

Strengthening Institutions to Improve Public Expenditure Accountability: Cost Effectiveness & Benefit-Cost Analysis of Home Grown School Feeding & Health, and Education Assistance Programs in FCT, Nigeria.



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Prepared by:
Ebere Uneze, Ph.D.
Ibrahim Tajudeen

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4 Dep Street
Off Danube Street,
Maitama District,
Abuja,
Nigeria.
Telephone: +234 (0) 9 8709070

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ABBREVIATIONS AND ACRONYMS

BE	Basic Education
BIA	Benefit Incidence Analysis
CBA	Cost Benefit Analysis
CEA	Cost Effectiveness Analysis
CSEA	Centre for the Study of Economies of Africa
CSO	Civil Society Organization
EA	Education Assistance
ECCDE	Early Childhood Care and Development Education
EFA	Education for All
FCT	Federal Capital Territory, Abuja
FCT SUBEB	Federal Capital Territory State Universal Basic Education Board
FME	Federal Ministry of Education
GDN	Global Development Network
HGSF&H	Home Grown School Feeding and Health
JSS	Junior Secondary School
LGA	Local Government Area
LGIC	Local Government Implementation Committee
LGMC	Local Government Monitoring Committee
MHTF	Millennium Hunger Task Force
NBS	National Bureau of Statistics
NBTE	National Board for Technical Education
NCCE	National Commission for Colleges of Education
NCNE	National Commission for Nomadic Education
NEPAD	National Economic Partnership for Africa Development
NLSS	Nigerian Living Standard Survey
NMEC	National Mass Education Commission
NUC	National Universities Commission
PARP	Policy Analysis and Research Project
PBE	Post-Basic Education
R4D	Research for Development
SBMC	State-Based Management Committee
SIPEA	Strengthening Institution to Improve Public Expenditure Accountability
SIMC	State Implementation and Monitoring Committee
SUBEB	State Universal Basic Education Board
UBE	Universal Basic Education
UBEC	Universal Basic Education Commission
VEI	Vocational Enterprise Institutions
WFP	World Food Program

ABSTRACT

The Federal Government of Nigeria, in its effort to improve access to, and quality of primary school education, as a way of achieving the Millennium Development Goals as well as ensuring Education for All, introduced a series of programs in the education sector, including, but not limited to the Home Grown School Feeding & Health program and the Education Assistance program implemented in public primary school in the FCT, Nigeria. This report primarily conducts a Cost-Effectiveness analysis of Nigeria's education sector with particular emphasis on the relative effectiveness and efficiency of HGSF&H and EA programs. However, it is complemented with a Benefit-Cost analysis. It proceeds with the analysis of the average cost of the education programs, and then moves on to the program CEA and the BCA. The cost per beneficiary shows that per pupil cost of HGSF&H program is approximately NGN8, 163 which is higher than the NGN5, 000 per pupil cost of EA program. This suggests that the EA program is more economical in reaching pupils in FCT public primary school than the HGSF&H program that appears to be expensive.

The program CEA examines the relative cost and effectiveness of HGSF&H and EA programs. Following the challenges encountered in identifying a suitable effect measure and in accessing data for estimating the effectiveness measure, the study used the probable impact of intervention developed by Schiefelbein and Wolff (2007) as the effectiveness measure. Relying on this effectiveness measure, this study estimated the incremental unit costs of HGSF&H and EA program, and later derived their cost-effectiveness ratios. The analysis shows that the EA program is more cost-effective than the HGSF&H program. On the BCA, the findings show that, though both programs are beneficial in monetary values, the EA program is more sustainable and beneficial. This is evidenced by its high NPV and Benefit-Cost ratio. To determine the validity of the findings, a one-way (for CEA and BCA) and multi-way (for CEA only) sensitivity analyses - worst and best case scenarios were conducted. Overall, the results show that the EA program is more successful, efficient and beneficial than the HGSF&H program.

1. INTRODUCTION

For many years, the main priority of government and educational policy makers in several countries has been to increase access to basic education, whereby quantitative expansion came at the expense of educational quality. But recently, improving the quality of education has become even more important than increasing school attendance and participation. However, ascertaining the most efficient and effective means of attaining these goals remains a great challenge to several developing countries. What this then means is that certain technique(s) must be applied in order to identify programs with least costs and greatest positive impact. It is in this instance that the cost-effectiveness analysis is developed for identifying interventions with optimal impacts, given the costs of achieving a given marginal outcomes¹. However, the major limitation of this technique is its inability to quantify effectiveness in monetary terms. Accurate measurement of effectiveness is another challenge that cannot be ignored. These strong limitations have given rise to the use of complementary techniques. For example, a benefit-cost analysis can help to address some of these deficiencies associated with cost-effective analysis. Consequently, a combined analysis based on the CEA and the BCA will provide better information on the effectiveness, efficiency and benefits of alternative interventions. The broad objective of this study, therefore, is to carry out a detailed cost-effectiveness and benefit-cost analysis of Home Grown School Feeding and Health and the Education Assistance Programs. In particular, the report aims to provide answers to the following questions:

¹ The concept of Cost Effectiveness Analysis (CEA) is the third analytical component of the project; "Strengthening Institutions to Improve Public Expenditure Accountability (SIPEA)" a five year project launched by the Global Development Network (GDN), in coalition with Results for Development (R4D). This project is geared towards supporting 15 research and policy institutions in developing economy to produce analysis to achieving expected outcomes including; to produce an internationally comparable and evidence-based analysis that aims at improving the institutions capacity to make appropriate policy/program choice for the education sector in the developing countries.

- Which of these government interventions in the education sector of Nigeria namely: Home Grown School Feeding and Health (HGSF&H) and Education Assistance (EA) program is more cost effective in terms of beneficiaries covered?
- What is the relative efficiency of HGSF&H and EA Programs in terms of achieving improved learning outcomes?
- Considering future benefits, impacts & cost which of these government interventions are more beneficial and sustainable?

Given the enormity of conducting an extensive cost-effectiveness analysis in terms of resource, time and data requirements, it will be impossible to examine interventions extending to several parts of the country. With these issues in mind, the scope of the study is limited to the Federal Capital Territory (FCT). The choice of FCT is informed by the availability of cost data from the FCT Universal Basic Education Board (FCT UBEB), Abuja. The remainder of this report proceeds as follows: Section 2 reviews the key and relevant literature on CEA and CBA. Section 3 looks at the structure of the education sector and sources of funding in Nigeria. Section 4 presents a brief discussion of FCT UBEB and some background on HGSF&H and EA programs, section 5 presents the methodology. Section 6 discusses the findings of the analysis. Section 7 concludes. Policy recommendations and the challenges to the work are presented in section 8 and 9, respectively. Lastly, limitations and plans for dissemination of the findings are presented in section 10 and 11 respectively.

2. LITERATURE REVIEW

Studies on CEA and BCA have multiplied since the 1950s, but the application of these tools to educational decision-making has been much slower to develop (Hitch and McKean, 1960 cited in Levin, 1995). Until recently the application of CEA and BCA as a policy and decision-making tool in

education has been largely restricted to the developed countries, with a few studies on developing countries. Studies by Quinn *et al.* (1984), Tatto *et al.* (1991), Borman and Hewes (2002), Schiefelbein and Wolff (2007) and Reynolds *et al.* (2011) are some of the recent and relevant studies on CEA and BCA of education programs. These studies have adopted varying effectiveness measures, depending on the objectives of the intervention and in many instances findings have been mixed.

For example, Quinn *et al.* (1984) evaluated the cost-effectiveness of two math programs; Goal-based Educational Management System Proficiency Mathematics (GEMS Math) and Traditional text-oriented Mathematics (Text Math) in the fifth grade of the Jordan School District. Apart from including the pupil parental socioeconomic status (SES) as a stratifying variable; the study used two distinct effectiveness measure; an indicator of pupil ability to benefit from maths instruction as well as the pupil outcomes on standardized test-the Iowa Test of Basic Skills and a district-developed math test. Their results were mixed - for middle to low SES pupils; GEMS Math was substantially more cost-effective; while for high SES pupils Text Math was more cost-effective though performance was not significantly different in the two programs. Tatto *et al.* (1991) examined the cost-effectiveness analyses of three main approaches to teachers training in Sri Lanka; pre-service, conventional in-service and distance in-service between March 1988 and October 1989, using the teachers' theoretical and applied knowledge, classroom performance and pupil achievement as effectiveness measures. The study found that trainees in colleges of education and in distance learning were more effective in subject theoretical knowledge and pedagogy than those in teachers colleges. But in terms of pupil achievement it was found that any type of training was better than to no-training. In addition, distance education costs were found to

be very low, suggesting that countries that have shortage of teachers could increase the number of qualified teachers more efficiently using distance education.

