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Social Return on Investment: A Cost-Benefit Analysis of the HIV Integrated Care and Prevention Programs in Cambodia

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Abstract Background: KHANA's HIV Integrated Care and Prevention (ICP) project provided comprehensive care and support to HIV-affected communities through home and community-based care teams from 2007 to 2011. The aim of this study was to use Social Return on Investment (SROI) methodology to evaluate the social, health, and economic impacts of the ICP project, enabling the calculation of a ratio cost-to-benefit for the community in terms of HIV care, support, and treatment. **Methods:** The SROI methodology is a social cost-benefit analysis framework that measures and accounts for the values created by a program or series of initiatives. Values were mapped to common outcomes of the project, which were defined by key beneficiaries during a community consultation exercise. Five stages were used to calculate the SROI: establishing scope and identifying key stakeholders, mapping project outcomes, assigning a financial value to project outcomes, establishing project impact, and calculating inputs. **Results:** A combined five-year investment of approximately US\$2,406,000 from the European Commission (EC), plus US\$1,957,934 from the World Food Programme (WFP) and community inputs, generated total benefits worth US\$10,894,835, after adjusting for the discount rate and Purchasing Power Parity (PPP). Monetized outcome values ranged from \$30, avoided cost of informal school fees paid by orphans and vulnerable children (OVC), to \$1,200, avoided burden of debt and asset loss caused by health costs prior to diagnosis. Beneficiaries gaining the most outcome value were people living with HIV (PLHIV), OVC, and their families (food security outcome 51% of total value, PLHIV 32%, and OVC 9%). The Return on Investment (ROI) was 1:2—every \$1 invested in the ICP generated a return of approximately \$2 worth of social, health, and economic value. **Conclusions:** The ICP program yielded substantial impacts in food security, wellbeing, improved health, and improved productive capacity, which enabled greater economic returns for the households. Results of this study have been used to inform project management, implementing partners, and policy-makers to further explore areas of benefit for PLHIV, OVC, and their families.

Keywords: cost-benefit analysis, integrated care and prevention, HIV, SROI, Cambodia

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1. Introduction

HIV and AIDS have remained a public health concern since the beginning of its epidemic [1,2]. With approximately 37 million people currently living with HIV, the disease creates a serious socioeconomic problem, with medical and treatment costs accounting for a large percentage of the economic burden [3,4,5]. Costs of implementing programs is another heavy burden—UNAIDS estimated that US\$20.2 billion was spent on HIV programs in 2014,

US\$8.64 billion of which were from international investments, a 2% increase from 2013 estimates [6]. Although the rates of new HIV infection has been declining due to significant improvements in interventions and treatments, these estimates from UNAIDS suggest that health expenditures are expected to continue to increase, indicating a need for greater allocation of resources in HIV programs worldwide [6].

Many studies have attempted to demonstrate the impact of community-based HIV prevention, treatment, and support programs on prevention, care, and treatment outcomes in different populations. In Rwanda, a

community-based program on intensive treatment support for antiretroviral therapy (ART) proved successful in retaining low rates of mortality of people living with HIV (PLHIV) [7]. Haiti's nationwide HIV prevention programs, which focused on improving knowledge, safe sex practices, and access to condoms, have contributed to significant declines in HIV prevalence among their general population [8]. In Cambodia, the 100% condom use program has greatly slowed its HIV epidemic; by 2014, HIV prevalence in the general population had fallen to 0.28% from a peak of over 2% a decade before [9,10]. Outstanding national leadership and commitment was recognized through the Millennium Development Goal (MDG) Award in 2010, when Cambodia reached its universal access target for ART, and halted and started to reverse the spread of HIV [11].

Cambodia's success in reducing its HIV prevalence now enables the focus to shift to ensuring the most effective use of resources, whilst maintaining a strong impact at the national level. KHANA, the largest national, non-governmental organization (NGO) providing HIV prevention, care, and support services in Cambodia, has been committed to community health and development issues. In 2007, KHANA implemented a European Commission (EC) supported HIV and AIDS program with two main program components: Focused Prevention (FP) for key populations, including female entertainment workers, men who have sex with men, transgender women, and people who inject drugs, and Integrated Care and Prevention (ICP) for PLHIV and orphans and vulnerable children (OVC). The ICP project supports groups of PLHIV and OVC families to establish savings groups, using a village saving scheme model similar to those introduced by CARE International and other organizations [12]. Through the ICP component, KHANA provided community-based care and support, and have taken a holistic approach to the varied needs of individuals and communities by facilitating access to HIV care and treatment, providing socio-economic support to PLHIV, OVC and their families, and reducing stigma and discrimination in the communities [13].

