# COMPARING THE COST-EFFECTIVENESS OF MASS MEDIA LONG-RUNNING ENTERTAINMENT-EDUCATION (EE) FOR SOCIAL AND BEHAVIOUR CHANGE IN AFRICA

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## Abstract

There exists an abundance of literature going back to the 1990s on the effectiveness of mass media social and behaviour change communication (SBCC) programmes in triggering changes in knowledge, attitudes, norms, and behaviour. Examples of this appear in the references at the end of this paper. Further, mass media entertainment-education (EE) may affect social norms change by stimulating community dialogue and social networks on important social and health topics (Papa et al. 2000; Rogers et al. 1999), implying that even those not directly exposed to the programme may re-examine previously held norms and identify ways to adopt novel behaviours (Burton 2008; Rogers 2004).

However, there is limited research on the cost-effectiveness of SBCC programmes using mass media EE to foster changes in reproductive health and other social behaviours in developing countries, especially in Sub-Saharan Africa (SSA) (Guilkey, Hutchinson, and Lance 2006; Hutchinson and Wheeler 2006). Focusing on the 21st century, empirical studies on the cost-effectiveness of such programmes have been conducted in developing settings (Hutchinson, Lance, Guilkey, Shahjahan, and Haque 2006; Sood and Nambiar 2006). However, many of these studies were based in Asia, resulting in very limited research on the cost-effectiveness of mass media programmes designed to shape social norms, attitudes, and behaviours in SSA.

## Objective

In an era of scarce resources for SBCC programmes, donors, policymakers, and scholars are increasingly seeking to know the return on investments in SBCC interventions, making the observed sparse literature on the cost-effectiveness of SBCC programmes in SSA surprising. Additionally, cost-effectiveness studies are complicated by differences in methodology, including research design, data quality, how variables are operationalised, and analysis making cross-country evidence

incomparable and difficult to generalise. This paper examines the cost-effectiveness of Population Media Center's (PMC) long-running mass media EE programmes in three SSA'n countries: Burundi and Rwanda (both in East Africa) and the Democratic Republic of Congo (DRC) in Central Africa. All three programmes were developed using PMC's unique entertainment-education (EE) approach and evaluated using identical research methods in the same year, 2016.

The rest of this paper is divided into the following six sections. The first section presents PMC's theory of behaviour change, which forms the framework for all three interventions, followed by a second section describing the three interventions. The third section describes the evaluation method used, including the measurement of the independent and dependent variables and the operationalisation of the cost-effectiveness analysis. The fourth section presents the results of the evaluation that briefly describes the relative impact of the interventions on the behavioural outcomes and a more detailed presentation of the cost-effectiveness analysis. In the final fifth section, we discuss the lessons learned from and the implications and limitations of this research.

## Theoretical Framework

PMC works in the developing world and the United States on multiple issues and deep-seated, social norms and behaviours, effecting change through the use of long-running EE where neither service provision nor direct messaging on their own cannot. Robust formative research employing both desk reviews and qualitative methods are at the heart of creating culturally resonant, captivating fictional characters. Additionally, highly qualified local creative teams comprising trainers, producers and writers, collaboratively interpret and co-analysed the dynamics of existing norms. Next, drawing on theories of behaviour change including Social Learning Theory (Bandura 1977), Social Cognitive Theory (Bandura 1986), and Stages of Change (Barker 2012), local teams map out behavioural paths to desired norm change to guide character and fictional plot development.

For each of the themes being addressed writers develop three character types: positive, negative, and transitional. Positive characters exemplify the desired behaviour change and are viewed as "larger than life" people in their communities while negative characters connote undesirable or dysfunctional behaviours and social norms. Transitional characters resemble average people in the society and are the primary behavioural role models for the audience. As transitional characters journey through the drama, scriptwriting techniques forge emotional bonds and adoration between the audience and transitional characters. At some point, the transitional character is confronted with an intractable situation requiring a decision with positive and negative characters attempting to influence this decision. Eventually, the transitional character makes a decision of his or her own accord and receives a reward or punishment. This cycle repeats itself as the drama unfolds with consequences becoming more impactful on the fate of the transitional character.

A climax occurs wherein these tensions are resolved and the transitional character is transformed and aligns with the desired behaviours. The audience's emotional identification with the transitional character ignites desires and self-efficacy to adopt similar values and behaviours in real life.