Similarly, Borman and Hewes (2002) analysed the long term effects and the cost-effectiveness of several programs, including notable interventions, such as: Perry Preschool, the Abecedarian project and the Tennessee Class-Size Experiment for children at risk. The study employs two key educational outcomes: reading and mathematics achievement as measures of effectiveness, ignoring the non-academic outcomes. The analysis revealed a conditional outcome that any one of the interventions could not serve as a "great equalizer". The study concluded that rather than choose one interventions over the other, the best policy may be to take them as complements. Additionally, Reynolds *et al* (2011) examined the cost-benefit analysis of the child parent centre (CPC) early education program using data on children of up to 26 years of age from the Chicago longitudinal study. The CPC is the first for a sustained publicly funded early intervention which provides services for low-income family in 20 school sites. Kindergarten and school age services were provided up to age 9 (third grade). Findings from this study indicates that from a complete cohort of over 1400 programs, including the preschool age program, the school age program, the extended intervention program (4-6years) and comparison group participants, CPC has economic benefits that exceed the cost. The primary benefits were increased earnings and tax revenue, and averted criminal justice system cost. Further analysis shows that males, 1-year preschool participants, and children from high risk families derived greater benefits. Following evidence that the estimates were robust across a wide range of analyses including Monte Carlo simulations, the study therefore concluded that sustained programs can contribute to the well-being of individuals and society.

More extensively, Schiefelbein and Wolff (2007) examined the cost-effectiveness of Primary school interventions in English Speaking East and West Africa countries. Given the enormous cost and time involved in conducting a rigorous CEA, the authors used an alternative - a "short cut" approach, harnessing experts opinions in the education sector. Through this approach a questionnaire was devised and given to twenty-three educational planners and economists to estimate the potential impact of 46 possible primary school interventions on learning as well as the probability that these interventions would be adequately implemented. The study used the probable impact of the interventions as an effectiveness measure, which is derived by multiplying the estimated achievement on a test in mathematics and reading, administered to grade four pupils by the probability of adequate implementation of the program. Alongside, the authors estimated the incremental unit costs of these interventions, and then calculated the cost-effectiveness ratios of the interventions. The results of the study were mixed, with various interventions showing varying levels of cost effectiveness. However, the present study will be drawing on the work of Schiefelbein and Wolff (2007), particularly the estimated effectiveness measure.

3. THE NIGERIA EDUCATION SECTOR

The education sector in Nigeria comprises UBE; ECCDE, Primary Schools, Junior Secondary Schools, and Nomadic and Adult Literacy; Post-basic education including Senior Secondary Schools, Technical Colleges, VEIs, Vocational Schools and Open Apprenticeship Centre and Tertiary education which consists of Universities, Polytechnics/ Monotechnics, Colleges of Education, and IEIs (FME, 2009). However, for the purpose of this report, primary education will be discussed under basic education of the UBE.

3.1 Universal Basic Education

The Universal Basic Education Commission was established to coordinate the implementation of UBE in Nigeria at the national level as well as supervise the affairs of the SUBEB which is in charge of the implementation of UBE at the sub-national level. The UBEC and SUBEB are directly responsible for the provision of primary and Junior Secondary school services. Other commissions such as the NCNE and NMEC are responsible for the nomadic education and Non-formal Education aspects of the UBE, respectively. The Universal Basic Education Act (2004) defines “Universal Basic Education” as early childhood care and education, the nine years of formal schooling, adult literacy and non-formal education, skills acquisition programs and the education of special groups such as nomads and migrants, girl-child and women, almajiri², street children and disabled groups”. With reference to the 2004 Act, “Basic education” is the education offered to children within 3 and 14 years of age. This comprises ECCDE, and nine (9) years of formal education. Under the UBE Act, ECCDE provides for children under the 3-5 age groups by making the provision for every public primary school to have a pre-primary school (Nursery or Crèches). However, there is no provision for children in the 0-3 age group³. The nine-year education is free and compulsory for all children within the ages of 6-14 years. The 9-year period covers six (6) years of primary education, and three (3) years of junior secondary education⁴. Adults and dropout youths at the primary and junior secondary education levels are catered for under the Adult and Non-formal education programs of the UBE. During the 6-year Primary Education period children between the ages of 6 and 12 are given a sound basic education in reading, writing and mathematics along with an elementary understanding of other subjects such as, history, geography, natural science, social

² “Almajiri” is an Arabic word for someone who leaves his home in search of knowledge in Islamic religion. In the Nigerian context, most of those who are involved are mostly young boys, who end up on the street as beggars.

³ UNESCO (Nigeria), Education for All Global Monitoring Report 2007.

⁴ The term “free” is theoretical. Government makes provision for education but parents pay subsidies and levies to improve on what the government is able to provide.

science, art and music" (EFA Global Monitoring Report, 2002). These serve to develop the pupils' ability to obtain and use information on their immediate environment and nation (FME, 2005). Primary education comprises six (6) classes; Primary 1 to 6, a year is spent in each class. Junior secondary education is the first 3-years of secondary education aimed at impacting pre-vocational and academic skills on students in preparation for senior secondary education. Junior secondary schools (JSS) comprises three (3) classes; JS1, JS2, and JS3. The characteristics of Nigeria primary education sector are presented in Table 1.

Table 1: Brief Description of Nigeria Primary Education Sector

<ul style="list-style-type: none"> • Population 140 Million (2006 Census) • Completion rate in primary education (six years): Male 53.02% , Female 47.98% • Student teacher ratio: 36:1 • Total Primary Schools as at 2008: 54,434 • Number of children in grades (1-6): 21,294,518 as at 2008 • Total cost of primary education system: NGN473.07Billion • Percentage of budget going to teachers salaries : 72% (average of 2006-2010) • Unit cost of primary education: NGN22,215.54 	<p>Rural Population : 53.1%</p>
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Source: NBSs/UBE/PBA and BIA by CSEA/Africa Development Indicators 2008/09

Note: Unit cost of primary education is the 2003 value converted to 2007 (see FME, 2005)

3.2 Post-basic Education

This is the education taught to pupils after a successful completion of the basic education. Post-basic education is the second stage of the 9-3-4 educational system. It comprises 3 years senior secondary education or 3 years Technical education, and Continuing Education for those who have completed the basic and senior secondary but may not further their education. Among others, the PBE aims include; preparing students for higher education to become meaningful contributors to

national development and good ambassadors in the international arena. In addition, the tertiary education is an important component of Nigeria education system. According to the National Policy on Education (1998), tertiary education is defined as the “education given after secondary education in tertiary institution; Universities, Colleges of Education, Polytechnics, and Monotechnics providing courses leading to the award of degrees or diplomas”.⁵ Aimed at taught and research and development programs, the objectives of tertiary institutions include: to contribute to national development through high-level relevant manpower training; acquire both physical and intellectual skills, which will enable individuals to be self-reliant and useful members of the society; forge and cement national unity and promote national and international understanding and interaction, among others. The activities of the universities are supervised by the NUC, the National Board for Technical Education for Polytechnics and Monotechnics, and the NCCE for Colleges of Education.

3.3 Sources and Allocation of Funds

Every year, the Federal Government transfers 2 percent of its Consolidated Revenue Fund to the UBE. This fund is used in financing the activities of the UBEC according to a pre-determined ratio. The UBE also receives fund from other sources such as Federal Guaranteed Credits, and local and international donor grants. The UBE funds are made available to the states based on certain criteria. The criteria require all states to bring a matching grant of 50 percent of the total cost. Funds contributed by the Federal and State government are shared among primary school, JSS and the ECCDE in a 60 percent, 35 percent and 5 percent ratio, respectively. These allocated funds are further distributed to three (3) categories within the basic education components. Infrastructural development receives 70 percent, instructional materials 15 percent, and teachers’

⁵ Nigeria Education Sector Reform Bill Draft

professional development 15 percent. To ensure that these funds are properly utilized, the UBEC is responsible for the disbursement of all funds to the States.

