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Cost Drivers and Unit Cost Analysis of Home-Based Early Learning in Uganda, Ghana, and Liberia: Lessons for Scaling

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Abstract: *Investment in early learning, though recognized as critical for human capital development, rarely receives proportionate funding. The problem arises from the fact that not many studies have focused on unit costs incurred in providing minimum childcare packages in communities. The purpose of this paper is to highlight unit costs, cost drivers and cost-benefit analysis of implementing the SIHELI model to deliver quality early learning in targeted rural communities in Africa based on Wright's learning curve theory which explains how the unit cost of production decreases by a predictable percentage each time cumulative output doubles. A mixed methods approach was used in this study involving quantitative and qualitative approaches, with data collected by survey forms, along with interviews with key program staff located at in the implementing sites in Uganda, Ghana and Liberia. Findings indicate that unit costs of different inputs varied across districts and countries in many aspects, while food items costs remained relatively constant across districts but varying across countries. In kind contributions were more costly as compared to cash inputs. Administrative costs took more than half of the operation costs. It is concluded that strategies used by communities can be enhanced to improve cost effectiveness in situations where administrative costs are minimized. The implication of the findings include tangible and intangible unit costs that organizations supporting early learning in communities need to consider as they support or plan to support such initiatives in marginalized communities.*

Keywords: *Unit costs, Cost benefit analysis, Early learning, human capital development, financing, home based*

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1. Introduction

Uganda, Ghana and Liberia have predominantly young population, making investment in early childhood education a good choice (UNICEF, 2023) with the greatest rate of return on human capital development (Heckman, 2006). This investment guarantees that attendance of pre-primary education ensures a powerful grade repetition rate reduction effect on primary school education (UNICEF, 2019). In addition, one year of quality pre-primary education extends children's expected years of schooling to an average of 7.2 years (UNICEF, 2023). The gains are attributed to child care allowing carers to return to work that generates funds to be invested in child development, increased labour force productivity and improved health (Marope & Kaga, 2015). Thus, every $1 invested in early childhood care and education can lead to a return of as much as $17 for the most disadvantaged children (CGECCD, 2013).

Despite the established benefits of investment in early childhood education, investment that would allow more children to access pre-primary education remains a matter of circumstance depending on where they are born and their family's socioeconomic status (Zubairi & Rose, 2017). In many communities in sub–Saharan Africa, only about 20 percent of children enrol in pre-primary education compared to more than 80 percent in high-income countries (UNICEF, 2019). This lack of equitable access to pre-primary education means more than 200 million children under the age of five in Africa are at risk of failing to reach their full potential (PAL Network, 2017).

2. Literature Review

The SDGs 4.2 enacted in 2015 committed countries and partners to ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education by 2030 (Tekin, 2019). Of the 193 countries that committed to the SDGs, only 38 currently provide free, compulsory pre-primary education (UNESCO, 2016). On average, most African countries spend just 6.5% of child-related social spending on those aged 0-5 and 55% on 12–17-year-olds (UNICEF, 2024). This investment is often a sub-set of wider investment in early childhood development, spanning through care, education, health, nutrition and social protection. This scope makes actual funding that accrues to pre-primary education to be very meagre, on average, 2.9% of total education expenditure spent on pre-primary education compared to 9% for high-income countries (Zubairi & Rose, 2017). With this level of funding, it is now estimated that low-income countries may reach $ 232 level of funding for pre-primary education in 2030, a goal that was projected for 2014 prices (Education Commission, 2016).

The variance in investment in early childhood education across different countries, especially in developing countries, may not necessarily arise from limited funds, but lack of Cost-benefit analysis (CBA) information. Cost-benefit analysis (CBA) has gained increasing interest among decision makers as a tool to select the most cost-effective programmes that can improve children's skills and life trajectories (Beuchert & Verner, 2019). Cost-benefit analyses describe the monetary value of a programme's benefits relative to its cost (Beuchert & Verner, 2019). Cost benefit analysis quantifies in monetary terms as much as possible investment advantages and disadvantages providing insights into the social-welfare effects for which there is no market price (Romijn & Renes, 2013). A collection of relevant and comprehensive CBA data helps to inform investment decisions in partner countries pertaining to scaling, replicating, and sustaining effective interventions (USAID, 2018). Better, feasible and more sustainable results can also be achieved if we use cost data alongside effectiveness data to inform large scale investment decision-making (USAID, 2018; Walls, Tulloch & Keuren, 2021).

Currently, in Uganda, Ghana and Liberia, early childhood education services are delivered through different interventions. One of them is Scaling Inclusive Home-based Early Learning Initiative (SIHELI), a home-based model for delivering ECE in marginalized communities. SIHELI is a hybrid of the Inclusive Home-based Early Learning Project (IHELP) model and the Inclusive Child to child Learning Approach Project (ICLAP) model that were implemented by Kyambogo University and her partners in Uganda, Kenya, Zimbabwe, Malawi and Ethiopia (Mhiza, Tafirenyika & Ejuu, 2022). In this model, we support communities to establish, run and manage homebased early learning centres for children of 3-6 years. When established, we supported the centres to use the child-to-child play approach for peer-to-peer learning and institutionalization of play pedagogy. The daily routine includes two days in a week being parent led learning and the other two days being teacher led. One day in a week is child led through the child-to-child play approach. The centres are managed by centre management committees who are responsible for the day-to-day running of the centres, with duty Rota that include every parent to play some role in running the centre. The district education officers are engaged for support supervision as a system strengthening approach.