Intensive promotion and popular broadcast media ensure that PMC shows yield high audiences and reach entire communities irrespective of socio-demographic characteristics. Cliff-hangers and plot-twists inspire discussion of the issues being modelled between individuals within communities and, as the stories are discussed, so too are the issues. With new knowledge and attitudes, vanguards in the audience develop greater confidence and adopt behaviours being promoted, with rippling effects to others in their social circles who can be regarded as "change agents". As change agents grow from the community to community, so do social norms begin to change. The net outcome is the development of a critical mass of empowered and motivated innovators in the target regions and sustained social norm and behaviour change on the issues being promoted by the interventions.

## Description of Interventions

The three country programmes were all created using PMC's unique method that is informed by the above theoretical framework. In Burundi, PMC launched *Agashi*! ("Hey, Look Again!"), a 208-episode radio serial drama (*RSD*) using EE in the Kirundi language from January 2014 to January 2016 across the entire nation. Key thematic areas addressed by the drama include family planning (FP), reproductive health (RH) including adolescent, HIV/AIDS, gender-based violence/gender equality, and child health/nutrition.

In Rwanda, a 104-episode RSD titled *Impano n'Impamba* ("A Gift for Today That Will Last a Long Time") was developed and aired nationwide in the Kinyarwanda language from October 2014 to October 2015. The RSD addressed FP, sexuality and RH, child health and nutrition, and gender.

In the DRC, PMC developed a 156-episode long *Vivra Verra* ("Time Will Tell"), broadcast nationwide in French from September 2014 that concluded in March 2016. The RSD focused on issues such as FP, adolescent sexual and RH, maternal and child health, and domestic violence. All three interventions were guided and monitored using thorough research. Each programme was broadcasted at two new episodes per week.

## Evaluation Method

The evaluation method was replicated across countries at the conclusion of each RSD.

*Data Source*:  In each of the countries, a local independent research firm was contracted to conduct a multi-stage cluster sample survey to achieve representation of the target population of reproductive age. The sample from each country was

surveyed on key programme outcomes and socio-demographic characteristics as well as their exposure to and perception of the respective RSD. The Burundi survey was conducted by a Burundian research firm in 2016 with 1296 respondents of reproductive age. For the DRC, the end line survey was conducted by Centre de Communication et d'education pour la Santé (CESD), a Congolese independent research firm, in May 2016. The representative sample consisted of 4000 reproductive-age women and men residing in four geographical regions of the country (East, West, North and South). Fieldwork for the Eastern region was conducted in South Kivu province; Congo Central was conducted for the West; North-Ubangui for the North and the Central Kasai for the South. The Rwanda survey was fielded in November 2015 with a total sample of 1477 respondents in their reproductive ages.

*Impact Analysis*:  Like the research design, the same analytical approach was replicated in each country. The Research Unit at PMC conducted the data analysis to determine the impact of each programme on key programmatic indicators to assess the success of the dramas in effecting positive behaviour change in the target populations. However, this research covers only behavioural indicators. Two analytical approches were used. The first approach focused on descriptive comparisons of those exposed (listeners) and those not exposed (non-listeners) to the dramas on the key programme indicators, using cross-tabulations and chi-square statistics. Because descriptive comparisons do not control for the potential influence of variation among individuals, the second analytical approach replicated the descriptive analyses in a multivariate logistic regression framework that controls for socio-demographic factors, yielding adjusted odds ratios as estimates. Accordingly, the interpretations about programme impact for each RSD are based on this latter more rigorous comparison of adjusted odds ratios between listeners and non-listeners.

For the purposes of evaluation, an exposure variable was constructed to serve as the independent variable thereby permitting comparisons between listeners and non-listeners on the key programmatic indicators. This exposure variable was derived from PMC's definition of regular listenership (i.e., listened to the respective drama one or more times per week). Key programmatic indicators for each RSD served as dependent (i.e., outcome) variables. Since we used logistic regression, all outcome and independent variables were dichotomised. The socio-demographic or control variables were either dichotomised or categorised.

*Cost-effectiveness Analysis*:  In addition to estimates of the impact of the intervention on programmatic indicators/outcomes described above, accurate determinations of the cost of every component of the intervention is critical to precise calculations of cost-effectiveness. Further, it is important to estimate the total number of beneficiaries (i.e., audience size) of the intervention. The paragraphs that follow describe how total programme cost, target population reached, and audience size were estimated.