Similarly, the Federal Government through its *Unity Schools* (senior secondary colleges), provides senior secondary education and makes provision for it in the national budget. However, parents/guardians are still expected to pay fees and levies for their children/wards as a way of complementing the efforts of the government. Table 2 provides the Federal Government expenditure in Basic (Primary and Junior Secondary) and Post-basic (senior secondary) education for the period of 2006-2009. The table reveals a fluctuating trend across basic education. However, PBE (senior secondary) shows some sustained increase from 2006 to 2008, with a reversal in 2009.

	2006	2007	2008	2009
Primary school expenditure	22,814,248,836	18,601,895,271	28,003,656,831	18,779,514,913
Junior secondary expenditure	13,308,311,821	10,851,105,575	16,335,466,485	10,954,717,033
Senior secondary	18,565,424,791	21,490,806,891	22,439,793,358	20,228,682,298

Source: *Program Budgeting Analysis by CSEA*

It shows that junior secondary education received the least allocation in all three categories. According to the UBEC sharing quota, primary education receives 60 percent of the UBEC allocation; junior secondary education received 35 percent while the early childhood care and development education (ECCDE) received 5 percent. However, with the present allocation, funding remains one of the major challenges to Nigeria education sector. The Benefit Incidence Analysis report (2010), prepared by CSEA, which partly evaluated the Nigeria education sector in three major priority areas; access and equity, funding and resource mobilization and utilization, concluded that the performance of the sector in these areas has been very weak. However, the federal and state governments of Nigeria, through various agencies, lunched a series of

programs/interventions aimed at overcoming some of these challenges. Motivated by these efforts, this study aims to provide government officials and policy makers with adequate information on the cost-effectiveness of alternative programs implemented in the FCT.

4. BACKGROUND

This section provides a brief discussion on FCT UBEB and some background on HGSF&H and EA programs. The FCT UBEB was established to provide quality basic education, which include early child care, primary, junior secondary and nomadic education to the teeming school age population in FCT. In order to perform its responsibility, allocation were made to the board by the federal government through universal basic education commission (UBEC). However, with the present allocation, funding remains one of the major challenges to education sector in FCT, hampering education delivery, monitoring, inspection and other quality assurance activities. In fact it is observed that the actual enrollment rates in early child care and primary education are significantly below the expected rates, leaving many children out-of-school. It is against this backdrop as well as other related issues that the federal government, through FCT UBEB, lunched a series of interventions, especially HGSF&H and EA programs, aimed at overcoming some of these challenges, especially the problem of low primary school enrollment, poor performance and learning achievements.

4.1 Home Grown School Feeding and Health Program

The HGSF&H program was first introduced by the WFP as the HGSF to purchase locally produced food that will be fed to pupils in schools under the program. The primary objective of the HGSF program was to increase school enrollment, attendance, retention, and completion among children from rural communities and poor backgrounds. Other objectives of the program include;

- increase small-scale farmers' access to the school feeding market, thereby increasing their income;
- encourage improved production practices among small-scale farmers;
- increase direct purchase from smallholders, reducing the roles of other participants in the supply chain who diminish their purchasing power;
- Create an enabling environment for small-scale farmers to access markets by providing market information, promoting aggregate supply and advocating for rules, regulations and incentives for smallholder procurement WFP

The initiative was to link a food based program to local agricultural production, with the aim of both meeting the demands of the program and stimulating the local economy. Following the initial success of the HGSF program, NEPAD, WFP and the MHTF signed a Memorandum of Understanding to enhance cooperation on HGSF. This later led to the launch of a pilot HGSF and Health program in twelve African countries (Angola, Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Malawi, Mali, Mozambique, Nigeria, Senegal, Uganda and Zambia). In Nigeria, the program was first launched in Nasarawa state in September 2005. Later the same year, the program was launched in Imo, Rivers, Osun, Ogun, Kogi, Bauchi, Yobe, Cross Rivers, Kebbi, and the Federal Capital Territory, Abuja. The FCT HGSF&H program is the focus of the present study. The HGSF&H program started with only one school and later grew to 30 schools by the end of the 2005. In 2006, the number increased to 80 schools and 144 in 2007. School-based Management Committees (SBMCs) were set up to manage, supervise the implementation of the program and ensure quality control. There were 144 SBMCs inaugurated, one in every school under the HGSF&H Program. In addition to the budgetary allocation, the program received contributions from other non-governmental organizations such as the Poultry Association of Nigeria, MTN, Zenith bank, the WTP and parents. The food served to the school children included rice, eggs,

indomie and other locally sourced food items. The program was suspended in February 2008 following funding constraints and a change in administration in the FCT. However, the program recorded an increased enrollment of 17,277 students over the entire implementation period.

4.2 Education Assistance Program

Similarly, in a bid to achieving goal 3 of MDGs as well as the broader target of Education for all, both of which seek to improve schools enrollment and provide six full year primary education of good quality, the Federal Government of Nigeria launched the EA program in 2007 in FCT, Abuja. The EA program is in form of scholarship award to students including those that participated in sport, indigent indigenes of FCT and residents that cannot lay claim to any states of Nigeria. The scholarship awards include the provision for NGN5000 per child, which covers the distribution of school materials such as school uniforms, school bags, textbooks and instructional materials. In 2007, the program started with 6063, 3566 and 982 beneficiaries in the primary, Junior and senior secondary schools, respectively. The benefiting schools are those in the area councils of *Abaji, Abuja Municipal, Bwari, Gwagwalada, Kuje and Kwali* along side with 1055 beneficiaries in the tertiary institutions. In 2008, the beneficiaries decreased to 5577, 2070 and 699 for the primary, junior and senior secondary school, respectively. The number of beneficiaries in tertiary institutions remained the same. School-based Management Committees were also set up to manage, supervise the implementation of the program and to ensure quality control. To ensure comparability of both programs, the focus of the analysis will be on primary school education, given that HGSF&H program was implemented in primary schools.

5. METHODOGY

This section sets out the assumptions, sources and methods of data collection, techniques used for the cost-effective and benefit-cost analyses and the description of the sensitivity analysis.

5.1 Assumptions

To facilitate the analysis, we make several assumptions. We assume that: part of the allocation from UBEC to FCT UBEB covers personnel cost of implementing HGSF&H program; the present infrastructure facilities will cater for the projected enrollment of pupils (i.e. infrastructure is not at full capacity); the average unit cost of primary education in Nigeria is made up of government expenditure on primary school per pupil as well as average expenditure incurred by parent in terms of fees, PTA, books and supplies, transportation and uniforms per pupil; that unit cost of primary education and programs to government remain the same for the period of analysis (zero inflation); the unit cost of primary education with the programs will exclude average expenditure by parents on fees and supplies, this is necessary to avoid the problem of double counting; average repeaters rate of 3% which is constant without the programs; the prospective repeaters that are saved by the programs will complete their primary education; average incremental income of first school leaving certificate holder is constant, with minimum of 35 years in service.

5.2 Data Sources

The Major source of data for this report is NBS. Other sources include; FCT UBEB, the World Bank, UBEC and FME. The NBS data are from the Annual Abstract of Statistics (2009). HGSF&H program data are from the FCT UBEB while school enrollments figures are from the UBEC and the FME. Given the challenges of getting the actual information on the programs and their cost components, especially the EA program, some data were derived through several computations, following relevant literature. We also had informal discussion with some government officials and

program managers. The unit of measurement applied in this study is pupil and the costs of all projects are expressed in Naira (local currency) and converted to the same base year - 2007.

5.3 PROGRAM Cost Effectiveness Analysis

The Program CEA tries to evaluate the relative cost-effectiveness of the HGSF&H and the EA programs by examining the achievement and impact of the programs with a given level of cost on the targeted population, in this case the pupils.

