Cost efficiency and budget impact analysis of inclusive education in Zambia - Tusambilile Chapamo project

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Sightsavers Ireland - Zambia Federation of Disability Organisations

Sightsavers

The Republic of Zambia
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Contents

Abbreviations

ABC	Activity-based Costing
BCC	Behaviour change communication
BIA	Budget impact analysis
CYWD	Children and youths with disabilities
CSEN	Children with special educational needs
GBP	British pound sterling
IIEP	International Institute for Education Planning
M&E	Monitoring and evaluation
MoE	Ministry of Education
TC	Tusambilile Chapamo (inclusive education project)
UNESCO	United Nations Educational, Scientific and Cultural Organization
USD	United States Dollar
WASH	Water, sanitation and hygiene
ZMW	Zambian Kwacha

Introduction

Inclusive education is a cornerstone of equitable development and a fundamental human right. It ensures all learners - regardless of ability, background or circumstance - can access and thrive within mainstream education systems (1). In Zambia, the pursuit of inclusive education has gained momentum through national policies and international commitments, including the ratification of the Convention on the Rights of Persons with Disabilities in 2010 and the enactment of the Persons with Disabilities Act No. 6 of 2012 (2).

Despite these efforts, significant challenges persist in translating policy into practice. Children with disabilities in Zambia continue to face systemic barriers to education - including inaccessible infrastructure, a shortage of trained inclusive education teachers, limited assistive technologies and prevailing social stigma (2).

These barriers are particularly pronounced in rural and underserved areas, where educational resources are already stretched thin. As a result, many children with disabilities are either excluded from school entirely or receive substandard education that does not meet their needs. The urgency of addressing these challenges is underscored by Zambia's broader educational context. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), Zambia faces a learning crisis, with an estimated 90 per cent of ten-year-old children unable to read and understand an age-appropriate text (1). While primary school completion rates have improved in recent years, reaching 97 per cent in 2019, the COVID-19 pandemic reversed some of these gains, with completion dropping to 86.4 per cent in 2020 (2).

Moreover, completion rates for secondary education remain low and disparities in learning outcomes persist across gender, disability and geographies (3). Inclusive education is not only a moral imperative but also a strategic investment in national development. It promotes social cohesion, reduces inequality and enhances the overall quality of education systems (1). However, implementing inclusive education requires more than good intentions, it also demands data and evidence to inform planning and efficient resource allocation. The learnings from the inclusive education project Tusambilile Chapamo (TC) will make a considerable contribution to this, particularly the findings from its economic evaluation.

Economic evaluation provides a structured framework for assessing the costs and benefits of inclusive education interventions. It enables policymakers to identify cost drivers, evaluate the efficiency of different approaches and make informed decisions about scaling up successful models (4). In Zambia, where education budgets are constrained and competing priorities abound, such evaluations are critical to promote, plan and implement effective and sustainable inclusive education.

This report presents an economic evaluation of the TC project, including a cost efficiency and budget impact analysis. Drawing on financial data and implementation experiences from 2021 to 2024, the evaluation seeks to inform future programming and policy by highlighting the cost structures and efficiencies, and estimating the cost of scaling up the inclusive education models in Muchinga Province.

Methodology

The economic evaluation of the TC project was designed to assess the financial implications of implementing inclusive education interventions across selected districts in Zambia. The project aimed to support children and youths with disabilities (CYWD) by integrating inclusive practices into mainstream education systems. This evaluation focuses on the incremental costs associated with these interventions, providing insights into their efficiency and unit cost. The resulting budget impact analysis can then estimate the cost of scaling up activities at the provincial level (in Muchinga).

The study covers the full implementation period from February 2021 to January 2025. It draws on financial records, activity reports and consultations with project staff to estimate the cost of delivering inclusive education services. The evaluation was structured around these key research questions:

- What are the additional costs incurred in supporting children with disabilities in communities and mainstream schools?
- How are these costs distributed across different activities and implementation years?
- What are the primary cost drivers of the inclusive education model?
- What is the average cost per year, and per school, of implementing the TC approach?
- What would be the cost of implementing the TC approach in all of the schools within Muchinga Province?

Costing approach

The costing was conducted from the perspective of the implementing organisation and its partners. It employed an activity-based costing (ABC) methodology, which allocates expenditures to specific activities based on their actual resource use. This approach allows for a more accurate reflection of the financial effort required to implement each component of the project.

Only incremental costs, those directly attributable to the inclusive education interventions, were included in the analysis. General education costs, in-kind contributions and opportunity costs (such as volunteer time or government staff not directly funded by the project) were excluded. This ensures that the evaluation reflects the additional investment needed to make education systems more inclusive.

The time horizon for the activity-based costing covered the entire project duration (48 months) and all costs are presented in current ZMW and GBP, based on monthly exchange rate data (5).

Data collection

Financial data was compiled from the project's accounting systems and validated through cross-checks with implementation teams. Expenditure records were categorised by year, activity (see table one below) and sub-activity. Output data, such as the number of schools supported, teachers trained, and children reached, were obtained from monitoring and evaluation reports. Expenditure data covered the period 2021–2024. As all programme activities were completed in December 2024, no additional costs occurred after this point.