*Programme Cost*:  The PMC Financial Unit is responsible for the recording of all financial matters related to its country programmes and provided the prerequisite financial information for the calculation of programme cost-effectiveness. The costs for each of the three country programmes were arrived at by summing up all the cost components associated with each from programme inception to conclusion. For each RSD the cost components, broadly include:

• Formative research
• Studio formation
• Programme development including day-to-day costs
• Training of writers and producers
• Episode writing, pretesting and editing
• Promotion
• Broadcast costs
• Country staff salaries
• Monitoring research
• Evaluation

*Audience Size*:  The estimate of the national audience potentially exposed was calculated for each RSD. This was estimated in several steps. In step 1, we used the latest five-year age-disaggregated country population estimate provided by the United Nations (United Nations Department of Economic and Social Affairs Population Division World Population Prospects, 2017)[1] to calculate the total population between the ages 15-49 for females and 15-59 for males. In step 2, we deducted from this total the subpopulation without access to radio since the programmes were aired on radio. In step 3, we estimated the population potentially exposed to the particular RSD based on the proportion of regular listeners (i.e., respondents reporting listening to the RSD one or more times weekly at end-line).

*Cost Per Listener (CPL) and Cost Per Behaviour Change (CPABC)*:  Cost of exposure to each RSD was simply obtained by dividing the total programme cost by the audience size. CPABC was calculated in the following way:  First, for each specific behaviour that was found to be statistically significant (p-value <= 0.001, p-value <= 0.01 or p-value <= 0.05) based on the multivariate logistic regressions, we compared of the percentage difference between listeners and non-listeners on the behaviour. We then multiplied this percentage difference by the audience size to estimate the total number of listeners impacted on this behaviour. Finally, to obtain the cost estimate this total was divided into programme cost and lastly divided by the number of storylines[2] in the drama whose behaviours were impacted.

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[1]  https://esa.un.org/unpd/wpp/Download/Standard/Population/.

[2]  Since PMC addresses multiple issues (usually four per drama), each issue is reflected in one storyline. Accordingly, to obtain a more refined cost estimate, the resulting CPABC is divided by the number of storylines in the drama that were impacted e.g., the resulting CPABC is divided by one if one storyline behaviours was impacted, two if two storylines behaviours were impacted, three if three storyline behaviors were impacted, and by four if four storylines behaviours were impacted. Note: the word "issue" is synonymous with "storyline" and "thematic area".

# Results

Findings are presented in two parts, the effect of the interventions on behavioural indicators and the cost-effectiveness of the interventions on these impacted indicators.

*The effectiveness of Interventions*: Table 1 shows logistic regression estimates of the effect of listening regularly to each of the dramas on the behaviours that were examined for cost-effectiveness. Based on the table and for Burundi five behaviours under three thematic areas (FP, RH and child health) were impacted; for Rwanda three behaviours under two thematic areas (FP and RH) were impacted; and for the DRC two behaviours under two thematic areas (FP and child health) were impacted.

**Table 1:  Logistic Regression Estimates of the Effect of Regular Listening to Radio Serial Communication Programmes on Various Behaviours Controlling for Selected Demographic Characteristics, 2016**

| Thematic Area and Behavioral Outcome | Country and Programme Name | | |
|---|---|---|---|
| | Burundi *Agashi 1.0* | Rwanda *Impano N'Impamba* | Democratic Republic of Congo *Vivra Verra* |
| | Estimates in Adjusted Odds Ratios | | |
| Family Planning | | | |
| Visited health institution to obtain information on the secondary effects of modern family planning methods. | 1.68* (1.07-2.64) | | 2.24** (1.26-3.99) |
| Frequently discussed the practice of family planning with spouse/partner. | | 4.20*** (1.80-9.80) | |
| Discussed family planning with family, friends and/or neighbours. | | 1.61** (1.17-2.21) | |
| Reproductive Health | | | |
| Have tested for the AIDS virus voluntarily in the past 24 months. | 1.72** (1.21-2.43) | | |
| Discussed HIV/AIDS with family, friends and/or neighbours. | | 1.47* (1.0-2.15) | |
| Child Health | | | |
| Disposed household refuse. | 2.19*** (1.54-3.13) | | |
| Used home-made oral rehydration solution recommended by the government to treat diarrhea. | 2.01** (1.21-3.34) | | |
| Used ready-made oral rehydration solution to treat diarrhea. | 1.62** (1.13-2.33) | | |
| Pregnant woman in household slept under a mosquito net night before. | | | 2.78* (1.03-7.52) |

Differences between listeners and non-listeners are significant at:  ***$p<.001$, **$p<.01$, *$p<.05$
Confidence intervals in parentheses

