maintenance). Complementary interventions included latrine construction, raising awareness on nutrition and sanitation, and providing agricultural tools and improved seed varieties.

Cash payments and grain parcels were distributed numerous times over a three-

year period. They targeted particularly vulnerable members of the recipient communities. Able-bodied recipients were required to participate in public works activities in exchange for this cash, while those who were old or infirm were simply given food.

Methodology

While the South Wollo Food Security Project targeted two districts, *woredas*, Ambassel and Kutaber, the evaluation only covered Ambassel *woreda*. Ambassel was selected given that the highland communities represented a large majority of the population in neighbouring districts, which made the finding of the analysis more widely applicable within Ethiopia. Ambassel also accounted for approximately two-thirds of the National Society's budget, therefore, this focus also better captures the significance of the project.

The evaluation was comprised of two distinct components a) qualitative assessment of how well the project and government follow-up activities delivered on six key aspects of resilience¹ b) community-based cost benefit analysis of the National Society's project activities. A combination of both qualitative (focus group discussions, key informant interviews, site visits) and quantitative (data set analysis) approaches was utilized.

Informant interviews were conducted with the National Society staff, local government officials and non-governmental organizations active in the *woreda*. Five villages, *kebeles*, (Dible, Eyesus, Merye, Teregmam and Yebar) from the 19 *kebeles* in Ambassel targeted by the food security project were also selected for focus group discussions. The focus group discussions concentrated on identifying the benefits delivered to the target communities by the project and government follow-up activities. In addition, the evaluation team conducted site visits to gather further data on current contextual factors.

¹ This resilience analysis examines factors identified via a participatory study by the IFRC that sought to define the characteristics of a safe and resilient community. The study found that a 'safe and resilient community' (a) is knowledgeable and healthy, (b) is organized, (c) is connected, (d) has infrastructure and services, (e) can manage its natural assets, (f) has economic opportunities. Characteristics of a Safe and Resilient Community: Community Based Disaster Risk Reduction Study, ARUP International Development, September 2011. International Federation of Red Cross and Red Crescent Societies. See http://www.ifrc.org/PageFiles/96986/Final_Characteristics_Report.pdf

Project outcomes

The evaluation's findings note that the target communities viewed the implementation of project activities favourably. This positive assessment is due to the fact that the project provided communities with sustained assistance in two distinct ways, namely making cash (or grain) transfers to the most vulnerable and investing in projects to build local productive capacity. The success of the project was further reinforced by the fact that the local government and non-governmental organizations have by-and-large replicated the project's activities and approach in the district.

Notably the targeted communities cited that the following three project activities were most beneficial to them:

- Environmental protection activities which have helped communities to produce crops and livestock despite poor rains while also providing them with supplementary products to sell.
- Water source development which provided water for people and livestock, enables growing of alternative crops and minimizes water-borne diseases.
- Road construction and maintenance help communities to access neighbouring areas to sell their products and buy needed supplies while also enabling government and projects to reach communities.

However, it should be noted that while the overall impact for the communities has been positive, in recent years the threat to food security has been further heightened due to risks associated with climate change, which can potentially undermine efforts to build sustainable livelihoods and roll back hard-earned advances. Climate change can adversely impact communities by undermining crop production, impeding pasture growth and exacerbating soil erosion.

Resilience analysis

The evaluation also took into consideration how the project delivered on building key aspects of resilience within target-

ed communities. The analysis builds on the findings of the 2011 IFRC study, which identified six key characteristics of a safe and resilient community.

Knowledgeable and healthy: The target communities are significantly healthier as a result of the project, though their health remains constrained by continued poverty and poor access to various services. The incidence of water-borne diseases has sharply decreased due to improved access to clean water. This is primarily due to water source development activities – e.g., protecting natural springs from direct use by livestock and wild animals, sinking boreholes – and from a proliferation of local springs due to watershed rehabilitation. Better access to water has also improved household sanitation, especially since the project trained villagers in sanitation and latrine construction. A third key health benefit of the project is that it protected households from hunger by both enhancing their productive capacity and providing emergency support to food insecure households during food crisis periods.

The target communities have noted that the project has had considerable positive impact on their health: “Before the project, about 80 per cent of villagers were affected by disease, but now only about 20 per cent are affected.”

Communities are also now more aware of the dangers posed by environmental degradation and drought. They are likewise more aware of how rehabilitating degraded lands offers a way to manage these risks, since it can reverse environmental degradation and build peoples' resilience to drought.

Organized: The project has fostered a higher level of community organization due to the nature of specific activities which require the allocation of group work, this has included the terracing of degraded hillside common lands and hillside farms and maintaining village-based water development structures.