Knowing that there are other models for being used to provide ECE services in the countries of focus, it will not make much sense to work with only one of them. This is because there are too many variations in early childhood education service provision that make it difficult for one to just pick one example and use it as a standard (Van Ravens & Aggio, 2008). Even if one was to be chosen, estimation

of costs may be complicated by a number of features that are not fully covered by existing cost assessment guides (Levin, McEwan, Belfield, Bowden, & Shand, 2018).

While there are many studies that have tried to do cost analysis on early childhood education service provision in Uganda, Ghana and Liberia, most of them focus on pre-school education that is supported by private sector or donors, with paying much attention to locally managed community-based models. If we are to fill this gap, we need to focus on drivers and unit cost analysis before we centre on cost benefit analysis for in kind support to these centres following the learning curve theory. This study, thus hopes to introduce CBA of home-based early learning into the picture so that data from it may allow policy makers understand the economic and social costs of investing in given early childhood programme and find the best way to invest limited funds on a set of cost-effective interventions (Walls, Tulloch & Keuren, 2021) for better early childhood education outcomes.

This study is based on Wright's (1936) learning curve theory in which he explains how the unit cost of production decreases by a predictable percentage each time cumulative output doubles. According to that rule cumulative assembly costs are reduced on average by 20% as the number of units is duplicated (Askin & Goldberg, 2001). This learning effect is attributed to increased labor efficiency, improved production methods, and technological advances over time, thus, a common approach to calculating these program costs is the ingredient method. This approach includes itemizing the resources necessary to provide services and calculating or estimating the costs of each resource (Levin & McEwan, 2001). Cost analysis considers the value of all resources used in providing a service, whether or not the resources were purchased directly by the program (Yates, 2009). Costs incurred in different years are adjusted for inflation so that all costs are measured in the same base year, usually the earliest year considered in the analysis (Calculating the Costs of Child Welfare Services Workgroup, 2013). Myers (2008) identified 11 categories of main costs for most early childhood development programmes that include: Personnel costs, Infrastructure, Materials, Supplies, Food, Overhead expenses, Transportation, Uniforms or special clothing, Training costs, Developmental costs, Evaluation costs.

The purpose of this paper is to highlight unit costs, cost drivers and cost-benefit analysis of implementing the SIHELI model to deliver quality early learning in targeted rural communities in Africa. This study was guided by the following objectives:

1. Determining the cost drivers for implementing the SIHELI model in community based early learning centres in target communities in Uganda, Ghana and Liberia
2. Assess the unit cost of delivering SIHELI model in target community based early learning centres in Uganda, Ghana and Liberia.
3. Conduct a cost-benefit analysis for delivering the SIHELI model of early learning in target communities Uganda, Ghana and Liberia for purposes of scaling.

3. Methodology

A mixed methods approach was used in this study involving quantitative and qualitative approaches. First, literature was reviewed to identify cost drivers and inputs for costing (Levin et al., 2018) and later their data collected by survey forms, along with interviews with key program staff located at the implementing sites in Uganda, Ghana and Liberia. The Cost-Benefit Analysis (CBA) employed a cross-sectional mixed methods design, in which the quantitative aspect was used to determine costs of implementing the model. Both financial and non-financial costs were analysed, with non-financial contributions costed to give a financial magnitude as utilized in the 15 early learning centres in Uganda, Ghana and Liberia. In Uganda, the districts of Buikwe and Kalaki were selected, while in Liberia it was the Sanniquellie Mah and Bain Garr Districts. Nanton district was selected in Ghana. The communities selected in the districts are those marginalized communities who live along lake shorelines in Uganda, nomadic as in the case of Ghana and poor as in Liberia. All the districts have ever suffered from conflict, poverty or ebola epidemic and have limited access to early learning.

The study worked with a total of 24 participants to collect the data. These included 15 management committee chairpersons, 5 from each of the three countries who are in charge of centre expenditures and transactions. The team also worked with 6 programme officers, 2 from each of the countries. These officers are the ones who support disbursement of the funds to the centres. We also worked with the 3 programme leads, one from each of the 3 countries who were responsible for programmatic costing and planning. The participants were given questionnaires that have different cost drivers for them to fill in the unit cost of each as expended in their areas of jurisdiction. Missing cost drivers were added and later unit costs were aggregated per country.

In the case of data analysis, data collected was fed into the Brooklyn's Center for Universal Education Childhood Cost Calculator (C3) for analysis. This was done to facilitate the costing of the current early learning intervention to determine cost per beneficiary and total costs to inform and understand cost distribution, and costs of scaling using the ingredients-based costing (Girma,

2023). Data from the calculator was used to do the cost-benefit analysis which converted all policy and program inputs and outputs into monetary terms to answer the question of whether social benefits exceeded social costs, as measured in monetary value (Aos & Pennucci, 2013).

For ethical consideration, informed consent was got from participants, permission to collect data was obtained from the district education office and the centre management committee heads. Confidentiality of the participants have been maintained by not revealing their identity.

4. Results and Discussion

The results here are presented first in terms of unit costs of inputs, the cost drivers and later cost benefit analysis.

Unit costs of inputs

In providing inclusive home-based early learning in marginalized communities in Uganda, Ghana and Liberia, the following cost inputs were identified as shown in Figure 1.

