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Report No: PAD846

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 6.5 MILLION
(US\$10 MILLION EQUIVALENT)

TO THE

CO-OPERATIVE REPUBLIC OF GUYANA

FOR A

SECONDARY EDUCATION IMPROVEMENT PROJECT

May 5, 2014

*Education Sector
Human Development Department
Latin American and the Caribbean Regional Region*

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CURRENCY EQUIVALENTS

(Exchange Rate Effective March 31, 2014)

Currency Unit = Guyanese dollar
G\$205 = US\$1
US\$1.54 = SDR 1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

CAS	Country Assistance Strategy
CMU	Country Management Unit
CPCE	Cyril Potter College of Education
CPD	Continuous Professional Development
CSEC	Caribbean Secondary Examinations Certificate
CXC	Caribbean Examinations Council
DA	Designated Account
EAMP	Environmental Assessment and Management Plan
EFA-FTI	Education for All Fast Track Initiative
EMF	Environmental Management Framework
EMIS	Education Management and Information System
EMP	Environmental Management Plan
ESP	Education Strategic Plan
FM	Project's Financial Management
GDP	Gross Domestic Product
GER	Gross Enrollment Rate
GNP	Gross National Product
GoG	Government of Guyana
GSS	General Secondary Schools
IA	Implementing Agency
IAD	Internal Audit Department
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
ICR	Implementation Completion Report
ICT	Information and Communication Technologies
IDA	International Development Association
IDB	Inter-American Development Bank
IFR	Interim Unaudited Financial Reports
ILO	International Labor Organization
IPP	Indigenous Peoples Plans
IRR	Internal Rate of Return
ISP	Implementation Support Plan

ISTE	Institute of Science, Technology and Engineering
ISR	Implementation Supervision Report
MIS	Management Information System
MOE	Ministry of Education
NCB	National Competitive Bidding
NCERD	National Centre for Educational Resource Development
NPV	Net Present Value
OM	Operational Manual
OP/BP	Operational Policy/Bank Procedures
ORAF	Operational Risk Assessment Framework
PDO	Project Development Objective
PS	Procurement Specialist
PU	Planning Unit
REd.Os	Regional Education Officers
DEOs	District Education Officers
RFP	Request for Proposal
SBD	Standard Bidding Document
SD	Secondary Departments
SDR	Special Drawing Rights
SEMIS	Secondary Education Management Information System
SSEE	Secondary School Entrance Exam
TA	Technical Assistance
UG	University of Guyana
UNDP	United Nations Development Program
UPE	Universal Primary Education
USE	Universal Secondary Education
WB	World Bank

Regional Vice President:	Jorge Familiar Calderon
Country Director:	Sophie Sirtaine
Acting Sector Director:	Mansoor Rashid
Sector Manager:	Reema Nayar
Task Team Leader:	Hongyu Yang

CO-OPERATIVE REPUBLIC OF GUYANA
Secondary Education Improvement Project

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PAD DATA SHEET

Co-operative Republic of Guyana

Secondary Education Improvement Project(P147924)

PROJECT APPRAISAL DOCUMENT

LATIN AMERICA AND CARIBBEAN

Human Development, Education

Report No.: PAD846

Basic Information			
Project ID P147924	EA Category B - Partial Assessment	Team Leader Hongyu Yang	
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints []		
	Financial Intermediaries []		
	Series of Projects []		
Project Implementation Start Date 31-October-2014	Project Implementation End Date 31-October-2019		
Expected Effectiveness Date 31-October-2014	Expected Closing Date 31-March-2020		
Joint IFC No			
Sector Manager Reema Nayar	Acting Sector Director Mansoor Rashid	Country Director Sophie Sirtaine	Regional Vice President Jorge Familiar Calderon
Borrower: Co-operative Republic of Guyana			
Responsible Agency: Ministry of Education			
Contact: Telephone	Priya Manickchand (592) 226-3094	Title: Minister Email:	moe.manickchand@moe.gov.gy

Project Financing Data(in USD Million)						
<input type="checkbox"/>	Loan	<input type="checkbox"/>	Grant	<input type="checkbox"/>	Guarantee	
<input checked="" type="checkbox"/>	Credit	<input type="checkbox"/>	IDA Grant	<input type="checkbox"/>	Other	
Total Project Cost:		10.00		Total Bank Financing:		10.00
Financing Gap:		0.00				
Financing Source						
						Amount
BORROWER/RECIPIENT						0.00
International Development Association (IDA)						10.00
Total						10.00
Expected Disbursements (in USD Million)						
Fiscal Year	2015	2016	2017	2018	2019	2020
Annual	0.30	1.70	2.50	2.50	2.50	0.500
Cumulative	0.30	2.00	4.50	7.00	9.50	10.00
Proposed Development Objective(s)						
The objectives of the Project are to: (i) strengthen the capacity of secondary school mathematics teachers nationwide, and (ii) increase enrollment in General Secondary Schools in targeted regions.						
Components						
Component Name				Cost (USD Millions)		
Strengthen the Capacity of Secondary School Mathematics Teachers Nationwide				1.80		
Expansion of General Secondary School Facilities				7.15		
Strengthen Institutional Capacity and Project Management				1.05		

Institutional Data				
Sector Board				
Education				
Sectors / Climate Change				
Sector (Maximum 5 and total % must equal 100)				
Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Education	Secondary education	100		
Total		100		
<input checked="" type="checkbox"/> I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.				
Themes				
Theme (Maximum 5 and total % must equal 100)				
Major theme	Theme	%		
Human development	Education for the knowledge economy	100		
Total		100		
Compliance				
Policy				
Does the project depart from the CAS in content or in other significant respects?			Yes []	No [X]
Does the project require any waivers of Bank policies?			Yes []	No [X]
Have these been approved by Bank management?			Yes []	No []
Is approval for any policy waiver sought from the Board?			Yes []	No [X]
Does the project meet the Regional criteria for readiness for implementation?			Yes [X]	No []

Safeguard Policies Triggered by the Project			Yes	No
Environmental Assessment OP/BP 4.01			X	
Natural Habitats OP/BP 4.04				X
Forests OP/BP 4.36				X
Pest Management OP 4.09				X
Physical Cultural Resources OP/BP 4.11				X
Indigenous Peoples OP/BP 4.10			X	
Involuntary Resettlement OP/BP 4.12				X
Safety of Dams OP/BP 4.37				X
Projects on International Waterways OP/BP 7.50				X
Projects in Disputed Areas OP/BP 7.60				X
Legal Covenants				
Name	Recurrent	Due Date	Frequency	
Implementation Arrangements (Section I.A.1 of Schedule 2)	X		Continuous	
Description of Covenant				
The Recipient, through the Ministry of Education, shall maintain within the Planning Unit of the Ministry of Education, a Project coordinator, a Project engineer, a finance officer, a procurement officer, and an assistant accountant.				
Name	Recurrent	Due Date	Frequency	
Safeguards (Section I.C.1 of Schedule 2)	X		Continuous	
Description of Covenant				
The Recipient, through MOE, shall carry out the Project in accordance with the Environmental Assessment and Management Plan (“EAMP”), and Part A of the Project in accordance with the Indigenous Peoples Plan (“IPP”), and shall not amend, suspend or abrogate any of the provisions of the EAMP or IPP without the prior agreement of the Association.				
Name	Recurrent	Due Date	Frequency	
Safeguards (Section I.C. 2 of Schedule 2)	X		Continuous	
Description of Covenant				
The Recipient shall ensure that no Resettlement shall take place as a consequence of Project				

implementation.			
Conditions			
Name Project Coordinator and Project Engineer (Article IV 4.01 a)			Type Effectiveness
Description of Condition The Recipient, through the Ministry of Education, has hired the Project coordinator, and the Project engineer, referred to in Section I.A.1 of Schedule 2 of the Financing Agreement.			
Name Project Operational Manual (Article IV 4.01 b)			Type Effectiveness
Description of Condition The Recipient, through the Ministry of Education, has adopted the Project Operations Manual pursuant to Section I.A.3 of Schedule 2 of the Financing Agreement			
Team Composition			
Bank Staff			
Name	Title	Specialization	Unit
Hongyu Yang	Senior Education Spec.	Team Leader	LCSHE
Robert Hawkins	Sr. Education Specialist	Education and ICTs	LCSHE
M. Mozammal Hoque	Sr. Financial Management Specialist	Financial Management	LCSFM
Plamen Stoyanov Kirov	Sr. Procurement Specialist	Procurement	LCSPT
Abril Ibarra Castaneda	Consultant, ETC	Education	LCSHE
Nancy Banegas	Consultant, ETC	Operations	LCSHS
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Maria Elena Paz Gutzalenko	Program Assistant	Program Assistant	LCSHE
Ramiro Ignacio Jauregui-Zabalaga	Counsel	Counsel	LEGLE
Victor Ordonez	Senior Finance Officer	Disbursement	CTRLN
Michael J. Darr	Environmental Specialist	Consultant	LCSEN
Gabriel Esteban Barrientos	Program Assistant Temporary	Team Assistant	LCSHE

Non Bank Staff					
Name		Title	Office Phone		City
Samuel Carlson		Education Specialist	802-399-2983		Burlington, VT
Ian Marfleet		Architect	868-628-9773		Trinidad
Locations					
Country	First Administrative Division	Location	Planned	Actual	Comments
Guyana	Regions	All 10 Regions and Georgetown			

I. STRATEGIC CONTEXT

A. Country Context

1. Guyana is located in the northern part of South America, bordering the Atlantic Ocean, with Suriname, Venezuela, and Brazil as neighbors. Guyana has a population of about 800,000 people and a per capita Gross National Product (GNP) of approximately US\$3,410 (2012).
2. For the five-year period 2008-2012, Gross Domestic Product (GDP) growth averaged 4 percent, recovering steadily since 2007 (when it fell by 3.6 percent). The economy grew by 3.9 percent during the first half of 2013, largely driven by rapid growth in mining, and is projected to grow by 5.8 percent overall in 2013. Inflation is stable at less than 2 percent. Guyana is well endowed with natural resources, fertile agricultural lands, bauxite, gold, and extensive tropical forests that cover 80 percent of the country. However, its incidence of poverty is among the highest in the Western Hemisphere, at 43 percent of the population (2011), and with much higher rates in rural and Amerindian areas. In 2012, it ranked 118 out of 187 countries on United Nations Development Program's (UNDP) Human Development Index, having declined from 107 in 2008. About 90 percent of the population lives on the coastal plain, in and near the capital of Georgetown¹.

B. Sectoral and Institutional Context

3. As stated in the Minister of Finance's annual Budget Speech to Parliament (2012), the Government of Guyana (GoG) recognizes that education is critical if the country is to develop a well-trained and skilled workforce, which is necessary to meet the needs of the modern economy. While the sector has recently made remarkable progress, by achieving Universal Primary Education, Guyana's education system is still recovering from years of underinvestment. Underspensing in the sector began with political instability in the 1970s and lasted through economic decline and fiscal adjustment until the early 1990s. Since then, the education budget has risen from 2.1 percent in 1991 to an average of 5 percent of GDP over the last four years, demonstrating the Government's firm commitment to education as a national priority. In the same period, education as a percentage of the national budget has risen from a low of 4.4 percent to an average of 15 percent (2012). The attainment of Universal Secondary Education (USE)—including provision of secondary education in appropriate conditions—is a major priority in the current Education Strategic Plan (ESP) 2008-13, and is expected to remain so in the new ESP 2014-18 (under preparation).
4. **Secondary Education in Guyana.** About 84,000 students are enrolled in secondary education nationwide.² There are 110 General Secondary Schools (GSS), which are comprised of grades 7-11 and enroll 89 percent of all secondary students. Most GSS are large (600-1000 students), urban-based, staffed with trained teachers, and able to offer the full secondary curriculum. Due to greater demand for places at secondary level than the places available in

¹ UNDP. 2013 Human Development Report; World Bank Data.

² The vast majority of students (95 percent) are enrolled in secondary education, with just 5 percent attending one of eight technical/vocational schools.

GSSs, the Government of Guyana established Secondary Departments (SD) at Primary Schools as a temporary solution to provide secondary education to as many children as possible. Currently, there are 175 SDs at primary schools offering Grades 7 to 9, which enroll about 11 percent of secondary students. SDs have less than 100 students on average, lack trained/qualified teachers at the secondary level, cannot offer the full curriculum and have no laboratories or specialty rooms.

