A Costing Analysis of Community-Based Programs for Children Affected by HIV/AIDS: Results from Zambia and Rwanda

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Abbreviations

AIDS	Acquired immune deficiency syndrome
ARV	Antiretroviral
CHH	Child-headed household
CRS	Catholic Relief Services
HBC	Home-based care
HIV	Human immunodeficiency virus
IEC	Information, education, and communication
IGA	Income-generating activities
OVC	Orphans and vulnerable children
PCI	Project Concern International
PLHA	Person living with HIV or AIDS
STI	Sexually transmitted infection
USAID	United States Agency for International Development
VCT	Voluntary counseling and testing
WFP	World Food Program

Summary

In sub-Saharan Africa an estimated 12 million children under the age of 18 have lost one or both parents to AIDS (UNAIDS, UNICEF, USAID, 2004). Many more children live with one or more chronically ill parent. At present, however, relatively few orphans and children with chronically ill caregivers are receiving services. Estimating the costs associated with delivering services to orphans and children with chronically ill caregivers can provide policymakers and program managers with important information necessary for the successful management and sustainability of a program. This paper analyzes the programmatic costs of two community-based programs for children affected by HIV/AIDS in Rwanda and Zambia in order to provide information on the current costs of the two programs. The paper also discusses additional costs related to scaling up the existing programs and outlines issues relating to long-term sustainability of programs for children affected by HIV/AIDS.

This paper analyzes costs from CARE Rwanda's and Bwafwano Zambia's programs for children affected by HIV/AIDS. CARE International operates an established program for children affected by HIV/AIDS in Gitarama Province, Rwanda. The program provides peer education and counseling, life skills training, psychosocial support, and food and nutrition support to more than 3,000 orphans and children with chronically ill caregivers. The Zambian organization, Bwafwano Community Home-Based Care Organization (Bwafwano Zambia), operates in the Chipata catchment area of Lusaka. Bwafwano Zambia provides a comprehensive set of services, including home-based care (HBC), a community health clinic, a community school, support for students to attend government schools, a feeding program, a sexual and reproductive health education program, and income-generating activities (IGA). Bwafwano Zambia currently serves approximately 2,000 orphans and children with chronically ill caregivers.

The cost of CARE Rwanda's activities in the Gitarama catchment area and of Bwafwano Zambia's activities in the Chipata catchment area totaled US$626,716 and US$85,016 per year,[1] respectively, in 2003. The cost analysis demonstrated that the programmatic areas with the highest cost per child in CARE Rwanda's program were health and nutrition services, which consist largely of food assistance to households, and education services, which consist of vocational training. The cost per child was $147.28 for health and nutrition services and $25.65 for education in 2003. In Bwafwano Zambia's program, IGA and health and nutrition were the most costly programmatic areas at $156.68 and $114.36 per child, respectively. Psychosocial support was one of the least costly programmatic areas for both organizations, at only $4.28 per child for CARE Rwanda and $8.62 per child for Bwafwano Zambia.

Further analyses calculated the variable costs as a percentage of total costs and demonstrated that health and nutrition and education services potentially offer fewer opportunities for economies of scale as compared to psychosocial services and legal education programs because of high variable costs. However, with no empirical evidence suggesting that the fixed costs will remain constant, further research is recommended to understand the full cost effects of scaling up programs for children affected by HIV/AIDS.

As CARE Rwanda and Bwafwano Zambia look to expand their programs to meet the needs of their target populations, the organizations should consider how they can most effectively mobilize funding to cover the variable costs related to scaling up their programs. In addition, both programs should continue to explore opportunities for increasing community participation through volunteer programs and community donations of capital items such as land and buildings.

[1] All costs in U.S. dollars.

Introduction

In sub-Saharan Africa an estimated 12 million children under the age of 18 have lost one or both parents to AIDS (UNAIDS, UNICEF, USAID, 2004). Many more children live with one or more chronically ill parent. However, at present, relatively few orphans and children with chronically ill caregivers are receiving services. Policymakers and program managers are struggling to develop methods to scale up existing programs for children affected by HIV/AIDS to reach a greater proportion of children in need. In planning to scale up programs for children affected by HIV/AIDS, policymakers and program managers must estimate future program costs. Projecting such costs is, however, difficult owing to limited data available on the costs of interventions targeting orphans and children with chronically ill caregivers.

Cost analyses have been conducted for a wide variety of AIDS interventions, including voluntary counseling and testing (VCT), treatment of sexually transmitted infections (STIs), workplace interventions, and antiretroviral (ARV) treatments. However, few studies have provided information on the costs of service provision to orphans and children with chronically ill caregivers, in part because of the wide variety of services offered to children affected by HIV/AIDS in developing countries and in part because of the difficulty in estimating the financial burden of the problem of HIV/AIDS-affected children on the community. The present analysis is one of the few studies designed specifically to identify the costs incurred by organizations providing services for children affected by HIV/AIDS.

