Community Anticipatory Actions to Improve Community-Level Disaster Resilience in Nigeria: a Cost-effectiveness Analysis (CEA)

HIGHLIGHTS

→ Flooding induced by climate change takes a devastating toll on vulnerable groups in informal settlements in risk-prone urban areas due to lack of drainage capacity. Globally, funders spent around 1.2 billion USD on multi-hazard response preparedness and 1 billion USD on disaster risk reduction in 2022.[i]

→ Early warnings and anticipatory action have the potential to mitigate the impacts of disaster by acting ahead of time, but decisionmakers need evidence on cost-effectiveness to decide whether to allocate resources to this program.

→ From 2023 – 2024, researchers evaluated an IRC-implemented community-led anticipatory action intervention to understand its impacts on improving community-level resilience to flooding shocks.

→ We conducted a cost-effectiveness analysis and found that community-led anticipatory actions cost 81,946 USD per community, compared to 71,720 USD per community for household level anticipatory cash. When this difference is compared to changes observed in 6 of the 30 resilience outcomes, we find incremental cost effectiveness ratios ranging from 10,000 to 18,000 USD for outcomes observed.

→ Our analysis suggests community-level anticipatory actions are a cost-effective approach to address community-level disaster resilience relative to anticipatory cash to households. If community-level outcomes are the primary aim of a program, funders could consider supporting community-led anticipatory actions. However, we do not have evidence that suggests community-level interventions are more effective at inducing changes at the household level when compared with anticipatory cash.

→ This assessment reflects only one evaluation in Adamawa state of northeastern Nigeria. We recommend evaluating if this finding is replicable in other contexts before generalizing the learnings beyond this context.

THE APPROACH:

Community-led anticipatory actions are bottom-up anticipatory actions that aim to strengthen community involvement and ownership of resilience activities. The intervention aims to improve community-level resilience to disaster shocks such as urban flooding caused by climate change. Researchers around the world are still studying the costs of anticipatory action and its effectiveness in improving resilience to flooding, especially among fragile and conflict-affected populations. Currently, there is limited evidence on the cost-effectiveness of anticipatory action. The IRC is beginning to bridge this gap in evidence with cost evidence.[1] Anticipatory action relies on forecasts using hydrometeorological data to trigger a set of pre-arranged actions and finances to help communities prepare for the onset of flooding before the impacts are felt.

We implemented a community-led anticipatory action program in eight urban communities in Yola, Nigeria. The research team selected urban communities with the highest risk of flooding and vulnerability and the presence of internally displaced populations. These communities lack basic needs and have a higher tendency to resort to negative coping strategies in the face of disaster. The IRC delivered the intervention at the community level over a year and a half. Community members participated in designing the urban community-led anticipatory action responses over the course of this period.

[1] Cochran, Mikaela. 2023. "Livelihoods Cost-Effectiveness Brief – Anticipatory Cash Nigeria." The International Rescue Committee. https://www.rescue.org/report/livelihoods-cost-effectiveness-brief-anticipatory-cash. Accessed on April 29, 2025/

Community involvement included joint identification of areas within communities with the highest exposure to flooding, mapping of community assets, joint learning about the probability and impact of flood hazards, evaluation of household needs and coping strategies, and an analysis of responses that communities and households previously used in response to flooding.

With funding from the European Commission Humanitarian Aid (ECHO), we measured the effect of the community-led anticipatory action treatment on community resilience via GOAL's 2015 Toolkit for Measuring Disaster Resilience.[ii] The treatment took place in 4 communities. We evaluated impact at the community level by comparing outcomes to 4 similar communities in the Yola region, which received household-level anticipatory cash assistance only (134 USD per household) 10 days prior to the forecasted flood.