5. **Increase number of GSSs to allow absorption of students currently in SDs.** . Given SDs' poor learning conditions, the Government of Guyana has set an objective to achieve quality universal secondary education through the consolidation of several smaller SDs into larger GSSs, at least in densely populated areas. Towards this end, the Ministry of Education (MOE) has constructed, equipped and staffed about five new GSS in the past five years; two in hinterland areas and three in the coastal regions. More GSSs are needed, particularly in Regions 3 and 4, which serve nearly 30 percent of the country's secondary school population and account for over 40 percent of the country's population that live in poverty. In addition, there are very low attendance rates in these Regions (70 percent average in 2013). Low performing students assigned to low-quality SDs with poorly trained teachers, irrelevant/insufficient learning materials, and poor learning conditions appear to be the main factors that discourage attendance.

6. **Mathematics is the most challenging area in regards to performance of secondary students.** Among the low proportion of secondary students who reach Grade 11 and take the Caribbean Secondary Examinations Council (CSEC), only 28 percent achieved CSEC scores in mathematics sufficient for entry into the University of Guyana (UG) or the Cyril Potter College of Education (CPCE) in 2013, versus 46 percent in English. Similar problems are apparent from the 2013 Grade 9 National Achievement diagnostic test in mathematics, on which students scored an average of just 54 percent (48 percent for males and 59 percent for females). Raising student achievement in mathematics, particularly among boys, is a national priority.

7. **Guyana faces teacher quality challenges.** Although the Government is already tackling this issue by rapidly increasing the percentage of trained teachers and strengthening the capacity of Cyril Potter College of Education,³ challenges remain for in-service teachers. The capacity to provide Continuous Professional Development (CPD) for secondary school teachers is weak. The MOE's National Center for Education Resource Development (NCERD) developed a CPD Policy a few years ago. Implementation of the policy has been a challenge due to a lack of human resources, institutional capacity and geographical challenges. Currently, NCERD offers a non-graduate program for secondary school teachers that lack content mastery, along with a few ad hoc workshops to improve instruction.

8. In addition, low capacity to assess teacher performance has made the existing teacher appraisal system ineffective and unreliable. The teacher appraisal instrument is out of date and ineffective. Its administration haphazard, frequently involving conflicts of interest. Furthermore, there is no established process for using the results of teacher appraisal to identify professional

³ A Bank-financed project aiming at producing more trained teachers (pre-service) efficiently (4 years), assessing and training/coaching lecturers at the teachers' college, improving the practicum, and introducing an induction year for newly qualified teachers.

development needs or incentivize teachers to improve their performance. As a result, educators have lost confidence in the appraisal process and many schools have abandoned the process completely.

9. As research over the past decade suggests, teacher quality is highly correlated with student learning outcomes (Hanushek & Rivkin, 2010; Rockoff, 2004). This correlation appears to be even stronger for mathematics students (Hill et al, 2011). Evidence shows that formal qualifications or experience are not always correlated with student learning; however, policies tackling teacher selection, professional development, and motivation have an important impact on learning (Bruns, 2014). Therefore, well- designed, tailored, and implemented teacher in-service training and evaluation systems could be a cost-effective way of improving teacher quality.

10. **The country also faces important equity challenges.** In the hinterland areas (Regions 1, 7, 8, and 9), accounting for around 10 percent of the country's population. About 40 percent of the population lives below the poverty line. Government has built general secondary schools in these regions. However, quality of teaching remains an issue. The GoG, in coordination with the Education for All Fast Track Initiative (EFA-FTI) and the Bank, has made important efforts to address the education needs of hinterland populations. This includes providing relevant learning materials for primary and SD students, school grants to implement improvement plans, remote area incentives and housing for teachers, and school meals for students. Additionally, the GoG built GSSs with dormitories in central locations in the hinterland to absorb students from nearby communities. The GoG also provides transportation for students from distant villages.

11. **The MOE's ability to collect, analyze and use school-level data to improve sector planning and policymaking is constrained by an outdated statistics information system.** Currently, questionnaires are distributed to schools once a year, which teachers and students fill out manually. Once the forms are re-transmitted back to the MOE, often with long delays, the Planning Office manually inputs data into static access database files separated by year, making time series analysis cumbersome and time-consuming. Real-time tracking of teacher assignments and qualifications is not possible, hampering efforts to match schools with the number of qualified teachers they need. An earlier pilot to establish an Education Management and Information System (EMIS) at the secondary level was not successful, primarily because the EMIS software chosen had high annual costs and schools lacked the necessary internet connectivity. This limited the system's expansion to additional schools and led to the MOE's decision to eliminate funding.

12. To address the above-mentioned issues, the GoG Education Sector Plan largely focuses on achieving quality USE through a two-fold strategy: (i) consolidating SDs into GSSs in densely populated areas; and, (ii) improving the quality of the teaching force nationwide. To these ends, the GoG has allocated national funds to: (i) construct additional GSSs; (ii) provide dormitories for students traveling long distances; (iii) offer both bus and boat transportation for students to commute to school; and (iv) improve the teaching force through initial and in-service training nationwide both for GSSs and SDs. However, domestic financing is insufficient to

address the infrastructure needs in Regions 3 and 4,⁴ address in-service teacher quality issues, and to strengthen the MOE's institutional capacity.

C. Higher Level Objectives to which the Project Contributes

13. The proposed Project is fully consistent with the World Bank Group's Guyana Country Assistance Strategy (CAS) FY2009-12 (Report No. 47983-GY), discussed by the Executive Directors on May 26, 2009, which continues to guide the Bank's assistance to Guyana, as the Bank moves towards more analytical work and the development of a new strategic engagement framework. The CAS discussed by the Board on May 26, 2009, focuses on: (i) Environmental resilience and sustainability, which focused on helping the country establish pilot forest areas that are protected and sustainably managed by local communities, and strengthening the country's ability to reduce its exposure to natural disasters and global climate risk and (ii) Education quality and social safety nets through teacher training reform and better service delivery, while bolstering the Government's efforts to deliver an enhanced social protection program.

14. The proposed Project would contribute to the higher level objective of improving secondary school student learning outcomes. More broadly, it would contribute to the GoG's efforts to reduce poverty and increase shared prosperity for the population through the provision of in-service teacher training to all mathematics secondary school teachers in the country, the construction of GSS in Regions 3 and 4 and, the strengthening of the MOE's Teacher Appraisal and EMIS. It is expected that improved mathematics instruction and enrollment at the secondary level would increase future economic opportunities for students. Society in general would benefit indirectly from a higher number of secondary education graduates with the necessary knowledge and skills to be productive, obtain decent-paying jobs, and contribute to Guyana's modernizing economy.

II. PROJECT DEVELOPMENT OBJECTIVE

A. PDO

15. The objectives of the Project are to: (i) strengthen the capacity of secondary school mathematics teachers nationwide, and (ii) increase enrollment in General Secondary Schools in targeted regions.

Project Beneficiaries

16. Approximately 800 secondary level mathematics teachers nationwide would benefit from in-service training. All secondary students (about 84,000) would benefit indirectly from the

⁴ According to the Guyana Poverty Reduction Strategy Paper 2011-2015, 56 percent of the entire population of Guyana lives in Regions 3 and 4. Among all regions, Region 4 has the highest absolute number of poor people and Region 3 has the third highest number of poor people. The catchment population for these schools will be mainly students from SDs situated 3 miles or closer to the new schools' location but also primary graduates from schools situated 3 miles or closer to the new schools sites; and some students currently at GSSs that live closer to the new school sites.

improved capacity of their mathematics teachers. The direct Project beneficiaries would be 2,600 students benefiting each year from new secondary school facilities in Regions 3 and 4. Given current enrollment shares between males and females in these regions, 50 percent of the student beneficiaries would be female. The Project would also benefit students at 8 schools with a Technology-assisted Learning in Mathematics pilot. In addition, the MOE would benefit from improved capacity in EMIS.

PDO Level Results Indicators

17. Progress towards meeting the Project Development Objective would be measured by two outcome indicators:

- (i) Percent of secondary school mathematics teachers that pass the examinations of the targeted training courses designed under the Project.
- (ii) Percent of secondary students enrolled in General Secondary Schools (GSS) increased in Regions 3 and 4.

III. PROJECT DESCRIPTION

18. The Project would achieve its development objective through the implementation of three components:

- 1. Strengthen the Capacity of Secondary School Mathematics Teachers Nationwide (US\$1.80 million);
- 2. Expansion of General Secondary School Facilities (US\$7.15 million); and
- 3. Strengthen Institutional Capacity and Project Management (US\$1.05 million)

A. Project Components

19. **Component 1: Strengthen the Capacity of Secondary School Mathematics Teachers Nationwide** (US\$1.80 million). The objective of this component is to improve the content knowledge and instructional skills of secondary school mathematics teachers to enhance their effectiveness in the classroom. It would have three subcomponents.

20. *Subcomponent 1.1 - In-Service Mathematics Teacher Training and Upgrading* (US\$1.275 million). Carrying out the following activities: (i) a diagnostic assessment of mathematics teachers; (ii) training and workshops for master trainers to deliver in-service training to all public secondary school mathematics teachers; (iii) design, development, and provision of modular, iterative, competency-based training for all secondary mathematics teachers; (iv) distribution of mathematics teaching aids in all public secondary schools, to promote the application of training in the classroom and improve student learning; and (v) development of a comprehensive website for an on-line community of practice for mathematics teachers in the country.

21. Teachers would be formally assessed at the end of each training course (a key Project indicator). This training would be closely followed up by regular supervision visits by master trainers (three times per year per school, including in hinterland regions), who would observe

teacher practices and provide immediate feedback. In addition, Regional Education Officers (REd.Os) and District Education Officers (DEOs) would play a key role in all training, supervision, and project monitoring activities. REd.Os/DEOs would help coordinate and participate in the teacher professional development workshops and school visits.

22. At the regional level, monthly Mathematics Subject Committee Meetings would be held for all Mathematics Department Heads, reinvigorating an existing policy that has not been rigorously implemented. Subject Committee Meetings would be carefully planned, structured and offered each month to address specific learning objectives and to share experiences, facilitated by mathematics instructional specialists and coordinated by Regional and District Education Officers. At the school level, Department Heads for Mathematics would organize meetings monthly or as necessary for all math teachers to share lesson plans, teaching methods, knowledge, and skills from regional Subject Committee Meetings, and to prepare new lessons and learning activities together. The Project would also provide information through initial training sessions to ensure the buy-in and support of all School Heads and to emphasize their responsibility as school leaders and agents of change for the whole school and beyond mathematics. The Project would finance procurement of laptops and LCD projectors to support the regional meetings. Meanwhile, the GoG has committed to providing sufficient funding each year in the MOE's budget for the required logistical support (supplies, transportation, snacks, etc.).

23. The establishment of an on-line community of practice among all mathematics teachers, via a comprehensive website would enable teachers to, *inter alia*, access on-line instructional resources, share lesson plans, pose questions to fellow teachers and mathematics experts, post blogs, review CSEC mathematics study guides, and exchange experiences with fellow mathematics teachers through internal email. This community of practice would be facilitated by the Mathematics Technical Group, composed of mathematics specialists from the MOE (including NCERD and CPCE staff) and UG. The Project would finance technical assistance, materials, training activities, supervision logistics and procurement/distribution of teaching aids.

24. *Subcomponent 1.2 – Revising Public Secondary School Teachers Appraisal Instruments* (US\$200,000). Improving mathematics instruction through: (i) the development of specific standards for mathematics instruction; (ii) the revision of the appraisal system for secondary school teachers and school principals; and (iii) the provision of training for secondary school principals, deputy principals, and master trainers in the use of the revised teacher appraisal instruments.

25. *Subcomponent 1.3 –Technology-assisted Learning in Mathematics* (US\$325,000). Carrying out the following activities: (i) improvement of mathematics instruction and learning through use of innovative technology, on a pilot basis; and (ii) an independent evaluation process to assess the effectiveness of different packages of tablets and on-line mathematics learning management systems for improving student learning outcomes in mathematics.

26. Specifically, this would be piloted at eight secondary schools over three years, promoting innovation and providing lessons for possible future scaling up. Tablets would be distributed to all Grade 7 students in the eight pilot schools for both school and home use, with the capability

to download and operate a range of self-paced mathematics software applications. This cohort would be followed for three years. LCD projectors and basic servers would also be provided to each school to ensure on-line resources can be downloaded and stored at the school level and accessed off-line. After receiving training, teachers would post regular “reflection blogs” discussing their experiences and questions on a website set up for this purpose. A more qualitative, process-focused evaluation would be conducted to gather teacher and student feedback, assess technology adoption, review on-line resources prepared by participating teachers, and compare outcomes with a set of control schools. The Project would finance technical assistance, procurement of hardware and software, training and evaluation activities.