This study will contribute to the existing literature on the costs of interventions targeting orphans and children with chronically ill caregivers in sub-Saharan Africa by providing costs of various interventions carried out by CARE in Gitarama Province, Rwanda, and Bwafwano in peri-urban Lusaka, Zambia. The two primary objectives of this paper are (1) to provide an analysis of costs from two community-based programs for children affected by HIV/AIDS in Rwanda and Zambia and (2) to demonstrate how policymakers and program managers can use data on the costs of interventions to strengthen program planning by taking into account issues related to program scale-up and sustainability. Community REACH has also produced a companion report entitled *The Well-Being of Children Affected by HIV/AIDS in Gitarama Province, Rwanda, and Lusaka, Zambia: Findings from a study,* which provides information regarding differences in well-being between orphans, children with chronically ill caregivers, and other children in the CARE Rwanda and Bwafwano project catchment areas.

Young girls at school in Zambia. *(PCI Zambia)*

Literature Review

Although the magnitude of the problem is large, few studies have documented the costs of interventions for children affected by HIV/AIDS. In this section, the literature on the costs of various types of interventions targeting orphans and children with chronically ill caregivers is briefly summarized. Similar to those in Subbarao and Coury (2004),[2,3] the interventions are divided into the following groups for

[2] The categories are modeled after Subbarao and Coury because their categories address a wide range of interventions such as adoption/fostering and reintegration programs that go beyond a community-based approach.
[3] See Appendix, Table 1 for a table of OVC intervention costs summarized by Subbarao and Coury.

purposes of this discussion: (1) institutional care, (2) programs for high-risk youth, (3) tracing and reintegration programs, (4) school and nutrition supplementation, (5) community home-based care (HBC), and (6) adoption/fostering.

Institutional care has traditionally been considered the highest-cost option for providing care to orphans and children with chronically ill caregivers. In Benin, the Ouidah Orphanage provides care through primary schools at a cost of approximately $1,315 per year per child, whereas the Adi Keith Group Home for orphans in Eritrea places children in a group home in the child's home town with a caregiver and assistant at a cost of $1,943 per year per child (Prywes et al., 2004). In South Africa, registered residential care is reported to vary from approximately $5,700 to $7,512 per child per year (Desmond and Gow, 2001). Subbarao and Coury determined through a literature review that costs per child per year for residential care in sub-Saharan Africa ranged from $471 in Ethiopia to $1,350 in Eritrea (Subbarao and Coury, 2004).

Interventions targeting high-risk orphans and children with chronically ill caregivers carry a higher cost. In Benin, the Groupe de Recherche et d'Action pour le Développement Humain (GRADH) child labor project, which apprentices children to artisans and helps younger children return to school, estimated costs at $566 per child per year, whereas a Red Cross project for street children that provides shelter and educational placement as well as family reintegration services is estimated to cost $646 per year per child (Prywes et al., 2004).

Tracing and reintegration interventions are estimated to cost $280 in Burundi and $305 per year in Eritrea (Deininger, Garcia, and Subbarao, 2003). Another study estimated that the Eritrea Orphan Reintegration Program, which provides economic support in the form of livestock or income-generating activities to families hosting war orphans, costs approximately $96 per child per year (Prywes et al., 2004).

Studies in Burundi and Uganda have estimated that costs for school and nutrition supplementation interventions total $148 and $105 per child per year, respectively (Deininger, Garcia, and Subbarao, 2003). Nevertheless, many policymakers and researchers are skeptical about the long-term financial sustainability of scaling up school and nutrition interventions because a large number of children require such assistance (Subbarao and Coury, 2004).

Studies in Malawi and Zimbabwe have found that the costs per year for HBC visits to a needy family total $1.50 to $5 and $5 to $10, respectively (Bhargava and Bigombe, 2002; Mann, 2002; and Lee, 2000). These low costs are largely attributable to extensive reliance on volunteer caregivers. Desmond and Gow estimated that home-based care and support interventions in South Africa cost approximately $82 per month while community-based support structures cost approximately $45 per month for a minimum standard of child care (Desmond and Gow, 2001).[4] These costs estimate and include the opportunity costs of volunteer labor. However, comparison across countries is difficult due to the variation in frequency of HBC visits.

In South Africa, Desmond and Gow estimated that programs encouraging temporary or permanent adoption such as fostering programs and cash grant programs for families that maintain a minimum standard of child care cost approximately $52 per month (Desmond and Gow, 2001). The Eritrea Adoption Program, in which unrelated volunteer families adopt orphans through legal procedures, costs $28.56 a year (Prywes et al., 2004).

[4] A minimum standard of care is based on "survival elements" such as food, clothing, home environment, education (fees and uniforms included), and hygiene.

This short review demonstrates that cost comparisons of programs for children affected by HIV/AIDS are difficult. In the absence of information about program effectiveness or quality, it is difficult to say whether less costly interventions produce improvements in children's well-being that are equivalent to improvements realized in more costly programs. It may also be true that it is more costly to assist orphans and children with chronically ill caregivers living in particularly difficult situations than those living in more favorable circumstances.

Despite these limitations, cost analysis is an important management tool. It provides decision-makers with information on cost structures, the effects of scale on future costs, and data that can shape decisions relating to long-term programmatic sustainability.

Descriptions of Programs: CARE Rwanda and Bwafwano Zambia

CARE has been working in Gitarama Province, Rwanda since 1995, addressing HIV/AIDS through programs that provide services to orphans and children with chronically ill caregivers. CARE's efforts focus on peer education and counseling, life skills training, psychosocial support, and food and nutrition support delivered to over 3,000 orphans and children with chronically ill caregivers. Perhaps the most innovative aspect of CARE's program is its mentoring approach, whereby members of the community, also known as *Nkundabanas*, are paired with children heading households to provide advice and support on how to care for their siblings, how to keep them in school, and how to avoid risky behaviors such as unsafe sex.