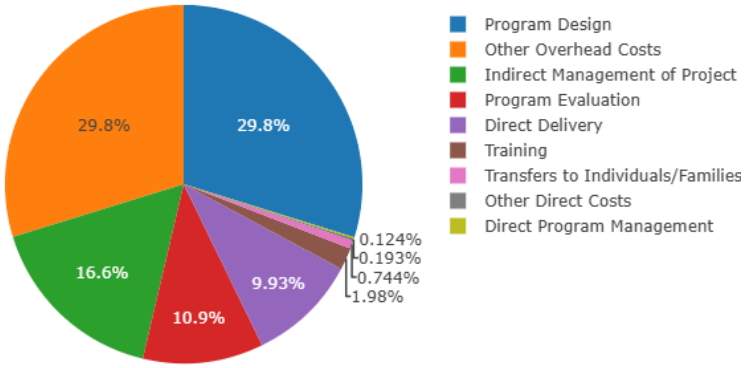

Figure 1: Cost inputs for sustainable inclusive home-based early learning model

Figure I shows that generally, the largest cost inputs that influence implementation of the inclusive home-based early learning model is indirect costs that account for 86% of the programme costs in the first and second year of implementation. But after the second year, when the indirect costs are significantly reduced, direct delivery of the programme costs just 9.9% of the total funding costs. The implication for this is that communities can run the model at very minimal costs if they are supported with startup costs that account for much of the indirect costs. The details of the cost units for providing the SIHELI model were established as summarized in Table 1.

Table 1: *Unit Cost of Inputs to Support 1,800 Children in 3 Years*

SN		Uganda			Liberia			Ghana				
		Cost in USD in Yr 1	Cost in USD in Yr 2	Cost in USD in Yr 3	Cost in USD in Yr 1	Cost in USD in Yr 2	Cost in USD in Yr 3	Cost in USD in Yr 1	Cost in USD in Yr 2	Cost in USD in Yr 3	Total	%
	Direct Programme Costs	**103,143**	**61,788**	**27,960**	**137,556**	**97,356**	**25,680**	**96,136**	**82,936**	**16,900**	**649,455**	**43**
1	Personnel	6,720	6,720	6,720	3,600	3,600	3,600	3,040	3,040	3,040		
2	Direct delivery costs	62,595	21,240	21,240	62,280	22,080	22,080	27,060	13,860	13,860		
3	Direct training costs	33,828	33,828	-	71,676	71,676	-	66,036	66,036	-		
	Indirect Costs	**136,788**	**136,788**	**-**	**42,000**	**42,000**	**-**	**252,360**	**252,360**	**-**	**862,296**	**57**
4	Overhead costs	107,976	107,976	-	26,280	26,280	-	203,940	203,940	-		
5	Evaluation Costs	28,812	28,812	-	15,720	15,720	-	48,420	48,420	-		
	Total	239,931	198,576	27,960	179,556	139,356	25,680	348,496	335,296	16,900	**1,511,751**	**100**

Table shows that overall in the three countries, indirect costs take up the largest proportion (57%) of the total investment in early learning in the SIHELI model, while the direct programme costs only account for 43% of the same budget. The amount of money spent on overhead costs is similar to that spent on direct programme costs that account for 44% of the same budget.

At country level, during the first year of intervention, more funding is taken by Liberia as direct costs (137,556 USD), followed by Uganda (103,143 USD) and then Ghana (96,136 USD) to support five centres each. However, in the case of indirect costs, Ghana spends more (252,360 USD) followed by Uganda (136,788 USD) and then Liberia (42,000 USD).

Taking a closer look at direct programme costs, the study notes that higher costs is incurred in Liberia for trainings (71,676 USD), followed by Ghana (66,036 USD) and then Uganda (33,828 USD). However, in terms of direct delivery costs, Uganda spends more (62,595 USD) compared to Liberia (62,280 USD) and Ghana (27,060 USD). Most of the delivery costs, in the three countries are donations or in kind contributions that have been monetized. For example, parents bring actual food items, while some volunteer their labour.

In implementing the SIHELI model in Uganda, Ghana and Liberia, a number of cost drivers were identified. One of the major cost drivers in the initial stages of implementation was overhead costs. This was seen in all the three countries with such costs taking up to 43% of the total expenditure. The second significant cost driver is training costs that take up to 22% of the expenditures and then direct delivery costs at 19%.

At country level, away from the overhead costs, the main cost drivers are personnel and feeding costs. Feeding costs are highest in Uganda, followed by Ghana and then Liberia. However, when it comes to personnel, the costs are highest in Uganda followed by Liberia and then Ghana. It should be noted that, while these costs seem high, most of it is given in kind by communities, thus attracting limited physical charges to the centres. These costs are covered as part of community volunteering and charges levied on them by centre management.

During the implementation of the SIHELI model, one striking cost driver is the implementing agency overhead costs. This finding is in line with studies conducted in the USA that found overhead and administrative costs taking up between 23-32% of most project funding (Guarino, 2020). This is partly because the institutions that receive the funding have to remove up to 15% of the total funding as indirect costs. The second factor is that the implementers stay away from the implementing sites and have to move to remote areas that are up to 400kms away from the partners for the case of Ghana and Uganda. These costs were consistently high in Ghana first followed by Uganda and then Liberia. If such communities have to be supported with novel ideas that speak to their unique challenges, funders may have to continuously bare overhead costs.

Another significant cost driver is training costs that take up a large proportion of the expenditures is training. This is because new innovations require more people to be trained or oriented into the novel approach being proposed. Later, a lot of monitoring and support supervision has to be done to ensure that what is being implemented is being done with fidelity and avoid voltage drop.

Feeding has also been found to be a significant cost driver in these communities. However, most of the food items are donations from community members. While the actual costs are high if the donations are converted to monetary terms, the communities are happy to give freely depending on the level of mobilization and volunteerism spirit present in a given community.

Expenditure on personnel costs have also been found to be significant in driving costs in the model. Teachers and support staff have to be paid to render their services. This finding is in line with that of Murdiyaningrum and Perdana (2020), who found that teachers' salaries was one of the significant cost drivers for ECE in Indonesia accounting for 24%. Likewise, Van Ravens and Aggio (2008) notes that teachers' salaries are usually the main cost component in education in Arab states. Similarly, studies from USA also confirm that personnel costs represent the largest portion of programs' budgets of between 63-65% due to low teacher-to-student ratios for quality (Guarino, 2020). In comparison to other studies conducted in Uganda, UNICEF found that in providing early learning services, staff salaries alone accounted for over 90% of total education budgets compared to the costs of maintenance, renovation, and the construction of latrines (Genesis/Unicef, 2023).