27. **Component 2: Expansion of General Secondary School Facilities** (US\$7.15 million). Expand access to General Secondary School services in underserved areas of Regions 3 and 4 of the Recipient, through:

28. *Subcomponent 2.1 – New School Construction* (US\$6.28 million): Construction of three new General Secondary Schools (one in Region 3 and two in Region 4), pursuant to the specifications set forth in the Project Operations Manual.

29. The three new schools would create a total of 2,600 student places. The main goals are to consolidate the SDs of nearby primary schools into these new GSSs, prepare for increasing student populations coming from primary schools in these regions, and ease overcrowding in surrounding GSS. There are ten SDs with a total number of 728 students in Region 3, and 17 with a total number of 1,257 students in Region 4. Two of the new GSSs would be located in new housing areas where hundreds of new homes are in the process of being built and no schools exist. The basic design and architectural plans already exist from recently constructed GSSs financed through domestic resources and, although they need to be revised, this is expected to accelerate bidding and implementation of civil works. This subcomponent includes the design and supervision fees.

30. *Subcomponent 2.2 – Provision of Furniture and Equipment for New School Construction* (US\$870,000). Financing procurement of classroom furniture, laboratory equipment, and basic technology for the three new GSSs, to ensure that the new schools provide the necessary learning conditions to offer the full secondary education curriculum.

31. **Component 3: Strengthen Institutional Capacity and Project Management** (US\$1.05 million). This component seeks to strengthen the Education Management Information System (EMIS) through design, development, and implementation of a new EMIS to increase efficiency in education sector data management and information use for planning and policymaking.

32. *Subcomponent 3.1 – Design, develop and implement a new education management information system to increase efficiency in education sector data management and information use for planning and policymaking* (US\$200,000). Design, development and implementation of a new EMIS, which would enable School Heads, REEd.Os and MOE policymakers to more efficiently manage education sector data and use information for more effective planning and policymaking. The Project would finance procurement of EMIS software and hardware, two tablets for each GSS for school-level uploading/downloading of data (including a keyboard

accessory as necessary), technical assistance and training, as well as tablets for REd.Os and the central MOE MIS unit. The EMIS would capitalize on the GoG’s e-government initiative, which has set up a large national data center and is establishing 4G wireless connectivity covering approximately 80 percent of the population (to be operational in August 2014). The vast majority of secondary schools, approximately 85 percent, is located within high-speed wireless areas and would have free connectivity, easy uploading of and access to education information with their tablets, and free hosting of the EMIS software and database. The REd.Os and DEOs would be in charge of supervising the implementation of the new EMIS at the school level.

33. *Subcomponent 3.2 – Carrying out of Project management, monitoring and evaluation, including Project audits.* (US\$850,000): This subcomponent would finance project management, monitoring and evaluation, and auditing activities.

B. Project Financing

Lending Instrument

34. Investment Project Financing for the proposed project would be provided by an International Development Association (IDA) credit in the amount of SDR 6.50 million (Equivalent to US\$ 10.0 million), to be disbursed over a period of five years.

Project Cost and Financing

Project Components	Project cost (in US\$ millions)	IDA Financing	% Financing
1. Strengthen the Capacity of Secondary School Mathematics Teachers Nationwide	1.80	1.80	100
2. Expansion of General Secondary School Facilities	7.15	7.15	100
3. Strengthen Institutional Capacity and Project Management	1.05	1.05	100
Total Costs	10.00	10.00	100
Total Financing Required	10.00	10.00	100

C. Lessons Learned and Reflected in the Project Design

35. The recently completed Education For All Fast Track Initiative Catalytic Trust Fund EFA-FTI Project (US\$33 million, P089324, Grant TF053679, approved on 20 September 2004) and the ongoing Improving Teacher Education Project (US\$4.2 million, P110018, Credit 4803-GY approved on 14 October 2010) offer important lessons that have been incorporated into project design. The Implementation Completion Report (ICR) of the EFA-FTI Project (Report No. ICR2547) highlighted the importance of a clear Results Framework with outputs and outcomes that can be attributed to the Project’s interventions and inputs. Such a Results Framework is presented in Annex 1. Secondly, the ICR highlighted the key role of Regional and District Education Officers (REd.Os and DEOs) in all training, supervision, and project monitoring activities to ensure they fully understand what is expected of them and of the Project, which improves project implementation and sustainability. Under the proposed Project, REd.Os and DEOs would participate in teacher professional development workshops and monthly Subject Committee Meetings, supervise implementation of the EMIS and Teacher Appraisal

activities at the school level, and be involved in general project monitoring activities. Thirdly, the EFA-FTI Project ICR discusses the importance of avoiding overly ambitious targets, particularly related to student achievement gains within a relatively short timeframe.

36. The Implementation Supervision Reports (ISRs) for the ongoing Improving Teacher Education Project point to the importance of keeping project design simple and scaled to existing implementation capacity, with clear implementation responsibilities among participating institutions. The proposed Project has integrated this approach and prepared a detailed Operational Manual with specified institutional responsibilities and Project milestones, along with terms of reference for key technical assistance to enhance implementation capacity. In addition, the unsuccessful prior attempt to establish an EMIS at the secondary level suggests the importance of choosing EMIS hardware and software solutions that are scale-able, low-cost and user-friendly, with minimal recurrent costs. Integrating the EMIS subcomponent with the GoG's e-government initiative is expected to help significantly in this respect.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

37. The MOE would be the implementing agency for the Project. The MOE has extensive experience implementing externally financed projects (World Bank, IDB, EFA-FTI). Technical responsibilities for implementation would lie with the Chief Education Officer of the MOE. Fiduciary responsibilities would be managed by the Planning Unit of the Ministry of Education, which currently handles all financial management and procurement for the on-going Improving Teacher Education Project and the University of Guyana Science and Technology Support Project (P125288, Credit 4969-GY).

38. A Project Coordinator would be hired and maintained in the MOE's Planning Unit. S/he would be responsible for day-to-day management, monitoring, and coordination of project implementation, including work planning, procurement, accounting, disbursement, financial management and other Project-related activities. The Project Coordinator would report to the Chief Planning Officer of the MOE, supervise agreed work plans with the technical leads for each subcomponent, and coordinate implementation among MOE departments (including NCERD and CPCE) and UG. In addition, the Project Coordinator would be responsible for preparing/consolidating information for Quarterly and Annual Progress Reports. Existing fiduciary staff in the MOE Planning Unit currently managing other Bank-financed projects would handle similar responsibilities for this Project. In addition, the technical capacity of the MOE to supervise the design, implementation and supervision of the proposed civil works activities would be strengthened with the addition of one project engineer financed by the Project.

B. Results Monitoring and Evaluation

39. The MOE's Planning Unit would be responsible for project monitoring and evaluation. It would, through the Project Coordinator, send Quarterly and Annual Progress Reports to the Bank, including on progress toward targets described in the Results Framework. Past experience with previous and ongoing Bank education projects indicates that the Planning Unit has the

necessary M&E capacity to generate reliable data using existing country systems. The MOE's M&E capacity to carry out project monitoring and evaluation would be further strengthened through the rollout of the proposed EMIS. The Planning Unit would participate in formal implementation supervision missions along with Bank supervision teams, to track progress in achieving project outcomes. For the evaluation of the pilot technology-assisted program to improve learning in mathematics, external technical assistance (national and international) would be contracted under the Project.

C. Sustainability

40. Sustainability of project interventions largely relate to three issues: maintenance of civil works (i.e. three new secondary schools) financed by the Project; technical and financial support of continuous teacher professional development in mathematics; and expansion of the EMIS system at the secondary level. With respect to civil works, provision within the MOE's budget for the maintenance of these facilities will be made on a recurrent basis. This is estimated to be equivalent to 0.7 % percent of its current spending on secondary education and to 0.08 % percent of its education spending overall, which has been programmed by the GoG.

41. With respect to the sustainability of teacher training proposed under the Project, the MOE is expected to ensure sufficient recurrent financing and institutional capacity-building of NCERD to sustain and expand project training activities. In addition, the on-line Community of Practice for mathematics teachers would greatly enhance the sustainability of qualitative investments at minimal cost, driven by the teachers themselves. Furthermore, it is expected that the Secondary EMIS to be established under the Project would improve the MOE's management of teachers, identifying and targeting those teachers in need of further upgrading. Synergy between the EMIS subcomponent and the GOG's e-government initiative would minimize recurrent costs for the EMIS and would greatly reduce expenditures currently incurred for EMIS data collection and data entry. Overall, recurrent costs to sustain the teacher professional development and EMIS systems are estimated at US\$90,000 annually. This represents only 0.04 percent of total annual education expenditure and is considered by the Bank to be financially sustainable.

42. Finally, although the Project will be responsible of the redesign of the Appraisal of Teachers and Principals, the GoG would take full responsibility for all recurrent costs of teacher evaluations, including the implementing costs of the monitoring and appraisal instruments, as well as the administrative costs that teacher evaluation results might entail from inception.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Risk Category	Rating
Stakeholder Risk	Moderate
Implementing Agency Risk	
- Capacity	Moderate
- Governance	Low
Project Risk	
- Design	Moderate
- Social and Environmental	Moderate
- Program and Donor	Low
- Delivery Monitoring and Sustainability	Low
Overall Implementation Risk	Moderate

B. Overall Risk Rating Explanation

43. The overall risk of the Project is Moderate. The implementation risk rating is driven largely by moderate stakeholder, design, capacity, and social/environmental risks linked to the construction of GSS. There is a moderate risk of building the GSSs and not being able to attract students, especially those at SDs of primary schools in more remote areas. To mitigate this risk, the location of the schools to be constructed has been carefully selected by the MOE, in coordination with the Ministry of Housing, to ensure that the schools are situated in areas where they are needed. The targeted regions are highly populated and the selected sites have several SDs and GSSs close by that usually experience crowding. In addition, the Government has put in place a scheme for paying students' transportation and accommodation stipends to attend GSS. Likewise, there is a moderate risk of not being able to attract trained teachers to these new GSS. However, the MOE has increased the number of trained teachers (with the support of the Improving Teacher Education Project, GITEP) and is committed to allocating trained teachers to all GSS. In addition, the Project would provide in-service tailored training to all secondary schools math teachers, including those placed at the newly constructed schools.

44. There is a moderate risk that the Project diverts attention and efforts to improve learning in other curriculum areas to focus only on mathematics. To mitigate this risk, the Project would help sensitize school principals to, among others, emphasize their responsibility as school leaders and agents of change for the whole school and beyond mathematics. In addition, the MOE is working on a comprehensive Education Strategy that also pays attention to improvements in English.

45. Conversely, the governance in the education sector, donor coordination, sustainability, and delivery monitoring are considered low risk areas. In sum, this is a well-defined Project, with only three medium-sized infrastructure investments that will be easy to monitor in areas close to the capital, and clearly defined groups of teachers who need training and schools that

require improved provision of learning materials. The MOE's past and ongoing experience with Bank-financed projects has been largely successful in terms of fiduciary performance, as evidenced in the EFA-FTI ICR and recent ISRs for the Improving Teacher Education Project.

VI. APPRAISAL SUMMARY

A. Economic Analysis

46. **Rationale.** The Government's sustained commitment to primary education has enabled Guyana to achieve universal primary education. Building on this success, attainment of secondary education is a major priority in the current and upcoming Education Strategy. The proposed Project would contribute to achieving this strategic goal.

47. **The Bank's Value-Added.** The Bank's unique global vision and international experience in secondary education has led to great success in helping other countries build up secondary education. Furthermore, the proposed Project perfectly complements and generates synergy with other Bank-financed projects, i.e., the Improving Teacher Education Project and the University of Guyana Science and Technology Support Project.

48. **Economic Analysis:** There are two sets of direct project beneficiaries: students graduating from the three new GSS that would not complete secondary education without the Project (estimated at 450 per year), and students attending other GSSs and SDs around the country who would benefit from the improved instruction in mathematics due to the Project and complete secondary education because of this support (estimated at 595 per year).

49. Using estimates of annual income by education level from data gathered from the Ministry of Labor and International Labor Organization (ILO)⁵ and updated during project preparation, the project's IRR is calculated at 9 percent with an NPV of US\$6.7 M (using a 5 percent discount rate).