Bwafwano Zambia was established in 1996 in the Chipata catchment area of Lusaka, Zambia, by a local community activist, Beatrice Chola. The program is among the most comprehensive of its type; it provides a variety of services including HBC, a community health clinic, a community school, support for students to attend government schools, a school feeding program, psychosocial support, a sexual and reproductive health education program, and IGA. Bwafwano Zambia enjoys strong community support and participation within the catchment area. The program currently serves approximately 2,000 orphans and children with chronically ill caregivers and is supported by Project Concern International (PCI), which provides program and administrative funds, training, and technical assistance.

An orphaned boy in Rwanda. *(CARE Rwanda)*

Table 1 provides a summary of each program's main interventions. To provide a framework for understanding the output generated from programmatic costs, information was collected on the design and implementation of each program for HIV/AIDS-affected children through discussions with program managers.

Table 1. Interventions Examined

	Study Sites	
	CARE Rwanda	**Bwafwano Zambia**
Education	The program advocates for reductions in school fees for orphans and children with chronically ill caregivers and distributes school materials.	The program runs a community school for orphans and children with chronically ill caregivers and sponsors others to attend government schools.
Income-generating activities	Orphans and children with chronically ill caregivers receive training and materials to create savings and loan groups and to establish microenterprise projects.	Volunteer caregivers generate income for project-related activities. Older male and female orphans and children with chronically ill caregivers receive skills training.
Health and nutrition	Persons living with HIV or AIDS (PLHAs), children who are heading households (CHH), and mentors receive food assistance. CHH receive referrals for medical care. AIDS behavior change communication programs are conducted at the community level.	Bwafwano Community Center runs a feeding program at the community school and a nutritional support program for malnourished under-fives. The medical clinic provides immunizations and other primary health care services. Older orphans and children with chronically ill caregivers receive peer education on AIDS.
Psychosocial support	Child mentors are paired with CHH. Mentors are trained in psychosocial counseling and receive assistance in developing activity plans.	Volunteer caregivers visit homes and provide informal counseling and referrals. Bwafwano Community Center provides psychosocial counseling for orphans and children with chronically ill caregivers.
Legal education	Mentors educate CHH about their rights. The program provides assistance in cases where a child's rights are violated.	

CARE Rwanda implemented its program for children affected by HIV/AIDS with financial support from several organizations, including the Community REACH Program, Tower Research, Catholic Relief Services (CRS), and the United States Agency for International Development (USAID). Bwafwano Zambia's programs are operated with financial support from Target Tuberculosis, Tuberculosis Alert, Cecily's Fund, the Global Fund, the World Food Program (WFP), Firelight Foundation, American Jewish World Foundation, and Community REACH.

Methods

Cost data were collected in the context of piloting a costing tool for programs for children affected by HIV/AIDS. The costing tool for programs for children affected by HIV/AIDS is undergoing development by the USAID-funded FHI/IMPACT Project. At the time of data collection, the tool consisted of worksheets designed to facilitate the categorization of the costs of programs. Feedback from the costing exercises will be used to transfer the tool from paper-based worksheets to a computer-based costing tool. Microsoft Excel was used to analyze the data collected for this report.

Cost data for each programmatic area was collected by reviewing programmatic budgets and financial documents, and costs were categorized according to standard costing resource types[5] as follows:

- Labor
- Materials
- Utilities
- Equipment/furniture
- Transport
- Building/land
- Administration

Cost data on labor was composed primarily of the programmatic technical and administrative staff as well as the estimated cost of volunteer labor. Material costs encompassed a wide range of items based on the program emphasis. In Zambia, items included school uniforms, books, food and cooking supplies as well as sewing materials. In Rwanda, there was greater emphasis on food assistance followed by training and office materials. Utility costs were based on electricity and water expenditures. Equipment and furniture costs included items such as desks and computers. Transport costs included fuel and vehicle maintenance. Building and land costs were based on the cost of the building and land for the project site.

For Bwafwano Zambia, all costs are categorized as either capital (with a lifespan of more than one year) or recurrent (with a lifespan of one year or less). The expected lifetime of capital items was assumed to be three years for electronic equipment (e.g., computers), 15 years for furniture,[6] 40 years for the building, and five years for other equipment.[7] Capital costs were annualized over the expected lifetime of the item by using a discount rate of 6 percent, which is the standard rate. For CARE Rwanda, furniture and equipment capital costs are categorized as the organization's administrative overhead, and the costs are allocated across interventions. Given that CARE rented its building, the monthly allowance was distributed across intervention categories based on the percentage of time used for an intervention.

Items were also identified as either donated or purchased. Donated items were assessed at current market price. For example, the monetary value of the food donated to CARE Rwanda by CRS included the current market price of the food. The cost of transport and storage in Rwanda was also included. Additionally, CARE Rwanda's volunteers received food assistance as an incentive for their volunteer work. The value of food allocated to volunteers was thus calculated as the opportunity cost of volunteer

[5] These categories are similar to the ones adopted in the FHI OVC Costing Tool.
[6] With the exception of the students' desks, which were determined to have an expected lifetime of only five years.
[7] With the exception of bicycles, which were determined to have an expected lifetime of only two years.

labor. The value of Bwafwano Zambia's unpaid volunteer labor was valued as the same as that of the supervisors ($30 per month).[8]

Costs associated with externally provided capacity building and technical assistance were not included. In the case of Bwafwano Zambia, PCI provides substantial levels of external technical assistance, monitoring, capacity building, and general support. With this support, Bwafwano Zambia has strengthened its capacity to implement programs and its ability to obtain further external assistance. Since the cost analysis focuses specifically on the provision of services, the costs of PCI's services were not included except for external assistance relating to the purchase of materials, supplies, or equipment.[9] The authors note, however, that technical assistance is necessary for achieving long-term sustainability of programs for children affected by HIV/AIDS.