However, with the major efforts and investments to reduce HIV globally, the importance of "value for money" has been increasingly recognized by the development sector in national and donor agendas, as upwards and downwards accountability and effective use of resources becomes more transparent. Most impact-evaluation studies have not included cost-benefit analyses of HIV intervention programs to include the social impacts of the programs on its population. To address this issue, the International HIV/AIDS Alliance adapted and simplified a Social Return on Investment (SROI) methodology for use at the community level. SROI is a form of cost-benefit analysis that evaluates the social, health, environmental, and economic impacts of a program in order to monetize program outputs and outcomes, which may otherwise be difficult to quantify [14,15].

India and Zambia, part of the International HIV/AIDS Alliance, have used the SROI methodology to assess the social and economic impacts of their community-based HIV intervention programs with promising results. A pilot study of the Alliance India's OVC home-based care and support program (CHAHA) found their SROI ratio to be 1:4.0 based on their work in Maharashtra State, meaning

for every \$1 invested into the CHAHA program, there would be a generated \$4 return of social, health, and financial value [16]. The Alliance Africa's Regional Program Phase 2 (ARP 2) partner capacity building and anti-stigma working with PLHIV found their program's SROI ratio to be 1:21.20 in Mumbwa and 1:13.75 in Mazabuka [17].

KHANA has applied the SROI methodology to its ICP project to determine the value generated by the program through social, health, and economic support it provides. The SROI study was the first of its kind conducted in Cambodia—it is a timely and relevant study that uses an applicable approach in line with the donors' current emphasis on cost-efficiency and effectiveness, value for money, and "doing more with less" in terms of cost-benefit. The objective of this study is to use the SROI methodology to assess costs, benefits, and impacts of the ICP project on community-based responses to HIV prevention, care, and treatment in communities reached by the program.

2. Methods

The SROI methodology is a participatory, beneficiary-led approach that measures and accounts for the values created by a program or series of initiatives [14,15]. Values, defined by the program beneficiaries themselves during community consultation exercises, were mapped to common outcomes of the project, as outlined by the SROI methodology guide. Stories of change (i.e. participants' living and health conditions) were captured during the discussions.

At first, consultative workshops and key informant interviews (KIIs) using a guided focus group discussion (FGD) approach, involved a total of 134 participants recruited through convenience sampling, and were representatives of the program's target population: 62 PLHIV, 62 OVC caregivers, two village chiefs, four community service volunteers (CSVs), three project staff, and one health center staff. The FGDs allowed the research team to identify the most common and relevant outcomes of the ICP project. Questions and guidance for the FGDs were discussed at an initial briefing between research, monitoring, and finance staff at KHANA.

Secondly, the research team examined the extent to which the outcomes had been achieved by mapping the beneficiary-defined outcomes against relevant indicators collected in the end-line evaluation. During the SROI research period, KHANA also conducted an end-line survey for the ICP project to capture outcome changes across a range of indicators. Data collection for the end-line evaluation took place in November and December 2011 in three provinces of Cambodia, and was based on more than 1,600 interviews. For the ease of logistical planning and time constraints, the research team conducted the beneficiary consultations in one province that was already being covered by the end-line evaluation.

For this study, five stages of the SROI process were generated for analyses: (1) identifying key stakeholders; (2) mapping project outcomes using theory of change; (3) identifying common outcomes and proxies; (4) establishing project impact; and (5) calculating inputs to the project.

Key stakeholders in the ICP community-based care and support component were identified, and a decision was made over whether to include them in the analysis (Table 1).

2.1. Identifying Key Stakeholders

Table 1. Stakeholders Included in the SROI analysis

Stakeholder	Involvement with ICP project	Rationale for inclusion	Method of engagement
PLHIV	Main target beneficiary, supported by CSVs	Included as main target beneficiary	End line evaluation survey Community consultation
OVC	Main target beneficiary supported by CSVs, supported to continue in schooling both materially and through counseling and self-help groups sessions. Food support. Skills development.	Included as main target beneficiary	End line evaluation survey Community consultation
Caregivers	Provide significant time and support to PLHIV as family members. Support OVC.	Included – time inputs captured	Community consultation National social economic impact report
Community Service Volunteers (CSV)	Focal points for delivery of community services providing basic health care, psychosocial support, referral services for PLHIV, OVC and families.	Included with PLHIV as key service providers	End line evaluation survey Community consultation
Wider community	Receive IEC prevention activities from partner organizations and anti-stigma awareness. Some have access to the revolving loan scheme. Referred for VCCT.	Included in analysis to test the potential value generated through VCCT early referral and PMTCT	N/A
Health service - health center level	Accept referred individuals from CSVs for care and treatment, VCCT	Benefit from greater outreach by CSVs to affected communities (not included here is the actual cost to the health center of this additional staff time)	N/A Key Informant Interviews to inform re. issues
Health facility – operational district (referral hospital)	Administer ARVs, conducts regular testing of CD4 and viral load, VCCT	Included - we have estimated one CSV is equivalent to 0.33 of a junior health service staff member. The project helps the center meet its ART and VCCT targets through referrals, benefits captured at the health center level.	N/A

Abbreviations: PLHIV, people living with HIV; OVC, orphans and vulnerable children; CSV, community service volunteers; IEC, information, education, and communication; VCCT, voluntary confidential counseling and testing; PMTCT, prevention of mother to child transmission; ARV, antiretroviral therapy.