5.3.1 Effectiveness Measure

The HGSF&H and EA programs implemented by the Nigeria government at the public primary schools in the FCT are relatively new programs with little or no data to capture the effectiveness. This study sparks an effort to estimate them, but we think that the best available information is in the Schiefelbein and Wolff (2007) [hereafter SW] estimates based on the opinions of education planners and economists of 46 possible education interventions. These 46 possible primary school interventions on learning include those typically thought of in the African context and elsewhere in the world. They estimated the probable impact (PI) of the interventions as well as the probability that the interventions would be adequately implemented in typical low income English speaking African Countries comprising six East and West African countries⁶. Thereafter, SW estimated the incremental unit costs (IC) of these programs and then created an index ranking the cost-effectiveness of each programs. The PI is derived by multiplying the probability of correct implementation (PCI) with estimated achievement in test scores (ATS) for each intervention. While PCI represents the average chance of correctly implementing a program, ATS captures the extent to which an intervention could increase learning over the base score (50 points). Though no interventions were identified for Nigeria, but it is interesting to note that HGSF&H and EA

⁶ The opinion of the expert on these programs was actually sorted through a questionnaire devised by the author.

programs implemented by Federal Government in the FCT public primary school are similar to some of the 46 programs identified in their study. For example, we think that the HGSF&H and the EA programs are closest to the “school feeding programs: free lunch for everyone” and the “give each student 2 standard textbooks”, respectively. Also, Nigeria is a West African country and has similar characteristics with the prototypical English speaking East and West African countries included in the study. This therefore provides a good basis for adopting some of the measures and the estimation methodology used by SW. The information set out in Tables 1, 3, 4 and the opinion of the expert reported in SW provide estimates of the following indices for each program:

X = if fully implemented, expected % increase in the test score of the target population.

Y = % probability of full implementation of the intervention; Z = % Estimated Increase in cost

XY = % probable impact; Z/XY = Cost-Effectiveness.

5.4 Benefit-Cost Analysis

This subsection explains the technique of benefit–cost Analysis. For the BCA, the future cost of the programs is derived by projecting the repetition and enrollment costs over 12 years. The idea is to generate future cost associated with each intervention using 2007 figures as baselines. Thereafter the values are discounted to present value, using 3% discount rate. In terms of benefits, the estimation considers two sources, direct and indirect. Direct benefits are associated with government savings from the reduction in repetition rate (this is based on the potential impact on learning and improvement of grade score associated with EA and HGSF&H programs, taken from SW). The indirect benefit (total value of incremental earnings) is the life-time incremental earnings of primary school certificate holders saved from repetition. This benefit is distributed over the 35 years allowed in government employment in Nigeria. After computing the costs and benefit of alternative programs, the Net Present Value (NPV) and the Benefit-Cost ratios are then calculated

to evaluate the usefulness (attractiveness) of the programs, so that recommendations for uptake and implementation are provided.

5.5 Sensitivity Analysis

In order to determine the robustness of the estimates as well as to analyse the impact of uncertainty based on the underlying assumptions made in the analysis, a one-way (including worse and best case scenarios) and multi-way (with worse and best case scenarios) sensitivity analyses are conducted for the CEA and BCA. This will highlight the effect of varying key parameters estimates which are either uncertain or may change overtime. The essence of the analysis is to determine the extent to which one can rely on the initial results given that some of the parameters were taken from the literature. Some of the assumption made also demand that sensitivity analysis be carried out.

6. RESULTS

This section presents summary of costs, results and discussions of findings of the analysis.

6.1 Cost of Programs

The total cost of HGSF&H program in 2007 was NGN703, 559,157 as against NGN400, 119,644 in 2006 (See Table 1A in appendix). This wide difference is likely to reflect the increase in the number of beneficiaries as well as increased budgetary provision. The contributions of government as well as the communities to the program changed over the period as numbers of beneficiaries increased. Data on total cost of EA program is not available and deriving is not necessary, given that the number and unit cost of beneficiaries was made available (see background on EA program). However, data regarding the unit cost of ingredient in EA program is very important to conducting adequate sensitivity analysis. In this case, the study computed the cost of the

ingredients based on the adjusted 2003 average cost, adopted from FME estimated unit cost of primary education in Nigeria (See Appendix 1B).

Table 3: Summary Cost (in Naira) of Items in the EA program (2003 and 2007)

Year	2003	2007
Items		
Prescribed Textbooks	1,454.40	2,237.54
School Uniform	730.8	1,124.30
School Sandals/Socks	536.1	824.77
School Bags	456.8	702.77
Total	3,178.10	4,889.39
Personnel cost		110.61
Grand Total		5,000

Source: Computed by CSEA based on data from FME, 2005

Table 3 shows the average cost of items for the EA program. The 2007 value was 2003 adjusted average prices, and was estimated using the consumer price index based on 2007 prices. The Table shows that in 2003, the estimated average cost of ingredient for EA program per child was NGN3, 178, while the equivalent value in 2007 is estimated to be NGN4, 889.39. Based on these estimates the personnel costs per beneficiary were estimated.

Average (Unit) Cost of Program per Pupil

The average cost ratio is derived by dividing the total cost by the total number of pupils reached in each program that is the cost per child for the provision of the intervention. It is expected that the program with lower average cost ratio is the more economical program.

Table 4: Average cost estimates for HGSF&H

Year	Total Cost of Program (NGN)	Total No. of Beneficiaries	Average Cost (NGN)
2006	400,119,644	77,278	5177.67
2007	703,559,157	81,547	8,627.65
Total	1,103,678,801	158,825	

The per child cost of the HGSF&H program is around NGN5177.67 and NGN8, 627.65 in 2006 and 2007, respectively (see Table 4). These figures exceed the stated unit cost (NGN5, 000) of the EA program. It suggests that the EA program has a better efficiency in reaching 6063 pupils in FCT

public primary schools than the HGSF&H program which appears to be somewhat expensive.

Similarly, the unit cost of EA program is the same in both periods while the per unit cost of the HGSF&H program increased by 66.63%, indicating changes in the cost components of the program.

6.2 PROGRAM Cost Effectiveness

The cost-effectiveness ratio (CER) was derived by dividing the Incremental cost of each program by the Probable impact (Effectiveness). Usually, the program with the least CER is considered to be the program with the least cost and reasonable impact on beneficiaries. Overall, the cost effectiveness result shows that the EA program is more successful and efficient than the HGSF&H program. Table 5 shows the incremental cost and the average cost of primary education by programs, in Nigeria, while Table 6 presents the Incremental CER.

Table 5: Estimates of Incremental cost (in Naira) of HGSF&H and EA Programs.

Intervention	Total Number of Pupils	Program cost (NGN)	Unit cost (NGN)	Average cost of Primary Education (NGN)	Unit Cost of Primary education with Program (NGN)	Incremental Cost (NGN)	Incremental Cost (%)
Home Grown School Feeding and Health	81,547	665,639,681	8,627.65	22,215.54	29,518.49	7,302.95	32.87
Education Assistance	6,063	30,315,000	5,000	22,215.54	24,563.69	2,348.15	10.57

Source: *computed by Authors*

Incremental Cost

Prior to the HGSF&H and the EA interventions, average cost of primary education to government and parents is NGN22, 215.54. The results that emerge show that the introduction of HGHSF&H resulted in an incremental cost of about 32.87% on what the government and the parents spent per pupil prior to the program. The value is far higher than the 10.57% incremental cost estimated for the EA program. However, this does not in any way suggest how efficient the EA program is,

relative to the HGSF&H program. Information on the potential performance (effectiveness) of

both programs is provided in the CEA presented in Table 6.

Table 6: Estimates of Cost-Effectiveness Ratios (CERs) of HSGF&H and EA Programs.

Intervention	X- Estimated Increase in Achievement (%)	Y- Probability of Adequate implementation (%)	XY- Probable Impact (%)	Z- Incremental in Cost (%)	Z/XY- CERs	
					(%)	(NGN)
Home Grown School Feeding and Health	16.7	18.1	3.02	32.87	10.88	2,417.09
Education Assistance	14.4	41.0	5.9	10.57	1.79	397.66
$CER = \frac{Z}{XY} = \frac{\text{cost}}{\text{effectiveness}}$						

Source: Computed by Authors

Cost Effectiveness Ratios

The ratio of estimated increase in cost and probable impact gives the estimated value of the potential CER of each program. The results presented in Table 6 show that the CER of the EA program is NGN397.66 per student repetition averted which is relatively lower than the NGN2,417.09 estimated for the HSGF&H program. The huge difference arises because the EA program is only not more effective, but also cost less. This implies that the EA program, which has lower unit cost, has more positive impact on learning than the HSGF&H program. In sum, this suggests that the EA program is relatively cost-effective than the HSGF&H program.