Results

Table 2 shows the total costs of CARE Rwanda's and Bwafwano Zambia's activities for children affected by HIV/AIDS for 2003–2004. For CARE Rwanda's program, costs totaled $626,716 per year. The costs of Bwafwano Zambia's activities in Chipata totaled $85,016 per year. For both programs, labor and materials constituted the largest share of expenditures.

Table 2. Costs by Resource Type in U.S. Dollars, 2003–2004

	CARE Rwanda		Bwafwano Zambia	
Resource Type	**Costs**	**Percent**	**Costs**	**Percent**
Labor	81,763	13	15,016	18
Donated labor	12,562	2	16,953	20
Materials	497,069	79	46,799	55
Utilities	2,803	0	923	1
Equipment/furniture	1,850	0	1,098	1
Transport/vehicles	18,568	3	3,755	4
Building/land	1,715	0	474	1
Administration	10,385	2	NA	NA
Total	**$626,716**	**100**	**$85,016**	**100**

The difference in the total costs for the programs is in part attributable to the size of each program (CARE Rwanda covers almost double the total number of beneficiaries) and to the value of food assistance that CARE Rwanda receives from CRS (almost $500,000 a year). Bwafwano Zambia works in a peri-urban area whose higher population density facilitates the program's access to the population and reduces transportation expenses. Within this context, Bwafwano Zambia can more easily access beneficiaries and provide them with material services such as food and school supplies. For CARE Rwanda, the material support is almost exclusively food assistance where for Bwafwano Zambia there is a wide range of material assistance provided to their beneficiaries. The material assistance provided by Bwafwano Zambia includes such things as food, soap, clothing, school supplies, school uniforms, income generation-related materials such as cloth, sewing kits, and paint as well as cooking supplies and training materials. As CARE Rwanda beneficiaries are dispersed in a rural area, supervision and transport of material goods are more difficult. Supervisors must

[8] In reality, six supervisor positions are rotated among the 150 total volunteers. Currently, the skill set required of the supervisors is the same as that of the volunteers. In the future, supervisors will be trained and given a permanent status.

[9] Since the cost of technical assistance from PCI Zambia would not be covered by Bwafwano if this donated input were not available, it is not included in these costing analyses.

travel to rural points to observe and manage local workers. A greater capacity for transportation is needed to move food aid and other materials to beneficiaries, as well as bringing supervisors to their charges.

Table 3 presents the distribution of costs by programmatic area. The principal focus of CARE Rwanda's program is HIV prevention and education as well as food assistance to older orphans and children with chronically ill caregivers. These interventions require significant labor and material inputs both to carry out the wide range of HIV/AIDS information, education, and communication (IEC) activities and to coordinate the management and distribution of food. CARE Rwanda's program relies heavily on volunteers to provide all of its services. Bwafwano Zambia's program operates an HBC and a school feeding program for a younger population of beneficiaries. As a result, Bwafwano Zambia purchases large amounts of food and supplies to support its efforts. Approximately 90 percent of CARE Rwanda's costs and 60 percent of Bwafwano Zambia's costs are devoted to the two groups' health and nutrition programs. Income generation and psychosocial activities are also responsible for a moderate share of the costs in both programs. In CARE Rwanda's catchment area, IGA constitutes 5.1 percent of costs while psychosocial support represents approximately 2.6 percent of costs. In Bwafwano Zambia's catchment area, psychosocial support totals approximately 20 percent of costs while IGA represents 11.1 percent of costs.

Table 3. Costs by Programmatic Area in U.S. Dollars, 2004

	CARE Rwanda			Bwafwano Zambia		
	Number of Children Served	**Costs**	**Percent**	**Number of Children Served**	**Costs**	**Percent**
Education	60	1,539	0.2	650	7,023	8.3
IGA	3,854	31,830	5.1	60	9,401	11.1
Health and nutrition	3,854	567,630	90.6	449	51,347	60.4
Psychosocial support	3,854	16,494	2.6	2,000	17,245	20.3
Legal education	3,854	9,222	1.5		NA	NA
Total		**$626,716**	**100**		**$85,016**	**100**

Table 4 provides estimates of the costs per child served for each programmatic area. Cost per child is calculated by dividing total costs by the number of children served. In the CARE Rwanda program, health and nutrition are the most expensive services at $147.28 per child per year and are similar to those found by Subbarao and Coury in Burundi and Uganda, where school and nutrition supplementation programs totaled $148 and $105, respectively, per child per year. Psychosocial support, IGA, and legal education incur lower costs, ranging from about $2.39 to $25.65 per child per year. Health and nutrition costs are high because of the need for food assistance, and education costs are high because the intervention takes the form of hands-on vocational training. Older orphans and children with chronically ill caregivers are provided with work supplies and placed as apprentices with tailors and hairdressers.

