



# Inclusive education expenditure in Senegal: evidence from a pilot project



**Irish Aid**

An Roinn Gnóthaí Eachtracha agus Trádála  
Department of Foreign Affairs and Trade



**Sightsavers**

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Particular thanks to Senegal country office for their support and to Salimata Bocoum, Guy Le Fanu and Paul Lynch for their feedback. Many thanks to Irish Aid for their financial contributions to this study.

## Acronyms

Table 1. Acronyms

Acronym	Description
<b>APE</b>	The Association of Parents of Students (L'association des Parents d'Elèves)
<b>BPO</b>	Blind People's Organisation
<b>CORIPH</b>	Council for the Rehabilitation and Integration of Persons with Disabilities
<b>CRFPE</b>	Regional Centre for Training of Education Personnel
<b>DEE</b>	Board of Elementary Education (Direction de l'enseignement élémentaire)
<b>DPO</b>	Disabled People's Organisation
<b>GAS</b>	Global Accounting System
<b>HI</b>	Handicap International
<b>LMIC</b>	Low and Middle-Income Countries
<b>IE</b>	Inclusive education
<b>IT</b>	Itinerant Teacher (Maître referent)
<b>MoE</b>	Ministry of Education
<b>LV</b>	Low vision
<b>MoH</b>	Ministry of Health and Social Action
<b>NGO</b>	Non-Governmental Organisation
<b>PTA</b>	Parent-Teacher Association
<b>UNICEF</b>	United Nations Children's Fund

<b>USD/\$</b>	United States Dollars
<b>VI</b>	Visual impairment
<b>XOF/FCFA</b>	West African CFA Francs

## Executive summary

In 2010, Senegal ratified the International Convention on the Rights of Persons with Disabilities, but despite a number of initiatives by the government, children with disabilities are not yet fully accessing basic services - including health and education. The economic burden of educational exclusion is not limited to individuals and their families, as it has substantial societal costs. Inclusive education (IE) is often considered financially challenging for resource-poor settings, but there is little real-life data to make accurate budgetary estimates.

This study was funded by Sightsavers and by Irish Aid and sought to identify the incremental expenditure of including children with disabilities in mainstream public primary schools, with a particular focus on children who were blind or had low vision (LV). Three schools were selected in three suburban districts of Dakar, Senegal to pilot an inclusive education (IE) programme. Overall, 240 children with disabilities - primarily with visual impairment (VI) - were recorded in school registers in the period from September 2011 to June 2017, representing a total of 716 academic years completed, excluding those who enrolled and dropped out.

The expenditure analysis was from the perspective of the national education system. The majority of expenditures were incurred by the international non-governmental organisation (NGO) Sightsavers, who supported the implementation of the pilot. Expenditures were obtained from Sightsavers' global accounting system and other financial records from project partners spanning the 2011-2016 financial years. As the analysis was incremental, expenditures were only included if they were directly related to the IE intervention. Expenditures that were excluded comprised those that were indirect (such as capital expenditures incurred at schools before initiation of the pilot) and the expenditures borne by beneficiaries including children with disabilities and their families. A mixed-method approach was used to report expenditure estimates; where possible expenditure components were identified at the aggregate level and allocated to specific inputs and activities. Where accounting or financial records were unavailable to estimate specific activity costs, cost estimations were made based on current market values, and then aggregated at the school level. The expenditures were reported in both West African CFA Francs (XOF) and US Dollars (USD) for comparison.

The total expenditure of the IE pilot over the six-year period was FCFA 548,181,885 (1,077,618 US Dollars). The average annual expenditure was FCFA 91,363,648 (165,782 US Dollars), with the highest expenditure occurring in year one (FCFA 101,941,613 / 216,320 US Dollars), which included start-up costs (such as elaboration of IE modules, training of teachers, establishment of parental guidelines and the purchase of IE equipment).

The average expenditure per child with disability and per academic year was FCFA 765,617 (1,505 US Dollars) ranging from FCFA 3,185,675 (6,760 US Dollars) in year one - where only 32 children with disabilities were enrolled and completed the school year to FCFA 531,633 (893 US Dollars) in year six, where 191 children were enrolled and completed the school year.

The largest expense in terms of input was personnel amounting to FCFA 143,435,403 (281,702.96 US Dollars), or 26.1% of the overall project expenditure, followed by accommodation, catering and event management services for organised training (FCFA 121,991,862/ 237,458 US Dollars) - 22% of the total expenditure.

The greatest expense (40%) in terms of activities was for teaching and support services for children with disabilities, amounting to FCFA 216,591,023 (426,836 US Dollars); followed by IE materials and assistive devices (FCFA 81,780,487 / 161,039 US Dollars) - 15% of the total expenditure.

Based on this pilot study, we made projections using the average annual expenditure per academic year for children with disabilities, assuming a minimum number of six and a maximum number of ten children with visual disabilities per inclusive class per grade. The study estimated that the scale-up of IE of children with blindness or VI alone in Senegal might require at least an additional FCFA 360,075,000-600,125,000 (704,000-1,173,000 US Dollars) annually, which is a 0.2-0.34% increase of the current primary education expenditure of Senegal. This study, however, was not able to make any estimates for educating children with non-VI disabilities, as the number of such children in the three pilot schools was very small.

It may be possible to minimise the expenditure required for scale-up by allocating programme management and supervision function to the existing education structures; constructing new schools using inclusive design and standards; bulk purchasing of education materials and assistive devices and integration of IE training into pre-service training or other education awareness-raising events.

To make more accurate projections of expenditure required for the scale-up of IE in Senegal, it is recommended to develop minimum standards for educational inclusion of children with VI and other disabilities; to pilot and estimate the expenditure of IE for children with non-VI impairments; to collect more accurate data on the prevalence and distribution of disability in children in Senegal; and on the severity of VI and academic progress of children currently in education. It is also essential for IE to be considered in the 2017-2030 Government Education Strategic Plan and to align future projections with the standard government procedures and processes for budget allocations.

## Background

Senegal is a lower-middle income country (LMIC) located on the West coast of Africa's Sahel region (Figure 1), with a per capita gross domestic product (GDP) of 910.80 US Dollars in 2015 (World Bank Group, 2016). The country has an estimated population of 14 million people with around 43.7% being below the age of 15 years. The country is subdivided into 14 regions, the largest city being the capital, Dakar (UN Statistical Division, 2015).



Figure 1. Location of Senegal

The education system of Senegal is based on the French education system, where the state is responsible for enabling access to education for all citizens, and the Senegalese Constitution guarantees access to education for all children. Education is compulsory and free up to the age of 16. However, due to limited resources and low demand for secular education in areas where Islamic education is more prevalent, the law is not fully enforced.

The net primary enrolment rate (the share of children of primary school age enrolled in primary schools) is estimated at 72.34% (UNESCO Senegal country profile, ND); but there are significant socio-economic variations with the rate being close to 78% in the top economic quintile and only 47% in the poorest quintile (UNICEF Senegal statistics, 2013). In addition, the enrolment data does not take into account the actual school attendance, and the number of children regularly attending schools is thought to be lower. Some data suggests that around 37% of children of primary school age in the country are currently out of school. The proportion is slightly higher among boys than girls (39% vs 36%) and is particularly high among rural (49%) compared to urban populations (19%) and among the poorest (52%) compared to the wealthiest (20%) quintile (FHI 360, 2014).

Primary school is designed for children aged seven to 12 years. It includes six years of study divided into three cycles of two years, which leads to achieving the Certificate of Elementary Completion (CFEE) and an entrance test into the next cycle of education. For children enrolled in the education system, attendance is mandatory until the completion of the second-year elementary course. The curriculum places an emphasis on French grammar and reading, maths, science and geography (UNESCO, 2010).

The government is the main funder of public education in Senegal, regarding operating and capital expenditures. In 2014, the total annual expenditure on public primary education was FCFA 177,821,000,000 (approximately 360,976,630 US Dollars) (MoE Senegal Financement public et extérieur de l'Éducation au Sénégal, 2016). The majority of the education budget is allocated at primary school level (MoE Senegal Financement public et extérieur de l'Éducation au Sénégal, 2016) as 75% of the estimated 2,365,000 children enrolled in education are in primary schools (1,783,000) (FHI 360, 2014). An additional budget of FCFA 100,000,000 (163,128 US Dollars) is allocated annually to support special needs education in special and/or inclusive schools.