*Cost-effectiveness of Impacted Behaviours*: Table 2 presents the findings of the cost-effectiveness analysis. It shows in the leftmost column countries and RSD, thematic areas, and behaviours impacted by the respective RSD per country. The middle three columns of the table present information on the target population reached, the audience size reached as well as the CPL. Target population reached is calculated based on people in the target population who have heard about the RSDs, and includes both listeners and those who have never listened. This means that the size of the target population reached can be viewed as diffusion of innovation and has the potential to foster norms and behaviour changes. While the target population is composed of both listeners and non-listeners, the audience size is comprised of only target population members who listened to the drama one or more times weekly and will be the focus of the discussion in this section. The three columns on the right-hand side of the table pertain to findings for the behaviour changes analysis.

The bottom of Table 2 indicates that PMC's RSDs that were evaluated in 2016; all of them in SSA potentially reached an audience size of 3,177,740 regular listeners to its programmes across the three countries, costing PMC a total cost of $6.60 per listener. Further, PMC reached an average of 1,059,247 per country, which translates into a cost-per-listener (CPL) of $2.20. In terms of behaviour changes, the bottom of the table shows that out of the above total potential audience size, 1,677,109 regular listeners across the three countries adopted one or more behaviours as a result of exposure to the RSDs and costs PMC a total of $98 per adoption of new behaviour. Generally, this amounts to 152,464 regular listeners adopting one or more behaviours, with an average cost of $8.94 per adoption of behaviour, per country.

However, the above findings are broad and obscure the specificities within countries relating to the RSDs. The upper part of Table 2 illustrates several of these specificities. A cursory look reveals that the target population reached is largest for the Burundi RSD, albeit it has the smallest population among the three countries, and the population reached is smallest for the DRC RSD, the most populous of the three countries. It is also obvious from the table that CPL is greatly influenced by audience reached. The Burundi RSD had the largest audience size of 2,254,547 but the lowest CPL; the Rwanda RSD had the next largest audience size (564,627) and next lowest CPL ($1.80), while the DRC RSD reached the lowest audience size of 358,564 and the highest CPL of $4.06.

With respect to behaviour change cost-effectiveness, we see that just as CPL is dependent on audience size, so is CPABC dependent on the number of listeners changing behaviours, which in turn is dependent on audience size. The number of regular listeners changing behaviours, whether for the country average or for specific behaviours within a country, is highest for the Burundian drama, followed by the Rwandan drama and lowest for the DRC drama.

Similarly, the average cost of all adopted behaviours within a country and therefore the CPABC for specific behaviours adopted in the country, mirrors patterns observed above, being lowest for the Burundi intervention and highest for the DRC

intervention with figures for the Rwanda intervention in the middle. Finally, the number of specific behaviours impacted is highest for the Burundi intervention (six in total), followed by the Rwanda intervention (three) and lowest for the DRC intervention (only two).

**Table 2: Audience Size and Cost Per Attributable Behaviour Change Across Radio Serial Dramas (Burundi, Rwanda, and Democratic Republic of Congo, 2016**