B. Technical

50. The Project design supports Guyana's priority of provision of secondary education in appropriate conditions for all. To achieve this goal, the Government has opted for the GSS model. This model is more costly, but technically sound since it is characterized by large schools (600-1,000 students), staffed with trained teachers and able to offer the full secondary curriculum, as opposed to the secondary departments of primary schools with few students at the secondary level (average 100), but without trained secondary school teachers and relevant materials that do not offer the full curriculum. The main challenge of the GSS model is that students in remote areas with low population densities are less likely to benefit, since they might find it challenging or unacceptable to travel long distances to attend GSS. As mentioned earlier, to address these issues, the MOE has put in place different programs that provide transportation and accommodation stipends to those students. Nevertheless, the MOE is aware that it might be hard to eliminate all SDs, especially in the most remote areas, where parents might refuse to send

⁵ National Employment Report – Guyana, ILO, 2006.

their children to GSS situated far from their localities. In this sense, the MOE is also working to ensure that SDs of primary schools that will remain, improve their learning environment by providing more relevant learning materials, remote area incentives and housing to attract better teachers, among others. The Project would support these efforts through the provision of in-service training to all mathematics secondary school teachers at all SDs and GSSs.

51. Regarding the Project's focus on mathematics, such prioritization is justified given the limited resources available and given that mathematics presents the most critical learning challenges, as seen in CSEC exams results.

52. Other aspects of the technical appraisal of the project focus on: school construction, teacher training and establishment of the EMIS system for secondary education. With regards to school construction, the designs and drawings for two recently completed General Secondary Schools have been studied by the MOE and the Bank's architect/consultant. As a result of this process, the MOE has agreed to certain design improvements for the three schools to be financed under the project, as well as increased specificity and oversight of the detailed design work to be carried out by contracted architectural firms which is included in the TORs. This should facilitate both the bidding process for the school construction and the supervision of the construction itself. Nevertheless, this subcomponent would require close supervision from the MOE's project engineers and by the architect/engineer participating in Bank supervision missions.

53. The success of the teacher training subcomponent would depend largely on the capabilities of master trainers. The Project would invest in building capacity among this core group, supported by international technical assistance. All training workshops would be first piloted with the master trainers, and then revised by national and international mathematics experts, before they are rolled out to teachers. Both the MOE and MOF have agreed to include annual recurrent financing for the Subject Committee Meetings in the MOE budget, which should enhance the effectiveness and sustainability of the teacher training activities. While there is a risk that increasingly qualified teachers would be lured to higher-paying teaching jobs outside the country, this would be mitigated by ongoing NCERD in-service training and the increased supply of pre-service teacher training being supported by the Improving Teacher Education Project. In addition, the GoG has put in place non-salary incentives for teachers such as duty free concessions and housing credits.

54. Concerning the secondary education EMIS, a scale-able pilot approach is proposed under the project so that the MOE can test the design and implementation of the system in a limited number of secondary schools. This would generate experience and lessons learned for the revision of the EMIS before it is scaled up. While this subcomponent is partially dependent on the rollout of 4G connectivity which will cover the vast majority of all public secondary schools under the GoG's "e-government initiative", this rollout is expected to be completed in August 2014, before project effectiveness. Furthermore, the national data center under the "e-government initiative" is already operational and can easily handle hosting of the EMIS. Thus there is some uncertainty but also the potential for synergy and increased efficiency and sustainability, which balances out the risk.

C. Financial Management

55. The Project's financial management (FM) would be handled by the Planning Unit's core fiduciary team, which is also handling the ongoing Guyana Improving Teacher Education Project (GITEP) financed by the Bank. This team comprises a Finance Officer with a degree in Accounting and over 10 years of experience and an Assistant Accountant, who has a degree in Accounting with considerable experience and has been working with the Bank Project for 2 years. The Project would utilize the accounting and financial management systems (Quickbooks and Access-produced IFRs) that have worked quite well for the Improving Teacher Education Project and EFA-FTI Program in Guyana. A Financial Management Section has been included into the Project Operational Manual. Interim Unaudited Financial Reports (IFRs) would be prepared and sent to the Bank every quarter by the Project.

D. Procurement

56. Procurement under the Guyana Secondary Education Improvement Project would be carried out by the procurement team of MOE's Planning Unit (PU) led by Project Coordinator and a Procurement Specialist (PS). The PU has gained significant experience in WB procurement during the implementation of the Bank financed "Improving Teacher Education Project" (GITEP), Education for All Fast Track Initiative (EFA-FTI) Projects. Additional procurement and technical support would be provided by teams implementing the Secondary Education Improvement Project (SEIP) and the "University of Guyana Science and Technology Support" (UGSTS) Project. These teams include a civil engineer and have gained significant experience in WB procurement of works.

57. Given the limited engineering capacity of the MOE, the preparation of the detailed design of and works supervision of the three secondary schools financed under the Project will be handled by a qualified consulting firm. Additional technical assistance would be provided by a qualified project engineer.

58. As with any construction works and their supervision, there is a risk of the contractors' nonobservance of contracts' standards for works, materials and the building designs. Indeed, visitation by the task team to one GSS recently built with GoG funds found examples of non-compliance with technical specifications. To mitigate this risk, the MOE's civil engineer would need to increase oversight of the consulting firm supervising schools' construction and conduct site visits to all schools on a regular basis.

E. Social (including Safeguards)

59. Key stakeholders potentially affecting project outcomes include secondary education students and their parents, as well as teachers (and the Teachers Union). For some students, the consolidation of SDs into GSS may increase transportation time and money, such that they might drop out. This risk would be mitigated by location of new GSS near public transportation routes, and by ensuring that the new GSS offer much higher quality learning conditions (both facilities and teachers) for the full secondary education cycle. A complaint mechanism will be established

to collect feedback from stakeholders during Project preparation and implementation. Consultations with parents, students, teachers, and community of the project schools sites were carried out throughout the project preparation.

60. Teachers of mathematics were repeatedly visited and consulted during project preparation missions. In all schools visited by the task team, teachers confirmed their strong interest in improving their content knowledge and teaching skills through formal training workshops and through the proposed Subject Committee Meetings. With respect to the Teachers Union, it has already endorsed the GoG's national policy on CPD, so no resistance is expected from their part. However, the revised Teacher Appraisal instrument and procedures may generate some resistance from some teachers. To mitigate this risk, regional awareness-raising workshops would be held with Teacher Union representatives and civil society to explain how results would be used and how information would be stored and managed, and to address other concerns.

61. The Indigenous Peoples Policy (OP4.10) was triggered and an Indigenous Peoples Plan (IPP) was prepared. Consultations with the Amerindian communities and schools were conducted during the project preparation, since January 31st, 2014. The IPP has been disclosed to the public in the country by the government. The main impact is expected to be improved mathematics instruction for indigenous youth, which should contribute to increasing their secondary level completion rates and opportunities to continue on to higher education and/or succeed in the labor market. There is no school construction or rehabilitation planned in indigenous areas.

62. No involuntary resettlement will occur and no private land acquisition will occur under this project. All schools will be constructed on existing Government land and the Government has provided proof of land ownership prior to project appraisal. The overall social risks are considered Moderate for this project.

F. Environment (including Safeguards)

63. The Project is classified a category B. Environmental Assessment OP/BP 4.01 was triggered. Consultations started on March 12, 2014 as stated in the ISDS. The main environmental impacts expected of the Project are localized, minor, and possible to mitigate or prevent using standard methods. Most impacts will be related to the construction works planned under Component 2. There is also risk of poor site selection (sensitive areas, poor drainage, etc.), as well as the potential for negative effects during operations from improper disposal of laboratory materials or other practices.

64. The sites considered for the construction works were visited in a pre-appraisal mission and consultations performed with those affected by the project. With Bank support the MOE has prepared a simplified Environmental Assessment and Management Plan (EAMP), which includes a description of the Project; basic information on existing environmental and social baseline conditions of the selected project sites; an assessment of the potential environmental and social effects likely to occur and generic mitigation measures to mitigate those impacts; specific environmental and social measures where applicable to address any site-specific problems; and, legal and institutional provisions (e.g. permits required, governmental agencies involved, etc.).

65. The EAMP has been disclosed as part of the Bank requirements and to contribute to the public information and communications strategy to help ease concerns from secondary students and their families, as well as to build buy-in for the Project and tolerance for any temporary inconveniences that the project may cause. The EAMP also describes a grievance redress mechanism that will collect complaints of the communities and provide timely response through establishment of a web page, review of comments received by the MOE and PTT, and transmission to the contractor for resolution.

Annex 1: Results Framework and Monitoring
CO-OPERATIVE REPUBLIC OF GUYANA
Secondary Education Improvement Project (147924)

Project Development Objective: The objectives of the Project are to: (i) strengthen the capacity of secondary school mathematics teachers nationwide, and (ii) increase enrollment in General Secondary Schools in targeted regions.

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source /Methodology	Resp. for Data Collection	Description
				2015	2016	2017	2018	2019				
Project Development Objective Indicators												
Percent of secondary school mathematics teachers that pass the examinations of the targeted training courses designed under the Project	<input type="checkbox"/>	%	0	0	0	20%	40%	60%	Annual	Formal assessment results at the end of each training course	The assessment results will be assigned by master trainers and shared with NCERD, copying the Project M&E Specialist at the MOE Planning Unit	All secondary school mathematics teachers will be assessed at the end of each training course through examinations, classroom observations, portfolios, microteaching, etc. Teachers obtaining 60% or more in the summative evaluation for each course will be considered passed.
Percent of secondary students enrolled in General Secondary Schools (GSS) increased in Regions 3 and 4	<input type="checkbox"/>	%	87	87	87	88	90	92	Annual	MOE Annual Digest of Education Statistics	MOE Planning Unit	The targets capture the impact of three new GSS to be constructed under the Project and are based on historical trends.

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source /Methodology	Resp. for Data Collection	Description
				2015	2016	2017	2018	2019				
Intermediate Results Indicators												
Component 1 – Strengthen the Capacity of Secondary School Mathematics Teachers Nationwide												
Subcomponent 1.1: Number of teachers that complete at least one training course designed under the Project	<input type="checkbox"/>	Number	0	0	200	400	500	600	Annual	Training monitoring reports	Master trainers (and if necessary REd.O, DEO) submit to NCERD copying the Project M&E Specialist at the MOE Planning Unit	Courses would range from 4 to 12 days per year. Teachers will be assessed at the end of each course. The full program of courses could last up to 36 days over 3 years.
Subcomponent 1.1: Number of secondary mathematics teachers observed in the classroom and receiving expert feedback at least once during the Project's lifetime <i>Cumulative</i>	<input type="checkbox"/>	Number	0	0	300	400	500	600	Annual	Classroom Observation Tool	Master trainers (and if necessary REd.O, DEO) submit to NCERD, copying the Project M&E Specialist at the MOE Planning Unit	Teachers would be observed in the classrooms following training activities by master trainers who would provide immediate feedback. A standardized classroom observation instrument, with accompanying feedback report, would be used systematically. For teachers in very remote areas, this activity would be conducted at a central hub. The targets were set based on an estimate of 1 math teacher per SD and 4 math teachers per GSS.

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source /Methodology	Resp. for Data Collection	Description
				2015	2016	2017	2018	2019				
Subcomponent 1.1: Number of secondary mathematics teachers who have registered in the Guyanese mathematics teacher website/ community of practice <i>Cumulative</i>	<input type="checkbox"/>	Number	0	0	300	400	600	600	Semi-annual	The registration database of the Guyanese mathematics teachers' website	MOE MIS Unit would download this data and forward it to the Project M&E Specialist at the MOE Planning Unit	Teachers would register via a comprehensive website that would enable them to access on-line instructional resources, share lesson plans, and exchange experiences.
Subcomponent 1.1: Number of secondary schools having received Mathematics Teaching Kits (includes SD) <i>Cumulative</i>	<input type="checkbox"/>	Number	0	0	100	250	250	250	Annual	Reports submitted by School Heads to MOE Planning Unit	MOE Planning Unit	Every school would receive a set covering the mathematics curriculum for Grades 7-11.
Subcomponent 1.2: Revised Appraisal of secondary school teachers and principals	<input type="checkbox"/>	Text	No	No	Yes	Yes	Yes	Yes	One time	Revised Appraisal of teachers and principals included in Progress Reports	MOE CEO's Office and Department of Secondary	A consultant would be hired to provide technical assistance to the MOE to revise the Appraisal of Teachers and Principals. The revised Appraisal design will be shared with the Bank for comments.