However, the costs of paying teachers and other associated centre costs are always negotiated based on different factors that may vary from community to community. This is partly because of differences in what is provided as the minimum early learning package, enrollment, quality of services and price levels (Levin & Schwartz, 2006). Also, estimates of program costs can vary significantly, depending upon the timing of the cost assessment and the judgments made about which costs to include (Jones, Bierman, Crowley, Welsh & Gest, 2019). In the case of this study some of the factors that were influencing costs include:

Level of volunteerism: Communities that have active mobilization institutions like clan leaders, chiefs or local political leaders who are able to rally members to come

together for a common good usually inspire volunteering spirit. Once communities start to volunteer, they offer services freely without a commercial intention, thus significantly reducing costs of implementing a programme. For example, in all the three countries of this study, most parents were volunteering their labour as teachers or facilitators. This act, especially in Uganda reduced significantly costs of hiring teachers.

Seasonal changes: Livelihood of some communities is very much affected by seasonal changes. For example, during rainy seasons, food will be in abundance to be donated to centres. If a centre was to buy food in that season, the costs would be significantly low. However, during dry seasons, where there is food scarcity, centres struggle to buy food as parents fail to contribute. Also, if food is found, it will be very expensive, requiring more funds to buy less low-quality food. In the case of communities like in Ghana that may be nomadic in nature, movement from one place to another makes many essential commodities needed is school more costly.

Poverty levels of communities: Poverty levels of a given community greatly influence how much a family is willing to offer for a service that may not be perceived as urgent. In a situation of extreme poverty, some families struggle to survive, making expenditure on early learning to be a luxury. Thus, if a family is willing to offer any resource to the centre, it will be a very small amount that may not do much in the centre. Also, if they are to offer a service in the centre, they will ask for a very small fee. For example, in some communities' teachers will happily accept to be paid as low as 10 USD a month, while a support staff, usually parents may take as low as 5 USD a month. However, in the urban areas, the same teachers will take not less than 100 USD per month in the case of Uganda or 200USD in the case of Liberia.

Strength of a country's currency:

When comparing unit costs across countries located in different regions, as the case is in this study, one significant difference is variation in costs of the same thing across the countries. For example, the cost of feeding a child in Ghana in a centre in a month is estimated at 5 USD, while in Uganda and Liberia it stands at 3 USD. Also, the cost of offering training to parents in Uganda in the first year is 1,716 USD, the same training costs 3,396 USD in Ghana and Liberia respectively. The difference here comes from the strength of the country's currency against the US dollar. In this case, the Uganda shilling is much weaker with an exchange rate of 1 USD: 3,500 UGX. In the case of Ghana, it is 1 USD: 10.76 Ghanaian cedis, while for Liberia, it is 1 USD: 181.53 Liberian dollar. Thus, while in the USD dollar sense less is being spent in Uganda, the local people see it as a lot of money. So, the poor people in Uganda will consider the poor people in Ghana or Liberia as richer from their spending. In this case, if cost of providing early learning services will be significantly lower in Uganda compared to Ghana and Liberia.

***Availability of alternative inputs*:** Early learning centres established in communities that have alternative inputs that centres need is able to make choices depending on their costs. If for example, cassava and be replaced with sweet potatoes, it means that centres can opt for a cheaper option if they are available. Likewise, different providers in a given area will always try to reduce costs to a minimum to keep their clients. However, if there are not alternatives, costs start to hike to levels that may not be affordable to some learning centres.

***Job opportunities for teachers*:** In countries that have public employment for teachers who work with children in early years, finding teachers who may be willing to work in remote areas may be a problem. If one decides to go to such places, higher compensation may be required. However, in cases like in Uganda where there are no public early learning centres, early years teachers struggle to get employment. Thus, any available opportunity with minimum pay may be accepted as it is better than nothing. So, teachers in Uganda may be happy receiving 50USD a month, while it may be difficult for the same category of teacher to accept it in Liberia or Ghana where there are alternative public employment opportunities.

During the third year of implementation, if the indirect costs, evaluation and training costs are removed, the costs drop significantly. Ghana leads with lower costs of implementing the model in the third year by spending only 16,900 USD, followed by Liberia (25,680 USD) and then Uganda (35,040 USD). In that third year, the significant cost drivers are personnel salaries and children's feeding costs across the three countries as shown in Table 2.

Table 2: *Unit Cost Per Child Calculations for the 3 Years*

SN		Uganda			Liberia			Ghana			
		Cost in USD in Yr 1	Cost in USD in Yr 2	Cost in USD in Yr 3	Cost in USD in Yr 1	Cost in USD in Yr 2	Cost in USD in Yr 3	Cost in USD in Yr 1	Cost in USD in Yr 2	Cost in USD in Yr 3	Total
1	Direct Programme Costs	**103,143**	**61,788**	**27,840**	**137,556**	**97,356**	**25,680**	**96,136**	**82,936**	**16,900**	**649,455**
2	Indirect Costs	**136,788**	**136,788**	**-**	**42,000**	**42,000**	**-**	**252,360**	**252,360**	**-**	**862,296**
	Total	239,931	198,576	27,840	179,556	139,356	25,680	348,496	335,296	16,900	**1,511,751**
	Number of children benefiting	300	300	300	300	300	300	300	300	300	
	Unit cost per child	799.77	661.92	92.8	598.52	464.52	85.6	1161.65	1117.65	56.33	

Table 2 shows a higher unit cost per child (1,162 USD) in Ghana in the first year compared to about half spent in Liberia (598.52 USD) and Uganda (799.77 USD). The same unit costs reduce slightly in the second year when one off investment costs are deducted. However, the costs significantly reduce in the third year with the lowest unit cost being recorded for Ghana (56.33 USD) followed by Liberia (85.60 USD) and Uganda (92.8 USD). As noted earlier, the big differences arise from the nature of cost driver inputs. For example, while high costs come from indirect and training costs, in Uganda they come from direct programme costs which are recurrent.