6.3 Benefit-Cost Analysis

The ratio of the monetary value of the probable impact and the estimated unit cost of the programs gives the estimated value of the potential benefit-cost ratio of each intervention. Overall, the BCA shows that the EA program is more sustainable and beneficial than the HGSF&H program. Table 7 and Table 8 present projections of primary school enrollment, repeaters, government expenditure on repeaters and number of beneficiaries of the HGSF&H and EA

programs, respectively. Tables 9 and 10 present the estimates of the Benefit-Cost ratio (BCR) for both programs, respectively. Finally the BCR with and without the programs are presented in Table 11.

Enrollment, Expenditure, Repeaters and Beneficiaries

Prior to the introduction of the two education programs, the average enrollment in public primary school is estimated to 14% (see for example NBS, 2007 and PARP, 2010). Using this average, the study projected the total enrollment for the next 12 years, which stands at 7,447,148 pupils, with an associated government and household expenditure estimated at NGN165.4billion (see Table 7). However, with the present average number of repeaters of 3% in public primary schools, the projected total repeaters by the end of 2018 stand at 223,425 pupils. Recall, the EA and HGSF&H programs started as pilot programs in a few public primary schools in the FCT. However, the BCA is only an attempt to provide evidence on the potential gains that can justify the possibility of extending the programs to every school in the FCT.

Table 7: Projected Enrollment, Expenditure, Repeaters and Beneficiaries of EA and HGSF&H Programs

Year	Projected Enrollment based on 14% average	Total Exp. On primary education by Govt. and Hh before Programs (NGN'million)	Projected Repeater based on 3% average	Total Exp. on Repeaters by Govt. and Hh before programs (NGN'million)	Projected Number of Beneficiaries (HGSF&H)	% Projection of Beneficiaries	Projected Number of Beneficiaries (EA)	% Projection of Beneficiaries
2007	273,083	6.07	8192.49	182.00	81,547	-	6063	-
2008	311,315	6.92	9,339	207.48	311,315	282%	311,315	5035%
2009	354,899	7.88	10,647	236.53	354,899	14%	354,899	14%
2010	404,584	8.99	12,138	269.64	404,584	14%	404,584	14%
2011	461,226	10.25	13,837	307.39	461,226	14%	461,226	14%
2012	525,798	11.68	15,774	350.43	525,798	14%	525,798	14%
2013	599,410	13.32	17,982	399.49	599,410	14%	599,410	14%
2014	683,327	15.18	20,500	455.41	683,327	14%	683,327	14%
2015	778,993	17.31	23,370	519.17	778,993	14%	778,993	14%
2016	888,052	19.73	26,642	591.86	888,052	14%	888,052	14%
2017	1,012,379	22.49	30,371	674.72	1,012,379	14%	1,012,379	14%
2018	1,154,112	25.64	34,623	769.18	1,154,112	14%	1,154,112	14%
Total	7,447,178	165.44	223,415	4,963.30	7,255,642		7,180,158	

Source: computed by CSEA

The projections show that in the second year of the implementation of the programs, the number of beneficiaries for HGSF&H and EA program would increase by about 282% and 5035%, respectively. Thereafter, it will increase by 14% annually for both programs to meet the projected number of enrollments (see Table 7). As earlier stated, this analysis considers two sources of benefits for both programs namely; (1) direct benefits: government savings or reduction in expenditure as a result of the reduction of repetition rates and (2) indirect benefits: life-time incremental earnings of the primary school certificate holders that would have repeated (the study considers this as an important benefit of the program as continuous repetition of pupils can lead to high school drop-out and non-completion rates). Following the initial assumption and the probable impact of HGSF&H and EA program on student performance, this study estimated the reduction in repetition in public primary schools by the end of 2018. The result of this exercise is presented in Table 8. A more in-depth examination of public primary schools in Nigeria shows that around 15% of repeaters achieve an average score of 35-49%, while 5% and the remaining 80% achieve average scores of 30-34% and 0-29%, respectively. However, SW show that HGSF&H and EA programs have the potential to improve pupils test scores by 16.7% and 14.4%, respectively⁷. Therefore, with the EA program, 15% of the repeaters will achieve test scores of over 50%, while with the HGSF&H 20% will achieve a test score of over 50%. Based on this, the total reduction in repetitions by the year 2018 was projected at 43,534 and 32,311 for HGSF&H and EA programs, respectively (see Table 8).

Table 8: Reduction in Repetition Based on HGSF&H and EA Programs

Year	Projected Repeaters based on 3% average	Projected Reduction in Repeaters based on 16.7% for HGSF&H	Projected Reduction in Repeaters based on 14.4% for EA program

⁷ This based on further assumption that the programs will be implemented by the expert, such that probability of adequate implementation (PAI) becomes one (1).

2007	8,192	489	27
2008	9,339	1,868	1,401
2009	10,647	2,129	1,597
2010	12,138	2,428	1,821
2011	13,837	2,767	2,076
2012	15,774	3,155	2,366
2013	17,982	3,596	2,697
2014	20,500	4,100	3,075
2015	23,370	4,674	3,505
2016	26,642	5,328	3,996
2017	30,371	6,074	4,556
2018	34,623	6,925	5,194
Total	223,415	43,534	32,311

Source: computed by CSEA

The associated cost savings and the life-time incremental earnings from reduced repetition are estimated and the results are presented in Tables 9 and 10. Based on a 3% discount rate and the projected reduction in repetition as well as other assumptions, it is clear that the government will save a total of about NGN785.38million by the end of 2018 with the HGSF&H program, in present value terms.

Table 9: Benefit-Cost Ratio (BCRs) for HGSF&H Program

Present Value					
Year	Total Annual Exp saved by Govt. and Hh due to HGSF&H program (NGN' million)	Life-time incremental earnings of beneficiaries (NGN' billion)	Total benefits of HGSF&H Program (NGN' billion)	Total projected cost of Program (HGSF&H) (NGN' billion)	Net Value of HGSF&H program (NGN' billion)
2007	10.87	1.06	1.07	0.70	0.37
2008	40.29	4.05	4.09	2.61	1.49
2009	44.59	4.62	4.67	2.89	1.78
2010	49.35	5.27	5.32	3.19	2.12
2011	54.62	6.00	6.06	3.54	2.52
2012	60.46	6.85	6.91	3.91	2.99
2013	66.91	7.81	7.87	4.33	3.54
2014	74.06	8.90	8.97	4.79	4.18
2015	81.97	10.14	10.23	5.31	4.92
2016	90.72	11.56	11.65	5.87	5.78
2017	100.41	13.18	13.28	6.50	6.783
2018	111.13	15.03	15.14	7.19	7.95
Total	785.38	94.48	95.26	50.84	44.43
				Cost-Benefit Ratio	0.53
				Benefit-Cost Ratio	1.87

Source: computed by CSEA

Table 10: Benefit-Cost Ratio (BCR) for EA program

Year	Present Value				
	Total Annual Exp. Saved by Govt. and Hh Due to EA program (NGN' million)	Life-time incremental earnings of beneficiaries EA (NGN' billion)	Total Monetary Benefits of EA Program (NGN' billion)	Total Projected Cost of Program (EA) (NGN' billion)	Net Value of EA program (NGN' billion)
2007	0.61	0.59	0.59	0.03	0.30
2008	30.22	3.04	3.07	1.51	1.560
2009	33.44	3.47	3.50	1.67	1.83
2010	37.01	3.95	3.99	1.85	2.14
2011	40.97	4.50	4.55	2.05	2.50
2012	45.34	5.13	5.18	2.27	2.91
2013	50.18	5.85	5.90	2.51	3.39
2014	55.54	6.67	6.73	2.78	3.95
2015	61.48	7.61	7.67	3.07	4.59
2016	68.04	8.67	8.74	3.40	5.34
2017	75.31	9.89	9.96	3.77	6.20
2018	83.35	11.27	11.35	4.17	7.19
Total	581.49	70.12	70.70	29.08	41.62
<i>Source: computed by CSEA</i>				Cost-Benefit Ratio	0.41
				Benefit-Cost Ratio	2.43