2.2. Mapping Project Outcomes Using Theory of Change

The relationship between the project activities, outputs, outcomes, and impact were assessed using the theory of change and represented through impact maps. Mapping project outcomes showed how a series of programmatic activities of community action on HIV prevention, care, and impact mitigation could lead to tangible positive and negative changes in the lives of beneficiaries.

The impact maps were reconstructed with the inputs from the beneficiary consultations. Beneficiaries were consulted in groups of about 15 respondents. KHANA's secondary qualitative research from the baseline and mid-term reviews of the ICP project were also instrumental in informing and framing the outcomes from the perspective of beneficiaries, allowing a better understanding of outcome-level changes in their lives [18].

2.3. Identification of Common Outcomes and Proxies

Common outcomes, indicators, and financial proxies of the ICP project were identified for each beneficiary group (Table 2). A financial proxy is a means of placing a financial value on a non-financially related outcome [14,15]. As of yet, there are few financial proxy data banks in developing countries.

A list of 18 emerging outcomes was identified for the beneficiaries as the unit of analysis. Note that not all outcomes identified in Table 2 were used towards the end calculation of the SROI ratio.

2.4. Establishing Project Impacts

The SROI approach allowed researchers to isolate the impact of a particular activity on the project outcomes. To do this, the research team analyzed the outcomes by measuring a) attribution, b) deadweight, and c) drop-off [15].

- **Attribution** - an assessment of how much of the outcome was caused by the contribution of others (organizations or people): “who else contributed and what is their claim in achieving the outcome?”
- **Deadweight** - a measure of the outcome that would have happened *even if the project activity had not taken place*. This determines the percentage of the outcome that would have happened without any intervention.
- **Drop-off** - measures the effect of an outcome after the project has finished; i.e. the value that is forecast to continue for a period of time into the future. For example, when the ICP project ends, it is likely that some of the benefits realized through the income generating activity (IGA) will continue, meaning that the drop-off estimate would be low for this outcome.

2.5. Calculating Inputs-investments to the ICP program

Resources invested into the ICP included the direct program budget, complimentary food support from the World Food Programme (WFP), and economic costs

captured within the community (i.e. self-help groups, caregivers, volunteers, and opportunity costs).

The WFP monthly food support for vulnerable PLHIV and OVC households covered 30 kg rice, 1 kg cooking oil, and 0.5 kg iodine salt.

The ICP budget accounted for 73% of the total EC budget of US\$3,295,741, and covered staff costs, equipment and supplies, administrative costs, travel, training, and sub-grants to implementing partners.