Table 1: Activities included in the costing

Activities	Description
Grant and project management and overheads	Includes all costs not directly attributable to specific output, but supporting the overall activities implementation (for example, coordination, technical support, research, media, etc). This also covers expenses linked to the efficient operation of the project, evaluation and monitoring, or dialogue with partners and donors.
Community support to CYWD	Costs related to the training of community members on identification of children and youths with disabilities, as well as capacity building to address stigmatisation and discrimination. This activity also includes costs necessary to the development, adaptation and translation of training and capacity building materials.
Education staff support	Includes expenditures used to train education staff on inclusion, disability and gender themes, and to assess, adapt, develop and translate training materials. The costs related to screening and referral for children and youths with disabilities at school are also included.
Inclusive infrastructure equipment	Costs of auditing and renovating schools to improve their accessibility, social environments and sanitation. It also includes expenses for children's examinations and the provision of assistive devices.
Dissemination advocacy and policy	Covers costs of policy and advocacy workshops and quarterly review and learning meetings.

Analysis

The analysis involved aggregating costs by activity and year, then calculating unit costs for key outputs (for example, cost per trained teacher, cost per school supported). Activities were further classified as either startup (one time investment) or recurrent (ongoing costs) to assess sustainability and inform scale-up planning.

The budget impact analysis (BIA) was conducted to estimate the financial requirements of scaling the TC inclusive education model across Muchinga Province over a time horizon of five years, to match the duration of the Ministry of Education Zambia's strategic plan (6). An additional sixth year, also referred to later as 'sustainability cost', was added to illustrate the recurrent costs of the inclusion model once all schools, schoolchildren and community structures have been covered. The analysis adopted a bottom-up approach, using unit costs derived from the TC implementation and applying them to projected coverage targets while adopting a budget holder's perspective, namely the Ministry of Education (MoE).

The target population is all public school children in primary and secondary schools of Muchinga Province and its eight districts, expecting to represent 94.5 per cent of all primary school pupils and 90.4 per cent of secondary school students (7). Following the UNESCO International Institute for Education Planning (IIEP) guidelines, a flow model was developed and used to estimate the future enrolment of schoolchildren in Muchinga (8). The model was based on 2024 school enrolment, drop-out rate and promotion rates. The number of children with special educational needs (CSEN) enrolled in 2024 was also used (9). New entrants' growth rate was calculated using 2023 figures, available in the Education Statistics Bulletin (2020 to 2024), and an exponential growth rate approach (9, 10). Prices remained unchanged throughout the analysis period and future financial flows were evaluated without applying any discounting. All inputs and assumptions used in the BIA model are presented in table two on the next page.

Table 2: Cost projection model's inputs and assumptions

Indicator	Assumption	Source
Administrative units:		
Number of provinces	1	Scenario's target
Number of districts	8	Scenario's target
Community support:		
Number of community structures per school	6	Based on expert opinion. List contains: parent support groups, traditional leaders/healers, faith-based organisations, community welfare assistant committee members, organisations of people with disabilities and parent teacher committees.
Number of community members to train per school	22	Based on expert opinion
Number of trainees per trainer	14.5	Output from TC project (2022–2025)
Education data, Muchinga:		
Enrolment in primary school	226,599	MoE Education Statistics Bulletin, Zambia 2024
Enrolment in secondary school	96,647	
Number of schools, primary	717	
Number of schools, secondary	105	
Number of schools, primary and secondary	**822**	
Number of teachers, primary school	6,419	
Number of teachers, secondary school	2,934	
Total number of teachers (primary and secondary)	**9,353**	
Estimated annual growth rate of new entrants in primary schools	7.5%	
Estimated annual growth rate of new entrants in secondary schools	3%	
Implementation recommendation:		
Schools		
Year 1: All schools to be audited and renovated	822	MoE Education Statistics Bulletin, Zambia 2024
Year 2: New schools (for structures and community members to be trained)	37	
Year 3: as per year 2	38	
Year 4: as per year 2	40	

Year 5: as per year 2	42	
Year 6: as per year 2	44	
Children		
Year 1: Screening of all children in primary and secondary school	323,246	MoE Education Statistics Bulletin, Zambia 2024
Year 2: New entrants in primary and secondary screened	67,651	
Year 3: as per year 2	72,106	
Year 4: as per year 2	77,450	
Year 5: as per year 2	82,437	
Year 6: as per year 2	58,483	
Children with special educational needs		
Year 1: Screening of all children in primary and secondary school	7,706	MoE Education Statistics Bulletin, Zambia 2024
Year 2: New entrants in primary and secondary school screened	1,900	
Year 3: as per year 2	2,008	
Year 4: as per year 2	2,135	
Year 5: as per year 2	2,283	
Year 6: as per year 2	2,500	
Training:		
Number of education staff to educate per school	10	Output from TC project (2022 – 2025)
Number of education staff to train (A)	8220	
Trainers to train per education staff (B)	14.5	From TC project phase 1, 16 trainers for 460 participants. Divided by two as assuming two trainers per session.
Number of training of staff session facilitated by trainers (C)	10	From SHIP guidelines (2016), to improve. - assume a trainer could conduct ten training sessions at the beginning of the project year that would two to three sessions per week for a month).
Number of trainers to be trained (A/B)/C	57	
Number of children to equip with an assistive device (percentage of CSEN)	15%	Number of children needing an assistive device based on number of CSEN equipped among children diagnosed with

		a disability (941 CSEN among 128,884 school children, of which 142 received a device).