Similarly, the life-time incremental earnings for the primary school certificate holders (saved from repetition - 35 years of service) were estimated and brought to its present value of NGN94.48billion.⁸ The NPV of the HGSF&H program which is about NGN44.43billion was derived by subtracting the total projected cost from the total benefits. Then the BCR was estimated at 1.87. Similar procedure was adopted for the EA program and the results are presented in Table 10. The results presented Table 10 show that total annual savings by government due to reduction in repetition by the end of 2018 is NGN581.49 million, while total life-time incremental earnings of the primary school certificate holders is NGN70.12billion. On the other hand, the total present cost of EA program stood at NGN29.08billion while the NPV of EA program is NGN41.62billion. The BCR is found to be 2.43. Overall, both programs appear to be beneficial, recording positive BCRs that are greater than unity. It is worth noting that the HGSF&H program recorded higher benefits than the EA program because it has more potential in reducing repetition (i.e. student achieve

⁸ Average of 3% discount is used to get the present value, the incremental cost of primary school qualification holders is a year is estimated to be (N101,000) and 35 maximum years of service in Nigeria is employed for the analysis.

higher test scores with HGSF&H than with EA) among the pupils. However, when costs and benefits are simultaneously considered, we find that the EA program is more beneficial- it has a higher BCR. Further analysis is presented on the total present benefits of government expenditure on primary school in FCT is presented in Table 11.

Table 11: Benefit-Cost Ratio (BCRs): With and without the Programs

Interventions	Year	Total life time benefit of primary 6 certificate holders (NGN' billion)	Total Projected cost of primary education in FCT (NGN' billion)	Net Value of primary education in FCT. (NGN' billion)	Benefit-Cost Ratio
Base	2007-2018	1,733.77	139.21	1,594.56	12.45
With HGSF&H Program	2007-2018	2,146.65	169.72	1,976.92	12.65
With EA Program	2007-2018	2,122.09	142.88	1,979.21	14.85
$BCR = \frac{TPV_{Benefit}}{TPV_{Cost}}, \text{ where } TPV \text{ is Total Present Value}$					

Source: computed by CSEA

The base case (without the programs) indicates that if government continues with the present expenditure and cater for the future primary school enrollment in FCT without any program, it will result in an NPV of NGN1.59trillion with an associated BCR of 12.45. However, with the introduction of HGSF&H and EA programs, which reduces the repetition rate and increases the chances of school completion, the NPV of primary school education improves to NGN1.977trillion for the HGSF&H and NGN1.979trillion for the EA, with associated BCRs of 12.65 and 14.85, respectively. In both cases the evidence that emerge shows an incremental monetary benefit for both programs, but with EA program presenting higher net benefits in terms of reaching government policy objectives.

6.4 Sensitivity Analysis

This sub-section presents the sensitivity analysis on the CEA and BCA results. While the sensitivity analysis of BCA focuses on the reduction of the benefits for EA and the reduction in costs for HGSF&H that of the CEA focuses on the adjustment of three key parameters namely; personnel

cost, the cost of other Ingredients and the Probable Impact (effectiveness). This exercise entails re-estimating of the CERs as well as the BCRs of the EA and HGSF&H interventions using different (lower or higher) values for the parameter. The results are presented in Tables 12 and 13.

The sensitivity analysis of the CEA results presents seven different possible scenarios namely;

1. Sensitivity of EA program to increase in personnel cost or/and sensitivity of HGSF&H program to decrease in personnel cost.
2. Sensitivity of EA program to increase in the cost of other ingredients or/and sensitivity of HGSF&H program to decrease in cost of other ingredients.
3. Sensitivity of EA program to decrease in probable impact (effectiveness) or/and sensitivity of HGSF&H program to increase in probable Impact.
4. Sensitivity of EA program to increase in personnel cost & the cost of other ingredients or/and sensitivity of HGSF&H program to decrease in personnel cost & the cost of other ingredients.
5. Sensitivity of EA program to increase in personnel cost & decrease in probable impact (effectiveness) or/and sensitivity of HGSF&H program to decrease in personnel cost & increase in probable Impact.
6. Sensitivity of EA program to increase in the cost of other ingredients & decrease in probable impact (effectiveness) or/and sensitivity of HGSF&H program to decrease in the cost of other ingredients & increase in probable Impact.
7. Sensitivity of EA program to increase in personnel cost, the cost of other ingredients & decrease in probable impact (effectiveness) or/and sensitivity of HGSF&H program to decrease in personnel cost, the cost of other ingredients & increase in probable Impact.

6.4.1 Summary of Sensitivity Analysis: Cost-Effective Analysis

Overall, the findings of the sensitivity analysis affirm the initial results, which support the implementation of the EA program. The EA program has to become much worse for the HGSH&H program to be preferred. For example, increase of 10%, 20% and 30% in the personnel cost of EA program leads to incremental cost of NGN2,359.22, NGN2,370.28 and NGN2,381.34, respectively. These therefore increased the CER to 1.80, 1.81 and 1.82, respectively. Similarly, decreases of 10%, 20% and 30% in personnel cost of HGSH&H program still leave the EA program as the preferable alternative. In all the scenarios, the estimated CERs of the EA are still lower than the CERs estimated for the HGSH&H program. This implies that the results are robust to changes in the parameters and assumptions.

Table 12: One-way and Multi-way Sensitivity Analysis on CEA Results; 1, 2, 3, 4 & 5

	Education Assistance Program				Home Grown School Feeding and Health Program			
	Sensitivity on personnel cost							
	Increase in personnel cost				Decrease in personnel cost			
	Base case	10%	20%	30%	Base case	10%	20%	30%
Personnel Cost (NGN)	110.62	121.68	132.74	143.80	3,336.63	3,002.97	2,669.30	2,335.64
Unit cost of Program (NGN)	5,000.00	5,011.06	5,022.12	5,033.18	8,627.65	8,293.99	7,960.33	7,626.66
Ave. Unit Cost (in Naira) of Pry Edu.	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54
Ave. Unit Cost (in Naira) of Pry Edu. in Nigeria After Intervention	24,563.69	24,574.75	24,585.82	24,596.88	28,805.19	28,471.53	28,137.87	27,804.20
Incremental Cost (NGN)	2,348.15	2,359.22	2,370.28	2,381.34	6,589.65	6,255.99	5,922.33	5,588.66
% of incremental Cost (Z)	10.57	10.62	10.67	10.72	29.66	28.16	26.66	25.16
Probable Impact (XY)	5.90	5.90	5.90	5.90	3.02	3.02	3.02	3.02
Cost- Effectiveness Ratio (Z/XY)	1.79	1.80	1.81	1.82	9.81	9.32	8.82	8.32
	Sensitivity on the cost of other ingredient							
	Increase in the cost of other ingredients				Decrease in the cost of other ingredients			
	Base case	10%	20%	30%	Base case	10%	20%	30%
Ingredient Cost (NGN)	4,889.38	5,378.32	5,867.26	6,356.20	5,291.02	4,761.92	4,232.82	3,703.72
Unit cost of Program (NGN)	5,000.00	5,488.94	5,977.88	6,466.82	8,627.65	8,098.55	7,569.45	7,040.34
Ave. Unit Cost (in Naira) of Pry Edu.	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54
Ave. Unit Cost (in Naira) of Pry Edu. in Nigeria After Intervention (NGN)	24,563.69	25,052.63	25,541.57	26,030.51	28,805.19	28,276.09	27,746.99	27,217.88
Incremental Cost (NGN)	2,348.15	2,837.09	3,326.03	3,814.97	6,589.65	6,060.55	5,531.45	5,002.34
% of incremental Cost (Z)	10.57	12.77	14.97	17.17	29.66	27.28	24.90	22.52
Probable Impact (XY)	5.90	5.90	5.90	5.90	3.02	3.02	3.02	3.02
Cost- Effectiveness Ratio (Z/XY)	1.79	2.16	2.54	2.91	9.81	9.03	8.24	7.45
	Sensitivity on effectiveness							
	Decrease in probable impact (effectiveness)				Increase in probable impact (effectiveness)			
	Base case	10%	20%	30%	Base Case	10%	20%	30%
Unit cost of Program (NGN)	5,000.00	5,000.00	5,000.00	5,000.00	8,627.65	8,627.65	8,627.65	8,627.65
Ave. Unit Cost (in Naira) of Pry Edu.	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54
Ave. Unit Cost (in Naira) of Pry Edu. in Nigeria After Intervention	24,563.69	24,563.69	24,563.69	24,563.69	28,805.19	28,805.19	28,805.19	28,805.19
Incremental Cost (NGN)	2,348.15	2,348.15	2,348.15	2,348.15	6,589.65	6,589.65	6,589.65	6,589.65
% of incremental Cost (Z)	10.57	10.57	10.57	10.57	29.66	29.66	29.66	29.66
Probable Impact (XY)	5.90	5.31	4.72	4.13	3.02	3.32	3.63	3.93

Cost-Effectiveness Analysis: Education Sector.