Table 2. Outcomes, indicators, and financial proxies of each beneficiary group

Beneficiary	Outcome description	Indicator	Financial proxy	Comments
PLHIV	Improvement in family wellbeing and protection of key assets	% reporting the need to sell key assets in the past year	Sale of key asset: rice field	Severe family and personal stress was reportedly are being caused by the need to sell key assets such as rice fields, farms and vehicles.
	Higher level of self esteem	% reporting higher levels of confidence/self esteem	Cost of sessions with a health service counsellor	The average salary of a health service staff member of a grade that would provide counselling is \$800 per month, an hourly rate of \$5. We used an estimate of 2 one-hour sessions per month, which works out at \$120 per year.
	Better health status and appetite	% receiving ART, OI, TB treatment through HCBC team reporting improved health	Average rate for day labour for farming, construction and factory work and number of days of work/year	Through access to a referral system and ultimately ARV, OI treatment, and TB treatment support, health is improved and therefore there is an increased ability to work. However, the health status of some PLHIV remains unpredictable, making it difficult for them to seek permanent, regular, paid employment, establishing a threshold limit to their earning potential. We estimated the proxy to be \$439 per year, which represents an average harvesting/construction salary and factory work at \$3.75/day x 30 days x 3 months per year (harvest season only).
	Better livelihood prospects through IGA loans	No. of people who have been trained and used a loan for an income generating activity	Average amount of income gained through a typical IGA	Note this is different from the income gained for day labouring above. Please refer to the case study box for typical IGA projects supported. The average value generated per year was \$420.
	Better livelihood prospects through access to credit (SHG)	No. of people accessing microfinance credit for small business through self-help groups	Average amount of income that can be generated through establishing a small business	KHANA's household economic livelihoods survey 2010 estimates profits from small scale business ventures that result from self-help group loans is approximately \$18.13/week, or \$870/year.
	Increased level of debt	No. of failed IGAs	Repayment amount of loan with interest	Cases have been reported of failed schemes that have resulted in families going deeper into debt. This is a negative value created by the programme. In consultation there were clearly some cases of IGA projects failing after a brief period (the loss of livestock from death, pigs in particular). Individuals and families mentioned going further into debt as a result of trying to save the situation. This is particularly the case for the very poor households. More will be said about this in a case study and the recommendations. It has not been possible to ascertain the numbers of beneficiaries that this is true for, but it was felt important to note in the report.
Caregivers for PLHIV	Inability to access Government poverty card – Equity Fund	Est. number of PLHIV qualifying for card	Value of services provided freely by card	Negative value It was reported that some PLHIV were not thought to be eligible by the village head as they already had access to NGO support, even if they were from the poorest households.
	Greater ability to earn wage resulting from reduced hours of care giving	Est. percentage of caregivers in PLHIV family able to generate additional income	Increase in average yearly income	The socioeconomic impact of HIV at the household level in Cambodia report by the National AIDS Authority (2010) states that in rural situations caregivers' wage earning capacity drops by \$15/month when a household member is diagnosed with HIV.
PLHIV/OVC	Less stress and greater peace of mind in relation to food security	No. reporting food support helping them with their families' daily living	Average consumption over a year (balanced basket Cambodia) ³	Consumption (person/year) - 150 kg of rice - 30-35 kg of vegetables - 8 kg of pork - 6.5 kg of poultry - 3 kg of beef - 50-53kg of fish (FAO)
OVC	Greater feeling of positivity and well-being	% OVC reporting they rarely felt despair or depression in the past month	Cost of sessions with a health service counselor	The health service counselor is paid \$800 on average per month. This works out to an hourly rate of approx \$5 per hour.
	Better health status and appetite	% of infected children receiving ART through facilitation and support of HBC team	Reduced cost of medical attention required for children on ART vs. those not on ART	Socio economic impact 2010 data reports the average cost of drugs (not including ART) for children is \$6.97 per month and \$3 for transport for HIV-affected households. We estimate that children on ART are less likely to have to attend medical services for treatment (saving 1 appointment per 3 months), making an average of 4 visits per year.
	Improved life chances	% decrease OVC	Difference in earning	OVC at times are required to stop their schooling in

	through decrease in level of school drop outs and improved chance of completing studies	reporting they have temporarily stopped school to earn money in the past 6 months	power of someone with secondary level vs. uncompleted education (skills based employment vs. non skills based)	order to help support the family. This can be due to poor health of caregivers/parents due to HIV who are unable to work through prolonged periods of illness. The financial proxy has to be based on national employment statistics - the difference in average annual salary of a junior Government worker and a day laborer is \$720 - \$358 / year.
	Reduced vulnerability of OVC and avoidance of school difficulties (with teachers) due to status of self and family	% reporting experience school difficulties	Avoidance of average informal fees paid by school children per year	Corruption is rampant, to the extent that school children often have to pay "additional fees" to teaching staff. Through the interventions of NGOs, OVC are generally exempt from this.
OVC households	Better livelihood prospects through IGA	No. of OVC households supported with successful IGA loans	Average amount of income gained through a typical IGA	Note this is different from the income gained for day laboring above. Please refer to the case study box for typical IGA projects supported. The average value generated per year, regardless of the IGA activity, was \$420.
	Better livelihood generation	People accessing PLHIV revolving loans at a lower interest rate	Difference in cost of loan from commercial sector compared to revolving fund	
	Avoidance of health costs resulting from late diagnosis	No. of referrals for VCCT services found to be positive	Avoided burden of debt and asset loss caused by health costs prior to diagnosis, yearly spend	NCHADS second comprehensive report 2010 on HIV prevention and care program states Q2 prevalence rate amongst those attending VCCT to be 0.3% Est. people presenting for late diagnosis would spend an average of 2 years with undiagnosed sickness, seeking medical attention. A conservative figure would be a spent of \$100 per month in treatments that is often paid for through loans, or the sale of family assets, such as rice fields, cattle, motorbike, etc.
Wider community	Avoidance of HIV transmission MTC	No. of avoided cases of HIV infection in infants resulting from PMTCT uptake	Cost benefit of avoided cases of CLHIV, cost per year - estimate	There is a 0.03 chance of a mother being HIV positive = $0.03 * 2599 = 78$ positive mothers. PMTCT reduces the risk of MCT from 30% to 15% therefore $0.15 * 78 = 11.7$ infected children avoided. Est. risk of a child being HIV+ from its mother is 30% WB, with PMTCT reduced to 15%. 15% of 78 infected mothers = 12 children avoided infections. Savings in cost based on 2010 prices = hospital inpatient costs $0.3 * 12 * \$82$ + inpatient costs $12 * 5$ episodes x \$8. However, the cost saved for the health service from HIV cases averted of xx may represent more realistic value
Health center	Increased use of services	No. of community service volunteers referring xxx people to health center	Cost of equivalent of 2 junior health service staff per health center	Est. cost of health staff \$60 x 12 months = \$720
Ministry of Health	Decrease in financial burden to health services of untreated PLHIV	Average number of OI episodes requiring treatment per PLHIV untreated	Average cost per person to health service of treating OI episodes	Home-based care was developed to provide HIV/AIDS care services, which reduce the burden on public health care facilities and provides a broad package of medical, psychological, and social support services to PLHIV and their families. No. of people accessing and adhering to ART – this assumes these people would have significant health problems if they were not on ART.