To assess the robustness of the cost projections and identify key cost drivers, both deterministic and multivariate sensitivity analyses were conducted. The deterministic univariate analysis varied each major input parameter independently by plus or minus 25 per cent from its baseline value. The multivariate analysis explored 81 scenarios - combining all possible permutations of minimum, median and maximum values across four key variables.

This was determined through the univariate sensitivity analysis) - number of schools covered, cost of renovation per facility, cost per assistive device and the number of community members to train. This approach enabled a comprehensive understanding of how simultaneous changes in multiple parameters could influence the total cost envelope, providing a realistic range of potential budget outcomes for scale-up planning.

Results

Financial analysis of the TC project reveals a total expenditure of ZMW 21,154,446 (see table three on the next page for details in ZMW) or £782,541 (see table four for details in GBP) over the four-year implementation period (2021–2024). As shown in tables three and four, the distribution of costs was relatively balanced across 2022-2024. Each year accounted for approximately 28 to 30 per cent of the total budget (GBP figures). The highest annual expenditure occurred in 2024, reflecting a peak in implementation activities.

A significant portion of the spending, over half (64 per cent), was allocated to grant project management and overheads - underscoring the administrative and coordination demands of a multi-stakeholder, multi-site initiative. Coordination activities alone accounted for 33 per cent of the total, highlighting the emphasis placed on inter-agency collaboration, stakeholder engagement and logistical support.

Table 3: Breakdown of project expenditure by activity, sub-activity and year of implementation (in current ZMW)

Activities/years	2021	2022	2023	2024	Total
Grant project management and overheads	2,241,495 (11%)	3,232,399 (15%)	3,468,571 (16%)	4,551,844 (22%)	13,494,310 (64%)
Coordination	890,039 (4%)	1,522,165 (7%)	2,221,682 (11%)	2,321,962 (11%)	6,955,848 (33%)
Finance	78,848 (0%)	78,848 (0%)	78,848 (0%)	78,848 (0%)	315,390 (1%)
M&E	29,907 (0%)	166,336 (1%)	221,611 (1%)	25,536 (0%)	443,390 (2%)
Media	(0%)	(0%)	201,399 (1%)	5,121 (0%)	206,520 (1%)
Overheads	1,161,560 (5%)	321,695 (2%)	344,965 (2%)	404,520 (2%)	2,232,739 (11%)
Technical support	81,141 (0%)	1,143,356 (5%)	400,066 (2%)	1,715,858 (8%)	3,340,422 (16%)
Community support to CYWD	48,987 (0%)	447,330 (2%)	123,724 (1%)	265,871 (1%)	885,911 (4%)
Adaptation, development, situation analysis translation and coordination related to behaviour change, sensitisation and awareness-raising in communities.	40,177 (0%)	414,699 (2%)	106,646 (1%)	140,751 (1%)	702,273 (3%)
Training and identification	8,810 (0%)	32,630 (0%)	17,078 (0%)	125,120 (1%)	183,638 (1%)
Education staff support	81,002 (0%)	66,594 (0%)	9,262 (0%)	397,211 (2%)	554,069 (3%)
Assessment, adaptation, development, translation and coordination related to screening and assessment tools.	8,387 (0%)	63,337 (0%)	3,799 (0%)	158,890 (1%)	234,413 (1%)
Inclusion training	72,615 (0%)	3,257 (0%)	5,463 (0%)	238,321 (1%)	319,656 (2%)
Inclusive infrastructure equipment	78,521 (0%)	949,890 (4%)	1,592,896 (8%)	1,558,937 (7%)	4,180,244 (20%)
Accessibility audit	1,465 (0%)	22,081 (0%)	3,419 (0%)	83,189 (0%)	110,154 (1%)
Assistive device, examination, club, training, coordination and provision.	54,692 (0%)	89,623 (0%)	451,800 (2%)	301,877 (1%)	897,992 (4%)
Renovation, BCC in schools, WASH stations, social environments, etc.	22,364 (0%)	838,186 (4%)	1,137,678 (5%)	1,173,871 (6%)	3,172,099 (15%)
Dissemination advocacy and policy	59,808 (0%)	546,124 (3%)	547,473 (3%)	886,506 (4%)	2,039,911 (10%)
Grand total	2,509,813 (12%)	5,242,338 (25%)	5,741,926 (27%)	7,660,369 (36%)	21,154,446 (100%)

Table 4: Breakdown of project expenditure by activity, sub-activity and year of implementation (in current GBP)*