COST-EFFECTIVENESS ANALYSIS: PROCESS

We used results from a difference-in-differences impact evaluation[2] and retrospective cost data to estimate the cost of achieving community-level resilience among the 30 outcomes that we evaluated using the GOAL toolkit. Nine out of the 30 outcomes exhibited positive significant differences at the **community level as a result of the treatment**. The six of the nine outcomes were significant at the 5% level[iii] and are therefore included in the cost analysis, described further in Table 1. We did not observe any community-level improvements as a result of household cash only.

We did not observe any significant impacts at the household level, this may be due to treatment activities focusing more on community-wide impacts, whereas control focused on change in household-level resilience. Control households did not reflect significant changes either; however this may also be due to households sharing their cash assistance with friends and neighbors.

Table 1. Resilience Outcomes

Descriptions
Funding: stable disaster risk reduction partnerships between community and other actors was established for improved access to funding
Participatory: community takes part in participatory vulnerability and risk assessment
Awareness: public awareness and knowledge of disasters increases, including debates about disaster risk
Disaster risk reduction organization: community experiences improved capacity in preparedness and response, including an increase in trained and prepared community-based organizations.
Early warning system: there is an active presence of an early warning system
Shelter: there is a presence of emergency shelters

These findings help us compare the impact of community-led interventions on community-level outcomes with household-level anticipatory cash within the urban context of Yola, Nigeria only. We cannot generalize the results to other contexts at this time. Additionally, these results speak to the role of this intervention's influence on community-level outcomes, not household-level outcomes.

COST FINDINGS

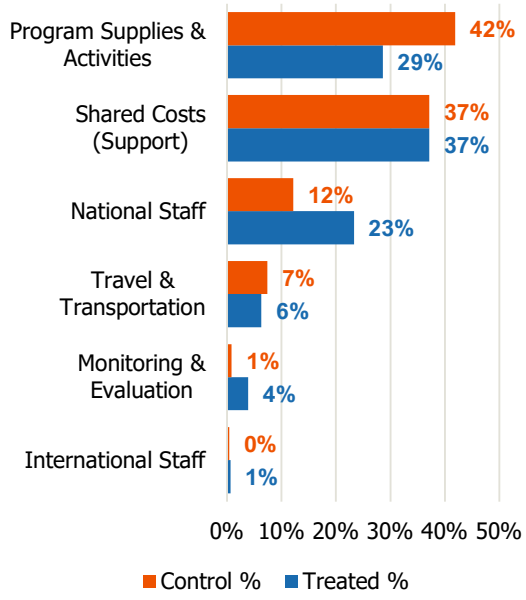
The community-wide treatment cost 327,784 USD, at 81,946 USD per community served, compared to a total of 286,879 USD for control, at 71,720 USD per community served. These costs include staff time, program materials, activities, and shared costs.

The breakdown of costs by cost category is provided in Figure 1, and an ingredients list of all unique costs can be found here. These breakdowns are crucial to inform potential future expansions, as they can help practitioners understand how to achieve cost savings, as well as how costs might vary by context.
In Figure 1, we break down costs by different categories, to help us understand where we

[2] Card, Katja and Claire Clingain. 2025. "Community-based Anticipatory Action for Climate Change in Urban Areas". International Rescue Committee Airbel Impact Lab. https://rescue.app.box.com/s/90kdy88ei3m3ohcafr22s99aus0p91rf . Accessed on April 29, 2025.

might be able to achieve cost gains. For the anticipatory cash control arm, Program Supplies and Activities was the largest cost driver mainly due to the cash distribution amount, followed closely by Shared Costs (Support). For treatment, Shared Costs (Support) was the largest cost driver at 37.2%, followed by Program Supplies and Activities (28.6%). For the treatment group, some Program Supplies and Activities costs will likely reoccur if the program expands to new communities, as the same activities will need to be reimplemented. However, replication within the same community may be achievable at lower costs by building on previous work established during the initial program. Alternatively, costs associated with program supplies and activities for the control group will be more difficult to reduce year after year without dipping below the cost associated with the cash transfer itself, along with transfer fees, and post-distribution monitoring costs.