| Country, Radio Serial Drama, Theme and Behaviours Showing Change | Target Population Reached (i.e. Population ever Heard of Drama) | Listeners/ Audience Size (i.e. Population that Listened One or More Times Weekly) | Cost Per Listener (CPL) | Number of Listeners Changing Behaviours | Cost Per Attributable Behaviour Change (CPABC) | % of Loyal Listeners Changing Behaviour |
|---|---|---|---|---|---|---|
| Burundi: Agashi 1.0 | 2,568,634.47 | 2,254,546.85 | $0.74 | | | |
| *Theme: Family Planning* | | | | | | |
| 1. Frequently Discussed of family planning with spouse/ partner. | | | | 315,636.56 | $1.76 | 14.0% |
| 2. Visited health centre to get information on family planning side effects. | | | | 202,909.22 | $2.73 | 9.0% |
| *Theme: Sexuality & Reproductive Health Indicators* | | | | | | |
| 3. Have voluntarily tested for AIDS virus in past 24 months. | | | | 293,091.09 | $1.13 | 13.0% |
| *Theme: Maternal/Child Health & Nutrition* | | | | | | |
| 4. Disposed household refuse. | | | | 315,636.56 | $1.76 | 14.0% |
| 5. Used government recommended home made ORS to treat diarrhea. | | | | 157,818.28 | $3.51 | 7.0% |
| 6. Used ready made ORS to treat diarrhea. | | | | 157,818.28 | $3.51 | 7.0% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Sub-total** | | | | **1,442,909.98** | **$14.39** | **64.0%** |
| **Sub-average** | | | | **240,485.00** | **$2.40** | **10.7%** |
| Rwanda: Impano N'Impamba | 1,542,720.15 | 564,629.24 | $1.80 | | | |
| 7. Frequently discussed family planning with spouse/partner. | | | | 107,280.00 | $4.73 | 19.0% |
| 8. Discussed family planning with family/friends. | | | | 33,878.00 | $14.97 | 6.0% |
| 9. Discussed HIV with family/friends. | | | | 33,878.00 | $14.97 | 6.0% |
| **Sub-total** | | | | **175,036.00** | **$34.66** | **31.0%** |
| **Sub-average** | | | | **58,345.33** | **$11.55** | **10.3%** |
| DRC: Vivra Verra | 1,198,026.90 | 358,564.00 | $4.06 | | | |
| *Theme: Family Planning* | | | | | | |
| 10. Visited health centre to get information on planning side effects. | | | | 28,685.12 | $25.37 | 8.0% |
| *Theme: Maternal/Child Health & Nutrition* | | | | | | |
| 11. Pregnant woman in household slept under mosquito net night before. | | | | 30,477.94 | $23.88 | 8.5% |
| **Sub-total** | | | | **59,163.06** | **$49.25** | **16.5%** |
| **Sub-average** | | | | **29,581.53** | **$24.62** | **8.3%** |
| **Total number of population reached** | **5,309,381.52** | | | | | |
| **Average number of population reached** | **1,769,793.84** | | | | | |
| **Total number of listeners** | | **3,177,740.09** | | | | |
| **Average number of listeners** | | **1,059,246.70** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Total cost per listener** | | | $6.60 | | |
| **Average cost per listener** | | | $2.20 | | |
| **Total number of listeners changing behaviour** | | | 1,677,109.04 | | |
| **Average number of listeners changing behaviour** | | | 152,464.4585 | | |
| **Total cost per listeners changing behaviour** | | | | $98.30 | |
| **Average cost per listener changing behaviour** | | | | $8.94 | |
| **Average % of listeners changing behaviour** | | | | | 10% |

## Discussion and Lessons Learned

Population Media Center (PMC) works around the globe to promote positive behaviour change around social and health issues by employing effective communication and educational strategies in the form of entertainment-education dramas broadcast on radio and television. This research embarked on a comparative examination of the cost-effectiveness of three interventions.

Findings show that programme target population reached and audience size, as well as costs per listener (CPL) and cost per behaviour change CPABC), are all independent of country population size. The intervention in Burundi, the smallest country among the three countries attained the largest potential national population reached and national audience size, followed by Rwanda and smallest in the Democratic Republic of Congo (DRC), the most populous of the countries. The same pattern is observed for CPL and CPABC. For specific behaviours and regarding CPABC, "frequent spousal discussion of family planning" cost only US$1.76 per adopter in Burundi but US$4.73 in Rwanda; "Visited health institution to get information on family planning side effects" cost US$2.73 per adopter in Burundi compared with US$25.37 in DRC (Table 2). Of note is that Burundi is one of the least developed countries worldwide. Of the 188 countries with data on the Human Development Index (HDI), Burundi ranks 184, with an index more favourable than only four other countries in the continent (Burkina Faso (185),

Chad (186), Niger (187), and Central African Republic(188)), compared with more favourable rankings for Rwanda (159) and DRC (176). One plausible explanation for the observed above findings that show Burundi's relatively positive performance may be that its media market may be less competitive due to it being a small country with small population size. Another reason may be related to the 2014-2016 civil unrest in Burundi:  unsafe environment and curfews kept Burundians indoors, which meant that they have more time to watch and listen to media programmes.

This comparative assessment was facilitated by the adoption of the same approaches in the:  development of the interventions/radio serial dramas, research designs, the operationalisation of the indicators/outcomes and independent variable, and cost-effectiveness analyses. Employing the same theoretical constructs of behaviour and normative change, programme development, and programme evaluation, we are able to demonstrate that cost-effectiveness can vary greatly across interventions due to contextual differences, compare the cost-effectiveness of mass media SBCC interventions across contextually differing countries, and thereby contribute to knowledge, scalability, and generalisability of evidence from such interventions. One of the limitations of cost-effectiveness research is the difficulty policymakers have in understanding the technical terms used in such research. Our intention was to make this paper as easily understandable as possible by all and hope we achieved just that.

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