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source /Methodology	Resp. for Data Collection	Description
				2015	2016	2017	2018	2019				
Subcomponent 1.2: Mathematics standards for secondary school teachers developed	<input type="checkbox"/>	Text	No	No	No	Yes	Yes	Yes	One time	Mathematics Standards for Secondary School Teachers	MOE CEO's Office and Department of Secondary	A consultant would be hired to provide technical assistance to the MOE for drafting the standards to be shared with the Bank for comments.
Subcomponent 1.3: Number of secondary school mathematics teachers trained in using technology in the 8 pilot schools <i>Cumulative</i>	<input type="checkbox"/>	Number	0	0	16	24	24	24	Annual	MOE Planning Unit	MOE Planning Unit	Teachers in pilot schools would receive hands-on training in ICT and on how to use the different resources/devices provided under the pilot. The targets are set based on the total number of actual teachers at the 8 schools selected for the pilot.
Component 2 – Expansion of General Secondary School Facilities												
Subcomponent 2.1: Number of additional student places created in general secondary schools in Regions 3 & 4 <i>Cumulative</i>	<input type="checkbox"/>	Number	0	0	800	1,800	2,600	2,600	Annual	MOE Planning Unit, and Annual Digest of Education Statistics	MOE Planning Unit	This captures the three new GSS to be constructed under the Project.
Subcomponent 2.2: Number of new GSS constructed and furnished <i>Cumulative</i>	<input type="checkbox"/>	Number	0	0	0	1	2	3	Annual	MOE Planning Unit Construction Completion Report	MOE Planning Unit	Two secondary schools would be built in Region 4 and one in Region 3.

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source /Methodology	Resp. for Data Collection	Description
				2015	2016	2017	2018	2019				
Direct project beneficiaries	<input checked="" type="checkbox"/>	Number	0	0	0	1000	2600	2600	Annual	MOE Planning Unit -Annual Digest of Education of Statistics	MOE Planning Unit	<p>Direct beneficiaries are people or groups who directly derive benefits from an intervention (i.e., children who benefit from an immunization program; families that have a new piped water connection). Please note that this indicator requires supplemental information. Supplemental Value: Female beneficiaries (percentage). Based on the assessment and definition of direct project beneficiaries, specify what proportion of the direct project beneficiaries are female. This indicator is calculated as a percentage.</p> <p>Students to be enrolled in the three new general secondary schools (2,600 places) financed by the project will be the direct beneficiaries.</p>
Female beneficiaries	<input checked="" type="checkbox"/>	Percentage Sub-Type Supplemental	0	0	0	49.8	50.0	50.0	Annual	MOE Planning Unit -Annual Digest of Education of Statistics	MOE Planning Unit	<p>Based on the assessment and definition of direct project beneficiaries, specify what percentage of the beneficiaries are female.</p> <p>% of female students to be</p>

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source /Methodology	Resp. for Data Collection	Description
				2015	2016	2017	2018	2019				
												enrolled in the three new General Secondary Schools (2,600 places) financed by the Project.
Component 3 – Strengthen Institutional Capacity and Project Management												
Subcomponent 3.1: Secondary EMIS designed, developed, piloted, revised, and rolled out		Text	No	EMIS design completed and technical specifications for EMIS adaptation, configuration, and installation finalized	EMIS software procured, installed at Data Center, and piloted	EMIS on-line data collection initiated in 20 secondary schools	EMIS data collection and analysis procedures revised; procedures developed for schools still not on-line	EMIS scaled up to at least 100 secondary schools with tele-connectivity (wireless or fixed); EMIS used to provide real-time analysis for policy makers & produce MOE Statistical Digest for 2019	Bi-Annual	MOE Statistical Unit and Bi-Annual Project Supervision Missions	MOE Planning Unit	The EMIS would go through 5 formal phases.

Annex 2: Detailed Project Description
CO-OPERATIVE REPUBLIC OF GUYANA
Secondary Education Improvement Project

1. The objectives of the Project are to: (i) strengthen the capacity of secondary school mathematics teachers nationwide, and (ii) increase enrollment in General Secondary Schools in targeted regions.

2. The Project would achieve its development objectives through implementation of three components:

Estimated Project Cost Summary by Component		
(US\$10 million)		
Component 1. Strengthen the Capacity of Secondary School Mathematics Teachers Nationwide		Total (US\$)
	Subcomponent 1.1 In-Service Mathematics Teacher Training and Upgrading	1,275,000
	Subcomponent 1.2 Revising Public Secondary School Teachers Appraisal Instruments	200,000
	Subcomponent 1.3 Technology-assisted Learning in Mathematics	325,000
Subtotal		1,800,000
Component 2. Expansion of General Secondary School Facilities		
	Subcomponent 2.1 New School Construction	6,280,000
	Subcomponent 2.2 Provision of furniture and equipment for the New Schools	870,000
Subtotal		7,150,000
Component 3. Strengthen Institutional Capacity and Project Management		
	Subcomponent 3.1 Design, develop and implement a new education management information system to increase efficiency in education sector data management and information use for planning and policymaking	200,000
	Subcomponent 3.2 Carrying out Project management, monitoring and evaluation, and audits	850,000
Subtotal		1,050,000
	Grand Total	10,000,000

Project Components

3. **Component 1: Strengthen the Capacity of Secondary School Mathematics Teachers Nationwide** (US\$1.80 million): The objective of this component is to improve the content knowledge and instructional skills of all secondary school mathematics teachers to enhance their effectiveness in the classroom. It would have three subcomponents.

4. Given that international education research has consistently shown that the primary factor in determining levels of student achievement is the quality of instruction (i.e. Hanushek 2005, 2009, Hanushek and Rivkin, 2005), it simply makes sense to focus on teachers. Secondly, only 65 percent of mathematics teachers in Guyana are actually qualified to teach mathematics; it is perhaps to be expected that teachers who have not participated in training in the instruction of mathematics have inadequate mathematical content knowledge and pedagogical content knowledge and skills and thus are not effective in ensuring all secondary students master the

mathematics curriculum. The expected outcome of this Component is improved mathematics instruction (as measured by a classroom observation tool) eventually resulting in improved student performance on Grade 9 National Assessments of Mathematics, and in the Grade 11 Caribbean Examinations Council tests. Three subcomponents are proposed:

5. *Subcomponent 1.1 - In-Service Mathematics Teacher Training and Upgrading* (US\$1.275 million). Carrying out the following activities (i) a diagnostic assessment of mathematics teachers; (ii) training and workshops for master trainers from the Ministry of Education National Centre for Education Resource Development (NCERD) to deliver in-service training to all public secondary school mathematics teachers; (iii) design, development, and provision of modular, iterative, competency-based training for all secondary mathematics teachers; (iv) in all public secondary schools, distribution of mathematics teaching aids to promote the application of training in the classroom and improved student learning; and (v) development of comprehensive website for an on-line community of practice for mathematics teachers in the country.

6. In total, there would be nine highly complementary, inter-related activities, described below.

- i. The first step would be to administer a diagnostic assessment of a large sample of mathematics teachers (at least 200), to identify the most common knowledge gaps (e.g. if it is algebra, geometry, trigonometry) and to reveal current instructional practices that need upgrading. This assessment would be conducted by the MOE (including NCERD and CPCE mathematics specialists), assisted by Regional Education Officers (REd.Os) and District Education Officers (DEOs), beginning in September 2014 and completed by the end of 2014. Four diagnostic activities would be undertaken: (i) classroom observation of 100 teachers; (ii) examination of mathematics skills of 100 other teachers; (iii) quantitative item-based analysis of recent student achievement on standardized assessments of mathematics (SSEE, Grade 9 Exam, CSEC); and (iv) questionnaires distributed to a sample of students to get their feedback on teachers' competencies and classroom behavior. The objective of this first step is to obtain a system-wide diagnosis of the highest-priority training needs of mathematics teachers at the secondary level. If needed, international and national technical assistance would be contracted under the Project to assist in the design and analysis of these diagnostic instruments. The actual administration of the diagnostic instruments (including data collection and analysis) would be carried out by the MOE (Secondary Secretariat and NCERD).
- ii. The second step would be to design and develop a series of modular, competency-based training workshops for all mathematics teachers, which closely reflect the diagnosis of training needs in Step 1. For the first year of training, up to 5 courses would be designed, corresponding to different levels of mathematics expertise and/or different content areas. All of the courses would include a "common core" of mathematics content and instructional skills. Based on the experience of the first year, a second set of courses would be designed for Year 2 that would be more specialized and targeted on certain problem areas in mathematics instruction. If needed, a third set of courses would be designed for Year 3. 13 weeks of international (1 expert) and national technical assistance

(about 80 weeks) would be contracted under the Project to assist mathematics experts at the MOE to design these workshops and train trainers. The idea is to continuously invest in capacity-building for design of high-quality training, but on a declining basis and with increasing responsibility of national technical assistants and staff from the MOE (including NCERD and CPCE) and UG.

- iii. Step 3 would be to Select and Train the master trainers, using the curriculum and learning materials developed in Step 2, and modeling the instructional practices promoted by the Project. The training would be offered by the international and national mathematics experts financed to design the training workshops, along with local mathematics specialists. Approximately 30 potential master trainers would be identified. Training would be offered face-to-face over a 5-day period at NCERD. Master trainers would participate in at least two training courses (10 days) each year. While all trainers would be expected to be capable of delivering any of the training workshops designed in Step 2, some trainers who are exceptional in certain content knowledge domains or instructional practices might be assigned to specific workshops. At the end of this training, the Mathematics Technical Group, in consultation with the international and national technical assistants, would select those participants who have demonstrated sufficient content knowledge and ability in effective instructional practices in mathematics, as well as enthusiasm (i.e., not all participants in the training would be subsequently hired by the Project to provide training to teachers).
- iv. Step 4 would be the actual teacher training, offered through face-to-face, distance, and blended learning modalities, by the trainers selected through Step 3. All 650-odd mathematics teachers working in GSS, and 175 teachers assigned to teach mathematics in the SD would be trained. Each year, teacher training registration forms would be sent out to every GSS along with the list of available training courses. The Head of the Mathematics Department would consult with each mathematics teacher and would agree on which courses would be most appropriate for which teachers (each teacher would choose at least 2 courses per year), and the registration forms would be sent back to the MOE, so that appropriate logistical arrangements could be made (based on the number of teachers who sign up for each course from each region). Training would be conducted at NCERD and regional training venues (e.g. satellite campus of CPCE, GSS located in regional capital). REd.Os and DEOs would also participate in this training, if they were not selected in Step 3 as trainers, so they can carry out supervision activities afterward (Step 5). At the end of each training workshop, teachers would be formally assessed on training content and workshop learning objectives to determine their progress and identify future training needs. Given that this feeds into Key Project Indicator No. 1, the percentage of teachers who pass the assessment would be communicated to the Project's M&E specialist.
- v. Following the training, periodic school-based supervision of mathematics teachers in action would be conducted by mathematics instructional specialists at GSS and SD. Each school would be visited around 3 times per academic year (1 time per term), for a period of 4 years. Visits would include classroom observations of all mathematics teachers,

followed by verbal feedback/coaching to the teachers and Head of the Mathematics Department.

- vi. To enrich both the training and teacher supervision, Mathematics Subject Committee Meetings would be held one day per month during the academic year at the regional level, facilitated by mathematics instructional specialists and coordinated by REd.Os and DEOs. All Mathematics Heads of Departments would be expected to participate in these meetings. Depending on available resources, one other mathematics teacher from each school would accompany the Department Head. At the beginning of each academic year, the topics and themes for the remaining meetings would be discussed and planned out, including assignment of lead facilitators among the participants for each meeting. Initially, these meetings would reinforce the content knowledge and instructional practices offered in the formal training (Step 4), including feedback from the Department Heads on the successes and challenges of application in the classroom. Over time, and based on consultation/feedback from the Department Heads, these meetings would become more tailored to regional training needs and provide an opportunity for Department Heads to share their experiences. The Project would finance the required technology (laptops and LCD projectors) to conduct these workshops, while the MOE would finance the logistical aspects (transportation, supplies and materials, snacks, etc.) from regional budgets.
- vii. Step 7 would be peer-based teacher professional development workshops at the school level (monthly or as necessary), facilitated by the Head of the Mathematics Department. All mathematics teachers in the school would participate in these workshops. Core learning objectives would replicate those addressed at the regional Subject Committee Meetings, to ensure that all teachers benefit from reinforcement after their initial face-to-face training and can share their experiences in applying their training, as well as jointly prepare lessons plans. In addition, this would ensure the Mathematics Department Head fulfills his/her role in leading the teachers in each school to improve their content knowledge and instructional practices. School Heads would receive training to ensure their buy-in of the Project and to ensure, among others, that teachers have the necessary time to participate in these workshops. The Heads would also participate in the school activities related with the Project, including these workshops.
- viii. All secondary schools would receive kits of mathematics teaching aids, to enable and promote the application of desired instructional practices in specific content areas. These teaching aids would be selected by the Mathematics Technical Group, possibly through additional consultation with a sample of Department Heads of Mathematics (to ensure relevance and adoption by teachers). The Project would finance procurement and distribution of two mathematics kits for every GSS (110) and one kit for every SD (175). Both the regional and school-level teacher professional development meetings would include instruction and discussion on how best to use these teaching aids in the classroom, i.e. for what subjects, at what grade levels, and in what specific curricular content areas.
- ix. Lastly, to complement these central, regional, and school-based teacher professional development workshops, all mathematics teachers would be expected to join and

participate in an on-line community of practice. This community of practice would be facilitated weekly by the Mathematics Technical Group, composed of mathematics specialists from the MOE Secondary Secretariat, CPCE, NCERD and UG, who would rotate responsibilities for sending out mathematics instructional tips, answering teachers' questions, posting new on-line mathematics resources, etc. Using the computer laboratories and Internet connections available at most secondary schools, and/or teachers' personal computers or smartphones, teachers would receive weekly tips, lesson plans, examples of effective teaching practices, and stories of other Guyanese mathematics teachers successfully applying the training. A Discussion Space would be set up for teachers to post their own questions, share their experiences and even their lesson plans, which would also be monitored by the Mathematics Technical Group. Over time, this on-line space would enable teachers to learn from each other virtually and pursue their professional development on a continuous basis. Only Guyanese mathematics teachers would be authorized to log in to this on-line space. A parallel public section of the website would provide self-instructional mathematics resources which could be downloaded, appropriate for both students and teachers.