Activities/years	2021	2022	2023	2024	Total
Grant project management and overheads	80,947 (10%)	136,919 (17%)	135,635 (17%)	144,290 (18%)	497,791 (64%)
Coordination	34,715 (4%)	72,712 (9%)	76,139 (10%)	70,839 (9%)	254,406 (33%)
Finance	2,793 (0%)	2,793 (0%)	2,793 (0%)	2,793 (0%)	11,174 (1%)
M&E	1,016 (0%)	5,766 (1%)	8,137 (1%)	769 (0%)	15,688 (2%)
Media	(0%)	(0%)	8,665 (1%)	161 (0%)	8,826 (1%)
Overheads	39,732 (5%)	15,192 (2%)	14,345 (2%)	12,400 (2%)	81,670 (10%)
Technical support	2,690 (0%)	40,454 (5%)	25,555 (3%)	57,328 (7%)	126,027 (16%)
Community support to CYWD	1,643 (0%)	20,489 (3%)	4,653 (1%)	8,022 (1%)	34,807 (4%)
Adaptation, development, situation analysis translation and coordination related to behaviour change, sensitisation and awareness-raising in communities.	1,355 (0%)	18,908 (2%)	3,991 (1%)	4,293 (1%)	28,547 (4%)
Training and identification	287 (0%)	1,581 (0%)	663 (0%)	3,729 (0%)	6,260 (1%)
Education staff support	3,560 (0%)	3,265 (0%)	350 (0%)	11,719 (1%)	18,894 (2%)
Assessment, adaptation, development, translation and coordination related to screening and assessment tools.	356 (0%)	3,113 (0%)	141 (0%)	4,859 (1%)	8,469 (1%)
Inclusion training	3,204 (0%)	151 (0%)	210 (0%)	6,860 (1%)	10,425 (1%)
Inclusive infrastructure equipment	3,264 (0%)	46,403 (6%)	58,581 (7%)	48,126 (6%)	156,374 (20%)
Accessibility audit	52 (0%)	1,051 (0%)	125 (0%)	2,479 (0%)	3,707 (0%)
Assistive device, examination, club, training, coordination and provision.	2,268 (0%)	4,458 (1%)	17,730 (2%)	8,767 (1%)	33,223 (4%)
Renovation, BCC in schools, WASH stations, social environments, etc.	944 (0%)	40,895 (5%)	40,726 (5%)	36,880 (5%)	119,444 (15%)
Dissemination advocacy and policy	2,250 (0%)	25,426 (3%)	20,748 (3%)	26,252 (3%)	74,676 (10%)
Grand total	91,664 (12%)	232,501 (30%)	219,967 (28%)	238,409 (30%)	782,541 (100%)

*Percentages differ slightly from table in ZMW because monthly exchange rate conversion was applied to each cost line before aggregation, which introduces minor distortions compared to using a single average rate.

Figure one, on the next page, is a Sankey diagram that shows cost allocation by activity and sub-activity - visually illustrating the flow of resources from broad cost categories into specific interventions. It shows that, while management and coordination functions consumed a large share of the costs, substantial spending were also made in areas such as inclusive infrastructure, assistive devices and training.

Figure two, that follows, further disaggregates expenditures by thematic cost category. This reveals that capital and personnel costs were the most important categories in terms of expenditure, followed by transportation and equipment and supplies. Capital costs were almost exclusively related to the renovation of schools, whereas personnel costs were shared across activities.