Figure 1. Percent of Cost Category by Treatment Group



COST-EFFECTIVENESS ANALYSIS

Our cost-effectiveness analysis found that it costs anywhere from 10,000 to 18,000 USD to achieve a one standard deviation change in the range of outcomes where the program made an impact with a significance level of 5% or lower. Table 2 provides these results. At the time of writing this report, no other organization has conducted other cost-effectiveness analyses of these outcomes at the community level. For this reason, comparison to other interventions other than the counterfactual used for this study (household-level anticipatory cash) is not feasible at this time.

We do not recommend extrapolating these results to the household level given that the level of reach at the household level differed greatly in scale between treatment and control, and we did not observe any household-level outcomes as significantly influenced by the treatment intervention.

Table 2. Incremental Cost-Effectiveness Ratios[iv]

Resilience Outcomes	Effect Size	ICER
Funding	0.586	$ 17,451
Participatory	0.703	$ 14,546
Awareness	0.953	$ 10,731
Disaster risk reduction organization	0.732	$ 13,970
Early warning system	0.637	$ 16,054
Shelter	0.784	$ 13,044

CONCLUSION

Our analysis suggests that community-led anticipatory actions is a cost-effective approach to address community-level resilience to flooding

IS THIS A BEST USE OF RESOURCES?

We classify an intervention as a best use of resources if we believe it is at least 20% more cost-effective than the alternative. If we think a program is no better than existing solutions, we do not think it is an especially good use of resources.

Maybe/Sometimes: We believe community-led anticipatory action intervention is a good use of resources in the urban Nigerian context, in cases where the program is aiming to improve community-level disaster resilience. Compared to household-level anticipatory cash, the community-led approach allows for reach to more individuals and households at a lower cost than household level cash. However, this intervention should be tested in other contexts before it is generalized.

among vulnerable groups in urban areas of Nigeria, compared to household-level anticipatory cash. To the best of our knowledge, there is no other pre-existing cost-effectiveness analysis of anticipatory action interventions at the community level at the time of writing this report, making comparisons to other intervention modalities apart from the control group in this case not yet possible. Globally, funders spent around 1.2 billion USD on multi-hazard response preparedness and 1 billion USD on disaster risk reduction in 2022.[v] Policymakers aiming to improve community-wide resilience to urban flooding may want to consider this intervention as a valuable tool when working in large urban areas where practitioners need sustainable anticipatory action interventions. Funders should prioritize funding to test this intervention in other contexts and include funding for more cost research using comparable methods. For implementers, we recommend scaling up this program in the urban regions of Nigeria. Scaling the program also offers an opportunity to partner with local and national NGOs who specialize in similar programming. Researchers must produce more rigorous cost-effectiveness evidence from additional contexts, and we must better understand how context influences costs before we can assess the generalizability of these results.

ABOUT THIS BRIEF

Suggested Citation: Cochran-George, Mikaela. 2025. "Community Anticipatory Actions to Improve Community-Level Disaster Resilience in Nigeria: a Cost-effectiveness Analysis (CEA)". International Rescue Committee: Airbel Impact Lab.

Writer and Analyst: Mikaela Cochran-George

Reviewer: Derrick Machora

Special thanks to the Nigeria IRC country team, particularly Ishaku Yohanna and Justina James for their support. Impact evaluation and research insights were produced by IRC researchers Katja Card and Clare Clingain.

For more information, please visit www.rescue.org/cost-analysis or contact us: CostAnalysis@rescue.org

The **Airbel Impact Lab**, the IRC's research and innovation team, designs, tests, and scales life-changing solutions for people affected by conflict and disaster. Our aim is to find the most impactful and cost-effective products, services, and delivery systems possible. Airbel works to develop breakthrough solutions by combining creativity and rigor, openness and expertise, and a desire to think afresh with the experience of a large-scale implementing organization.