The United Nations Convention on the Rights of Persons with Disabilities states that children with disabilities should have access to “an inclusive, quality and free” primary and secondary education, with “effective individualised support measures” (UNCRC, 2006). See Appendix 2 for other legislative directives.

However, the number of children with disabilities not attending school remains high (UNESCO Institute for Statistics global databases, 2015). Data on the prevalence of disability in children is scarce and varies between studies depending on the methodology and definitions used. The 2004 Global Burden of Disease Study estimated that around 5.1% of children aged 0-14 years worldwide had a moderate or severe disability (World Health Organisation, 2008). Empirical studies in low and middle-income countries (LMICs) in more recent years suggested lower estimates. For example, research by the International Centre for Evidence in Disability at the London School of Hygiene and Tropical Medicine (LSHTM) measured the prevalence of physical, visual and hearing impairments, epilepsy and cerebral palsy in children aged 0-18 years and estimated the prevalence of one or more impairment at 1.7% in Malawi, 0.9-1.4% in Bangladesh and 0.5% in Pakistan (Mactaggart and Murthy, 2013 and Tataryn M et al, 2015). A study by Plan International conducted in Senegal in 2013 estimated the prevalence of disability among children registered in the Plan International database at 0.5% (Plan International, 2013).

The economic burden of educational exclusion is not limited to individuals and their families, but has substantial societal costs. IE is often considered financially challenging for resource-poor settings. However, economic costs associated with the continuous exclusion of persons with disabilities can be significantly greater (Banks & Polack, 2014). For example, a study by Thomas and Barnett (2013) conducted in 20 low-income countries estimated the economic cost of out-of-school children (many of whom will have disabilities) to be “greater than the value of an entire year of GDP growth”.

In 2010, Senegal ratified the International Convention on the Rights of Persons with Disabilities, but despite a number of initiatives by the government, children with disabilities are not yet fully accessing basic services, including health and education. Moreover, a significant number of children receiving education attend Koranic schools that are not aligned with the public school curriculum, and have little or no provision for pupils with disability (World Bank country overview, 2016). Until recently, Senegal had only one special school accommodating children who are blind, one for children who are deaf, and an IE project run by Handicap International in Casamance region, with limited spaces available.

In 2011, the Ministry of Education (MoE) and Sightsavers initiated a pilot IE project in Dakar, focusing on children with VI. The pilot was conducted in three elementary schools in the suburban districts of Guediawaye, Rufisque and Thiaroye. In each school, there were two classes for each grade - one class was designed to be ‘inclusive’ and the other one was ‘ordinary’. As there were many children enrolled in the pilot schools, ‘ordinary’ classes had two cohorts of children in each grade. One cohort attended classes in the morning and the other attended classes in the afternoon. Inclusive classes had only one cohort of children, as teaching required more time and the classes were run in both the morning and afternoon. Although the project focused primarily on children with VI, the schools enrolled a few children with other disabilities and some children with VI had additional disabilities.

## **Purpose of the study**

The purpose of this study was to estimate the incremental expenditure of integrating children with disabilities in mainstream schools, supporting their special educational needs and strengthening the education system to make it more inclusive. The following research questions guided the study design, data collection and analysis:

1. What is the incremental cost of including and supporting the needs of children with disabilities, particularly those who are blind or have low vision in three mainstream schools?
2. How are these expenditures distributed across the different inputs and activities performed by the project?
3. What are the key expenditure drivers of the IE pilot programme?

An incremental analysis in this report refers to the process of estimating the additional resources required to make mainstream schools inclusive of children with disabilities.

The study was funded by Sightsavers and by Irish Aid.

## Methodology

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### Approach

A field visit was carried out whereby key informant interviews were used to collect data on the IE intervention, listing all partners and their contribution in terms of resources.

The time horizon of the pilot spanned the financial years of 2011 to 2016, and the cost perspective was that of the education system. The method of analysis applied was a mixed method (top-down and bottom-up). The top-down costing method was the preferred approach, meaning the expenditures were identified at the aggregate level and then allocated to specific inputs and activities. Where accounting or financial records were unavailable to estimate specific activity costs, cost estimations were made based on current market values, and then aggregated at the school level.

### Data collection procedure

The nature of the expenditures borne by the partners involved in the project were only included if directly related to the IE programme, meaning only the additional expenditure of supporting the educational needs of children with disabilities were included. It was assumed that children who had a disability (blind, low vision or other) received the same level of generic education as children without a disability, and the costs of providing generic education was not taken into account in this analysis. As a result, expenditures that were excluded were general operating costs incurred for all children at school (unless a share of the cost could be apportioned to the project), capital assets purchased before initiation of the IE programme, and any costs borne by beneficiaries were excluded (for example, costs borne by children with disabilities and their families such as food or

transport). Resources that were shared among all pupils of the pilot schools were adjusted using appropriate repartition keys.

The two main sources of financing for the pilot were Sightsavers (through grants from Irish Aid and Kumba International) and government appropriations (both at central and local level). Some additional resources were also provided by local NGOs, teachers, parents' associations and other members of the civil society.

Project expenditures recorded in Sightsavers' Global Accounting System (GAS) were extracted; this included both direct expenditures covered by Sightsavers and Sightsavers' transfers to implementing partners. Expenditure data was also collected from school and partner financial records. In addition, school directors and Ministry partners were contacted to determine any other monetary contributions made to the project, putting a value to each of the resources.

All expenditures were analysed and reported in local currency, West African CFA Francs. Expenditures were then converted to US Dollars (USD) using the average market exchange rate for the year expenditures were incurred.

### **Categorisation of expenditures**

Each expenditure line was categorised into a number of domains, by type of consumption (capital or recurrent), by activities and inputs (directly attributed to the pilot or shared) and by source of financing.

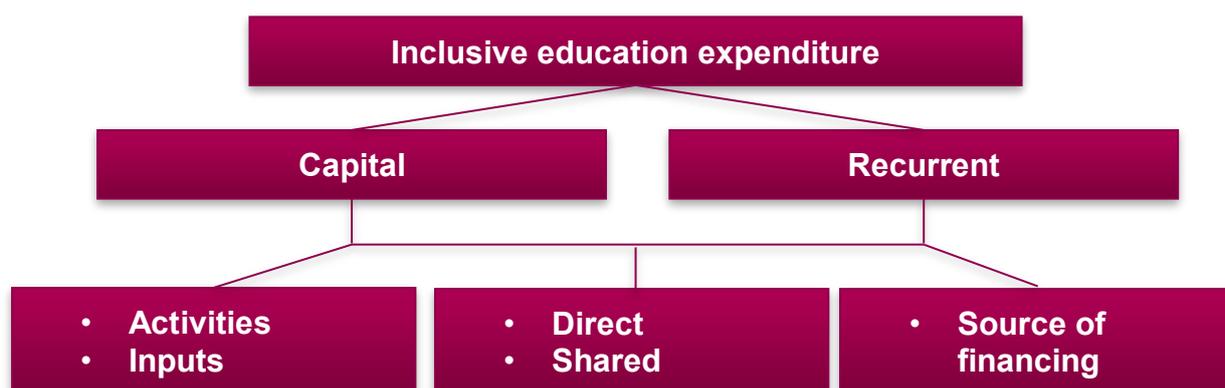


Figure 2. Taxonomy of expenditures

Recurrent (operating) expenditures referred to resources consumed within a year or having to be regularly replaced, and were split by personnel (salaries and allowances), materials and supplies

(items with useful life of less than a year), transportation and others. Capital (investment) expenditures were defined as assets that had a life expectancy of more than one year. This included construction costs, vehicles such as motorbikes for itinerant teachers and assistive devices such as magnifiers and Braille typewriters. Expenditures for capital assets were not annualised for actual expenditures but were accounted for in the year, when they incurred, and annualised for projection estimates. Expenditures were also disaggregated by types of input, sub-input, activity and sub-activity as shown in Tables 2 and 3.