FCT, Nigeria.

Cost- Effectiveness Ratio (Z/XY)	1.79	1.99	2.24	2.56	9.81	8.92	8.18	7.55
Sensitivity on personnel cost and the cost of other ingredients								
	Increase in personnel cost & the cost of other ingredients				Decrease in personnel cost& the cost of other ingredients			
	Base case	10%	20%	30%	Base case	10%	20%	30%
Ingredient Cost (NGN)	4,889.38	5378.32	5867.26	6356.20	5,291.02	4,761.92	4,232.82	3,703.72
Personnel Cost (NGN)	110.62	121.68	132.74	143.80	3,336.63	3,002.97	2,669.30	2,335.64
Unit cost of Program (NGN)	5,000.00	5,500.00	6,000.00	6,500.00	8,627.65	7,764.89	6,902.12	6,039.36
Ave.Unit Cost (in Naira) of Pry Edu.	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54
Ave.Unit Cost (in Naira) of Pry Edu. in Nigeria After Intervention	24,563.69	25,063.69	25,563.69	26,063.69	28,805.19	27,942.43	27,079.66	26,216.90
Incremental Cost (NGN)	2,348.15	2,848.15	3,348.15	3,848.15	6,589.65	5,726.89	4,864.12	4,001.36
% of incremental Cost (Z)	10.57	12.82	15.07	17.32	29.66	25.78	21.90	18.01
Probable Impact (XY)	5.90	5.90	5.90	5.90	3.02	3.02	3.02	3.02
Cost- Effectiveness Ratio (Z/XY)	1.79	2.17	2.55	2.93	9.81	8.53	7.24	5.96
Sensitivity on personnel cost & effectiveness								
	Increase in personnel cost & decrease in effectiveness				Decrease in personnel cost & increase in effectiveness			
	Base case	10%	20%	30%	Base Case	10%	20%	30%
Personnel Cost (NGN)	110.62	121.68	132.74	143.80	3,336.63	3,002.97	2,669.30	2,335.64
Unit cost of Program (NGN)	5,000.00	5,011.06	5,022.12	5,033.18	8,627.65	8,293.99	7,960.33	7,626.66
Ave.Unit Cost (in Naira) of Pry Edu.	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54
Ave.Unit Cost (in Naira) of Pry Edu. in Nigeria After Intervention	24,563.69	24,574.75	24,585.82	24,596.88	28,805.19	28,471.53	28,137.87	27,804.20
Incremental Cost (NGN)	2,348.15	2,359.22	2,370.28	2,381.34	6,589.65	6,255.99	5,922.33	5,588.66
% of incremental Cost (Z)	10.57	10.62	10.67	10.72	29.66	28.16	26.66	25.16
Probable Impact (XY)	5.90	5.31	4.72	4.13	3.02	3.32	3.63	3.93
Cost- Effectiveness Ratio (Z/XY)	1.79	2.00	2.26	2.59	9.81	8.47	7.35	6.40

Table 13: One-way and Multi-way Sensitivity Analysis on CEA Results: 6 & 7

	Education Assistance Program				Home Grown School Feeding and Health Program			
Sensitivity on the cost of other ingredient & effectiveness								
	Increase in the cost of other ingredients & decrease in effectiveness				Decrease in the cost of other ingredients & increase in effectiveness			
	Base case	10%	20%	30%	Base Case	10%	20%	30%
Ingredient Cost (NGN)	4,889.38	5,378.32	5,867.26	6,356.20	5,291.02	4,761.92	4,232.82	3,703.72
Unit cost of Program (NGN)	5,000.00	5,488.94	5,977.88	6,466.82	8,627.65	8,098.55	7,569.45	7,040.34
Ave.Unit Cost (in Naira) of Pry Edu.	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54
Ave.Unit Cost (in Naira) of Pry Edu. in Nigeria After Intervention	24,563.69	25,052.63	25,541.57	26,030.51	28,805.19	28,276.09	27,746.99	27,217.88
Incremental Cost (NGN)	2,348.15	2,837.09	3,326.03	3,814.97	6,589.65	6,060.55	5,531.45	5,002.34
% of incremental Cost (Z)	10.57	12.77	14.97	17.17	29.66	27.28	24.90	22.52
Probable Impact (XY)	5.90	5.31	4.72	4.13	3.02	3.32	3.63	3.93
Cost- Effectiveness Ratio (Z/XY)	1.79	2.40	3.17	4.16	9.81	8.20	6.86	5.73
Sensitivity on personnel cost, the cost of other Ingredient & effectiveness								
	Increase in personnel cost, the cost of other ingredients & decrease in effectiveness				Decrease in personnel cost, the cost of other ingredients & increase in effectiveness			
	Base Case	10%	20%	30%	Base Case	10%	20%	30%
Ingredient Cost (NGN)	4,889.38	5,378.32	5,867.26	6,356.20	5,291.02	4,761.92	4,232.82	3,703.72
Personnel Cost (NGN)	110.62	121.68	132.74	143.80	3,336.63	3,002.97	2,669.30	2,335.64
Unit cost of Program (NGN)	5,000.00	5,500.00	6,000.00	6,500.00	8,627.65	7,764.89	6,902.12	6,039.36
Ave.Unit Cost (in Naira) of Pry Edu.	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54	22,215.54
Ave.Unit Cost (in Naira) of Pry Edu. in Nigeria After Intervention.	24,563.69	25,063.69	25,563.69	26,063.69	28,805.19	27,942.43	27,079.66	26,216.90
Incremental Cost (NGN)	2,348.15	2,848.15	3,348.15	3,848.15	6,589.65	5,726.89	4,864.12	4,001.36
% of incremental Cost (Z)	10.57	12.82	15.07	17.32	29.66	25.78	21.90	18.01
Probable Impact (XY)	5.90	5.31	4.72	4.13	3.02	3.32	3.63	3.93
Cost- Effectiveness Ratio (Z/XY)	1.79	2.41	3.19	4.19	9.81	7.75	6.04	4.58

Source: Computed by CSEA with partial adaptation from SW.

6.4.2 Summary of Sensitivity Analysis: Benefit-Cost Analysis

This section evaluates the extent to which the risks inherent in the EA program could affect the overall project life time relative to the benefits and the overall desirability of the project, compared to the HGSF&H program. Two scenarios are presented in Table 14. First, is a reduction in life time benefits of the EA program and second, a reduction in the cost of the HGSF&H program. For the first, the study established three alternatives that considered 10%, 15% and 20% reductions in the benefits of the EA program. On the second sensitivity scenario, the study examined the effect of 10%, 15% and 20% reductions in the cost of HGSF&H program. For all scenarios, the results show that the EA program is more beneficial than the HGSF&H. For example, a 20% reduction in the total cost of HGSF&H program increased the benefit-cost ratio from 1.87 to 2.34.