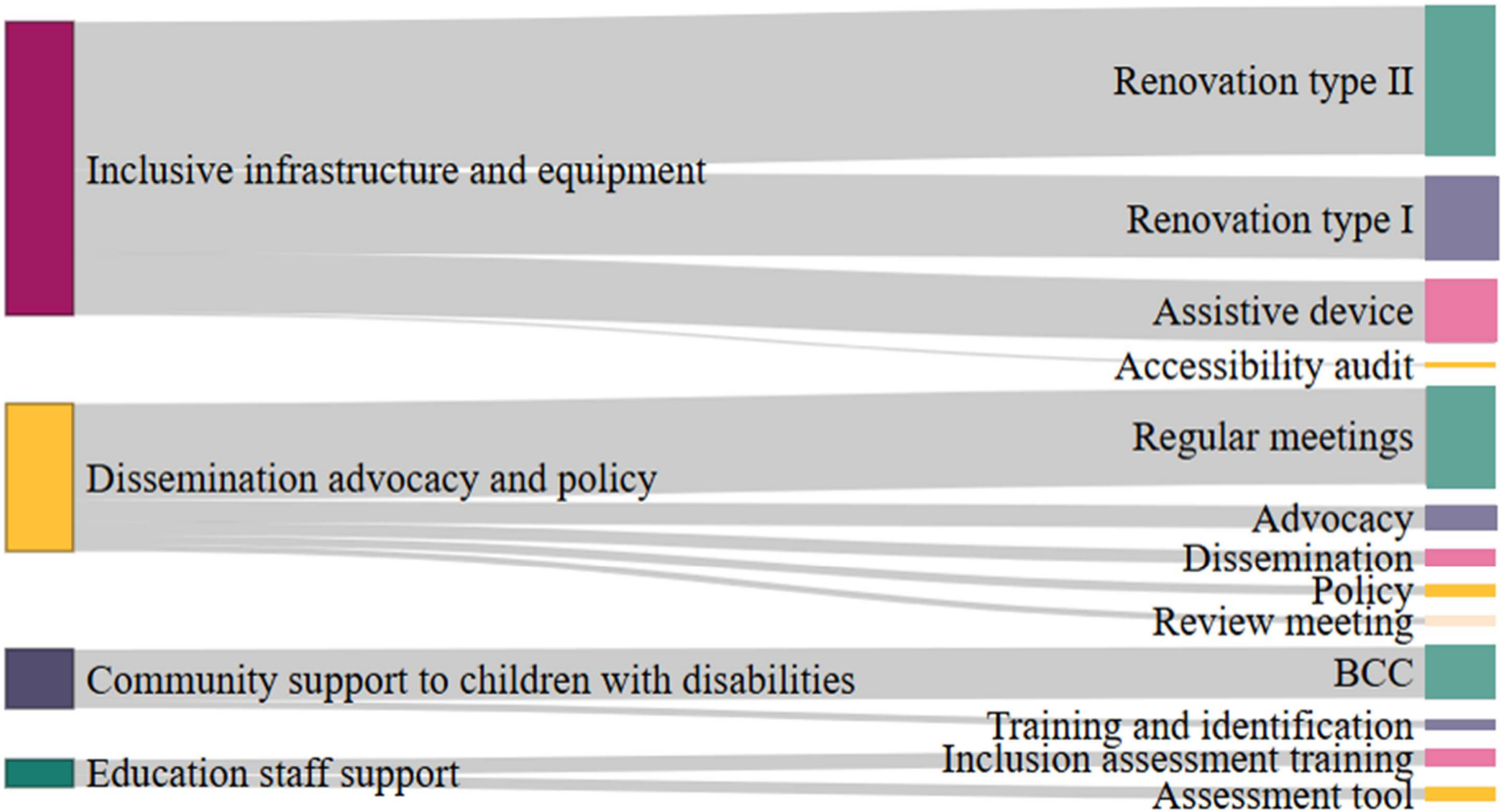

Figure 1:Sankey diagram of cost allocation by activity and sub-activity

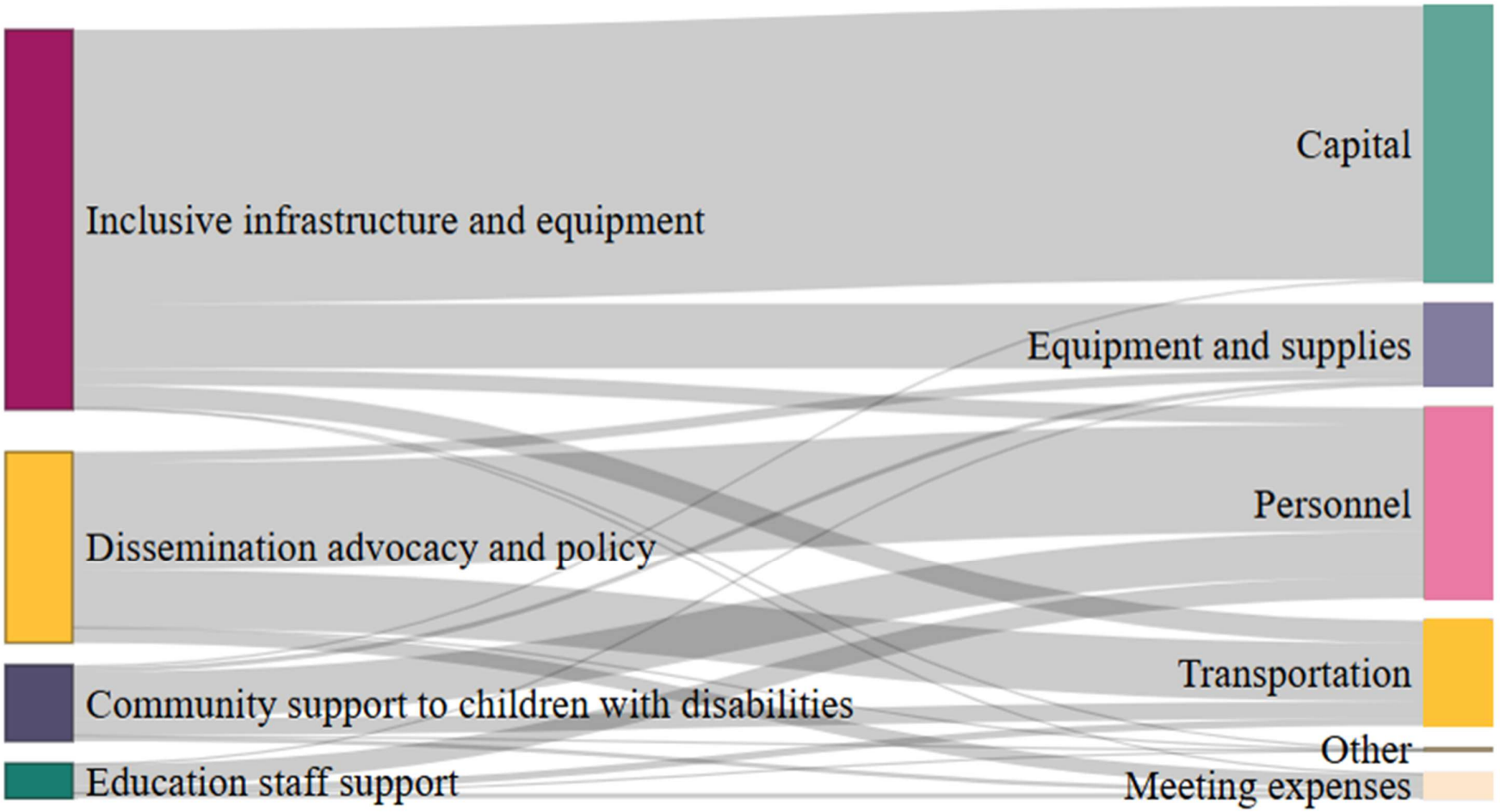

Figure 2: Sankey diagram of cost allocation by activity and category

Table 5 shows costs that are estimated to be start-up, recurrent or semi-recurrent. A total of 57 to 58%of the costs were considered 'one-off' expenditures or related to the pilot activities. For example, these include any cost related to the development of training materials, the assessment of staff or communities to be trained, or other expenses related to grant management.