Table 2. Category list of inputs and sub-inputs that were used to conduct activities

Inputs and sub-inputs
<p>Accommodation, catering and event management</p> <ul style="list-style-type: none"> <li>● Accommodation and catering</li> <li>● Event management</li> <li>● Rental equipment and venue hire</li> </ul>
<p>Buildings</p> <ul style="list-style-type: none"> <li>● Construction and renovation work</li> <li>● Supervision of work</li> </ul>
<p>Equipment and technologies (capital resources)</p> <ul style="list-style-type: none"> <li>● Assistive devices and technologies (including spectacles)</li> <li>● Freight charges and import duties</li> <li>● IT equipment</li> <li>● Kitchen and gardening tools (canteen)</li> <li>● Purchase of vehicles (motorcycles)</li> </ul>
<p>Materials and supplies (recurrent resources)</p> <ul style="list-style-type: none"> <li>● Canteen supplies</li> <li>● Medical supplies (drugs and consumables)</li> <li>● Office stationery, supplies and reprography</li> <li>● Promotional and IEC materials</li> <li>● School supplies</li> </ul>
<p>Other</p> <ul style="list-style-type: none"> <li>● Direct awareness</li> <li>● Financial support for children with disabilities</li> <li>● Gifts</li> <li>● Reporting and research</li> <li>● Support for operating costs of pilot schools</li> </ul>
<p>Personnel</p> <ul style="list-style-type: none"> <li>● Allowances for MoE staff, trainers, facilitators, participants, medical staff, other staff</li> <li>● Fees for consultants, doctors and trainers</li> </ul>

<ul style="list-style-type: none"> <li>• Additional allowances (additional IE project personnel)</li> </ul>
<p>Services</p> <ul style="list-style-type: none"> <li>• Communication (mobile phone credit)</li> <li>• Financial and accounting services</li> <li>• Identification and mapping of children with disabilities</li> <li>• Maintenance and repair of equipment</li> <li>• Media</li> <li>• Translation/production of textbooks in Braille</li> </ul>
<p>Transportation</p> <ul style="list-style-type: none"> <li>• Fares (taxi, bus and airline)</li> <li>• Fuel and others (rental, tolls, parking fees)</li> <li>• Transport for children with disabilities, participants in meetings etc.</li> <li>• Vehicle operating costs (cars and motorcycles)</li> </ul>

Table 3. Category list of activities and sub-activities that were conducted during the pilot

Activities and sub-activities
<p>Capacity building for IE</p> <ul style="list-style-type: none"> <li>• Elaboration of IE policy, guides, technical material and training modules</li> <li>• IE training</li> </ul>
<p>Identification of children with disabilities</p> <ul style="list-style-type: none"> <li>• Stakeholder engagement workshop</li> <li>• Community mapping (initial and additional activity)</li> </ul>
<p>IE programme management</p> <ul style="list-style-type: none"> <li>• Planning and co-ordination of activities</li> <li>• Supervision</li> <li>• Monitoring and evaluation</li> <li>• Institutional support</li> <li>• Others (audit, bank fees, communication etc.)</li> </ul>
<p>Teaching and support services for children with disabilities</p> <ul style="list-style-type: none"> <li>• Improving accessibility and security of schools</li> <li>• Teaching for children with disabilities</li> <li>• School supplies</li> <li>• Special educational material and assistive devices</li> <li>• Support services for children with disabilities</li> </ul>
<p>Promotion of IE</p> <ul style="list-style-type: none"> <li>• Advocacy</li> <li>• Development and dissemination of IEC and promotional materials</li> </ul>

- Sensitisation and community awareness raising

## Intervention

The IE intervention aimed to incorporate seven key elements of IE used in Sightsavers' education programmes (see Appendix 3). Five components were invested in by the project in Senegal: capacity building for IE, identification of children with disabilities, IE programme management, teaching and support services for children with disabilities, and promotion of IE materials.

- Capacity building for IE

Teachers from pilot schools were trained on IE general principles and in Braille. The initial training was conducted over a two-week period once, and repeated annually for new teachers as children advanced to the next grade. The training focused on the use of IE equipment and on teaching and learning approaches for children who were blind or had low vision, including Braille training. Ministry of Education (MoE) staff in charge of teacher supervision (at the central and local level) were trained at the same time as teachers. Quarterly meetings were also held with a special school for the blind (INEFJA) for knowledge building and sharing. Sightsavers developed training methodology and IE technical manuals for teachers with the Teacher Training College (CRFPE), as well as a parental guide translated into local languages providing basic training on IE for parents of children with VI. Other guides produced included a trainer's guide, disability terms and technical guidelines for educational materials. Extensive contributions were made with the Ministry of Education in developing an IE policy for the primary education sector.

- Identifying children with disabilities

Initially, in 2011 an exploratory study of potential schools in the project area was commissioned to the Council for the Rehabilitation of Disabled Persons (CORIPH). A door-to-door survey was carried out whereby children with disabilities were identified and recruited for the pilot. After the initial mapping, school management committee (CGE), DPOs and the Association of Parents of Children with Disabilities (APE) volunteered to take responsibility for identifying children within the community through advocacy and sensitisation activities.

- IE programme management

A technical and advisory team was set up to provide the supervision of teachers and to monitor activities. This involved the follow-up and coordination of medical and social services, regular monitoring visits, and the follow-up of enrolment of children with disabilities. Institutional support covered costs such as office equipment and supplies, computer purchases and maintenance. Planning and coordination were required for the steering committee, as well as support of local coordination committees. Monitoring tools and indicators and a project database were developed with the plans to integrate disability data in the Education Monitoring Information System (EMIS). Workshops were also held for reporting activities and data analysis.

- Teaching and support services for children with disabilities

The three pilot schools underwent retro-fitting through the construction and renovation of the school facilities to improve accessibility and safety, including ramps to access classrooms, an accessible toilet, a specialised room for pedagogical needs and a kitchen for canteen services. Teachers created didactic materials to aid learning in classrooms where resources were scarce. Educational assessments for children with disabilities by teachers were developed, and transport allowances were provided for teachers, inspectors, supervisors and other participants involved in the development of the tools. Itinerant teachers provided tuition for children with disabilities who required more learning time at home; to retain the services of these teachers, transport expenditures including a motorbike, maintenance and fuel costs were covered by the project. Children with disabilities were equipped with school kits and supplies, such as notebooks, schoolbags and pens. Inclusive education materials and assistive devices were purchased to accommodate the needs of children who were blind or had LV, including spectacles, magnifying glasses, Perkins Braille machines, white canes and Braille slates.

Support services encompassed canteen, medical and social services, as well as transport for children with disabilities to/from school and for extra-curricular activities. Canteen services were shared among children who were either disabled, excelling academically, from poorer backgrounds or travelling from afar. These shared expenditures were incurred by local councils and civil society organisations; and only a proportion of these expenditures were allocated to the IE programme, based on the proportion of children with disabilities among children eating at the canteen. In 2011, all children in pilot schools underwent visual screening. Children diagnosed with VI were referred to hospital and received treatment, where appropriate. In the second year of the pilot, only inclusive classes were screened due to budget restrictions. In 2015, a full paediatric assessment was carried out for all children with disabilities in inclusive classes.

- Promotion of IE

Sightsavers and partners developed an advocacy plan and promoted the mainstream schooling of children with disabilities through mass media and advocacy/sensitisation workshops within the community. The project also aimed to build synergies between families and schools, and included various community-level activities. Information, Education and Communication (IEC) materials were widely disseminated, including an IE magazine.



Figure 3. Didactic materials constructed by teachers in Guediawaye and Rufisque pilot schools



Figure 4. Construction ramps leading to accessible toilet, Pikine 23b school, Guediawaye

## Analysis

The analysis produced the following estimates: annual and total expenditure of the IE pilot, breakdown by inputs and activities, the key expenditure drivers and the expenditure per academic year for children with disabilities (see Table 13 for the total academic years completed per grade per school).

## Results

The results of the expenditure analysis are presented in Tables 4-11.