- x. The issue of gender would be integrated across all training activities in a cross-cutting fashion. The 11-percentage point difference between boys' and girls' in Grade 9 mathematics scores in 2013 needs attention. Specifically, awareness-raising among teachers of the specific challenges boys face in mastering mathematics in Guyana would be conducted and teachers would be trained to show, through practical activities, how mathematics relates directly to "real life" and occupations in agriculture, mining, fishing, telecommunications, transportation, etc. Increased access for boys to "math manipulative" and other learning aides provided through Step 8 would also help to make mathematics more concrete and tangible. The Project Results Framework (Annex 1) would monitor student mathematics achievement and Grade 11 survival rates by gender each year, and additional measures would be taken, if needed.

7. *Subcomponent 1.2: Revising Public Secondary School Teachers Appraisal Instruments* (US\$200,000). Improving mathematics instruction through: (i) the development of specific standards for mathematics instruction; (ii) the revision of the appraisal system for secondary school teachers and school principals; and (iii) the provision of training for secondary school principals, deputy principals, and master trainers in the use of the revised teacher appraisal instruments.

8. This subcomponent aims to improve mathematic teaching through the following three activities: (i) the development of specific standards for mathematics instruction, based on the general teaching standards that are being produced by the MOE; (ii) the revision and piloting of the appraisal instruments for secondary school teachers and school principals, based on the current Report on Annual Appraisal on Teachers in Guyana and the teachers' diagnostic under Subcomponent 1.1; and (iii) training for secondary school Principals and Deputy Principals in the use of the revised teacher appraisal instruments. The Project would provide technical assistance for the revision of the appraisal instrument and training for school principals, but the MOE would assume technical and financial responsibility for administering the appraisal.

9. The ability of teachers to effectively deliver the curriculum and ensure high quality of educational outcomes (students' learning) is critical. Within the context of continuous professional growth and development, teachers must be engaged in a systematic process of evaluation, which gives them timely, reliable feedback in relation to their performance and clear standards. A well-conceived, comprehensive and reliable process and instrument for appraising teacher performance in the classroom is an important aspect of the MOE's efforts to improve student learning system-wide.

10. The existing teacher appraisal system has a number of weaknesses that have rendered it ineffective and unreliable. Foremost among these is the absence of an up-to-date teacher appraisal instrument aligned with established professional standards and accepted teacher competencies. As a result, educators have lost confidence in the existing teacher appraisal process. In some schools, teachers have abandoned the process completely and in others it is done in a haphazard and/or perfunctory manner. The findings of the appraisals are not being acted upon by the respective administrators and officers. A significant degree of subjectivity is found in many cases, further undermining the confidence educators have in the process. There are no incentives or disincentives built into the system as underpinning factors. There is no repository of teacher appraisals to facilitate necessary research to inform the planning process or in-service teacher training. The appraisal process has ceased to be an activity that contributes to the improvement of teaching/learning process.

11. In order to diagnose individual teachers' performance more objectively, this Subcomponent would help develop standards for mathematics instruction for secondary schools teachers, revise the appraisal instruments for teachers and head teachers. This subcomponent would also finance an operational manual/practical appraisal schedule, including technical recommendations for the adequate administration of the instruments and would build capacity among relevant staff in how to use them and how to interpret results.

Subcomponent Activities

- i. Provide support to relevant stakeholders to refine the relevant professional standards and teacher competencies, which would form the basis of the Teacher Appraisal Instrument and evaluative processes and, based on these general standards, develop specific standards for mathematics instruction for secondary school teachers.
- ii. Provide assistance to relevant education stakeholders to refine the Teacher Appraisal System, focusing on international best practices/mechanisms to measure teacher quality.
- iii. Develop Appraisal Instruments to assess teacher performance in the classroom and Head Teacher performance.
- iv. Develop an operational manual and guidelines, including a practical appraisal schedule, specifying the instruments' implementation arrangements.
- v. Provide training to all Principals and Deputy Principals of all GSS to effectively administer and analyze the results of the teacher appraisal instrument.

Outcomes/Deliverables

- i. Standards for mathematics instruction for secondary school teachers.
 - ii. Guidelines governing the appraisal instruments administration and analysis of the results.
 - iii. Comprehensive Teacher Appraisal Instruments to assess performance in the classroom for teachers and Head Teachers.
 - iv. Training of relevant stakeholders in the use of the instruments and the analyses of results.
12. *Subcomponent 1.3 - Technology-assisted Learning in Mathematics* (US\$325,000). Carrying out the following activities: (i) improvement of mathematics instruction and learning through use of innovative technology, on a pilot basis; and (ii) an independent evaluation process to assess the effectiveness of different packages of tablets and on-line mathematics learning management systems for improving student learning outcomes in mathematics.
13. This would include support to: (i) pilot the use of technology (both hardware and software) to improve mathematics instruction and learning in eight secondary schools over three years, promoting innovation and providing lessons for possible future scaling up; and (ii) carry out an independent process evaluation to assess the effectiveness of tablets and on-line mathematics learning management systems in improving student learning outcomes in mathematics. Tablets would be distributed to all Grade 7 students in the eight pilot schools, for both school and home use, with the capability to download and operate a range of self-paced mathematics software applications. This cohort would be followed for three years. LCD projectors and basic servers would also be provided to each school, to ensure on-line resources can be downloaded and stored at the school level and accessed off-line. After receiving training, teachers would post regular “reflection blogs” regarding their experiences and questions to a website set up for this purpose. A more qualitative, process-focused evaluation would be conducted to gather teacher and student feedback, assess technology adoption, review on-line resources prepared by participating teachers, and compare outcomes with a set of control schools. The Project would finance technical assistance, procurement of hardware and software, training and evaluation activities.
14. Pilot scope: The pilot would be run in eight pilot secondary schools in five regions of the country – one school in Region 1; one school in Region 9; two schools in Region 3; three schools in Region 4; and one school in Georgetown. It is estimated that three teachers, including Head of Department for mathematics, from each school would participate, for a total of 32 mathematics teachers. The pilot would focus on one cohort of students (comprised of four classes) at Grade 7 and would support and evaluate this cohort over the three-year scope of the pilot as they progress from Grades 7 to 9. The teachers would progress with the cohort over the three-year pilot. It is anticipated that approximately 1,120 students would participate in the pilot (140 per school x 8 schools). The first year of the pilot would focus on procurement of hardware (tablets), and review and orientation of mathematics software, as well as identification of intervention and control schools, collection of baseline student achievement data, development of training materials and initial teacher training in the use of the tablets and software for mathematics instruction.

15. Objectives: The objectives of the pilot would be to assess the impact of technology-assisted learning for improving student learning and attitudes toward mathematics.

16. Research Questions: Pilot research questions include the following:

- How much does (or does not) technology-assisted learning improve student learning outcomes?
- To what extent does technology-assisted learning improve student attitudes toward mathematics?
- What are the ways in which students use self-paced technology-assisted content used in and out of school based on tablets and how much does this use support improved student attitudes and learning outcomes in mathematics?
- How much does technology-assisted learning support changes in teacher content knowledge and pedagogy for mathematics instruction?

17. Intervention: In order to address these questions, the Project would support a pilot with one treatment group and one control group.

Control group: Traditional classroom, traditional textbooks, and traditional lectures

- Lowest cost, teacher-centric, existing infrastructure.
- Control students and teachers would be selected from similar schools in the selected regions.
- 8 control schools would be selected with equivalent numbers of teachers and students.

Treatment group: Internet-accessible tablets would be provided to students throughout pilot (three years) for use in school and out of school. A free learning platform and content management system (such as Khan Academy or Gooru Learning) would be used to deliver curriculum-aligned digital learning resources for in-class and out of class presentation and self-paced learning. The resources would need to be both accessible on-line through Internet connectivity and off-line through a local server (for instance see <https://kalite.learningequality.org/>). Tablets could either access a local school server or connect directly into the cloud-based content management and learning system for aggregation of student data and ability to monitor student learning. The criteria for selection of the learning platform include the following:

- Access: On- and off- line versions should be available
- Cost: Free
- Device: Use on any device, including tablets and smart phones
- Modular: Learning content should build on prior content
- Self-paced: Student should be able to progress at his or her own pace
- Content management system: Assessment should be built in and provide immediate feedback to the learner

- Contextualization: Content should align to Caribbean Examinations Council curriculum
- Teacher Tools: Teachers should have the ability to create their own class and monitor student and skill progress
- Usability: Platform should be very easy to use and understand

The Control group should not receive any treatment for the duration of the intervention. It should be recognized, however, that teachers in all secondary schools would participate in training activities as part of subcomponent 1.1 and would be encouraged to participate in the on-line mathematics community of practice, so they may experiment with technology-assisted learning at their own initiative.

18. Outcome measures: The pilot could use any one of the following to measure impact of the various interventions for the evaluation:

- National Grade 9 examination – with a focus on differential learning gains of students engaged in pilot and those that are not (“difference in differences” approach)
- Measures of Time on the Task and access to the content management system
- Measures of Student and Teacher attitudes to mathematics
- Measures of Improved Teacher Pedagogy and teaching techniques
- Qualitative reports from Teacher and Student focus groups

19. In addition to measuring outcomes, the pilot should also collect related cost data, to be able to do a crude cost-benefit analysis.

20. Tablet usage and time on task data should be easy to collect through the content management system. This could possibly be very valuable, especially where it might provide insight into minimal usage thresholds that are relevant, as well as to inform the qualitative analysis.

21. Pedagogical Practice: The pilot would follow a pedagogical practice of guided discovery in the classroom. Teachers would have the option of presenting a lesson themselves or showing a video to the class, followed by student practice and teacher support. Students would work individually on practice questions, but would also be grouped to discuss concepts.

22. Technology configuration at school level. Each school should be provided with a server to locally store content and access to the learning management system and provide access to content to all devices in the school. The server will refresh content either through synching with the Internet or updating content through USB keys. The server would require electricity, surge protection and a secure room.

23. **Component 2: Expansion of General Secondary School Facilities** (US\$7.15 million): Expand access to General Secondary School services in underserved areas of Regions 3 and 4 of the Recipient.

24. New school construction would include classrooms, laboratories, outdoor areas, and specialty rooms required under the secondary education curriculum. This would enable

approximately 1,300 students to be re-assigned from SD and over-crowded GSS to new high-quality GSS, and create an additional 1,300 student places at the secondary level.⁶ It would have two subcomponents.

25. *Subcomponent 2.1 - New School Construction (US\$6.28 million):* Construction of three new General Secondary Schools (one in Region 3 and two in Region 4), pursuant to the specifications set forth in the Project Operations Manual.