Recurrent and semi-recurrent costs (42 to 44%) are related to activities that are expected to be replicated throughout the duration of the project and ideally beyond, for example, screening and referral of new entrant schoolchildren or newly built schools. Some of these costs are considered semi-recurrent, such as training of education staff or community members, because they would not necessarily be yearly and completed but would require refresher training every two or three years.

Table 1: Recurrence of costs*

Activities/years	Start-up (in ZMW)	Recurrent or semi-recurrent (in ZMW)	Start-up (in GBP)	Recurrent or semi-recurrent (in GBP)
Grant project management and overheads	6,095,071 (43%)	8,016,465 (57%)	227,697 (44%)	288,747 (56%)
Community support to CYWD	614,098 (87%)	95,463 (13%)	25,882 (88%)	3,595 (12%)
Education staff support	146,238 (39%)	231,481 (61%)	5,805 (43%)	7,760 (57%)
Inclusive infrastructure equipment	3,105,903 (79%)	809,816 (21%)	117,822 (79%)	30,558 (21%)
Dissemination advocacy and policy	2,039,911 (100%)	-	74,676 (100%)	-
Grand total	12,001,221 (57%)	9,153,225 (43%)	451,881 (58%)	330,660 (42%)

*Percentages differ slightly from table in ZMW because monthly exchange rate conversion was applied to each cost line before aggregation, which introduces minor distortions compared to using a single average rate.

Table 6 on the next page presents a breakdown of unit costs associated with key outcomes of the TC project. The analysis reveals that the most resource intensive interventions were related to infrastructure and accessibility. Renovation and environmental improvements in schools, including WASH stations and social environment enhancements, had a unit cost of ZMW 100,327 to ZMW 174,551 per school (£4,790 to £5,872). Auditing schools for their accessibility costed, on average, ZMW 1,470 (£168) per school, while the provision of assistive devices reached ZMW 1,470 (£54) per child.

In terms of community engagement (outcome 1), the cost of enrolling a child with a disability was ZMW 871 (£34), with a total of 1,017 children supported. Community capacity building efforts, aimed at reducing stigma and promoting inclusive attitudes, had a unit cost of ZMW 6,002 (£244) per community structure - indicating the depth and intensity of these interventions. Training of individual community members on identification of CYWD was ZMW 606 (£21) per person.

For education system strengthening (outcome 2), training and support for education staff were delivered at a cost of ZMW 695 (£23) per person. Meanwhile, the development and coordination of screening tools incurred a cost of ZMW 78,138 (£2,823) per tool.

Table 6: Unit cost by main outcome and used for cost projection

Activities	Output	Unit definition	Unit cost (in ZMW)	Total cost (in ZMW)	Unit cost (in GBP)	Total cost (in GBP)
Community support (outcome 1)	**1,017**	**Children with disabilities enrolled**	**871**	**885,911**	**34**	**34,807**
Training of community members on identification of CYWD.	303	Community members	606	183,638	21	6,260
Community capacity building to address stigmatisation, discrimination of CYWD and support to education access.	117	Community structure	6,002	702,273	244	28,547
Education staff support (outcome 2).	**460**	**Education staff**	**1,204**	**554,069**	**41**	**18,894**
Education staff trained on inclusion, disability and gender.	460	Education staff	695	319,656	23	10,425
Assessment, adaptation, development, translation and coordination related to screening and assessment tool.	3	Tools developed	78,138	234,413	2,823	8,469
Inclusive infrastructure and equipment (Outcome 3)	**22**	**Schools made accessible**	**190,011**	**4,180,244**	**7,108**	**156,374**
Accessibility audit	22	Schools audited	5,007	110,154	168	3,707
Assistive device, examination, club, training, coordination, and provision or referral (including transportation).	611	Assistive devices provided	1,470	897,992	54	33,223
School renovation type I*	9	Schools renovated/adapted	100,327	902,941	4,790	43,106
School renovation type II*	13	Schools renovated/adapted	174,551	2,269,159	5,872	76,339

*List of renovations in Appendix

Table 7 presents the projected cost of scaling up the TC inclusive education model across all public schools in Muchinga Province over a five-year period. The total estimated cost over five years is ZMW 198 million (£7.4 million), with an average cost of ZMW 40 million (£1.5 million) per year. The last column shows the recurrent cost of sustaining inclusive education in Muchinga province, once all community members and teachers have been trained, schools renovated and schoolchildren assessed and equipped when required. The budget impact model suggests that the yearly recurrent cost would be ZMW 4.9 million (£0.2 million) following the initial five-year scale-up.