### Total expenditure of the IE programme

Table 4. Annual and total expenditure of the IE pilot programme in FCFA and USD (2011-16)

Year	XOF	USD
2011	101,941,613	216,320
2012	61,341,855	119,862
2013	85,496,075	173,557
2014	96,896,977	196,701
2015	99,900,022	198,801
2016	102,605,344	172,377
<b>Total</b>	<b>FCFA 548,181,885</b>	<b>\$ 1,077,618</b>

As Table 4 shows, the total expenditure of the IE pilot amounted to FCFA 548,181,885, equivalent to approximately 1,077,618 US Dollars over six years. The annual expenditure varied as expected in a pilot project, with the greatest expenditure occurring at the beginning of the pilot.

Table 5 describes the average expenditure of the pilot per year and per school per year.

Table 5. Average expenditure per year and per school per year in XOF and USD

	XOF	USD
<b>Average cost per year</b>	FCFA 91,363,648	\$ 165,782
<b>Average cost per school per year</b>	FCFA 30,454,549	\$ 55,260

The average expenditure of the pilot per year was FCFA 91,363,648 (165,782 US Dollars). The identification and valuation of expenditures incurred for each individual pilot school was challenging, as most expenditures recorded were not school-specific, therefore it was assumed expenditures were equally distributed among the three schools. The average annual expenditure per school amounted to FCFA 30,454,549 (55,260 US Dollars).

### Programme expenditures by type of input and activity

Table 6 presents the overall expenditure of the IE pilot disaggregated by type of inputs required to conduct pilot activities.

Table 6. Breakdown of expenditures by type of input in XOF and USD, and by percentage of total expenditure

Inputs	XOF	USD	%
Personnel	143,435,403	281,703	26.1%
Accommodation, catering & event management	121,991,862	237,458	22.0%
Equipment & technologies	67,339,897	132,008	12.3%
Materials & supplies	58,293,806	116,031	10.8%
Transportation	56,501,767	109,661	10.2%
Other services (communication, financial/accounting, media)	53,157,050	105,160	9.8%
Buildings (renovation, toilet facilities)	40,702,850	83,329	7.7%
Miscellaneous	6,759,250	12,268	1.1%
<b>Total</b>	<b>FCFA 548,181,885</b>	<b>\$1,077,618</b>	<b>100%</b>

The largest input expense was personnel amounting to FCFA 143,435,403 (281,703 US Dollars), or 26.1% of the overall project expenditure. Personnel covered additional remuneration in the form of allowances paid to various project partners, including allowances for field visits and trainings, MoE staff, teachers, inspectors, trainers of stakeholders, resource persons and other staff (journalists, drivers). Personnel expenditures also covered fees for trainers, consultants to develop

the project database and other IE documents, and for doctors who carried out medical examinations and treatment. In one project school, the Local Council paid students with disabilities stipends for six months, and mothers involved in the canteen were paid 25,000 FCFA per month for two months. Personnel expenditures did not include the salaries of Senegal country office staff or teachers, as these were not intervention-specific and would have been incurred with or without the IE programme.

The second-largest input expense was accommodation, catering and event management services at FCFA 121,991,862, equivalent to 237,458 US Dollars - 22% of total expenditure. Venues including conference equipment were hired and accommodation was provided for the following training events and workshops: the dissemination of results of the mapping of children with disabilities; production and development of sensitisation messages; reporting and data analysis workshop; training of teachers, inspectors and parents in Braille; training of MoE staff; the development of an advocacy plan, IE policy and messages; and the development of guidance documents and monitoring tools.

Programme materials and supplies were divided into two categories. Equipment and technologies accounted for 12% of the overall expenditure, amounting to FCFA 67,339,897 (132,008 US Dollars). These included purchases of capital assets such as assistive devices and technologies, associated freight and import duty fees, IT equipment, kitchen and gardening equipment. Expenditures on operational materials and supplies amounted to FCFA 58,293,806 (116,031 US Dollars), which incorporated school and office supplies such as stationery, promotional and IEC materials, medical, and canteen supplies (11% of the total cost).

Transportation was a 10% share of the overall expenditure at FCFA 56,501,767, or 109,661 US Dollars. This covered travel fares (taxi, bus and airline), fuel costs for project partners' monitoring activities, transport for children with disabilities and vehicle operating costs, including those for itinerant teachers' motorcycles.

Other services delineated communication charges such as mobile phone credit, financial and accounting services such as bank fees, payments to coordinators for the mapping of children with disabilities, maintenance and repair of equipment, media (including television advertising), magazine production, newspaper interviews, translation and production of textbooks in Braille and others. Combined, this amounted to FCFA 53,157,50 (105,160 US Dollars), 9.8%. Amelioration and the maintenance of school buildings amounted to FCFA 40,702,850 (83,329 US Dollars) or 7.7%; and miscellaneous expenditures were around 1%.

The majority of input expenditures (83%) were recurrent expenditure and 17% of resources were investment/capital assets.

Table 7 disaggregates the overall expenditure by activities and sub-activities.

Table 7. Breakdown of expenditures by programmatic activity and sub-activity, in XOF and USD, and by percentage of total expenditure

Activities	XOF	USD	%
<b>Teaching and support services for children with disabilities</b>	<b>216,591,023</b>	<b>426,836</b>	<b>40%</b>
• Inclusive education materials and assistive devices	80,800,488	161,039	14.8%
• Teaching for children with disabilities	44,411,177	86,392	8.0%
• Improving accessibility and security of school facilities	40,642,450	83,206	7.7%
• Support services for children with disabilities (canteen, medical, social)	37,674,158	71,283	6.6%
• School supplies	13,062,750	26,562	2.5%
<b>Capacity building for Inclusive Education</b>	<b>163,378,767</b>	<b>320,823</b>	<b>30%</b>
• IE training	120,481,344	237,112	21.9%
• IE policy, guides, technical material and training modules	32,800,923	64,175	5.9%
• Experiential learning visit	5,823,000	12,356	1.1%
• Knowledge building and sharing	4,273,500	7,179	0.7%
<b>IE programme management</b>	<b>79,807,035</b>	<b>152,647</b>	<b>14%</b>
• Supervision and monitoring activities	23,292,107	44,932	4.1%
• Institutional support	18,720,4222	35,778	3.3%
• M&E system	19,238,919	35,416	3.3%
• Planning and coordination activities	12,834,101	25,509	2.4%
Others	5,721,486	11,012	1.0%
<b>Promotion of IE</b>	<b>71,370,852</b>	<b>141,488</b>	<b>13%</b>
• Development/dissemination of IEC promotional materials	41,054,681	81,664	7.5%
• Sensitisation and community awareness raising	25,286,371	49,434	4.6%
• Advocacy	5,029,800	10,390	1.0%
<b>Identification of children with disabilities</b>	<b>17,034,208</b>	<b>35,825</b>	<b>3%</b>

• Community mapping (initial)	10,297,208	21,851	2.0%
• Community mapping (additional activities)	3,500,000	7,105	0.7%
• Dissemination	3,237,000	6,869	0.6%
<b>Total</b>	<b>FCFA 548,181,885</b>	<b>\$ 1,077,618</b>	<b>100%</b>

The greatest expense in terms of activities (40%) was allocated to teaching and support services for children with disabilities, amounting to FCFA 216,591,023, approximately 426,836 US Dollars. Inclusive education materials and assistive devices (including cubarithm boards, Perkins machines, Braille manuals, white canes, tablets and styluses) accounted for almost half of these expenditures at FCFA 80,800,488, or 161,039 US Dollars (15%). Other sub-activities in this category included teaching support for children with disabilities (holiday courses, home tuition, counselling and educational assessments) at FCFA 44,411,177 or 86,392 US Dollars (8%); improving accessibility and security in schools at FCFA 40,642,450 or 83,206 US Dollars (7.7%); support services (medical, social and canteen) for children with disabilities at FCFA 37,674,158 or 69,637 US Dollars (6.6%) and school supplies at FCFA 13,062,750 or 26,562 US Dollars (2.5%).