Table 4. Costs per Child by Programmatic Area in U.S. Dollars, 2004

	CARE Rwanda	Bwafwano Zambia
	Cost per child	Cost per child
Education	25.65	114.36
IGA	8.26	10.80
Health and nutrition	147.28	8.62
Psychosocial support	4.28	156.68
Legal education	2.39	NA
Total	**$187.86**	**$290.46**

For Bwafwano Zambia's program, IGA and health and nutrition costs total $156.68 and $114.36 per child per year, respectively. Income generation activity costs are high because of the need for supplies to carry out activities, while health and nutrition activities costs are higher because of the required food and cooking materials.

For both CARE Rwanda and Bwafwano Zambia, psychosocial support incurs the lowest cost at $4.28 per child annually in CARE Rwanda's program and $8.62 per child annually in Bwafwano Zambia's program. The two programs are similar in that they both require little material support but do depend on a significant level of volunteer support. The CARE Rwanda psychosocial program is completely integrated into the rest of CARE's program. The same volunteers who provide psychosocial support work on the health and nutrition, legal education, and IGA components as well. In Bwafwano Zambia's catchment area, HBC caregivers deliver psychosocial support and other services for PLHAs in the household. In addition, trained counselors work at the Bwafwano community center.

The cost per child for educational services is similar for CARE Rwanda's and Bwafwano Zambia's catchment programs. CARE Rwanda's education program focuses on informal education for older orphans and children with chronically ill caregivers while Bwafwano Zambia's program supports younger children in community schools.

As a final note, "child served" was used as the denominator as if it were a common measure. That measure, however, does not indicate whether an intervention improved a child's life, how it improved a life, or how much it improved a life. Psychosocial support appears to incur lower costs; however, the authors did not objectively assess the degree to which a child's current or future prospects are improved by this type of intervention. Although health and nutrition interventions cost about 10 times more than psychosocial support, a child might receive more than 10 times the benefit. Additional research should be conducted to document the effectiveness of various interventions as will be done by Community REACH.[10]

Scaling Up

Future directions of the programs

The scope of the AIDS epidemic in Rwanda and Zambia continues to produce a crisis of HIV/AIDS-affected children beyond the capacity of local families and communities. As a result, both CARE Rwanda and Bwafwano Zambia plan to continue delivering services to orphans and children with chronically ill caregivers in collaboration with local communities. The organizations have set forth some specific goals for the next five years.

CARE Rwanda plans to triple the size of its program by scaling up the number of households served from 750 CHH in 2003 to 2,400 CHH in 2008. As a result, the program will expand from 3,800 to 12,000 beneficiaries. CARE will continue to support orphans and children with chronically ill caregivers with health and nutrition programs, microenterprise projects, and psychosocial support. In addition, CARE Rwanda would like to expand its economic and social work to include additional literacy, life skills, and vocational training for older orphans and children with chronically ill caregivers while encouraging younger orphans and children with chronically ill caregivers to stay in school. The organization is also interested in expanding program benefits to include assistance for shelter and essential household items.

[10] The Community REACH program is conducting an effectiveness study of these programs in collaboration with CARE Rwanda, Bwafwano, and PCI Zambia. Community REACH conducted the baseline study in mid 2003, and MEASURE Evaluation will implement the endline survey in 2005.

Bwafwano Zambia plans to scale up its existing program to cover other communities on the outskirts of Lusaka and rural communities lacking home-based care services for orphans and children with chronically ill caregivers, PLHAs, and tuberculosis patients. Bwafwano Zambia plans to double the number of beneficiaries by 2007, reaching an additional 2,000 children in rural areas. Bwafwano Zambia also intends to target child-headed households by providing CHH with income generation skills and literacy training.

Understanding the costs of scaling up programs for children affected by HIV/AIDS

As CARE Rwanda and Bwafwano Zambia make plans to scale up their existing programs, they need a firm understanding of how costs will affect projected resource needs. Current methods for estimating the financial resources required to support orphans and children with chronically ill caregivers in sub-Saharan Africa call for multiplying the number of orphans and children with chronically ill caregivers by the estimated cost per child (Stover et al., 2004). Such methods do not, however, take into consideration the potential for economies of scale if existing programs increase the number of targeted orphans and children with chronically ill caregivers. Hankins et al. (forthcoming), adopt an approach similar to that of Stover, et al., 2004, when estimating the costs of programs for children affected by HIV/AIDS and state that the program unit costs are held constant throughout the analysis because economies of scale could not be adequately factored into the analysis.

Estimating the costs of program scale-up requires disaggregation of current costs into (1) costs that will increase with the addition of beneficiaries and (2) costs that will remain approximately constant with the addition of beneficiaries. In economic terminology, these costs are called, respectively, *variable costs* and *fixed costs*. Variable costs include, for example, the increased purchase or donation of food assistance to serve increased numbers of beneficiaries. Fixed costs might include, for example, vehicles and furniture. Fixed costs remain constant only within ranges. Eventually, if programs grow large enough, additional layers of administration and support are needed. Empirical evidence is currently unavailable to suggest at what point fixed costs no longer remain constant.

In the next few paragraphs, the report discusses how fixed and variable costs could potentially affect the resources needed to scale up the CARE Rwanda and Bwafwano Zambia programs for children affected by HIV/AIDS.