26. The three new schools would create a total of 2,600 student places. The main goals are to consolidate SD of primary schools into these new GSS and to prepare for increasing student populations coming from discrete primary schools in these regions and ease crowdedness in surrounding GSS. There are ten SD with a total number of 728 students in Region 3, and 17 with a total number of 1,257 students in Region 4. In addition, two of the new GSSs would be located in new housing areas where hundreds of new homes are in the process of being built and no schools exist. This would reduce severe overcrowding at two existing GSS, and prepare for increasing student populations coming from the primary level to all GSS in these regions. The basic design and architectural plans already exist from recently constructed GSS financed through domestic resources and, although they need to be revised and improved, this is expected to accelerate bidding and implementation of the civil works.

27. In Region 3, the specific location chosen for the new GSS is Parfait-Harmony School. In Region 4, the specific locations chosen for the new GSS are Good Hope and Yarrakabra in the Upper East Bank. Project preparation has confirmed that the sites chosen are on land belonging to the GoG and are sufficiently large to accommodate a full-size secondary school.

28. For each school to be constructed, in Year 1 the Project would finance detailed architectural/engineering designs, resulting in blueprints and all specifications with respect to the quality and quantity of construction materials, such that bid documents could be prepared and the bidding process for the actual construction could be initiated. In Year 2, contractors would be selected, along with the supervising engineering/architectural firm. It is anticipated that the initial contracting of civil works for each school would be completed within 12 months of the Project's starting date, with all construction completed no later than January 2017 (though ideally before the 2016-17 academic year).

29. For each school to be constructed, the Project would hire an engineering firm to supervise the construction work and to ensure quality control. This firm would submit regular progress reports to the MOE's project engineer and MOE Planning Unit, including technical approvals of works completed for progressive construction phases, which would in turn authorize payments to the contractors building the schools. The firm would also oversee and certify application of the

⁶ Given that new school construction will not be completed until 2016 (or possibly 2017), it is impossible to state with certainty now how many students attending the new GSS will be from existing SD and GSS, and how many will be additional secondary students who would otherwise be excluded. This means the relative impact of this subcomponent on expanded enrollment versus improved learning conditions is hard to determine *a priori*. For purposes of Project Appraisal, a 50-50 split is assumed: 1,300 students re-assigned from existing schools and 1,300 additional students.

EAMP by the contractor or identify any environmental issues for follow-up by the MOE with the contractor.

30. In addition to the supervisory work of the engineering firm, the MOE's own civil works department would conduct regular visits to the school construction sites, to ensure the engineering firm is conducting its work properly and to identify as early as possible any outstanding issues (technical or financial) that might need MOE intervention to avoid construction delays. The project would finance transportation costs related to this supervision as needed.

31. *Subcomponent 2.2 - Provision of Furniture and Equipment for the New Schools* (US\$870,000) referred to subcomponent 2.1 above.

32. This would finance procurement of classroom furniture (desks, chairs, shelving, closets, tables, etc.), laboratory equipment, and basic technology for the three new GSS to ensure that the new schools provide the necessary learning conditions to offer the full secondary education curriculum. The technical specifications and quantities of the furnishings, equipment and technology to be procured and distributed were defined by the MOE as part of the design work for two recently constructed and equipped GSS, financed with national resources. The MOE would schedule this procurement process so that the furnishings and equipment are available immediately upon completion of school construction (but not so early as to require long storage times, with associated risks of loss and damage).

33. Catchment population for the three schools to be constructed under the Project. The GoG is building three secondary schools under this Project, with the main goal of consolidating most SD of primary schools into GSS in coastal regions, but also to better absorb primary students from discrete primary schools and to ease crowdedness in GSS in Regions 3 and 4. Only in terms of SD, in Region 3 there are 10 primary schools with SD, with a total number of 728 students; and in Region 4 there are 17 with a total number of 1,257 students. It is expected that reallocating students from SD nearby and from GSS closer to their home towns will reduce dropout and increase school attendance.

34. Good Hope Secondary School (Region 4) will cater for 800 students and will be built in the East Coast Demerara in Region 4. The closest SD to this new secondary school is Lusignan, which is about 4 kilometers away and has 132 students. Annandale SD has 73 students and Paradise has 45. Both schools are less than 5 kilometers from the site. Students from Enterprise (108 students) and Enmore SD (160 students), which are further away might also benefit since there is accessible public transportation for them to commute. In total, the consolidation of these SDs will require around 520 places in Good Hope Secondary.⁷ In addition, it is expected that some students in the same discrete primary schools will transfer to the new secondary school (around 100 students per primary school from Grades 4, 5 and 6 equivalents to 400 places in a three-year time period). Some students from Annandale, Golden Grove, LBI, and Buxton GSS coming from Good Hope community or nearby villages will also be reallocated (around 100 students in total). Overall, the expected catchment population for this new GSS is estimated at

⁷ Similar trends are expected in future cohorts.

around 1,200 students. In addition, the new housing scheme in the Good Hope area will increase the number of secondary school aged children in the community who would be attending to this new GSS in the upcoming years.

35. **Yarrowkabra GSS (Region 4)** will cater for 800 students and will be built in the Upper East Bank. Kuru Kururu with 118 students is the closest SD to the site and it is expected that all students will be transferred to the new GSS. In addition, around 250 students from 7 SD located further away, but with accessible transportation to the new school site, will also benefit. This includes students from Susannah's Rust (5), Low Wood (9) and even some from Diamond (50), Covent Garden (50), Providence (50) Supply (50), and Craig (50). In addition, around 350 students currently in Grades 4, 5 and 6 from nearby discrete primary schools will benefit (Kuru Kururu (363), Covent Garden (134), Craig (328), Supply (131), St. Marrys with (320), Timehri (209), Grove Primary (495). Finally, some students from Soeszyke GSS, which is experiencing problems with overcrowding, might also be transferred to the new GSS.

36. Parfait Harmony Secondary (Region 3) will cater for 1,000 students. The closest SD to the new GSS (less than 5 kilometers from the construction site) is La-Grange one of the two largest SD in this Region, with 207 students. In addition, this new secondary school will absorb some students from discrete primary schools coming from Grades 4, 5 and 6 (in a three-year time period) including: Parfait Harmony Primary located in the same community will allocate 265 students, McGillibary 76, Two Brothers 65, and La Grange 187. Finally, L'Aventure Secondary School will be transferring 190 students to the new GSS.⁸ Some students will be transferred from crowded GSS with an easy and inexpensive commute through public transportation, especially at Patentia Secondary and some Georgetown GSS.

37. **Component 3: Strengthen Institutional Capacity and Project Management** (US\$1.05 million): This component seeks to strengthen the capacity of the Education Management Information System (EMIS) through design, development, and implementation of a new EMIS to increase efficiency in education sector data management and information use for planning and policymaking.

38. *Subcomponent 3.1 - Design, develop and implement a new education management information system to increase efficiency in education sector data management and information use for planning and policymaking* (US\$200,000). The revised EMIS would enable School Heads, REd.Os, and MOE policymakers to more efficiently manage education sector data and take effective measures to address key sector issues. In addition, it would take advantage of the GoG's "e-government initiative" and commitment to ensure that all public secondary schools have broadband Internet and/or 4G connectivity. A series of activities would be financed by the Project, detailed below.

- i. EMIS Installation, Configuration and Launch: Beginning with open source EMIS software packages that have been used widely in other countries, international technical assistance would support the MOE Statistics Unit and Planning Office to customize/adapt

⁸ This secondary school has an annex at Two Brothers Primary (with 100 Grade 7 students) due to the lack of space. In total, L'Aventure hosts 690 students and has an actual capacity for 500 students.

the EMIS software to Guyana's specific needs. The MOE MIS Unit would receive three servers for this purpose, to cover development, testing and production. Configuration would include exporting of all historical statistical data currently stored in Access database files to the EMIS, as well as development of mobile applications suitable for tablets and smartphones. Once it is ready, the EMIS system would be ported over to the E-Government Initiative Data Center and piloted in 20 schools. This would identify bugs to be worked out and additional functionalities to be configured before it is rolled out to all 110 GSS.

- ii. Procurement of EMIS Hardware and Revised Data Collection Procedures: all 110 GSS would receive two tablets to upload and access EMIS data, linked wirelessly through the E-Government Initiative to the EMIS hosted on the E-Government Initiative Data Center. The tablets would initially be issued to the School Heads and Deputy Heads, although information uploading might be delegated to another person at the school. REd.Os would also receive tablets so they can access/upload information directly into the EMIS. This would require modification of the data collection procedures for pilot schools, and training of REd.Os, School Heads, and Deputy Heads in the use of the technology to upload and access information.
- iii. One year after the program's rollout to all GSS, the MOE Statistics Unit and Planning Office would assess the functionality of the EMIS program and identify necessary revisions to the hardware, software or procedures. Additional training would be provided to School Heads and Deputy Heads.

39. *Subcomponent 3.2 - Carrying out of Project management, monitoring and evaluation activities, including Project audits (US\$850,000).* Specifically, the Project would support the hiring of a full-time Project Coordinator and a full-time project engineer (more detail on their responsibilities can be found in Annex 3). The subcomponent would also support the procurement specialist, financial officer, assistant accountant, and MOE specialist starting Year 2 of the Project. The staff is currently under GITEP Project, which will close on July 31, 2015. The TORs for the annual independent auditors to be contracted under this subcomponent are in the Operations Manual for the Project.

Annex 3: Implementation Arrangements
CO-OPERATIVE REPUBLIC OF GUYANA
Secondary Education Improvement Project

Project Institutional and Implementation Arrangements

1. The Ministry of Education would be responsible for implementing the Project. Under the Education Act, Chapter 39 - Laws of Guyana, the Ministry of Education is, *inter alia*, responsible for (a) setting, enforcing, and providing resources for the implementation of education policy; and (b) the governance and operations of the teacher training institutions. The Project's components would be executed over a period of five years, from 2014-2019.

Project administration mechanisms

2. The activities proposed under the Project would be considered as part of the day to day work of the MOE; hence it does not require the establishment of a parallel structure or a specific Project Implementation Unit. Various departments and divisions of the MOE would be responsible for the technical aspects of the Project, as well as for monitoring of the Project development indicators. Details of the institutional roles and responsibilities are specified below for each of the subcomponents of the Project.

3. A Project Coordinator with qualifications, experience, and TORs satisfactory to the Association would be hired and maintained in the MOE's Planning Unit as a condition of effectiveness. S/he would be responsible for efficiently and effectively carrying out the day-to-day management and monitoring, preparing project implementation progress reports, and coordinating Project implementation, including procurement, accounting, disbursement, financial management, and other Project related activities. The Project Coordinator would coordinate Project implementation among MOE departments and report directly to the Chief Planning Officer. To ensure smooth coordination of Project implementation and communication among the major actors, the Project Coordinator would also act as the main liaison with: (i) the Bank, (ii) the Permanent Secretary of the MOE and other senior representatives of the Ministry, and (iii) the Financial and Procurement staff at the MOE Planning Unit.