Capacity building for IE was the second most expensive activity at FCFA 163,378,767 (320,823 US Dollars) making up 30% of the total expenditure. When we further disaggregated the capacity building costs, training of education officials, teachers and other partner staff was the highest expenditure, amounting to FCFA 120,481,344 (US Dollars 237,112) or 21.9% of the total expenditure. Development of IE policies, manuals and guidance was also included in this category and accounted for 5.9% of the total expenditure (FCFA 32,800,923 / US Dollars 64,175).

Programme management amounted to FCFA 79,807,035 or US Dollars 152,647 (14% of the total expenditure), with supervision and monitoring (4.1%), institutional support (3.3%), M&E system (3.3%) and planning and coordination (2.4%) being the key sub-activities.

IE promotional activities were FCFA 71,370,852, approximately 141,488 US Dollars, accounting for 13% of the total expenditure. This included development and dissemination of IEC promotional materials (7.5%); sensitisation and awareness raising (4.6%) and advocacy (1%).

Lastly, activities relating to the mapping and identification of children with disabilities were FCFA 17,034,208 (35,825 US Dollars), accounting for just under 3%, with the initial community mapping being the main expenditure.

### **Key drivers of the programme expenditure**

Table 8 highlights the key drivers of the intervention by delineating activities and inputs as a percentage of total expenditure.

Table 8. Key expenditure drivers of IE pilot project (all years)

Key: Expenditure above 10% =  Expenditure between 5-10% =

Inputs	Teaching and support services for children with disabilities	Capacity building for IE	IE programme management	Promotion of IE	Identification of children with disabilities	Total
Personnel	5.6%	11.7%	4.2%	3.0%	1.6%	26.6%
Accommodation, catering and event management services	0.5%	15.8%	2.2%	3.2%	0.2%	21.9%
Equipment and technologies	11.1%	0.0%	1.3%	0.0%	0.0%	12.1%
Material and supplies	6.1%	0.4%	1.1%	3.0%	0.2%	10.8%
Transportation	3.2%	1.6%	4.0%	1.2%	0.1%	10.1%
Other services	4.9%	0.0%	1.2%	2.5%	1.1%	9.7%
Buildings	7.7%	0.0%	0.0%	0.0%	0.0%	7.7%
Others	0.6%	0.3%	0.1%	0.1%	0.0%	1.1%
<b>Total</b>	<b>39.6%</b>	<b>29.8%</b>	<b>14.2%</b>	<b>13.1%</b>	<b>3.3%</b>	<b>100%</b>

The two key activities, which together accounted for nearly 70% of the programme expenditure were teaching and support services for children with disabilities (39.6%) and capacity building for IE (29.8%). Within the capacity building category, nearly all incurred costs (92.5%) were due to two main inputs - personnel allowances and expenditure relating to organising the trainings and workshops (including accommodation, catering and event management services). These two inputs accounted for 27.4% of the total expenditure of the pilot.

Within the teaching and support of children with disabilities activity, there were four main cost drivers: equipment and technologies (largely assistive devices and technologies including Braille tablets and punchers, Braille embossers, Perkins Braillers and Braille manuals) being the highest expenditure, followed by building adjustments (construction and renovation work); materials and

supplies (stationery, bags and manuals) and personnel allowances for project partners, including medical staff, trainers, teachers, training inspectors, building work consultants, field visit personnel and journalists. Together these three inputs accounted for over 30% of the total programme expenditure.

Overall, personnel, costs of organising events and equipment, materials and adjustment of the buildings accounted for nearly 68% of the total programme expenditure.

Table 9. Expenditure influencing activities in years five and six of the project

Key: Expenditure above 10% =  Expenditure between 5-10% =

Activities	Teaching and support services for children with disabilities	Capacity building for IE	IE programme management	Promotion of IE	Total
Personnel	7.3%	8.4%	7.6%	2.1%	25%
Accommodation, catering and event management services	0.5%	16.2%	2.7%	4.4%	24%
Equipment and technologies	11.0%	0.0%	2.8%	0.0%	14%
Transportation	4.3%	1.2%	6.0%	1.7%	13%
Services	4.6%	0.0%	1.7%	2.0%	8%
Material and supplies	6.8%	0.2%	0.5%	0.3%	7%
Buildings	5.1%	0.0%	0.0%	0.0%	5%
Others	1.6%	0.9%	0.1%	0.0%	3%
<b>Total</b>	<b>41.2%</b>	<b>26.9%</b>	<b>21.4%</b>	<b>10.6%</b>	<b>100.0%</b>

Table 9 shows the key expenditure drivers in years five and six of the project; from this, we can deduce how expenditures might be distributed for a 'mature' programme, focusing on education system strengthening, as the initial start-up costs have already been accounted for.

The two key activities (teaching and support for children with disabilities and capacity building) continued to be the dominant expenditure categories accounting for 68% of programme expenditure in years five and six. Within these activities, the key expenditure drivers remained the same. With regards to programme inputs, personnel and accommodation, catering and event management continued to be the key drivers accounting for 49% of the total expenditure in years five and six (48.5% over all six years). There was little change in the share of expenditure on equipment and technologies and materials and supplies (22.9% in the overall programme and 21%

in years five and six ). The expenditure on buildings slightly decreased from 7.7% in the overall programme to 5% in years five and six as this only covered expenditures on a specialised room, kitchen and storage, and part of the security wall and not the initial accessibility construction work; there was little difference in other input categories. The only significant difference observed was no expenditure on identification of children in years five and six and an increase in IE programme management expenditures. Thus, while in the overall pilot, programme management expenditure accounted for 14.2% of the total expenditure. In years five and six, this activity accounted for one fifth (21.4%) of the total expenditure in these years. The key expenditure drivers within this activity were personnel and transportation, accounting for 13.6% of the total expenditure in years five and six , which included mainly allowances for field visits for monitoring, supervision and evaluation activities.

### Expenditures per child with disability academic year

The number of children with disabilities attending the schools varied, as children dropped out and joined or re-joined the schools throughout the years. Appendix 1 shows the number of children recorded in each school, grade and year of the programme. As shown in Table 10, in year one of the programme (academic year 2011-12) all three schools enrolled only grade one children with disabilities. As an example, Pikine 23B school enrolled 18 children with disabilities. One would expect that this cohort of 18 children would transfer to grade two in the next academic year. However, the school records suggest that only 16 children with disabilities were in grade two in the academic year 2012-13. In the following academic year (2013-14), 17 children with disabilities were recorded in grade three. Although the programme kept records on the overall number of drop-outs, it did not record whether the new children who joined the cohorts were the ones who had dropped out in the previous years, or those who newly joined the programme from outside. For the purpose of the analysis, we calculated the costs per academic year completed by a child with disability, where the number of child years was based on the number of children enrolled in all grades minus the number of recorded drop-outs.

Table 10. Average expenditure per academic year completed by children with disabilities

	XOF	USD
<b>Expenditure per child with disability academic year</b>	FCFA 765,617	\$ 1,505

In total, 716 academic years were completed by children with disabilities over six years. Based on this data, the average expenditure per child academic year was FCFA 765,617 (1,505 US Dollars). The expenditure varied between the programme years, as the number of child years delivered by the programme increased with the number of children enrolled in the programme.

Table 11. Number of children with disabilities enrolled, drop-outs and academic years per grade per school over the six-year period

	Pikine 23b			Cherif 1			Malick Diop			All schools
	Children with disabilities enrolled (all years)	Drop outs (all years)	Academic years	Children with disabilities enrolled (all years)	Drop outs (all years)	Academic years	Children with disabilities enrolled (all years)	Drop outs (all years)	Academic years	Academic years
<b>Grade 1</b>	81	6	<b>75</b>	83	0	<b>83</b>	51	6	<b>45</b>	203
<b>Grade 2</b>	70	1	<b>69</b>	73	1	<b>72</b>	40	3	<b>37</b>	178
<b>Grade 3</b>	61	0	<b>61</b>	54	0	<b>54</b>	26	0	<b>26</b>	141
<b>Grade 4</b>	49	0	<b>49</b>	42	0	<b>42</b>	16	2	<b>14</b>	105
<b>Grade 5</b>	27	2	<b>25</b>	24	0	<b>24</b>	13	1	<b>12</b>	61
<b>Grade 6</b>	9	0	<b>9</b>	14	0	<b>14</b>	5	0	<b>5</b>	28
<b>Total (school)</b>	297	9	<b>288</b>	290	1	<b>289</b>	151	12	<b>139</b>	<b>716</b>

The highest expenditure per child with disability academic year was in year one, at FCFA 3,185,675 (6,760 US Dollars), as only 37 children with disabilities were enrolled in schools, five of whom dropped out (i.e 32 child years in year one). The expenditure per child year decreased significantly in year two to FCFA 864,026 (1,567 USD) as the annual programme expenditure decreased, while the number of academic years by children with disabilities doubled (71). The expenditure per child academic year continued to decrease further throughout the programme but at a lower rate and reached around FCFA 531,633 (893 US Dollars) in year six, when the total number of academic years (excluding drop-outs) was 193.