Table 5 presents a detailed breakdown by fixed and variable costs for each programmatic intervention for CARE Rwanda. The table shows considerable variation in variable costs as a percentage of total costs by programmatic area. The health/nutrition and education programmatic areas have high variable costs due to the large volume of materials and supplies needed to run the interventions. Variable costs as a percentage of total costs for health/nutrition and education are 93 and 81 percent, respectively. Variable costs as a percentage of total costs for psychosocial support, IGA, and legal education are considerably less, between 50 and 64 percent.

Table 5. Distribution of Fixed and Variable Costs in CARE Rwanda's Catchment Area by Programmatic Area in U.S. Dollars, 2004

	Health and Nutrition	Education	Psychosocial Support	IGA	Legal Education	Total
Fixed Costs						
Building/land	1,027	0	202	323	163	1,715
Transport/vehicles	14,596	0	1,032	2,447	494	18,568
Equipment/furniture	1,054	0	265	218	313	1,850
Supervision (labor)	17,653	289	5,366	7,436	2,258	33,003
Administration	6,549	0	1,279	1,164	1,394	10,385
Total Fixed Costs	***40,879***	***289***	***8,145***	***11,587***	***4,622***	***65,521***
Fixed costs as percent of total	7%	19%	49%	36%	50%	10%
Variable Costs						
Labor	34,117	866	6,678	16,656	3,005	61,322
Utilities	1,384	0	435	588	396	2,803
Materials	491,250	384	1,237	2,999	1,199	497,069
Total Variable Costs	***526,751***	***1,250***	***8,350***	***20,243***	***4,600***	***561,194***
Variable costs as percent of total	93%	81%	51%	64%	50%	90%
Total	***$567,630***	***$1,539***	***$16,494***	***$31,830***	***$9,222***	***$626,716***

For the Bwafwano Zambia program, variable costs as a percentage are slightly higher than for CARE Rwanda, as shown in Table 6. At 91 and 79 percent, respectively, health/nutrition and education interventions continue to have high variable costs. Variable costs associated with IGA are also substantial at 81 percent of total costs, reflecting a programmatic intervention that relies heavily on materials and supplies to prepare arts and crafts sold to generate income.

Table 6. Distribution of Fixed and Variable Costs for Bwafwano Zambia by Programmatic Area in U.S. Dollars, 2004

	Health and Nutrition	Education	Psychosocial Support	IGA	Total
Fixed Costs					
Building/land	119	129	104	121	474
Transport/vehicles	1,163	447	1,820	324	3,755
Equipment/furniture	133	306	135	523	1,098
Supervision (labor)	3,366	583	3,264	778	7,992
Administration	-	-	-	-	
Total Fixed Costs	***4,782***	***1,466***	***5,324***	***1,746***	***13,318***
Fixed costs as percent of total	9%	21%	31%	19%	16%
Variable Costs					
Labor	10,099	1,750	9,793	2,334	23,976
Utilities	129	408	28	357	923
Materials	36,336	3,399	2,100	4,963	46,799
Total Variable Costs	***46,565***	***5,557***	***11,921***	***7,654***	***71,698***
Variable costs as percent of total	91%	79%	69%	81%	84%
Total	***$51,347***	***$7,023***	***$17,245***	***$9,401***	***$85,016***

If fixed costs remain constant, the above tables would suggest that the costs associated with expanding the health/nutrition and education programs in Rwanda and Zambia offer limited economies of scale; the fixed costs account for only a small share of total costs. However, other programs that require fewer materials and supplies, such as psychosocial support and legal education, offer greater potential for economies of scale.

There have been no studies that have analyzed cost reductions per child resulting from economies of scale. Factors such as the cost of identifying orphans and children with chronically ill caregivers, particularly in peri-urban and rural areas, could be significant and therefore would dramatically increase the cost of program expansion. Likewise, it is unclear whether potential cost savings are associated with certain variable costs such as unused staff time, which is currently not considered. There is an urgent need to gain a better understanding of how variable costs contribute to economies of scale in programming for children affected by HIV/AIDS.

Sustainability

Costing analysis is useful for examining issues related to the feasibility of maintaining a programmatic intervention over time. Both CARE Rwanda and Bwafwano Zambia are currently effective in mobilizing resources from governments and international donors to support their programs. However, it is uncertain how donors will respond in the future to requests for assistance. Therefore, it is important to consider whether the interventions in question are sustainable.