Table 2: Cost of scaling up TC approach to Muchinga Province (ZMW 2024)

Inclusive education	Muchinga province						
Activities	Year 1	Year 2	Year 3	Year 4	Year 5	**Total**	Recurrent costs
Start-up costs							
Start-up preparation and review meetings							
Number of districts	8	8	8	8	8		
Cost per district	120,473						
Total sub-activity	963,788	963,788	963,788	963,788	963,788	**4,818,939**	-
Community support cost							
Training of community members on identification of CYWD							
Number of schools to cover in one year	166	201	202	204	206	**979**	44
Number of community members to train (22 per school)	3,652	4,422	4,444	4,488	4,532	**21,538**	968
Cost of training one person	606	606	606	606	606		606
Total sub-activity	2,213,353	2,680,023	2,693,357	2,720,024	2,746,691	**13,053,447**	586,672
Adaptation coordination related to behaviour change, sensitisation and awareness raising in communities.							
Number of community structures per school	6						
Number of community structures to cover	996	1,206	1,212	1,224	1,236	**5,874**	264
Cost of sensitisation and awareness raising campaign per community structure	6,002	6,002	6,002	6,002	6,002		6,002
Total sub-activity	5,978,328	7,238,819	7,274,833	7,346,861	7,418,889	**35,257,729**	1,584,617
Education staff support							
Education staff trained on inclusion, disability and gender							
Number of education staff to educate per school	10						

Number of staff to train	1,660	2,010	2,020	2,040	2,060	**9,790**	440
Cost of training one staff member	695	695	695	695	695		695
Total sub-activity	1,153,541	1,396,757	1,403,706	1,417,604	1,431,502	**6,803,110**	305,758
Inclusive infrastructure, environment and equipment							
Assistive device, examination, club, training, coordination and provision.							
Number of children with disabilities needing assistive device(s)	1,001	2,234	2,305	2,387	2,482	**10,408**	1,623
Cost per child provided with assistive devices (s) or referred	1,470	1,470	1,470	1,470	1,470		1,470
Total sub-activity	1,470,759	3,282,965	3,386,983	3,508,179	3,648,460	**15,297,347**	2,385,737
Audit, Renovation, BCC in schools, WASH stations, social environments, etc.							
Number of facilities to audit and renovate	166	164	164	164	164		
Cost per facility	149,193	149,193	149,193	149,193	149,193		149,193
Total sub-activity	24,766,090	24,467,703	24,467,703	24,467,703	24,467,703	**122,636,903**	-
Total	36,545,858	40,030,055	40,190,370	40,424,158	40,677,033	**197,867,475**	4,862,784

Figure 3 presents a deterministic univariate sensitivity analysis, illustrating the impact of varying individual cost drivers on the total projected cost of scaling the TC model. The analysis shows that the number of schools covered and the cost per facility renovation are the most influential parameters, with potential cost swings of over ZMW 42 million (£1 million). Other variables, such as the number of community members to train and the unit cost per assistive device, also contribute significantly to budget variability. The standard scenario is set at ZMW 198 million (£7.4 million), while lower and upper bounds range from approximately ZMW 156 million to ZMW 240 million (£5.8 million to £9 million).

Figure 3: Deterministic univariate sensitivity analysis (variation +/-25%, in thousands)

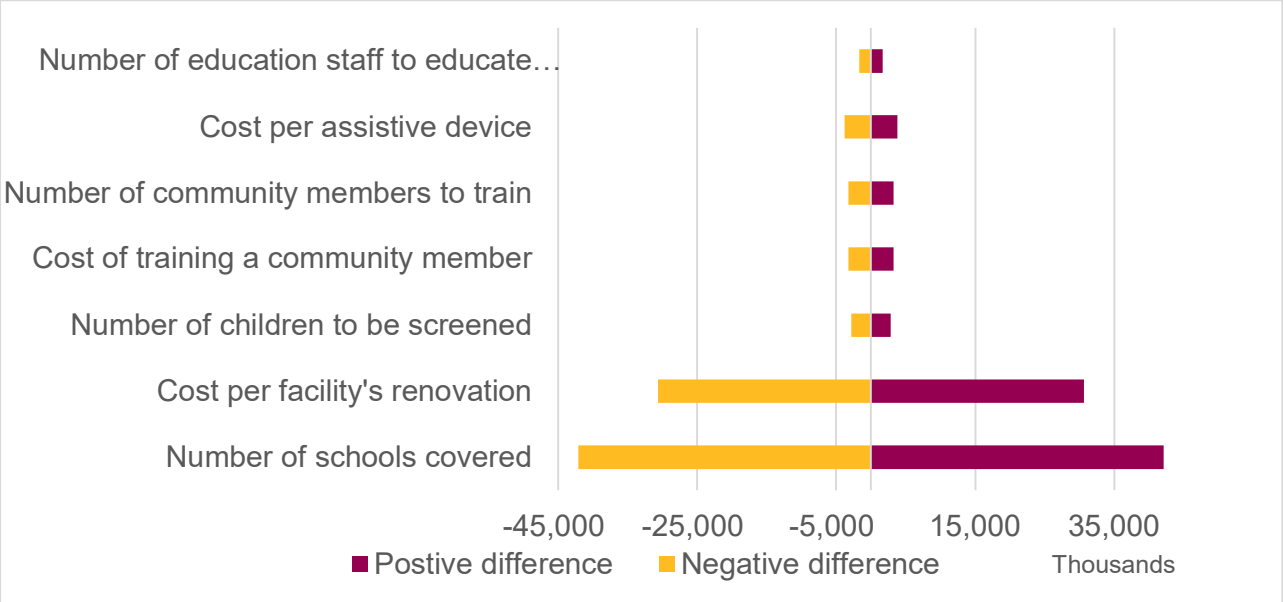

Table eight on the next page presents a four-way multivariate sensitivity analysis, exploring 81 scenarios that vary four key cost drivers:

- Number of schools covered.
- Cost of renovation per facility.
- Number of community members to train.
- Cost of assistive device(s) provided.