In the SIHELI model, the unit cost per child was higher in the first year but were not uniform across the countries. To implement the model effectively, with a class size of 30 learners in each class working with 2 teachers, the model demanded a unit cost per child of 1,162 USD in Ghana in the first year, 598.52 USD in Liberia and Uganda 799.77 USD. However, the costs significantly reduce in the third year with the lowest unit cost being recorded for Ghana (56.33 USD) followed by Liberia (85.60 USD) and Uganda (93.2 USD). This unit cost in the case of Uganda is slightly above what was being proposed in 2018. At that time, it had been proposed that the per pupil expenditure should increase to USD 54.6 for Urban schools and USD 51 per year for rural schools from the current USD 8.4 that government is contributing (Uganda National Planning Authority, 2018). It is important to note that in the urban areas, especially within the private sector, fees for pre-primary students in Kampala range from USD 243 to USD 1,386 per year. In Nakapiripirt in Karamoja, parents pay from USD 4.05 in rural areas to USD 72 in rural urban areas. In Omoro district in northern Uganda, parents pay between USD 27 and USD 63 (Human Rights Watch, 2024). In Ghana, by 2014, the average cost of maintaining a child in pre-school was 38USD per month or 304 USD per year (Bidwell, Parry & Watine, 2014).

When we compare the units costs with other countries in the sub Saharan Africa, we note that the average per capita spending on ECD learners for countries in the SADC region is US$138, with Eswatini spending USD 217, Lesotho USD 109), South Africa USD 435 and Zimbabwe USD 392 being the lead when excluding infrastructure (Bhunhu, 2024). The situation, however, is different in developed countries who are investing significantly in early years learning. For example, O'Neill (2009) notes that in Europe, the estimated cost per youth of the IY programmes is a much more modest €1463 per youth.

Cost-Benefit Analysis

In order to estimate the cost benefit for this analysis, this study reviewed literature to establish key cost benefit areas for inclusion in the analysis. These included benefits that accrue from increase in expected years of schooling, savings from reduced repetition rates, better graduation rates, freed up primary caregiver time, healthcare uptake, tax revenue from working parents, reduced crime rate, social welfare benefits for the elderly and youth empowerment programmes.

Increase in expected years of schooling

Other studies, for example one done in Uganda concluded that one year of quality pre-primary education extended children's expected years of schooling in Uganda to an average of 7.2 years (Genesis, 2023), that is by 1.1 from the current average expected years of 6.1 years (NPA, 2019). This increase corroborates one suggested earlier by Engle et al (2011), who noted that the lower bound of 1.25 years increase in grade attainment per child enrolling in preschool is a good foundation for later learning. Currently, among children who had no pre-primary education in Uganda, 50% repeat primary grade 1 (Genesis, 2023). Thus, maintaining presence of children in pre-school promoted higher graduation rates of between 28% and 47% (Trefler, 2009) that in turn predicts higher rates of employment than high school dropouts.

Freed up primary caregiver time

Childcare has been seen as an area that takes up most time for women to do their work like their male counterparts. Some studies suggest that women with children younger than six years of age at home have an unemployment rate of 10.2% (Trefler, 2009). Unpaid time spent looking after 5–6-year-olds, carried out predominantly by girls and women, would reduce significantly as more children attend pre-primary education (Genesis, 2023). So, if there are initiatives that can provide care for such children in form of pre-primary education, such a service would free up to 15 hours of primary caregivers' time, which could be put towards income-generating activities (Bjorvatn, Ferris, Gulesci et al. (2022).

Health

We know that chronic illnesses, especially those arising from poor hygiene and sanitation, imparts a huge burden on families and on the economy. We also know that some of these diseases can be prevented by early childhood interventions. Studies already show that children attending pre-school education tend to practice improved hygiene and sanitation (Save the children, 2024). If 10% of the population is at risk of a chronic disease that is mitigated by early childhood interventions, and assuming that these interventions would reduce health care costs for the at-risk group by 25%, government health care expenditures would fall considerably by the same percentage (Trefler, 2009).

That can be part of the cost savings that accrue to the nation if we invest wisely in pre-school education.

Youth Programmes Capitalization, Violent crimes reduction and social welfare

Youth who are not empowered can be a ticking time bomb for uprepared nations. This is because they can be up for manipulation by self-seeking people and destroy the peace in a given country. Thus, most countries that have not invested well in supporting children's early education tend to spend more on youth, sometimes with limited success. At present, Liberia is spending USD 200 per year on each youth under the Youth service programme, while Uganda spends USD 300 under the Youth Livelihood Programme (MoGLSD, 2021). Ghana spends 180 Cedis (16.5 USD) per year. Compared to what could have been spent on the same youth in their early years to prepare them for the future, this is over-expenditure, with very limited success. Even after spending such amounts on the youth to support their livelihood programmes, some of them still engage in crime, leading to more expenditure. For example, in 2024, prison population in Liberia had reached 4,000 from 2,200 in 2020 (UNDP, 2024) with government spending USD 2 million, which dropped to USD 300,000 in 2020 (GAC, 2020). This implies an average spending of 909 USD per prisoner before 2020. In Ghana, government raised feeding costs to 5 Ghana Cedis or 166 USD per person per year (Myjoyonline, 2025), while in Uganda it is 1,080 USD per year (MoFPED, 2024). These are costs that can be avoided and instead turned into benefits that accrue to the nation if children have a good foundation in the early years. Similarly, the Uganda governments provide Social Assistance Grant for Empowerment (SAGE) by Ministry of Gender Labour and Social Development for the elderly who do not have means to support themselves. In Uganda, this is equal to 120 USD per person per year. In Ghana, it is between USD 768 per person per year under the LEAP project (Paa-Kwesi, 2019), while in Liberia, it is 29 USD or 348 USD per year (National Health Accounts Report, MOHSW, 2009).