Figure 1. Funding by Donor for CARE Rwanda, 2004

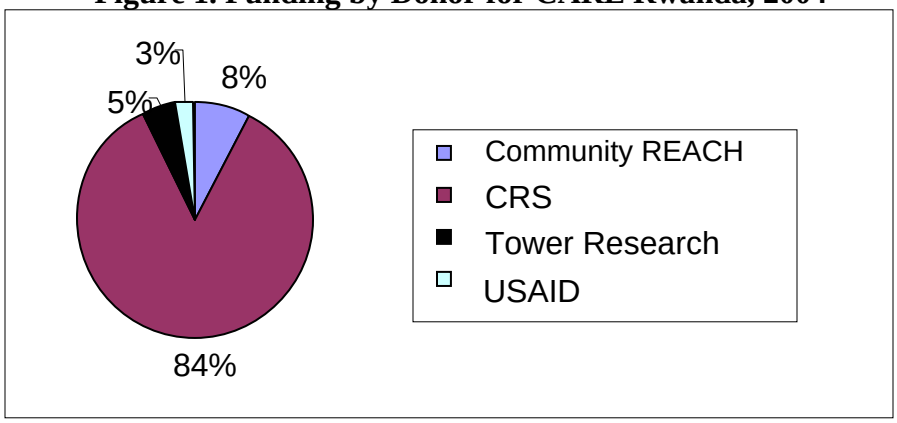


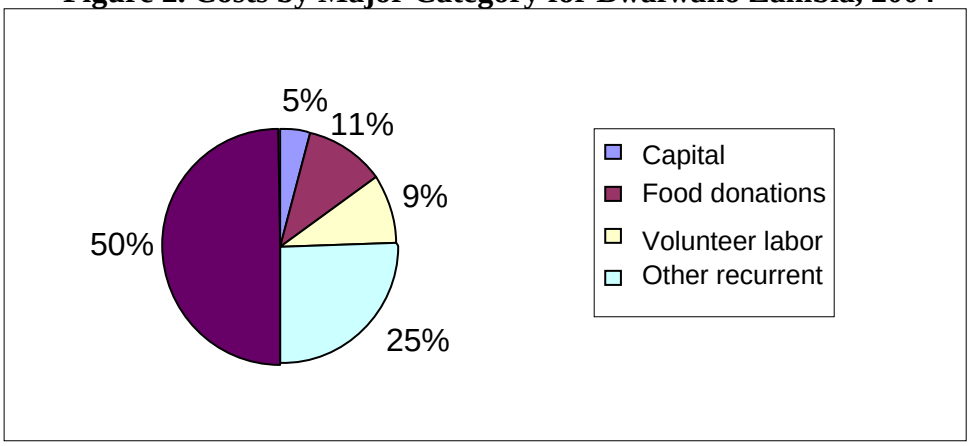
Figure 1 presents the distribution of funding for CARE Rwanda. CRS provides approximately 84 percent of program funding, largely for food assistance which, as discussed in Table 2, constituted approximately $500,000 or close to 75 percent of the total costs.[11] Community REACH provides approximately 8 percent of funding and Tower Research approximately 5 percent. The authors note, however, that local sources, including the government of Rwanda and individual communities do not factor into program funding. Although CARE has been successful in tapping into a variety of international donors, greater attention should be placed on incorporating government and community participation in future program plans.

[11] The scope of work for the Bwafwano Zambia costing research differed slightly and did not emphasize data collection on funding sources.

Moreover, the full opportunity cost of volunteer labor was not included. The authors assumed that the donated food that goes to program volunteers fully replaces the wages they would have earned in the marketplace. A more complete analysis would have calculated the value of volunteers' time devoted to the program and compared it with the value of the donated food received by the volunteers. If the value of the time exceeded the value of the donated food, the authors could have included the difference as an element of total cost. These potential costs should not be overlooked since volunteers are an integral component of the program, particularly in the rural setting. The costs per child could be significantly higher if the volunteer labor were a paid market wage. Continued program sustainability depends critically upon ensuring that the volunteers know that they are appreciated and fairly compensated.

In Zambia, the authors performed a different analysis to address sustainability. Figure 2 disaggregates costs by inputs including capital costs, food donations, volunteer labor, and other recurrent costs. In general, volunteer labor and capital costs are locally generated resources. Through local fundraising and community mobilization, the Bwafwano community section leaders mobilized building materials and manpower to build the community school, which constitutes a significant portion of capital costs. Donor resources largely cover food and other recurrent costs which constitutes the majority of the total costs of the project (approximately 84 percent as shown in table 6). By this rough calculation, 27 percent of resources are generated locally and independent of donor financial or material intervention.

Figure 2. Costs by Major Category for Bwafwano Zambia, 2004



Although complete sustainability is not possible, significant opportunities exist for developing sustainable aspects of the program. For example, CARE Rwanda currently realizes no returns to project funds from IGA. Yet, a potential adjustment to the programs could require a percentage of the income from IGA to be returned to the project.

As another mechanism for sustainability, the program could be structured to require further involvement of communities through the recruitment of more volunteers and through other opportunities such as donations of land or buildings or the use of land for food production.

The government could recognize greater community participation for the social good and acknowledge that the program relieves the public sector of a financial burden that it might otherwise have to bear. In other words, governments could contribute to the operating costs of programs for children affected by HIV/AIDS through a voucher system or per capita subsidy. For example, orphans and children with chronically ill caregivers could receive medical services from public facilities with a special identification card and the government would then pay for the expenses. In Rwanda, a support system for victims of the genocide has been established by the government. The system is financed through a payroll tax. Many

CARE beneficiaries enlisted in this program and did so with support from their community mentors provided by CARE. A similar mechanism could be established specifically for orphans and children with chronically ill caregivers in other countries.

CARE Rwanda is seriously considering the implications of sustainability by scrutinizing the program's food assistance component and the dependency it creates. For example, the organization is exploring home gardening as an option to reduce dependency on food assistance. It is also exploring the use of a human rights-based approach to achieve sustainability. That is, it could potentially provide orphans and children with chronically ill caregivers with the tools they need to access government assistance and protect their inheritance. CARE Rwanda is also working with community volunteers to form associations and higher-level networks that would be respected by government officials. The organization will train the community volunteers in IGA in order to create incentives for their participation. Each of the above activities should be considered in light of how variable costs will influence the program's long-term success.