Each variable was adjusted by plus or minus 25 per cent from its baseline. The resulting total costs range from a best case scenario of ZMW 126 million (or £4.7 million) to a worst case scenario of ZMW 286 million (or £10.7 million). Notably, renovation cost and school coverage exert the strongest influence on budget variability, reinforcing their role as primary cost drivers.

Table 3: Four-way heatmap of multivariate sensitivity analysis in million ZMW

Discussion

Economic evaluation of the TC project highlights the financial costs of implementing inclusive education in a resource-constrained setting. The cost structure is marked by substantial initial investments in coordination, infrastructure and training to integrate inclusive practices into mainstream education systems. Over 50% of the project's budget, ZMW 13.5 million out of 21 million, or £497,791 out of £782,541 (see tables 3 and 4), was allocated to grant management and overheads. Coordination alone accounted for 33%, ZMW 7.9 million (£254,406), underscoring the importance of strong inter-agency collaboration and technical support during early implementation.

At the same time, analysis shows (see table 5) that many of these costs are non-recurrent. 57 to 58% of total expenditures were classified as start-up or pilot-related, such as the development of training materials and school renovations. Recurrent or semi-recurrent costs, such as screening new student

s and refresher trainings, made up the remaining 42 to 43%. This suggests that future phases could be delivered more cost-efficiently once foundational systems and capacities are in place.

The unit cost analysis shown in table 6 further supports the notion that inclusive education requires a mix of costs. For example, the cost of making a school more accessible in TC was between ZMW 100,327 (£4,790) and ZMW 174,551 (£5,872), while training a community member to identify children with disabilities cost just ZMW 606 (£21). This pattern is consistent with global evidence showing that, while physical accessibility improvements are capital intensive, investments in human capacity, such as teacher training and community sensitisation, can be scaled more affordably (11).

Indeed, several activities of the TC project would not be recurrent if scaled up. For instance, all the costs related to the development of training materials, the adaptation of referral systems or renovation of schools would only occur once. The yearly recurrent costs are expected to be lower over the course of a longer-term project (for example, refresher training every five years, screening and assistive devices provided to new students only).

However, the relatively high proportion of coordination and technical support costs suggests that future iterations could benefit from increased integration into national systems, potentially reducing overheads and enhancing sustainability.

Indeed, considering that the existing Ministry of Education zonal staff and special education department would coordinate the programme, the budget impact analysis (BIA) model estimates a total cost of ZMW 197.9 million (£7.4 million) for scaling the TC model across Muchinga Province over five years. This front-loaded investment strategy is typical of systems-strengthening interventions and suggests potential for cost efficiencies in future phases, as shown by the costs of sustaining inclusive education once all schools and communities are covered, (ZWM 4.9 million, or £0.2 million).

Multivariate sensitivity analysis confirms the robustness of the model, with total costs ranging from ZMW 126 million to 286 million (or £4.7 million to £10.7 million) depending on variations in key parameters. The number of schools in the province to cover and their renovation costs emerged as the most influential cost drivers, indicating areas where strategic adjustments could yield significant savings.

These findings have important implications for policy and planning. According to the UNICEF Zambia Education Budget Brief 2023, the Ministry of Education's expected budget in 2023 was ZMW 23.2 billion (12). Assuming a proportional budget to population, Muchinga Province is estimated at about 5% of the national education budget, which translates to approximately ZMW 1.2 billion per year. This means the TC model average yearly cost (ZMW 39.6 million, table 7) would consume around 3.1% of Muchinga's entire education budget each year during five years, with the assumption that the education budget remains at ZMW 23.2 billion per year.

This is an important initial investment to cover all schools, communities and students. However after these five years, the inclusive education programme would only cover primary schools' new entrants and refresher training for community members and education staff, drastically reducing the yearly costs (see cost drivers above). Indeed, according to the budget impact analysis, following an initial investment over five years an annual requirement of only 0.4% of the provincial education budget would be necessary to cover the recurrent costs of sustaining an already implemented TC programme in Muchinga.

In addition, different strategies could be sought to further decrease the cost of inclusive education, for instance with the local funding of school renovation by grants from the Ministry of Education or the Constituency Development Fund (as in Phase II of Tusambilile Chapamo). As an additional analysis, where the cost of school renovation would be null, we estimate that the total cost of TC would evidently be lower and reach approximately yearly ZMW 15,869,262 (£595,577) per year or the equivalent of 1.3% of the provincial education yearly budget. Showing the importance of flexible approach, adapting to local context and budget.

In future phases, revisiting cost estimates based on refined implementation models and real-time data will be essential. Institutionalising inclusive education practices, such as embedding training into teacher education curricula and leveraging community structures, can further reduce costs and improve outcomes. Ultimately, the TC project offers a compelling case for inclusive education as both a moral imperative and a strategic investment in Zambia's development.

Conclusion

In conclusion, the TC project offers a replicable and adaptable model for inclusive education in Zambia and similar contexts. With continued investment, policy alignment and stakeholder collaboration, inclusive education can move from pilot to policy, ensuring that no child is left behind.

Appendix

Renovation types

Type of renovations	Type of toilet	Other renovation
Type I	Ventilated improved pit latrine	Ramps, walkway (handrails in one school), lighting work for visually impaired children and accessible handwash station.
Type II	Waterborne toilet	Ramps, walkway (handrails in two schools), supply clean water (in one school) and accessible handwash station.

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