Based on the above costs being incurred on different programmes arising from children who did not get adequate preparation for life in their earlier years, this study used the SIHELI model to calculate the future returns on investment, a Cost Benefit ratio and returns on investment in three years. Several cost areas were identified; likely costs were calculated based on current rates as guided by literature. The total benefits that accrue from the first-year investment in SIHELI, seen after 25 years when the beneficiaries start producing returns, is summarized in Table 2.

Table 3: Benefits for participation in ECE

SN	Cost Areas	Countries		
		Uganda	Ghana	Liberia
1	Cost of freed labour (Average income from work)	1,080 USD per family per year x 150 parents = 162,000 USD	3,972 per year x 150 parents = 595,800 USD	4,800 per year x 150 parents = 720,000 USD
2	Cost of class repetition	93.2 USD x 50% of 300 children likely to repeat = 13,980 USD	56.3 USD x 50% of 300 children likely to repeat = 8,445 USD	85.6 USD x 50% of 300 children likely to repeat = 12,840 USD
3	Cost of increase in years of school, more job years for teachers	93.2 USD x 1.25 years increased x 300 children in a class =34,950 USD	56.3 USD x 1.25 years increased x 300 children in a class =21,112 USD	85.6 USD x 1.25 years increased x 300 children in a class =32,100 USD
4	Savings accrue when more learners graduate and get higher paying jobs	28% of 300 children getting jobs that pay a teacher's salary of 150USD per month = 151,200 USD	28% of 300 children getting jobs that pay a teacher's salary of 275USD per month = 277,200 USD	28% of 300 children getting jobs that pay a teacher's salary of 200USD per month = 201,600 USD
5	Savings from health care	25% of 300 children who will be adults will take care of their families saving government 25% of 144 USD health expenditure on them = 10,800 USD	25% of 300 children who will be adults will take care of their families saving government 25% of 82 USD health expenditure on them = 6,150 USD	25% of 300 children who will be adults will take care of their families saving government 25% of 816 USD health expenditure on them = 61,200 USD
6	Savings from crime	25% of 300 families will have employed workers who are not easily diverted to petty crime to survive = 75 x 1,080USD per year (3 per day) = 81,000 USD	25% of 300 families will have employed workers who are not easily diverted to petty crime to survive = 75 x 166 USD per year = 12,450 USD	25% of 300 families will have employed workers who are not easily diverted to petty crime to survive = 75 x 909 USD per year = 68,175 USD
7	Savings from social empowerment for the elderly	25% of the 300 families will do without SAGE funds = 120USD x 75= 9,000 USD	25% of the 300 families will do without SAGE funds = 768USD x 75= 57,600 USD	25% of the 300 families will do without SAGE funds = 348USD x 75= 26,100 USD
8	Tax to government	25% of children will get taxable jobs i.e 300 people x 10% of a teacher's salary (150 USD) x 12 months = 13,500 USD	25% of children will get taxable jobs i.e 75 people x 10% of a teacher's salary (275 USD) x 12 months = 24,750 USD	25% of children will get taxable jobs i.e 75 people x 10% of a teacher's salary (200 USD) x 12 months = 18,000 USD
9	Families not covered under youth empowerment fund	25% of families will be better off and not in need of government support. 75 people x 300USD fund per year = 22,500 USD	25% of families will be better off and not in need of government support. 75 people x 16.5 USD fund per year = 1,237 USD	25% of families will be better off and not in need of government support. 75 people x 200USD fund per year = 15,000 USD
	Total	498,930 USD	1,004,744 USD	1,155,015 USD
	@ 5% discount rate	473,984 USD	954,506 USD	1,097,264 USD
	@ 8% discount rate	459,016 USD	924,364 USD	1,062,613 USD
	@14% discount rate	429,080 USD	864,079 USD	993,312 USD

Table shows Liberian beneficiaries will have the highest returns (1,155,015 USD), accounting for 643%, Ghana (1,004,744 US) 288%, while Uganda will have the least returns (498,930 USD) accounting for 263% after the 25 years based on the first year of investment in SIHELI. Cost benefit ratio for the three countries based on the first year of SIHELI intervention was also computed as summarized in Table 4.

Table 4: *Cost Benefit Analysis in USD in the first year of intervention*

	Costs in USD in the first year of intervention			**Benefit**			**Cost Benefit Ratio**		
	Uganda	Ghana	Liberia	Uganda	Ghana	Liberia	Uganda	Ghana	Liberia
Actual Cost	239,931	348,496	179,556	498,930	1,004,744	1,155,015	2.6	2.9	6.4
@ 5% discount rate	227,935	331,071	170,578	473,984	954,506	1,097,264			
@ 8% discount rate	220,737	320,616	165,191	459,016	924,364	1,062,613			
14% discount rate	206,341	299,706	154,418	429,080	864,079	993,312			

Table shows Liberia getting the highest cost benefit ratio of 6.4% on return on investment based on the first year SIHELI intervention. Ghana follows next (2.9%) and finally Uganda (2.6%). The same ratios are maintained after discounting costs and benefits at 5, 8 and 14%. Analysis of the cost benefit ratios were also done considering the third year of intervention costs and benefits. The results are summarized in Table 5.