PCI Zambia and Bwafwano are independently examining issues of sustainability in their program. Currently, they are focusing on using part of the money raised from the income-generating program to supplement school feeding and under-five feeding of malnourished orphans and children with chronically ill caregivers. Though not reflected in the analysis, over a six month period, more than $11,000 was raised through income-generating projects and community contributions to the Bwafwano clinic, with more than 95 percent of the funds returned to the program. It is important to note that, as a truly grassroots community-based organization, Bwafwano has evolved both technically and organizationally in less than 10 years into an organization capable of attracting funding from diverse sources. The program stands as a model for organizations looking to provide services to orphans and children with chronically ill caregivers in the future.

Conclusions

Estimating the costs associated with delivering services to orphans and children with chronically ill caregivers can provide policymakers and program managers with information essential for successfully managing programs and ensuring program sustainability. This paper provides decision-makers with an example of how they can use costs to develop plans for program expansion and identify strategies for long-term sustainability. The paper presents some important points to be considered when using costing analyses to inform program expansion and sustainability.

1) *Programs for children affected by HIV/AIDS vary tremendously.* The situation is complex and requires a varied approach in dealing with the unique problems of each child and environment. As a result, it is difficult to generalize the costs of one program for HIV/AIDS-affected children across countries and diverse situations. Therefore, to gain a better understanding of how programs and costs vary by situation and region, it is important to recognize that each programmatic approach and geographic region demands additional costing analyses, particularly in the case of Asia and the Latin America and Caribbean regions. To simplify the effort and facilitate cost comparisons, it would be useful to formulate standardized categories and measures for interventions and to use a costing tool such as the OVC Costing Tool forthcoming from FHI/IMPACT.

2) *Costs vary greatly across interventions.* Most cost data are collected independent of impact measures; therefore, it is unclear whether a more costly intervention is necessarily a more effective intervention. For example, costs could increase because of either greater impact or less efficient use of resources. A greater effort is therefore needed to collect effectiveness data that take into account quality measures of

interventions. If effectiveness data are collected across similar outcomes, cost comparisons could then be employed to determine the cost-effectiveness of such interventions.

3) *Further research is required to understand how an increase in the number of program beneficiaries affects costs.* The scope of the AIDS epidemic continues to produce a crisis of HIV/AIDS-affected children beyond the capacity of families and local communities. As a result, it is important to understand how costs will change as programs scale up, particularly given that many programs depend on the distribution of material goods and thus incur high variable costs.

4) *Scaling up existing programs may reduce the cost per child for some interventions.* In some cases, it may be less costly to scale up existing programs (when feasible) than to create new programs, particularly if the proportion of fixed costs as a share of total costs will likely decline. For example, costs for psychosocial support would require an initial fixed cost associated with training counselors. However, once trained, these individuals, particularly if they are volunteers, could support many orphans and children with chronically ill caregivers over an extended period of time. Therefore, to reach the growing number of orphans and children with chronically ill caregivers, policymakers and program managers should consider options for scaling up existing programs.

5) *Opportunities for sustainability.* Although it is unlikely that programs for children affected by HIV/AIDS can be fully sustainable, all parties, including community members, NGO director's program managers and policymakers should begin to explore opportunities for sustainability. For example, they could:

- Use a proportion of IGA revenue to subsidize other aspects of a program;
- Support further involvement of communities in a program by increasing the number of volunteers or using community-donated land and buildings; and
- Encourage the government to contribute to other program operating costs through a voucher system or a per capita subsidy.

Appendix

Appendix Table 1. Cost of Interventions (excerpted from Subbarao and Coury, 2004)

Country	Type of Intervention	Cost per Child per Year
South Africa (Desmond and Gow, 2001)	Orphanage Formal foster care (grant) Support grant (for children until age 17) Place-of-safety grant (short-term grant of 12 weeks to six months)	$684 from government plus own fundraising; may reach up to $2,400 $312 $84 $1.70 per day
Malawi (Bhargava and Bigombe, 2002; Mann, 2002) (Kalemba 1998)	SOS Village (NGO) Institutional care (Open Arms) Home visits by volunteers (COPE) Day care (group assistance)	$1,704 $200 plus donation (clothes and toys) $1.50–$5 $13
Burundi (Deininger, Garcia, and Subbarao, 2003)	School and nutrition supplement Tracing and reintegrating an orphan Orphanage (NGO APECOS)	$148 $280 one-time expense $689 (in 1999)
Uganda (Deininger, Garcia, and Subbarao, 2003)	School and nutrition supplement	$105
Eritrea (Deininger, Garcia, and Subbarao, 2003)	Tracing and reintegrating an orphan Orphanage	$305 one-time expense $1,350
Ethiopia (Bhargava and Bigombe, 2002)	Orphanage (Abebetche Gobena)	$471
Tanzania (Deininger, Garcia, and Subbarao, 2003) (Bhargava and Bigombe, 2002)	Orphanage School fees (WAMATA)	$649 $40
Zimbabwe (Lee, 2000)	Home visits by volunteers (FOCUS NGO)	$5–$10 by family $0.10 by visit
Rwanda (Williamson, Donahue, and Cripe, 2001, cited by Phiri and Webb, 2002)	Orphanage	$540 plus cost of donated food

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