The project has enhanced the community's organizational capacity and spearheaded new initiatives. During the consultations, community members highlighted that: "Building on the Red Cross project, the local government has launched a watershed development programme to organize people to do terracing and plant trees via communal labour. We can see that these activities lead to better production via more fertile soils that hold moisture better, so people are very interested in this works and keen to be part of these groups."

Connected: The project's emphasis on building and maintaining roads has greatly enhanced the connection of targeted communities to neighbouring towns. It should be noted that the improved accessibility of these villages is relative, with many still difficult to access.

Infrastructure and services: The target communities now have better infrastructure and services in several ways. They have improved roads and better access to clean water, while many also now have pit latrines by their homes.

Management of natural assets: The targeted communities are now significantly better equipped to manage their natural assets. Notably, a rapidly growing population has placed great pressure on local natural resources, leading to widespread deforestation and severe soil erosion. More recently, climate change has brought impacts that have wrought havoc on historical livelihood strategies. The project addresses these concerns directly via activities such as terracing, tree planting and



Community members have strongly advocated the project's positive impact on management of natural assets and enhanced socio-economic opportunities: "The fact that our hillsides are now covered with vegetation controls erosion, which raises crop production. It also means that we now have access to fuel wood as a supplementary source of cash and have more pasture for our livestock. All of this helps minimize outmigration."

creating enclosures, all of which delivered major livelihood benefits to communities.

Economic opportunities: The economic opportunities for the targeted communities have increased significantly. These stem from three underlying strategies embedded in the project: 1) building up key assets, 2) rehabilitating the natural resource base that underpins various local livelihood options, 3) fostering the use of innovative technologies and practices. Critically, these strategies can create income streams that are not only inherently attractive, but also resilient to climate change impacts.

An overview of the cost-benefit analysis

The study found that the project and government follow-up activities were highly successful, as reflected in a benefit-cost ratio of 8.9:1. Estimating this ratio required generating quantitative estimates for both the project's benefits and its costs, then comparing these two headline figures. The study found that it would be impossible to tease apart the benefits from the project and those from the government follow-up activities, since the government continued many of the activities originally launched by the National Society. As a result, both the benefits and costs from these two initiatives were aggregated for this analysis.

Generating aggregated costs for the work of these two initiatives in the target communities was straightforward, since it simply involved obtaining the relevant figures from the National Society and the woreda government, then adding them. Generating quantitative estimates of benefits was more complicated. It involved identifying project benefits, separating out benefits that could be readily quantified using the data obtained, then estimating numeric values for this subset of benefits.

The evaluators used evidence gathered in February 2013 to quantify the benefits of the projects in the target communities.

Benefits were only calculated for the 19 *kebeles* in the Ambassel *woreda* that received support from the Ethiopian Red Cross Society. These benefits were assumed to accrue to the entire population of the 19 *kebeles*. The benefits derived by the communities from food equivalent were assumed to accrue only from 2001 to 2012, since the cash-for-work schemes on which they depend hand only run through 2012.

The benefit-cost ratio of the project was calculated over 20 years. Actual benefits and costs accrued over 13 years, from the start of the project in 2000 to 2012, the last full year before the evaluation was conducted. However, various project benefits are expected to continue to accrue into the future, since they are not dependent on cash transfer and are instead based on changes in resource management practices. Based on CBA standard practice, net benefits were discounted using a 10 per cent discount rate.

It is assumed that benefits accrue every year, regardless of variations in rainfall. This is a reasonable assumption in that the benefits in question are based on innovations that should deliver even in years where there poor rainfall. For instance, trees can access aquifers due to their deep roots, while water sources are based on groundwater. Based on these calculations, the benefit to cost ratio generated by the evaluation is 8.9:1 – for every 1 Ethiopian Birr spent, 8.9 Ethiopian Birr of benefits are delivered. This finding notes the great value and cost effectiveness of the Ethiopian Red Cross Society's project.

Challenges and lessons learned

The South Wollo Food Security Project and the resultant follow-up initiatives led by the government have had a discernable impact in providing vulnerable communities with both emergency assistance and viable longer-term livelihood alternatives that are resilient to climate change impacts.



The project has yielded a number of critical lessons in terms scaling up existing efforts and the means of replicating similar projects by the IFRC. It should be noted that target communities still remain at high-risk for threats such as land scarcity linked to population pressure, environmental degradation and climatic shocks. Project activities linked to environmental protection, water source development and roads constitute critical areas in addressing emerging risks and therefore should be scaled up.

The evaluation also yielded a number of critical issues that should be factored for future interventions. Specifically, measures should be taken to safeguard the communities from becoming overly reliant on outside assistance for meeting their food needs. Follow-up interventions will need to carefully balance interventions which promote and enhance the resilience of communities in the face of increasing risks.