Abbreviations: PLHIV, people living with HIV; ART, antiretroviral therapy; OI, opportunistic infections; TB, tuberculosis; HCBC, home and community based care; IGA, income generating activity; SHG, self-help group; NGO, non-governmental organization; FAO, Food and Agriculture Organization; OVC, orphans and vulnerable children; ART, antiretroviral therapy; HBC, home based care; VCCT, voluntary confidential counseling and testing; NCHADS, National Center for HIV/AIDS, Dermatology, and STDs; Q2, quality 2; MTC, mother to child; PMTCT, prevention of mother to child transmission; CLHIV, children living with HIV; WB, The World Bank.

2.6. Financial Assumptions and Variables Used for the Model

Financial proxies of the ICP outcomes were adjusted with a discount rate and Purchasing Power Parity (PPP) to take into account any changes (positive or negative) in the value of money over time.

The net present value (NPV) accounts for the value of money over time and includes inflation and a comparable return. When calculating the present value of an investment or input, the NPV uses a rate that discounts the cost of capital and deducts the sum from the investment level (i.e. discounting). A positive result would indicate a

good investment in financial terms. There is no specific discount rate for evaluation of health projects in Cambodia. For this study, a discount rate of 5.3% was applied to all projected benefits for sensitivity analysis. This rate was used for two premises. First, according to the Cambodia Central Bank, a discount rate for general commodities was 5.25% in 2007 [19]. Second, for impact evaluation of health issues, a discount rate could range between 3% to 7% for sensitivity tests [20]. Thus, we approximated the discount rate of 5.3% to compute social return in our study.

The net present value was converted to its international dollar equivalent using a GDP-based PPP rate of 2.58, according to the trade economics Cambodia PPP rate conversion factor in 2010 [19].

2.7. SROI Analysis

The SROI model estimated values generated by the ICP program over the 5-year project period through the steps above. Amounts were converted from Cambodian riels into international units. The return on investment (ROI) was calculated by dividing the total value generated with the total investment.

2.8. Sensitivity Analysis of the Model

Uncertainties may occur in models where variables are not known with exact precision, and where the relationship between inputs and outcomes are not straightforward (e.g. human behavior and interaction, wellbeing, support). Therefore, to test the robustness of the SROI model, financial proxies, attribution, and drop-off were used to assess the sensitivity of the economic model.

2.9. Ethical Considerations

This study was approved by the National Ethics Committee for Health Research, Ministry of Health, Cambodia (Reference no.169 NECHR). Participants provided written informed consent after a detailed description of the study objectives and procedures were provided. They were also informed that participation in the study was voluntary, and they could refuse or discontinue their participation at any time for any reason.

Participants received food and personal items such as soaps equivalent to \$1.25, as compensation for their time. Transportation supports were provided to those who needed it. Removing all personal identifiers and using code numbers ensured participant confidentiality.

3. Results

3.1. The SROI Ratio and Breakdown of Value

The SROI for the ICP project, after accounting for the total inputs invested into the program, was an additional 96% on top of returns—for every \$1 invested, \$1.96 was generated in social, health, and economic value. In other words, a combined investment of approximate US\$2,406,000 from the EC plus US\$1,957,934 (WFP and community inputs) generated total benefits worth US\$10,894,835, after adjusting for the discount rate and PPP.

The SROI model shows that the proportion of value created varies considerably according to beneficiary type (Figure 1). An unexpected value generated for caregivers of PLHIV (2%), came about in possible two ways: (1) through the opportunity to return to productive work, as the burden of caring for PLHIV in the household was reduced due to health gains; and (2) through the opportunity to support and take better care of family members, and the opportunity to be supported by the ICP program.