## Projections

Table 12. IE expenditure projections

	Recurrent	Annualised investment*	Total	Recurrent	Annualised investment*	Total
	XOF			USD		
<b>Annual expenditure*</b>	29,463,260	35,350,250	<b>64,813,510</b>	56,757	69,894	<b>126,652</b>

<b>Per school (N=3)</b>	9,821,087	11,783,417	<b>21,604,503</b>	18,919	23,298	<b>42,217</b>
<b>Per child (N=108)</b>	272,808	327,317	<b>600,125</b>	526	647	<b>1,173</b>
<b>(N=144)</b>	204,606	245,488	<b>450,094</b>	394	485	<b>880</b>
<b>(N=180)</b>	163,685	196,390	<b>360,075</b>	315	388	<b>704</b>

\* NB. The projected annual expenditure does not include start-up costs (FCFA 106,637,612 or 212,988 US Dollars) associated with the pilot, such as the development of IE guides for teachers, MoE inspectors and parents, modules, advocacy plan and IE promotional material, monitoring tools and indicators, set-up of task force and initial mapping and one-off start-up events such as official ceremonies. See Table 16 for further detail on start-up and Table 17 for investment.

To make projections of annual expenditures that may be required to scale up IE for children with VI in Senegal, we excluded start-up costs associated with initiation of the pilot in the three schools and annualised the capital (investment) expenditures. Our projections show that the total annual expenditure of the IE programme is FCFA 64,813,510 (126,652 US Dollars) and that the annual expenditure per school is FCFA 21,604,503 (42,217 US Dollars). For the purpose of the analysis, we assumed that a mature IE programme would have six children with vision disabilities per class per grade; this is the maximum number of children recommended by IE experts in Senegal, i.e. 108 children in three schools in grades one to six. As the pilots in Senegal had more than six children per class, we also made estimates for a large number of children with vision disabilities - eight per class per grade and ten per class per grade, i.e. 144 and 180 children in three schools. The median expenditure per child year projected was FCFA 450,094 (880 US Dollars) ranging from FCFA 360,075 (704 US Dollars) to FCFA 600,125 (1,173 US Dollars) depending on the number of children integrated per class.

## Discussion

Our study sought to identify the incremental expenditure of including children with disabilities in mainstream schools as part of a pilot IE programme in Senegal. The total incremental expenditure over six years was FCFA 548,181,885, equivalent to 1,077,618 US Dollars, and the average annual expenditure was FCFA 91,363,648 (165,782 US Dollars). Expenditures in years three to six had little variation and were close to the average, while the expenditure in year one was higher than the average (FCFA 101,941,613 or 216,320 US Dollars), which would be expected in a pilot programme, as year one often includes programme start-up costs. In addition, expenditure on equipment or construction were annualised only for projections and not actual expenditures, which increased the amount of resources spent at the beginning of the programme, when the expenditure

was incurred. The expenditure in year two was the lowest across the years. But this is probably atypical, as some programme records suggest that in year two, the programme experienced financial constraints and a number of activities were not implemented. For example, only children in inclusive classes rather than in all classes had vision screening in year two.

The average expenditure per child with disability academic year was FCFA 765,617 (1,505 US Dollars) ranging from FCFA 3,185,675 (6,760 US Dollars) in year one to FCFA 531,633 (893 US Dollars) in year six. High costs per child year would be expected in a pilot programme, as only few children (37) were enrolled in schools in year one. The expenditure per child year decreased, as the number of children enrolled increased to 193 in year six. Further decreases may be expected if more children are enrolled in the same schools or the programme is scaled up to other schools (see further discussion below).

It is difficult to place the findings of this study in the context of other research, as i) there is a paucity of evidence on costs of IE globally; ii) the studies that are available were published in the 1990s and were largely in high-income countries; and iii) the methodology and expenditures included in the estimates vary between the settings (UNICEF Financing inclusive education technical booklet, 2014).

The figures reported in a few publications available from LMICs often refer to the capitation grants for the education of children with disabilities rather than the actual expenditure. For example, the African Child Policy Forum reported IE grants in Ghana at 2.70 US Dollars for boys and 3.88 US Dollars for girls; in Kenya the grants were 14 US Dollars per student (MOESS 2006; African Child Policy Forum, 2011). Evidence suggests that such grants are too low to cover actual costs per student, resulting in significant out-of-pocket expenditures for parents. For example, in Ghana, parents had to cover additional costs of mandatory school uniform, school lunches and transportations, which were three, 23 and 24 times higher than the capitation grant respectively (African Child Policy Forum, 2011).

The only study which had a methodology and expenditure categorisation similar to this research was a study by Handicap International in Burkina Faso and Togo. This study estimated the incremental expenditure per child with disability per year at FCFA 25,000 (approximately 44 US Dollars) but this estimate only accounted for the purchase of school supplies, equipment and technologies and teacher-student educational assessments (Handicap International, 2015). Other expenditures were reported as additional expenses for specific disabilities. For example, the

purchase of a wheelchair for a student with mobility impairment was estimated at FCFA 100,000 (181 US Dollars). Complementary services (school transport, school canteens, extracurricular activities, personal assistance and medical and paramedical care) were excluded from the estimates. If we align our estimates with the type of resources included in the Handicap International report, the average expenditure per child with disability year in our pilot will be FCFA 264,368 (approximately 472 US Dollars).

Some OECD data from the mid-1990s suggests that the average cost of educating a child with disability may be 1.9 times the cost for a non-disabled child, with a coefficient ranging from 1.6 to 3.1 depending on the type and the severity of the disability (OECD, 1995). In 2014, Senegal's public and external per pupil expenditure (PPE) at the public primary school level was FCFA 123,000 (approximately 220 US Dollars) (MoE Senegal Financement public et extérieur de l'Éducation au Sénégal, 2016), which is higher than in many other lower-middle income countries (FHI 360, 2014). If the OECD study coefficients are applicable to Senegal, the annual expenditure per child with disability would be somewhere between FCFA 196,800 and FCFA 381,300 (352 to 682 US Dollars), which is not too far from our estimates, given that our pilot focused on children with VI, which is likely to be one of the most resource-intensive IE interventions for children with disabilities, although the data to support or disprove this is very limited. The only source of data on IE for different types of disabilities in LMICS that we could identify in the literature was the study by Handicap International in Burkina Faso and Togo, which suggested that the expenditure on school supplies, equipment and materials can be 10-12 times higher for students with VI (FCFA 559,250) compared to those with language and hearing impairments (FCFA 55,900) and motor impairments (FCFA 44,200) respectively (Handicap International, 2015). Data on special education from the United States confirms this proposition and shows that the most expensive education interventions are for children with autism, multiple disabilities, VI and blindness, while interventions in the middle range include emotional disturbances, hearing impairments, mental retardation, orthopaedic and other health impairments (Bitz, M. (Ed.), 2016).

There is no accurate data on the number of children with VI in Senegal. To make estimates of the expenditures that may be required to scale up IE for children with VI in Senegal, we used estimates of the prevalence of blindness and functional LV in children in other similar settings - although these estimates vary depending on the methodology and definitions used (Gilbert et al, 2008; WHO 2012; Mactaggart I and Murthy GV, 2013 and Tataryn M et al, 2015). For the purpose of this study, we used an estimate of children with VI that may require special educational adjustments of 0.8 per

1000, which means there are potentially 1,426 primary school-aged children with special educational needs related to VI in Senegal. If children with disabilities have the same level of enrolment in schools as other children of this age in Senegal (approximately 70%), we would expect around 1,000 children with VI that require educational adjustments being enrolled in primary schools.