Additionally, another challenge that came to light during the evaluation of the project was the potentially adverse impact of planting eucalyptus trees on the environment. The project initially focused on planting eucalyptus trees in the target communities. This was primarily due to the fact that that eucalyptus trees grow rapidly and are

Quantified benefit	Livelihood situation “without cash-for-work”	Livelihood situation “with cash-for-work”	Values / assumptions
Food equivalent	Limited access to food or assets that can be sold for food	Better access to grain and increased livestock holdings	Cash and grain transfers are used to buy grain and livestock
Wood sales	Households have few sources of income to rely upon, especially in poor rainfall years	Selling wood provides an alternative income that is resilient to poor rains	15-25% of community are “professional woodsellors” – it is their primary occupation and they sell wood in town or other villages. These sellers earn 6,000-7,000 Birr per year. Meanwhile, 50-60% sell wood in their kebele and earn 500-1,000 Birr per year.
Time spent to collect wood	Family members had to travel long distances to gather fuelwood	Fuelwood is now readily accessible	Villagers report a fall in time spent collecting fuelwood from 2 hours to ½ hour per day. Average daily wage rate over this period is 17 Birr per day.
Time spent to collect water	Women had to travel long distances to obtain water for domestic use	Water points are now stronger, cleaner and closer to homesteads, and travel times reduced	At a minimum, women in the communities have decreased travel times by 30 minutes per day, but some cited reductions as high as 3.5 hours. The analysis used a 1 hour saving. Daily wage rate used was 17 Birr per day.
Diarrhoea incidence	High incidence of diarrhoea due to use of unclean water and poor sanitation	Incidence of diarrhoea has decreased substantially	Villagers report that diarrhoea incidence has fallen from 80% to 20%. A 21% fall in incidence is used. Since children are most likely to be the ones affected, lost school days (on average 3 days per case) are used in the valuation, instead of days lost to labour. Cost of treatment is estimated at 9 Birr but it not included in the cost as the number of people who will seek treatment is unknown. Lost school days valued at half the daily wage rate. Total Cost = 3*8.5 Birr = 25.5 Birr per person

Calculation of losses / benefits without cash-for-work	Calculation of losses / benefits with cash-for-work	Total annual benefit
0	Total value of cash and grain distributed to target communities	Varies by year – see model
0	$(111,116 * 15\% * 6,000) + (111,116 * 50\% * 500) = 127,783,400$	127,783,400
$17 \text{ Birr}/8 * 2 \text{ hours} * 365 * 22,223 = 34,473,429$	$17 \text{ Birr}/8 * 0.5 \text{ hours} * 365 * 22,223 = 8,618,357$	25,855,072
$17 \text{ Birr}/8 * 1.5 \text{ hours} * 365 * 22,223 = 25,855,072$	$17 \text{ Birr}/8 * 0.5 \text{ hours} * 365 * 22,223 = 8,618,357$	17,236,715
$80\% * 111,116 * 25.5 \text{ Birr} = 2,266,766$	$63\% * 111,116 * 25.5 \text{ Birr} = 1,785,079$	481,687

able to survive in harsh conditions. Furthermore, they provided the communities with a source of cash earnings that enabled them to buy food in times of need. Despite their merits, it is also widely documented that eucalyptus trees can disrupt local hydrology by decreasing soil nutrients, soil moisture and crop yields while also drying up natural springs. Any such adverse hydrological impacts could have serious consequences for the resilience of target communities, given the water scarcity they already face, therefore for future interventions alternative options should be investigated.

Several opportunities to build on the work of the National Society and the government in Ambassel *woreda* can be identified based on the findings of the evaluation. These include:

- Extending environmental protection activities to private lands: this could include terracing and agroforestry practices, notably tree species that provide high-value livestock fodder that is resilient to climate change impacts.
- Intensifying community-led environmental protection activities: this could include identifying viable alternatives to eucalyptus as sources of wood, notably species that are locally adapted, fast-growing and suitable for cropping.
- Horticulture: placing greater emphasis on growing vegetable and fruit trees in home gardens to develop alternative income streams and sources of nutrition.
- Greater market engagement: this could be done by improving roads to facilitate sales of local products (e.g., wood, livestock, milk, vegetables) or stimulating cottage industries to process local products.
- Increased innovation: fostering increased experimentation and innovation at a low cost by hiring farmers to serve as village-based para-extensionists who demonstrate technological options and provide information on them to others in the community.
- Rule of Three: encouraging farmers to explore at least three fundamentally distinct alternative solutions to any given livelihood challenge.



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