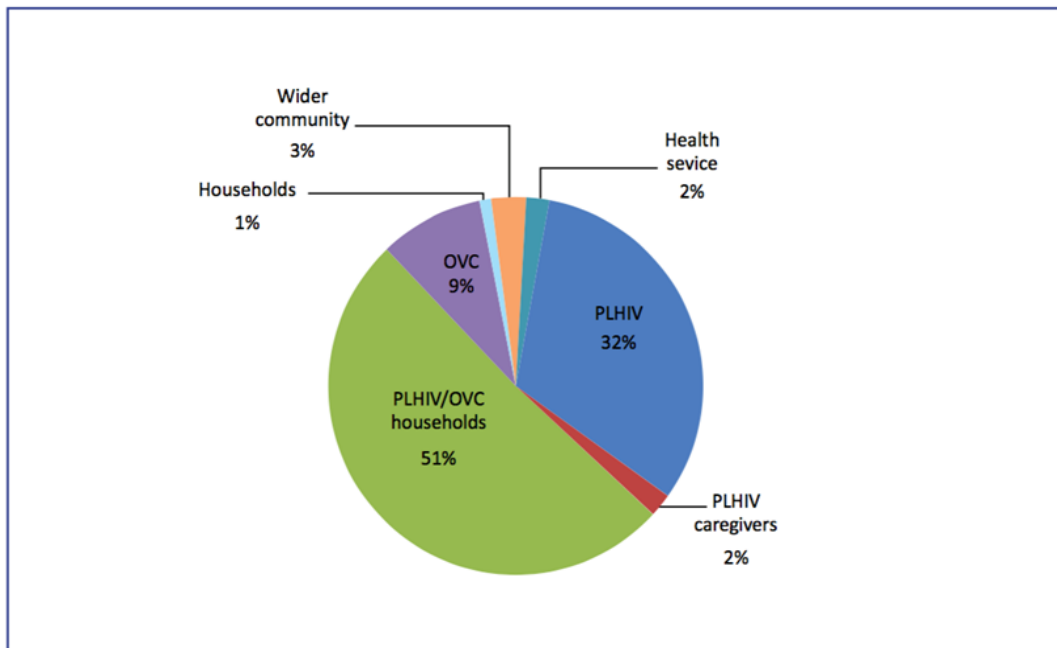


Figure 1. Proportion of value created according to beneficiary type

Abbreviations: PLHIV, people living with HIV; OVC, orphans and vulnerable children

3.2. Outcome Value for PLHIV

Table 3 shows ICP outcome values created according to beneficiary type. The three highest outcome values for PLHIV, constituting 71% of the total value created, were: i) higher quality caregiver support to PLHIV (37%); ii) improved family wellbeing and feelings of greater economic security resulting from decreased debt and decreased need to sell-off key family assets (18%); and iii) higher levels of self esteem (16%). The two livelihood (or

economic productivity) outcomes represented 2.1% and 2.3% of the total value created for PLHIV.

3.3. Outcome Value for PLHIV/OVC Households in Terms of Food Security

The food aid provided to PLHIV/OVC households generated a huge value for the beneficiaries. The outcome was defined by beneficiaries in the FGDs as “less stress and greater peace of mind in relation to food security.” The indicator ‘number reporting that food support is

helping them with their family daily living' was considered a valid representation of outcome change for families of PLHIV and OVC, and could be directly linked to the provision of food support through the WFP. The value created under this outcome was \$10,822,771. However, the value generated in relation to food aid is short term, and drop off would, therefore, be immediate by the nature of this emergency relief.

3.4. Outcome Value for OVC

The highest outcome value for OVC was from 'greater understanding and ability of caregivers to support their OVC family members,' and represented an important positive change for OVC within their households. The OVC outcome of 'greater feeling of positivity' was also linked to this, and generated a high value. The self-help groups and peer support components of ICP would have had a large effect on these two outcomes. The outcome of 'greater feeling of positivity' was expected to be more, however the baseline for this indicator was conservatively

estimated at 50% [21,22,23] i.e. half of OVC already felt some level of positivity about their lives at the baseline.

The IGA scheme targeting OVC households only reached a relatively small number of households, so a strong outcome for OVC was not expected.

3.5. Outcome Value for the Wider Community and Health Services

Wider community and health services outcomes quantified the avoided costs for people reached by the ICP project by enabling them to access HIV voluntary confidential counseling and testing (VCCT) and treatment. The results showed that the value for communities in terms of avoiding late diagnosis and health-related costs were very high, confirming the information gathered during the consultations with project beneficiaries. The outcome value 'avoidance of HIV transmission from mother to child' did not produce substantial value, but was important to test whether the SROI approach could have been used to account for these broader outcomes i.e. the cost-benefit of the ICP project's influence on PMTCT.