The recommended number of children with VI in primary schools based on the context of Senegal is six per class per grade, however our pilot schools enrolled a higher number of children with VI and other disabilities, thus we made projections based on a minimum of six, median of eight, and maximum of 10 children with VI per class. If we assume that this is the maximum number of blind/LV children that the schools of this capacity can accommodate and the expenditure per child year cannot decrease further, the inclusion of 1,000 children in primary schools will require between FCFA 360,075,000-600,125,000 or 704,000-1,173,000 US Dollars *annually*. This would require between a 0.2-0.34% increase in the total annual budget on public primary education in Senegal, FCFA 17,782,100,000 in 2014 (MoE Senegal Financement public et extérieur de l'Éducation au Sénégal, 2016). Therefore, the current additional allocation of FCFA 100,000,000 (163,128 US Dollars) cannot be considered sufficient, as this is 4.5-7.5 times less than what is required annually to integrate children with vision-related special needs only.

We were not able to make any estimates for educating children with non-VI disabilities, as the number of such children in the three pilot schools was very small. To reach more definitive conclusions on such estimates, further studies using data on the integration of children with non-VI impairments in Senegal will be required.

Given that this was one of the first IE interventions in the country and the pilot was supported by an international NGO, it is considered that it may be possible to generate savings when the programme is being scaled up. For example, 14% of the total expenditure in this pilot (FCFA 79,807,035 or 152,647 US Dollars) was spent on programme management, which included planning, coordination, and supervision and M&E. In a scaled-up programme integrated within the existing education system, these activities can be delegated to the existing government structures in charge of planning and/or supervision, providing their staff has adequate capacity and IE expertise.

Further, given that over a third of all pilot expenditure was for IE training and special education materials and devices, it may be useful to explore whether any savings could be made in the inputs contributing to these activities. For example, bulk purchasing or competitive tendering for education

materials and assistive devices, or integration of comprehensive IE training in to pre-service training of teachers or other education events - where costs of catering and accommodation are already covered - could lead to significant reductions in the overall expenditures of the programme.

Another way that may be useful to explore is whether more children with disabilities (particularly non-VI impairments) can be included within the programme schools without significant additional resources. Even if a higher number of children with disabilities in schools require additional education materials or more visits from itinerant teachers to support children at home, expenditures on fixed inputs (for example teacher training or IE promotion) is likely to stay unchanged, and the annual expenditure per child year may decrease, bringing savings in the overall IE expenditure.

We also retrofitted resources in this pilot, whereas if the necessary adjustments had been considered from the start, when the school buildings had been planned and constructed, this would make significant savings and the expenditures would not be needed in the future, other than repair and maintenance.

To optimise the forecast of expenditure required to scale up IE in Senegal, we would recommend to develop minimum standards for inclusion of VI children in mainstream schools. We would also recommend to collect more accurate data on the prevalence and distribution of disability in children in Senegal. It is also essential to pilot the IE of children with other disabilities and assess the expenditure and the most appropriate mix of children with different disabilities in a class.

There is no doubt that the scale up of IE in Senegal will require additional annual allocation of resources from the government budget. It is therefore essential that IE is integrated in the Government Strategic Plan for Education, and that the allocation and disbursement of resources follows standard governmental budgetary practices and procedures. Also, given that there are at least three different models of allocation of funding for IE globally (UNICEF Financing of IE, 2014) and all models have their weaknesses and strengths, it is essential to discuss with the government and other education players the most appropriate model for allocation of IE funding in the Senegal context.

There are a number of limitations in this study, which need to be taken into account when interpreting and using the results. Firstly, we did not have the individual budgets at school level and could not compare the differences in expenditures between the pilot schools. It is possible that the expenditure per child year would vary depending on the school infrastructure and capacity. For example, larger schools with more space and higher numbers of teachers may integrate more

children with disabilities and at a lower cost, while smaller schools would require more significant resources to adjust their physical environment or hire more teachers. Secondly, we did not make a distinction by severity of disability or by age of student or class grade, which may vary the expenditure per child year. It is essential that the current or similar pilots in Senegal collect data on both visual acuity and the age of entry to make such estimates possible. Thirdly, if the IE programme is to be scaled up in areas of Senegal other than the capital, the programme expenditure may vary. For example, if the programme is to be implemented in a rural setting, the expenditure per child year is likely to inflate due to additional requirements such as boarding and transport.

Furthermore, this study did not look at the education outcomes and progression of students. If some students are unable to pass their end-of-year exam and have to repeat the academic year, this may require additional programme expenditure, which needs to be taken into account in programme planning. Future programmes need to collect data on academic progress, repetition, drop out and transition rates. Finally, some of the human resource expenditure may have been underestimated, as there was no account of the teachers' extra time required to support children with disabilities or the time of volunteers who supported the programme. Itinerant teachers in this pilot performed their itinerant teacher duties on top of their other responsibilities as classroom teachers. Overburden and poor motivation of teachers was shown to be a significant barrier to effective teaching in many settings, including Senegal (Handicap International 2015; Sightsavers, 2016). If IE is to be sustained and scaled up in Senegal, the government may consider employing itinerant teachers on a full-time basis to support exclusively children with disabilities. This, however, is likely to increase the overall education expenditure and demand for teachers.

Although this study was useful to understand the resources used in the pilot project, it does not calculate the actual cost or the benefits of including blind and LV children within mainstream schools, since expenditure was limited by the amount of funds allocated for the project. It is also important to acknowledge that this was a pilot project which was implemented at a small scale in three schools, and that the intervention is likely to change if the programme is to be implemented at national level.

As a result, in order to make projections around the budget needed to implement a national IE programme, it is necessary to use a different approach to the one used in this study. Our next step is to make long-term cost projections and estimate the resources required for including blind and LV children within mainstream primary schools in Senegal; this proposed analysis will be based on the Senegalese government's planning and budgeting process for the education sector. UNESCO

is already working with the government of Senegal on the guidelines for planning and budgeting in the education sector. We recommend that Sightsavers collaborates with UNESCO on this initiative to develop a model for inclusive education of children with VI (and possibly other disabilities, if such data become available); and ensures that the necessary provisions are made within the guiding documents, budgets and the overall system.

## Conclusion

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This is one of a few studies estimating the expenditure for IE in a lower middle-income country, and the first one in Senegal. The expenditure findings of the study can be used to make projections of the resources required to scale up IE in the country. To make such projections more accurate, minimum standards for educational inclusion of children with VI will be required. If the scale up is extended to children with other disabilities, the development of such standards and their piloting will also be required for other types of disabilities. It is also advisable to collect more accurate data on the prevalence of disability in children in Senegal and the severity of VI, as well as academic progress of children currently in education. Furthermore, it is imperative that IE is included in the Government Education Strategic Plan in Senegal and that budgetary estimations for scale up follow the standard government procedures for budget allocations.