Table 5: *Cost Benefit Analysis in USD in the third year of intervention*

	Costs in USD in the 3rd year of intervention			Benefit			Cost Benefit Ratio		
	Uganda	Ghana	Liberia	Uganda	Ghana	Liberia	Uganda	Ghana	Liberia
Actual Cost	27,840	16,900	25,680	688,320	1,004,744	1,155,015			
@ 5% discount rate	26,448	16,055	24,396	653,904	954,506	1,097,264	24.7	59.5	44.9
@ 8% discount rate	25,613	15,548	23,625	633,254	924,364	1,062,613			
@14% discount rate	23,942	14,534	22,084	591,955	864,079	993,312			

Table shows Ghana receiving the highest Cost benefit ratio (59.5%) returns on investment after the third year of intervention, overtaking Liberia when the children in this SIHELI cohort graduate and get jobs after 25 years from now. Liberia comes next with 44.9%, while Uganda follows with 24.7%.

Cost Benefit Analysis has been done to show the magnitude of benefit that can accrue for every dollar invested in pre-school programmes that should interest any authority to give preferential treatment for investment in it. This study joins a list of many others trying to bring to light the need to urgently invest in early learning because of the established benefits. It shows that Liberian beneficiaries will have the highest returns (1,155,015 USD), accounting for 6.43, Ghana (1,004,744) translating to 2.88, while Uganda will have the least returns (498,930 USD) accounting for 2.63 after the 25 years based on the first year of investment in SIHELI. Other similar studies had found that generally, more benefits accrue for every dollar invested in early learning. A study conducted in Malawi showed a benefit-cost ratio (BCR) of 4.5 in the base case with a discount rate of 8% for an intervention in pre-school education (National Planning Commission, 2021), the LOGSE reform project in Spain found a benefit–cost ratio of about 4.3, signifying that for every dollar invested in ECEC, society gets back more than $4 (van Huizen, Dumhs & Plantenga, 2017).

Beyond the Cost Benefit Ratio, we also find that there are other spillover effects that arise as a result of the investment in the programme. For example, being community-based initiatives, many community members got employment as teachers, construction workers, food vendors, and casual laborers. Other benefits included being trained in livelihood programmes, savings and parenting that helped them to invest better and gain more than we have been able to quantify. This finding agrees with other earlier studies elsewhere that also found other benefits that accrue in the name of a drop in repetition rates. For example, they found that every year of investment in pre-school resulted in a drop in repetition rates in the primary school by 0.12 percentage points in 24 Sub-Saharan African countries (Jaramillo & Mingat, 2008). Based on this association, exposure to an African pre-school reduces repetition rates by 12.3 percentage points relative to no pre-school, implying a reduction in years at schooling of 0.98 years, without any loss of grade attainment (National Planning Commission, 2021). This finding also aligns well with that of Engle et al. (2011), who found that investment in pre-school across 73 low-and-middle income countries boosted grade attainment of between 1.25 to 2.0 years.

5. Conclusion and Recommendations

5.1 Conclusion

In physical terms, at first glance, the cost of implementing SIHELI is slightly higher than other similar programmes in the participating countries in rural and not urban areas. This is partly due to the nature of package of support services provided. However, the assurance of sustainability promised by the additional support services is the game changer. While other models may claim lower costs, many of them are not easily sustained, leading to greater wastage.

The broad range of beneficiaries supported by SIHELI at the same cost, ranging from children, family members, community members, teachers, caregivers, education officials at system level is worth every fund being spent. This socio and eco cultural wide support system breed far reaching benefits that outweigh the costs, justifying investing in such models.

Teacher or caregiver salaries remain the biggest cost driver across communities in the three countries, with Ghana showing the highest rate followed by Liberia and then Uganda. Initiatives that will focus on supporting these communities to deliver early learning needs to focus on teachers' salaries as a relief to the communities.

Liberia had a higher Cost Benefit ratio for the investment in early learning compared to Ghana and Uganda. The different could be seen from the nature of the countries, being a lower income country compared to Ghana and Uganda. The implication is that we tend to see higher CBR accruing for poorer communities as compared to middle income countries.

5.2 Recommendations

Governments

Both local and national governments where this model is being implemented have the opportunity to try out a hybrid model grounded in local realities. It is recommended that more opportunities are provided for communities to experiment in their context without over restricting them to western based standards that may subdue the innovation.

Development partners

Facilitation of teachers or caregivers who work with children in home-based centres remain the most crucial cost driver to resources communities collect. Any support that can be given in this line will lighten the burden communities currently face in providing sustainable early learning to their children.

This study demonstrates that more benefits accrue from investing in poorer communities than in more affluent ones. It is recommended that more investment should be channeled to target such communities to support early

learning in such communities as a way of helping them come out of their current situations.

The SIHELI model has demonstrated what can accrue when we invest in early learning in marginalized communities. It is recommended that development partners can use the model as part of a scale up initiative to support communities that badly need it for their children.