Table 3. ICP outcome values created according to beneficiary type

Beneficiary group	Outcome area	Value (Int'l \$)
PLHIV	Improved family wellbeing and protection of key assets	6,896,107
	Higher levels of self esteem	1,230,276
	Better health status and appetite	1,076,853
	Better health status and appetite	912,309
	Greater sense of belonging in community and social life	800,171
	Better livelihood prospects through IGA loans	146,295
	Better livelihood prospects through access to credit (self-help groups)	161,239
OVC	Greater understanding and ability of caregivers to support PLHIV family members	2,568,964
	Greater understanding and ability of caregivers to support PLHIV family members	2,002,431
	Greater feeling of positivity and well-being	126,103
	Better health status and appetite	25,901
	Improved life chances through decreased level of school drop-outs	635,609
Wider community and health service	Reduced vulnerability of OVC and avoidance of school difficulties	135,939
	Greater understanding and ability of caregivers to support OVC family members	1,078,879
	Greater understanding and ability of caregivers to support OVC family members	1,090,887
PLHIV-OVC households	Avoidance of health costs resulting from late diagnosis	729,350
	Avoidance of HIV transmission MTC	1,871
PLHIV caregivers	Greater ability to meet service delivery targets round ARV, VCCT	359,666
	Less stress and greater peace of mind in relation to food security	10,822,771
OVC household	Greater ability to earn a wage, resulting from reduced hours of care giving	442,994
	Better livelihood prospects through IGA	91,847

Abbreviations: PLHIV, people living with HIV; OVC, orphans and vulnerable children; IGA, income generating activity; MTC, mother to child; PMTCT, prevention of mother to child transmission; ARV, antiretroviral therapy; VCCT, voluntary confidential counseling and testing.

3.6. Sensitivity Analysis of the Model

3.6.1. Financial Proxies

Halving the financial proxy for the outcome 'avoided costs resulting from improved family wellbeing as a result of protection of key assets' decreased the SROI ratio from 1:1.96 to 1:1.90, showing a low sensitivity to this change. Similarly, halving the expected income generated from an increase in earning potential through income generating projects decreased the SROI ratio to 1:1.95.

Halving the financial proxy for 'equivalent cost in care training for caregivers of PLHIV' reduced the SROI ratio to 1:1.84 indicating moderate sensitivity to this indicator.

3.6.2. Attribution to the ICP Project

Halving the attribution of the project (from 80% to 40%) for health outcomes through referrals, treatment literacy, and adherence support resulted in a decrease in the SROI ratio to 1:1.92.

For the outcome value created for food security, halving the attribution of the project from 90% to 45% resulted in a decrease in the SROI ratio to 1:1.46, indicating moderate to high sensitivity here. For OVC, halving the attribution portion for the outcome 'greater understanding and ability of caregivers to support OVC family member' from 70% to 35% reduced the SROI to 1:1.91.

3.6.3. Drop-off

Highest value-generating outcomes were analyzed in order to test the sensitivity of the SROI model to drop-off. By increasing the annual drop-off for the outcome ‘improved understanding and ability to support PLHIV family members’ to 70% in year 3 and 90% in year 4, the SROI decreased marginally to 1:1.95, indicating that the model is not very sensitive to drop-off for this indicator. Similarly, increasing the drop-off each year for ‘improvement in livelihood status’ to 40%, 60%, and 80% were insufficiently sensitive to changes in the SROI ratio.

4. Discussion

The present SROI study found the ICP program delivered a cost to benefit ratio of 1:1.96. This suggests that investment costs put into a community-based HIV prevention, care, and treatment program in Cambodia can lead to moderate returns generated by the program, even after adjusting for the discount rate, PPP, financial proxies, attribution, and drop off.

The highest outcome value created for PLHIV and OVC was ‘greater understanding and ability of caregivers to support PLHIV and OVC.’ This contributed to increased quality of life for PLHIV/OVC, and illustrates the substantial contribution of caregivers to the ICP program.

Similarly, the ARP 2 ‘training of trainers’ was shown to generate substantial value by increasing the understanding of HIV, resulting in significant behavior change across an entire community to help support PLHIV and OVC long after the ARP 2 project ended [17]. Consistent with these results from ICP and ARP 2, some systematic reviews have indicated the potential cost-effectiveness of community health workers in improving health outcomes for populations in low and middle-income countries [24,25].

As indicated by KHANA’s survey on children affected by HIV and AIDS in 2000, 40% of OVC were without sufficient food, clothes, and basic necessities [26]. The ICP projects targeting caregivers of OVC for sensitization, family counseling, and food support have resulted in a better quality of life for OVC within their family environment. These results are consistent with India’s CHAHA program where substantial value was created for ‘improved health status of OVC’ (i.e. better health for OVC due to less need for treatment of opportunistic infections and other illnesses, which were significant financial burdens to families) [16].

A high outcome value was also noted from ‘avoidance of health costs resulting from late diagnosis.’ Validated secondary research consistently showed the potentially devastating impact of late HIV diagnosis, due to the health-related expenses incurred [27,28,29]. This outcome generated by the ICP project contributes to preventing households affected by HIV from slipping into health-related debt and poverty.