## References

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# Appendix 1

Table 13. Children with disabilities who enrolled, dropped out and completed academic years

Ecole Pikine 23B									
Class	Total # children with disabilities that enrolled at start of: YEAR 1 Sep 2011 - Jun 2012	Total # children with disabilities that enrolled at start of: YEAR 2 Sep 2012 - Jun 2013	Total # children with disabilities that enrolled at start of: YEAR 3 Sep 2013 - Jun 2014	Total # children with disabilities that enrolled at start of: YEAR 4 Sep 2014 - Jun 2015	Total # children with disabilities that enrolled at start of: YEAR 5 Sep 2015 - Jun 2016	Total # children with disabilities that enrolled at start of: YEAR 6 Sep 2016 - Jun 2017	Total enrolled (per grade)	Total: assumed Oct 2012, 2013, 2015, 2016 Dropped Out	Total # children with disabilities that completed School Year
1st Grade	18	18	16	15	9	5	81	6	75
2nd Grade	0	16	17	13	17	7	70	1	70
3rd Grade	0	0	17	18	14	12	61	0	61
4th Grade	0	0	0	15	19	15	49	0	49
5th Grade	0	0	0	0	15	12	27	2	25
6th Grade	0	0	0	0	0	9	9	0	9
<b>TOTAL (on aggregate)</b>	18	52	102	163	237	297	297	9	288
Ecole Cherif1 Rufisque									
Class	Total # children with disabilities that enrolled at start of: YEAR 1 Sep 2011 - Jun 2012	Total # children with disabilities that enrolled at start of: YEAR 2 Sep 2012 - Jun 2013	Total # children with disabilities that enrolled at start of: YEAR 3 Sep 2013 - Jun 2014	Total # children with disabilities that enrolled at start of: YEAR 4 Sep 2014 - Jun 2015	Total # children with disabilities that enrolled at start of: YEAR 5 Sep 2015 - Jun 2016	Total # children with disabilities that enrolled at start of: YEAR 6 Sep 2016 - Jun 2017	Total enrolled (per grade)	Total: assumed Oct 2016 Dropped Out	Total # children with disabilities that completed School Year
1st Grade	14	15	15	15	12	12	83	0	83
2nd Grade	0	14	16	16	13	14	73	1	72
3rd Grade	0	0	12	14	14	14	54	0	54
4th Grade	0	0	0	12	14	16	42	0	42
5th Grade	0	0	0	0	12	12	24	0	24
6th Grade	0	0	0	0	0	14	14	0	14

<b>TOTAL (on aggregate)</b>	14	43	86	143	208	290	<b>290</b>	1	<b>289</b>
<b>Malick DIOP THIAROYE</b>									
Class	Total # children with disabilities that enrolled at start of: YEAR 1 Sep 2011 - Jun 2012	Total # children with disabilities that enrolled at start of: YEAR 2 Sep 2012 - Jun 2013	Total # children with disabilities that enrolled at start of: YEAR 3 Sep 2013 - Jun 2014	Total # children with disabilities that enrolled at start of: YEAR 4 Sep 2014 - Jun 2015	Total # children with disabilities that enrolled at start of: YEAR 5 Sep 2015 - Jun 2016	Total # children with disabilities that enrolled at start of: YEAR 6 Sep 2016 - Jun 2017	Total enrolled (per grade)	Total: assumed Oct 2012, 2014 and 2016 Dropped Out	Total # children with disabilities that completed School Year
1st Grade	5	8	11	10	5	12	51	6	45
2nd Grade	0	2	6	12	8	12	40	3	37
3rd Grade	0	0	3	6	10	7	26	0	26
4th Grade	0	0	0	3	4	9	16	2	14
5th Grade	0	0	0	0	4	9	13	1	12
6th Grade	0	0	0	0	0	5	5	0	5
<b>TOTAL (on aggregate)</b>	5	15	35	66	97	151	<b>151</b>	12	<b>139</b>

## Appendix 2

Table 14. Disability-focused mandates

<b>1948</b> <b>UN universal declaration of human rights</b>	All children have a right to a free and compulsory education.
<b>1989</b> <b>UN convention on the rights of the child</b>	Children with disabilities have a right to education based on equal opportunity.
<b>1990</b> <b>World conference on education for all (Jomtien)</b>	Six goals established for the year 2000, including universal access to education, equity and learning outcomes
<b>1993</b> <b>UN standard rules for the equalisation of opportunities for persons with disabilities (rule 6)</b>	Children, adolescents and adults with special educational needs should have access to the regular school system.
<b>1994</b> <b>Salamanca declaration of world conference on special needs education</b>	Education systems should be inclusive. Everyone has a right to education in 'integrated' and 'general' settings.
<b>2000</b> <b>World education forum (Dakar)</b>	This reaffirmed the commitment of the international community to EFA.
<b>2000</b> <b>Millennium Development Goals (now Sustainable Development Goals)</b>	All children – girls and boys – should be able to complete a full course of primary education by 2015 (Goal 2). This is now sustainable development goal 4 (education for all).
<b>2006</b> <b>UN convention on the rights of persons with disabilities</b>	Governments should provide IE for children with disabilities
<b>2011</b> <b>World report on disability</b>	Removing barriers for disabled learners by implementing systemic and institutional changes
<b>2013</b> <b>UN high level meeting</b>	Towards and beyond 2015: disability inclusive development agenda

## Appendix 3

Table 15. Seven elements of IE

<b>Element 1</b>	
<b>Access</b>	Children with disabilities easily and safely access schools and classrooms
<b>Element 2</b>	
<b>Equity</b>	Children with disabilities do not experience any form of discrimination
<b>Element 3</b>	
<b>Quality</b>	Children with disabilities receive an education that meets their diverse needs
<b>Element 4</b>	
<b>Family &amp; community participation</b>	Sensitisation of the community members Regular support meetings for parent-teacher association (PTA) Training and materials for caregivers of children with disabilities
<b>Element 5</b>	
<b>Education systems with necessary capacities</b>	Effective management, teacher training, equipment distribution, funding systems, monitoring and evaluation, support personnel, infrastructure, educational and health services
<b>Element 6</b>	
<b>Comprehensive services</b>	Comprehensive health, educational and social services, provided by the state and non-state sector. MoE take responsibility for the education of children with disabilities
<b>Element 7</b>	
<b>Policy frameworks</b>	Appropriate policies in place for equitable funding of education. Recognition of rights children with disabilities in National education policy and National Constitution.

## Appendix 4

Table 16. Disaggregation of start-up expenditures

Start-up	XOF	USD
	<b>106,637,612</b>	<b>212,988</b>
<b>Capacity building for Inclusive Education</b>	<b>38,623,923</b>	<b>76,531</b>
Development of IE guidance documents; IE policy; parent's guide; disability and technical guidelines for educational material; trainer's guide; training and validation of modules; initial study trip		
<b>Identification of CWD</b>	<b>13,534,208</b>	<b>28,720</b>
CORIPH fees; report and workshop (initial mapping dissemination)		
<b>IE programme management</b>	<b>7,287,500</b>	<b>13,780</b>
Development of monitoring tools and indicators; EMIS; IEP database; initial orientation and planning meetings; set of task force and advisory team		
<b>Instructional and support services for CWD</b>	<b>1,107,500</b>	<b>1,903</b>
Design and production of educational material		
<b>Promotion of inclusive education</b>	<b>46,084,481</b>	<b>92,054</b>
Development of advocacy plan; IE messages; one-time production of adverts for television and radio; IE magazine; promotional and IEC material; workshop for sensitisation messages in Thies (initial)		

Table 17. Annualisation of investment expenditures

Activity I	Full description	Expected useful life years (EUL)	XOF	Annualised [XOF/EUL]	USD	Annualised [USD/EUL]
Instructional and support services for CWD	Motorcycles for itinerant teachers	10	12,884,000	1,288,400	26,201	2,620
Instructional and support services for CWD	Helmets for itinerant teachers	5	284,660	56,932	566	113
Instructional and support services for CWD	Infrastructure (ramps, kitchen, storage, specialised room, part of security wall)	20	40,642,450	2,032,123	83,206	4,160
Capacity building for Inclusive Education	Training of teachers	6	87,503,759	14,583,960	172,348	28,725
Capacity building for Inclusive Education	Training of inspectors and others MoE staff	6	21,319,395	3,553,233	41,243	6,874
Capacity building for Inclusive Education	Training of parents	6	11,658,190	1,943,032	23,521	3,920
Instructional and support	Canteen services	10	2,795,654	279,565	5,068	507

services for CWD						
Instructional and support services for CWD	Assistive devices (10 years useful life) Braille machines and manuals only	10	42,783,922	4,278,392	85,207	8,521
Instructional and support services for CWD	All other assistive devices (6 years useful life)	6	36,030,900	6,005,150	72,219	12,036
IE programme management	Institutional support equipment	6	7,976,785	1,329,464	14,508	2,418
<b>Total</b>			<b>263,879,715</b>	<b>35,350,250</b>	<b>524,088</b>	<b>69,894</b>

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