Annex

This annex contains the original calculations in EUR 2024. Conversations to USD 2024 were made based on the 2024 average conversion rate provided by the US Internal Revenue Service.[vi]

Table 1 provides an overview of costs incurred per cost category for both the treated (community-led anticipatory action intervention) as well as the control (household level anticipatory cash).

Table 1. Cost Category by Treatment Group

Cost Category	Treated	Treated %	Control	Control %
National Staff	€ 71,981	23.3%	€ 32,922	12.2%
International Staff	€ 1,884	0.6%	€ 1,066	0.4%
Non-staff Personnel	€ -	0.0%	€ -	0.0%
Capital Assets	€ 146	0.0%	€ 146	0.1%
Travel & Transportation	€ 19,593	6.3%	€ 20,020	7.4%
Office Rent & Expenses	€ -	0.0%	€ -	0.0%
Program Supplies & Activities	€ 88,396	28.6%	€ 113,268	41.9%
MEAL	€ 12,005	3.9%	€ 2,374	0.9%
Shared Costs (Support)	€ 114,768	37.2%	€ 100,445	37.2%
EUR	**€ 308,772**		**€ 270,240**	
USD	**$ 327,784**		**$ 286,879**	

Table 2b provides cost-efficiency estimates in terms of cost per group, per community and per household. Additional information on cost per activity can be found in the excel workbook.

Table 2b. Cost per Activity and Cost-Efficiency (Group-Level)

Group	Total Cost per Group	Per Community	Per Household
Treated (EUR)	€ 308,772	€ 77,193	€ 58
Treated (USD)	$ 327,784	$ 81,946	$ 61
Control (EUR)	€ 270,240	€ 67,560	€ 332
Control (USD)	$ 286,879	$ 71,720	$ 352

Table 4 provides a summary of the incremental cost-effectiveness ratios per dimension evaluated using the GOAL toolkit.

Table 4. Cost-effectiveness estimates Outcome dimension	Effect size	ICER (EUR)	ICER (USD)
"Funding": Stable DRR partnerships between community and other actors, and access to funding	0.586	€ 16,439	$17,451
"Participatory": Community carries out participatory vulnerability and risk assessment	0.703	€ 13,703	$14,546
"Awareness": Public awareness and knowledge (debates about disaster risk)	0.953	€ 10,108	$10,731
"DRR organization": Capacities in preparedness and response, trained and prepared CBO	0.732	€ 13,160	$13,970
"EWS": Presence of operational early warning system	0.637	€ 15,123	$16,054
"Shelter": Presence of emergency shelters	0.784	€ 12,287	$13,044

[i] Visualizing Official Development Assistance: https://visualizingoda.org/flow/visualize/. Accessed on April 8, 2025.
[ii] GOAL. 2015. "Toolkit for measuring community disaster resilience: guidance manual." https://www.pacesconnection.com/g/the-climate-trauma-project/fileSendAction/fcType/5/fcOid/473769385957047349/fodoid/473769385957047348/GOAL_Toolkit_Disaster_Resilience_Guidance_Manual_May_2015.compressed%20%281%29.pdf. Accessed on April 8, 2025.
[iii] JPAL Guidance on Power Calculations. nd. Accessed on May 27, 2025. https://www.povertyactionlab.org/resource/power-calculations.
[iv] Incremental cost-effectiveness ratios (ICERs) are the difference between the treatment and control costs divided by the effect size observed. These metrics are most useful for comparing across interventions evaluating the same outcomes to understand how variation in treatment affects the cost-per-effect ratio, i.e., ICER.
[v] Visualizing Official Development Assistance: https://visualizingoda.org/flow/visualize/. Accessed on April 8, 2025.
[vi] IRS. 2024. Accessed May 27, 2025. https://www.irs.gov/individuals/international-taxpayers/yearly-average-currency-exchange-rates.