The ‘better livelihood prospects through IGA’ component of the ICP (i.e. build skills and increase incomes for PLHIV/OVC households) did not generate as strong a return as expected. However, this was most likely due to the limited scale of reach, since the component was a late addition to the program and had small initial grants,

which resulted in a small budget allocation. An important consideration would be to assess the sustained value of the ICP project in more details by determining what the longer term socioeconomic impact of the IGAs and self-help financing loans has on PLHIV and their families. For example, substantial value was indicated for the livelihoods component in India’s CHAHA program, and the program suggests that consideration be put on the size of initial grants issued for this component since it potentially generates a large benefit return [16]. This would allow KHANA to ensure that their livelihood generating activities are continuing to provide value after the project activities end.

FGDs highlighted the issue of continuation of emergency household food support after the end of the WFP project in 2012. The SROI indicated a high outcome value of decreased stress related to food security, and showed a high sensitivity to the food security attribution. This component generated by the ICP project has been supported by several studies linking food insecurity and HIV, where one factor exacerbates the severity of the other [30,31,32]. Food security, on the other hand, has been shown to have a positive impact on PLHIV, especially in low-income countries where households may prioritize food over healthcare needs, leading to poorer health outcomes for PLHIV [33,34]. KHANA and implementing partners should gather further evidence on the topic of food security to advocate with donors and the Cambodian government.

Though substantial, a 1:2 SROI is not an unexpected return if one takes into account the level and period of investment. KHANA’s financial commitment to a longer-term (5-year) program strategy has created an enabling environment for working towards the sustainability of the project. Without such levels of commitment, it is unlikely that the project would have generated enough of an impact to sustain social, health, environmental, and economic benefits for an estimated 3-5 years after completion. More importantly, the exercise has provided an answer to the question of “whose value counts?” Whilst by no means a perfect science, it is important to note that all monetary values, or financial proxies used to represent a program outcome should be informed by program beneficiaries. Establishing financial proxies was a major part of the consultation process with beneficiary groups and key informants. Where it was difficult to find a financial proxy through consultation, secondary sources of data were used (i.e. the cost of a bicycle). The methodology of SROI clearly focused on the outcomes identified by beneficiaries, and the value they have received from the project with each step of the process being led by beneficiary-inputs.

The key limitation in this research was time. Time constraints limited discussion between the research team and health service staff; discussions with direct beneficiaries such as PLHIV, OVC, family members, caregivers, and CSVs were given priority. In addition, the ICP project covered three provinces, but the beneficiary consultations for the scope of the SROI were captured in one province due to time constraints—most of the data on outcomes came from Kampong Speu, but additional data were recorded across all three provinces in the end-line survey and used in the SROI study. However, the program staff assumed that there would not be significant

variations in results between the provinces, as the ICP program was the same across all provinces and implementing partners.

In the absence of SROI standards and a robust method of auditing an organization's 'claims' to the value it creates, detailed assumptions, processes, and measurement of outcomes were implemented in order to fully document how figures were calculated or estimated. A comprehensive costing of community input is necessary to give a true reflection of how much the community invests through its involvement with the ICP. The true costs of this have not been completely captured in the present SROI study due to lack of reliable secondary information to validate financial proxies. The study was also not able to quantify certain values: government poverty cards, costs incurred by the government, financial burdens to health services of untreated PLHIV. Lastly, attribution percentages were estimated as a range rather than an exact amount, making calculations more complicated and less precise.

5. Conclusions

SROI has been used to evaluate the economic and social impacts of HIV and AIDS programs. The methodology is well suited for evaluating public health programs because it incorporates the social, health, environmental, and economic costs and benefits, making it a more holistic approach compared to traditional frameworks [35]. SROI is a useful tool for quantifying values of a program, and should be used as a forecasting and evaluative tool at the mid-point and end of programs to increase ownership of the program amongst beneficiaries and implementing partner organizations.

Whilst a SROI ratio of 1:1.96 is a meaningful and positive result of this study, KHANA and partners should not be complacent about ensuring maximum opportunities for identifying and effecting cost saving measures. Additionally, the implications of this SROI study would be of wider interest, rather than solely to HIV and AIDS program implementers, since several international initiatives that have helped shape, but would also benefit from, the results of this study. For example, the UNAIDS Investment Framework [36] emphasizes community mobilization as a critical enabler in the HIV and AIDS response, yet the definitions of what this means in relation to a range of different programmatic interventions such as behavior change, communication, prevention with key populations, and treatment and care, are not clear. The SROI approach would help to quantify the importance of community mobilization in different interventions.

Statement of Competing Interests

The authors have declared that no competing interests exist.

Author's contributions

Conceived and designed the experiments: TS LT HS. Performed the experiments: TS LT HS. Analyzed the data:

TS LT HS. Contributed reagents/materials/analysis tools: TS LT HS ML PC KP TK CN SY. Wrote the paper: TS ML SY. Commented on manuscript and interpretation of results: LT HS PC KP CN SY. Collected data relevant for modeling: TS HS LT. Designed and implemented the model used in the analysis: LT.

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