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SIHELI YEARLY COSTS

SN	Cost	Uganda					Liberia					Ghana				
		Number of beneficiaries	Unit Cost (USD)	Total Cost in Year 1 in USD	Total Cost in Year 2 in USD	Total Cost in Year 3 in USD	Number of beneficiaries	Unit Cost (USD)	Total Cost in Year 1 in USD	Total Cost in Year 2 in USD	Total Cost in Year 3 in USD	Number of beneficiaries	Unit Cost (USD)	Total Cost in Year 1 in USD	Total Cost in Year 2 in USD	Total Cost in Year 3 in USD
A	**Direct Programme Management Costs**		2,407.00	124,008	68,868	35,040		3,417	137,556	97,356	25,680		2,671	96,136	82,936	16,900
i	**Personnel**		**42**	**6,720**	**6,720**	**6,720**		**35**	**3,600**	**3,600**	**3,600**		**28**	**3,040**	**3,040**	**3,040**
a	Teachers' salaries	10	17	2,040	2,040	2,040	10	15	1,200	1,200	1,200	10	13	1,040	1,040	1,040
b	Parent teachers	20	14	3,360	3,360	3,360	20	10	1,600	1,600	1,600	20	10	1,600	1,600	1,600
c	Support staff salaries	10	11	1,320	1,320	1,320	10	10	800	800	800	10	5	400	400	400
ii	**Direct Delivery Costs**		**235**	**21,120**	**21,140**	**21,120**		**251**	**22,080**	**22,080**	**22,080**		**56**	**13,860**	**13,860**	**13,860**
a	Stationary	5	29	1,740	1,740	1,740	5	18	1,080	1,080	1,080	5	5	300	300	300
b	Cleaning materials	5	14	840	840	840	5	50	3,000	3,000	3,000	5	6	360	360	360
c	Utilities (water & Electricity)	5	6	360	360	360	5	80	4,800	4,800	4,800	5	2	120	120	120
d	Firewood/Gas/Fuel	5	6	360	360	360	5	20	1,200	1,200	1,200	5	8	480	480	480
e	Furniture	5	6	360	360	360	5	30	1,800	1,800	1,800	5	20	1,200	1,200	1,200
f)	Feeding costs	300	3	7,200	7,200	7,200	300	3	7,200	7,200	7,200	300	5	10,800	10,800	10,800
g	Maintenance	5	171	10,260	10,260	10,260	5	50	3,000	3,000	3,000	5	10	600	600	600
2	**Direct Training Costs**		**1,211**	**33,828**	**33,828**	**-**		**2,461**	**71,676**	**71,676**	**-**		**2,367**	**66,036**	**66,036**	**-**
a	Education officers support visits	1	143	1,716	1,716		1	283	3,396	3,396		1	283	3,396	3,396	
b	Parents' training	1	143	1,716	1,716		1	283	3,396	3,396		1	283	3,396	3,396	
c	Centre Management Committee Meetings	1	189	2,268	2,268		1	339	4,068	4,068		1	339	4,068	4,068	
d	Teacher capacity building	1	191	2,292	2,292		1	339	4,068	4,068		1	339	4,068	4,068	
e	Special Needs Education Periodic Assessment	1	143	1,716	1,716		1	339	4,068	4,068		1	339	4,068	4,068	
f)	Parents' meeting	5	200	12,000	12,000		5	339	20,340	20,340		5	190	11,400	11,400	
g	Play materials maintenance	5	30	1,800	1,800		5	339	20,340	20,340		5	339	20,340	20,340	
h	Livelihood grants	5	172	10,320	10,320		5	200	12,000	12,000		5	255	15,300	15,300	
3	**Centre establishment**		**919**	**55,140**	**-**	**-**		**670**	**40,200**	**-**	**-**		**220**	**13,200**	**-**	**-**
a)	Land acquisition	5	171	10,260			5	0	-	-	-	5	0	-		
b)	Centre construction/Renovation	5	571	34,260			5	300	18,000			5	150	9,000		
c)	Centre registration	5	35	2,100			5	20	1,200			5	20	1,200		
d	Toilet construction	5	142	8,520			5	350	21,000			5	50	3,000		

C	**Indirect Programme Management Costs**		**9,169**	**136,788**	**136,788**	**-**		**2,780**	**42,000**	**42,000**	**-**		**19,589**	**252,360**	**252,360**	**-**
	Indirect Costs		**8,198**	**107,976**	**107,976**	**-**		**1,790**	**26,280**	**26,280**	**-**		**16,499**	**203,940**	**203,940**	**-**
	Programme design	1	285	3,420	3,420		1	700	8,400	8,400		1	375	4,500	4,500	
	Personnel	1	5142	61,704	61,704		1	190	2,280	2,280		1	12000	144,000	144,000	
16	Advocacy drives	5	200	12,000	12,000		5	100	6,000	6,000		5	124	7,440	7,440	
	Overhead costs	1	2571	30,852	30,852		1	800	9,600	9,600		1	4000	48,000	48,000	
11	**Evaluation Costs**		**971**	**28,812**	**28,812**	**-**		**990**	**15,720**	**15,720**	**-**		**3,090**	**48,420**	**48,420**	**-**
a)	Research assistants	6	286	20,592	20,592		9	40	4,320	4,320		6	115	8,280	8,280	
b)	Tool development	1	114	1,368	1,368		1	120	1,440	1,440		2	370	8,880	8,880	
c)	Data collection, analysis and validation	1	143	1,716	1,716		1	100	1,200	1,200		1	800	9,600	9,600	
d)	Report writing	1	143	1,716	1,716		1	70	840	840		1	550	6,600	6,600	
e)	Research dissemination	1	171	2,052	2,052		1	330	3,960	3,960		1	730	8,760	8,760	
f)	Research publication	1	57	684	684		1	100	1,200	1,200		1	295	3,540	3,540	
g	Research validation	1	57	684	684		1	230	2,760	2,760		1	230	2,760	2,760	
	Total cost	**400**		**253,596**	**198,476**	**27,840**	**300**		**179,556**	**139,356**	**25,680**	**300**		**348,496**	**335,296**	**16,900**