Table 14: One-way Sensitivity analysis of Benefit-Cost Analysis

One-way sensitivity	Scenario 1 – reduction in Benefits EA Program			
	Base	10%	15%	20%
Total Benefits (NGN)	70,702,493,531.46	63,632,244,178.31	60,097,119,501.74	56,561,994,825.17
Total Cost (NGN)	29,083,329,259.35	29,083,329,259.35	29,083,329,259.35	29,083,329,259.35
BCRs for EA	2.43	2.19	2.07	1.94
Total Benefits (NGN)	95,262,949,321.43	-	-	-
Total Cost (NGN)	50,835,419,880.41			
BCR for HGSF&H	1.87	-	-	-
One-way sensitivity	Scenario 2 - reduction in cost of HGSF&H Program			
	Base	10%	15%	20%
Total Benefits (NGN)	95,262,949,321.43	95,262,949,321.43	95,262,949,321.43	95,262,949,321.43
Total Cost (NGN)	50,835,419,880.41	45,751,877,892.37	43,210,106,898.35	40,668,335,904.33
BCRs for HGSF&H	1.87	2.08	2.20	2.34
Total Benefits (NGN)	70,702,493,531.46			
Total Cost (NGN)	29,083,329,259.35	-	-	-
BCR for EA	2.43	-	-	-

Source: Computed by CSEA

7. CONCLUSION

This report has systematically conducted the cost-effectiveness and benefits-cost analysis of two education interventions – HGSF&H and EA in FCT, Nigeria. The findings show that EA program has a lower-cost per beneficiary and a higher effectiveness value. However, the cost effectiveness

ratio and in particular, the NPV and the benefit–cost ratio indicate that both programs are beneficial and implementable. In comparative terms, the EA program is more efficient, beneficial and sustainable. This result is consistent with similar studies that find that high-cost intervention like the HGSF&H is less likely to be well implemented, making it relatively less effective and efficient than some low-cost interventions. The likely reasons for the low-effectiveness and inefficiency of high-cost program such as HGSF&H are (1) source of program funding and lack of continuity; (ii) Mismanagement, corruption and misappropriation of funds; (iii) traditions and values of different homes and families. In sum, the findings provide answers to the first, second and third research questions asked at the earlier part of this report.

8. POLICY RECOMMENDATIONS

A number of important policy recommendations emerge from this analysis and include the following:

- First, for the Government is to achieve the goal of increased public primary school enrollment and learning outcomes, there is need to re-allocate some resources from the HGSF&H program to the EA program – for example, if 50% of the resources of the feeding program were diverted to EA, about 26% additional students would be covered because of the lower cost of EA program and there would be additional 4% reduction in repetition.
- Second, measures should be initiated to further reduce unit cost in order to extend the benefits and coverage of EA program to pupils in other parts of the country, while ensuring that quality of service is not compromised. For example, if a 20% reduction in the unit cost of the EA program can be achieved, it will increase the exiting coverage from 2.22% to 2.57%.

- Third, the savings generated by the government from reduced repetition can be used to take-up additional school age children/pupils that are not yet benefiting from the program or to provide additional materials under the EA program. With the present 6063 beneficiaries of EA program, the money saved from reduction in repetition can cater for additional 121 pupils.
- Fourth, there is a need to extend the program to all parts of the country, especially to the states where the program has not been introduced. The federal government through UBEC and other relevant agencies should encourage states and local government to adopt the EA program in their various states.
- Finally, impact evaluation should be introduced – beneficiaries in public primary school should be evaluated regularly either through a test score or other related means. This way, it will be easy to see whether the programs are being adequately implemented and if there are improvements in performance that can be associated with such interventions.

9. CHALLENGES TO CONDUCTING THIS WORK

The major challenges faced in conducting this study were lack of access to the required data and program documents. Officials and individuals involved in the programs were not willing to release/disclose the program documents or answer certain questions. Some of the documents were termed 'sensitive' since some of the program costs are likely to have been manipulated and were not to be made public. Data on unit cost of primary education and exiting impact of the two programs were not available; therefore arriving at a good effectiveness measure was a major challenge. However, we attempted to generate some data through several computations, interactions and interview with some government officials/individuals, as well as using market estimates. For the effectiveness measure, the values were generated from similar programs discussed in the literature.

10. LIMITATIONS

This study, like many similar studies, has some limitations. HGSF&H has three main components: – agriculture, school feeding and health. These components also have their complications in terms of costing, measuring and isolating effectiveness and benefits. With this in mind, and coupled with lack of data, the analysis focused on the school feeding as a means of increasing enrollment, retention and reducing repetition, ignoring other benefits like agriculture and health. This therefore limits the ability of this analysis to generalize. For a more in-depth understanding of the usefulness and sustainability of HGF&H interventions this study suggests that additional research should be carried out on the cost-effectiveness and benefit-cost analyses of HGSF&H taking into account all the components and the associated benefits.

11. PLANS FOR DISSEMINATION

The findings of this study will be disseminated using various strategies including:

- Media: Press conferences, press releases, policy briefs as well as newspaper publications will be used to reach out to potential stakeholders and policy makers.
- Collaboration and sharing research findings with Civil Society Groups, Community Based organizations, academicians, economists and researchers working on similar project.
- Interactive communication: seminars, workshop and conferences will be conducted with various representatives of civil society organisation, non- governmental organisations, policy makers and stakeholders to share result of the findings.
- Website: the final report will be available on CSEA website as a source of information to interested parties, to create awareness and inform different audiences of findings and implications of projects.

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Appendix

- Appendix 1A

Summary Cost of Home Grown School Feeding and Health Program (HGSF&HP).

INPUT	Unit cost	Quantity utilized as at 2007	Cost as at 2007	Quantity utilized as at 2006	Cost as at 2006	Incremental quantity	Incremental cost
GOVERNMENT INPUTS							
UBEC to FCT UBEB			44,350,000		44,350,000	-	-
Federal Capital Territory Adm. to FCT UBEB			499,834,000		204,719,037		295,114,963
Total			544,184,000		249,069,037	-	295,114,963
NON-GOVERNMENT INPUTS							
Zenith bank			107,142.86		107,142.86	-	-
Eggs (poultry Association)	20	5142.86	102,857.20	5142.86	102,857.20	-	-
Community contributions	10	81,547(195)	159,016,650	77,278(195)	150,692,100	4,269	8,324,550
MTN (bags of rice)	6189/Bag	21.43	132,630.27	21.43	132,630.27		-
50 gallons of vegetable oil	740.88 /gallon	21.43	15,877.06	21.43	15,877.06		-
TOTAL			159,375,157		151,050,607		303,439,513
Grand Total			703,559,157		400,119,644		

Note:

1. The HGSF&H program actually started towards the end of 2005, but since this analysis is annual basis, its emphasis is on 2006 and 2007.
2. The personnel costs for the HSGF&H Program were recognized in the cost of the project as an allocation to UBEC.

3. The 2007 FCTA allocation value to FCT UBEB was based on the budgetary provision, as we could not get to the actual value
4. Non-Governmental inputs to the program were received at the inception of the program, Sept. 2005. To arrive at the annual value of donations, the cost was first split over the months, Sept. 2005 to Dec.2007 and later incorporated accordingly to the estimates.

- **Appendix 1B**

Unit Cost (in Naira) Characteristics in Primary Education in Nigeria

Year	20003		2007 adjusted
Items	Primary		
Tuition Fees		1,674.00	2,575.38
Learning Materials			
Prescribed Textbooks	1,454.40		2,237.54
Notebooks/Drawing Books	575.20		884.93
Physical Education Materials	532.20		818.77
Pencils	164.60		253.23
Other Materials	629.00		967.69
SUB-TOTAL		3,356.20	5,162.16
Clothing Materials			
School Uniform	730.80		1,124.30
Caps/Beret/Badge	282.40		434.46
School Sandals/Socks	536.10		824.77
School Blazer/Cardigan	494.60		760.93
School Bags	456.80		702.77
Pants and other Underwear	454.90		699.85
Umbrella/raincoats	477.80		735.07
Others	838.90		1,290.62
SUB-TOTAL		4,272.40	6,572.77
Miscellaneous Items			
Lunch in School	1,324.70		2,038.00
Transportation	1,312.00		2,018.46
School Report Card	129.60		199.38
PTA Levy per annum	216.00		332.31
Development Levy per annum	270.00		415.39

Cost-Effectiveness Analysis: Education Sector.

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Examination Fees	216.00		332.31
Sports and Games	362.20		557.23
Founder's Day Celebration	295.40		454.46
End-of-year activities	311.30		478.92
Other areas	700.30		1,077.39
SUB-TOTAL		5,137.50	7,903.85
	Total	14,440.10	22,215.54

Source: Adapted from FME, 2005 based on the 2003 field Survey programme