4. Project Coordinator responsibilities include:

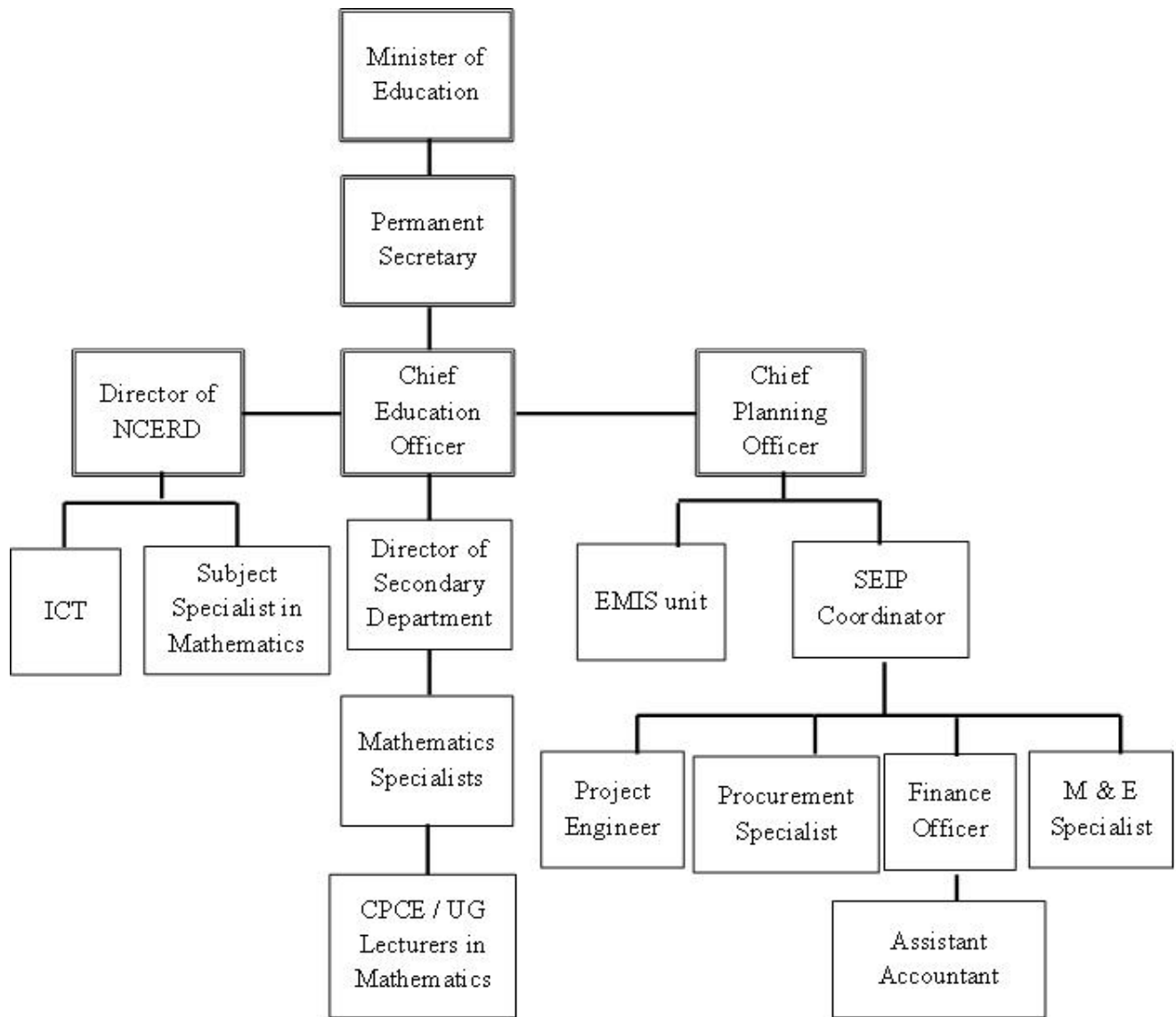
- directing and facilitating the planning of Project components and activities;
- overseeing the implementation of Project components and activities;
- ensuring accurate, timely, and continuous monitoring and evaluation of the Project;
- serving as spokesperson and advocating for successful project implementation and achievement of the Project's development objectives;
- financial management of the Project, including reporting, disbursements, accounting, and audit related matters;
- promoting and sustaining partnerships and collaboration with Project partners in particular, and other donor agencies more generally; and
- fulfilling all reporting requirements of the Project, as well as general implementation

aspects, as needed. S/he would also be required to provide supervisory financial management, planning and budgeting services.

5. The Procurement Specialist of the MOE's Planning Unit is responsible for all aspects of procurement related to the Project.

6. The following organizational chart illustrates the main actors involved in the implementation and supervision of the Project.

**Guyana Secondary Education Improvement Project (SEIP)
Implementation structure**



Project Financial Management, Disbursements and Procurement Arrangements

Financial Management

7. *Project Entities.* The overall responsibility for the Project's Financial Management would lie with the fiduciary staff attached to the Project Team that managed the fiduciary aspects of the EFA-FTI Project in Guyana from 2004-2013, and now handles both the Improving Teacher Education Project and the University of Guyana Science and Technology Project. Overall financial management would be under the responsibility of a Finance Officer. He has a degree in Accounting, 10 years of experience, and has been the Project Accountant for the above-mentioned projects. The Finance Officer would be assisted by an Accounting Assistant that has been working with the Bank's projects for several years and has previous accounting experience in the private sector.

8. *Accounting System.* The MOE Planning Unit uses QuickBooks accounting software to record, manage, and report its Project transactions. An accounting system, also QuickBooks based, has been used by other two on-going Bank-financed projects. Similarly, the Access-based reporting system developed for preparing Interim Financial Reports under the Improving Teacher Education and UG Science and Technology Projects should be expanded to include this new Project. It was agreed that the expansion of the reporting system would include modalities for enhancing its interconnectivity with QuickBooks in order to eliminate manual input of data that would be required for preparing the new Project's Interim Financial Reports.

9. *Financial Management Procedures.* The financial management section of the Operations Manual (OM) for Improving the Teacher Education Project has been adapted to cover the requirements of the new Project. Presently, the OM incorporates the key financial procedures for all major financial transactions that would cover the needs of Secondary Education Improvement Project. It also includes the procedures on budgeting, reporting, and internal control.

10. *Reporting and Monitoring.* Interim Unaudited Financial Reports (IFRs) would be prepared by the fiduciary staff and sent to the Bank every quarter. One single set of reports would be used for monitoring Project implementation and as the basis for disbursement (see the section below on disbursement). To this end, the IFRs would include an Executive Summary covering the overall status of Project implementation, the description of the status of the attainment of key performance indicators, a summary of the physical progress of Project implementation, and the status of procurement. Agreement was reached on the IFR format and content prior to and confirmed during negotiations. The IFRs would include: (i) sources and uses statement; (ii) use of funds by Project component; (iii) use of cash; (iv) six monthly forecasts every three months, upon which the disbursements will be based; and (v) notes to the financial statements. It would also include reconciliation statements of Designated Account and Local Currency Project Account.

11. As they would be used for disbursements, IFRs would be sent to the Bank each quarter, within 45 days after the end of each such period. The IFRs would serve as a basis for the annual audited financial statements. The supporting documentation of the financial statements would be maintained by the fiduciary staff and made easily accessible to Bank's supervision missions and to the external auditors. All financial reports would be made public.

12. *Internal control and Internal Audit.* The Project Team has prepared a Project Operations Manual (OM) which includes all financial rules and regulations. The expenditures of the Project would be reviewed by the internal auditors of the Government and summary of the internal audit findings will be shared with the Bank on a half yearly basis.

13. *External Audit.* The Project accounts would be audited by the Auditor General of Guyana. If support is needed, the Auditor General would hire a private auditing firm to conduct the audit. However, the final audit opinion would be issued by the Auditor General. The audit would be conducted using the International Auditing Standards or INTOSAI standards, which are acceptable to the Bank. The Appraisal Mission reviewed the TORs for the audit for the Project and agreement on the audit TORs has been reached.

14. *Supervision Plan.* Given the relatively limited capabilities within Guyana, financial management supervision would focus on: (i) the evolution of the internal control mechanisms of the Project with more frequent and intensive transactions testing; (ii) more frequent consultation with the Internal Audit Department (IAD) of the MOE; and (iii) review of the quarterly IFRs, which would help monitor financial performance of the Project. FM staff would undertake two supervision missions a year during the first year of implementation and at least one supervision mission every year thereafter. The overall financial management system of the Project would be monitored on an on-going basis to ensure it continues to be satisfactory.

15. *Disbursement and Flow of Funds.* The Bank would disburse the proceeds of the Credit into a segregated Designated Account (DA) denominated in US dollars in the name of the Project, held at a commercial bank to be designated by the Bank of Guyana (Central Bank). The Project would maintain a segregated local currency Project Account at the Bank of Guyana to finance day-to-day expenditures of the Project. The Credit proceeds would finance eligible expenditures to support key Project activities to be included in the Project's annual implementation plan and included in the MOE's capital budget approved by the GoG. The initial advance would be provided on the basis of a withdrawal application and the projected expenditures during the period covering Credit effectiveness until the end of the second quarter following Credit effectiveness. After the initial advance, disbursements under the Project would be on the basis of quarterly advances linked to the IFRs. There would also be retroactive financing not to exceed US\$1 million. Details of the flow of funds arrangements are provided in the Operations Manual.

Disbursements

16. *Disbursement Arrangements.* Disbursement under the Project would be in the form of Advances, Direct Payments, Special Commitments, and Reimbursements. Disbursements for Project eligible expenditures via the US Dollar denominated DA under the Project would be reports-based. Funds would be transferred periodically from the DA to a Project Account, which would be denominated in Guyana Dollars. Both accounts would be segregated. The DA would be opened at a commercial bank designated by the Bank of Guyana (Central Bank) and the Project Account would be opened at the Bank of Guyana. Disbursements on the basis of direct payments would be fully documented. The minimum application size for Direct Payments, Special Commitments, and Reimbursements is US\$100,000 equivalent and expenditures paid out

of the DA should be reported quarterly.

17. *Initial Advance.* An initial advance would be made upon Credit Effectiveness. The initial advance would be provided on the basis of a withdrawal application and the projected expenditures during the period covering Credit Effectiveness until the end of the quarter following the quarter after effectiveness (a period up to six months).

18. *Subsequent Advances.* Subsequent advances for disbursements via the DA would be made on the basis of the IFRs, which would include a cash forecast statement of the funding needs for the next two quarters.

19. *Direct Payments.* Disbursements could be made on the basis of direct payment to suppliers, contractors or service providers. The applications for direct payments would be fully documented and would include the original records evidencing eligible expenditures such as invoice and receipts.

20. *Retroactive Financing.* The GoG has requested that US\$1,000,000 be considered for retroactive financing. This corresponds to eligible Project expenditures incurred after Project Appraisal, March 25, 2014, up to the date of signing of the Financing Agreement. The disbursement request for retroactive financing would consist of IFRs and other evidence of payments as needed.

21. *Disbursement Schedule.* The following table specifies the category of Eligibilities that may be financed out of the Financing (“Category”), the allocations of the amounts of Financing to each Category, and the percentage of expenditures to be financed for Eligible Expenditures in each Category.

Category	Amount of the Credit Allocated (SDR) (equivalent to US\$10 million)	Percentage of Expenditures to be Financed
(1) Goods, works, non-consulting services, consultants’ services, Training and Operating Costs for the Project.	6,500,000	100%
TOTAL AMOUNT		

Procurement

22. Procurement would be carried out in accordance with the Bank “Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits and Grants by Bank Borrowers, January 2011,” and “Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by Bank Borrowers, January 2011” and the provisions stipulated in the Financing Agreement (FA). The various procurement actions under different expenditure categories are described in general below. For each contract to be financed under the FA, the various procurement or consultant selection methods, the estimated costs,

prior/post review requirements, and time frame have been agreed between the Borrower and the Bank in the Procurement Plan (PP). The PP will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity. A General Procurement Notice (GPN) in UNDB and Specific Procurement Notices (SPN) will be published for all ICB procurement and Consulting contracts as per Guidelines as the corresponding bidding documents and Request for Proposal (RFP) become ready and available.

Procurement Arrangements

23. *Works:* Works procured under the Project would consist mostly of construction of three secondary schools. Procurement of works will be carried out using International Competitive Bidding (ICB), National Competitive Bidding (NCB), Shopping, and other methods indicated in the FA. The procurement would be carried out using the Bank's Standard Bidding Documents and other sample documents and templates, all agreed with the Bank. The procurement methods thresholds and prior review thresholds for Works are indicated in the table below. Domestic preferences in accordance with clause 2.55 and Appendix 2 of the guidelines will not apply.

24. *Procurement of Goods and Non-Consulting Services:* Procurement of goods and services other than consulting services would include: computers and tablets for mathematics instruction, teaching and learning materials (including software), teaching aides for mathematics, printing materials, brochures etc., and other goods and services. Procurement of goods would be carried out using International Competitive Bidding (ICB), National Competitive Bidding (NCB) Shopping and other methods indicated in the FA. Procurement would be carried out using the Bank's Standard Bidding Documents and other sample documents and templates, all agreed with the Bank. The procurement methods thresholds and prior review thresholds for Goods are indicated in the table below. Domestic preferences in accordance with clause 2.55 and Appendix 2 of the guidelines will not apply.

25. *Selection of Consultants:* Consultants' services contracts procured under this Project would include: detailed design and works supervision writing of terms of reference, evaluations of teachers, evaluations of the technology-assisted mathematics pilot, training of mathematics trainers, and capacity building in use of ICT for teaching and learning of mathematics, among others, etc. The following selection methods would be used: Quality and Cost Based Selection (QCBS); Least Cost Selection (LCS); Selection Based on Consultants' Qualifications (CQ); Individual Consultants, and other selection methods indicated in the FA. The Project staff selected competitively under the previous Bank projects would be hired on a Single Source Selection (SSS) basis, subject to the Bank's prior review and approval. The selections would be done using the Bank's Standard Request for Proposal (RFP) and other sample documents and templates, all agreed with the Bank. Short lists of consultants for services estimated to cost less than US\$100,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

26. *Operating Costs (OC):* "Operating Costs" means incremental operating costs incurred by the Project on account of Project implementation, management, and monitoring, including dissemination of Project related information and publications; office rent and utilities; office and equipment insurance, maintenance and repair; vehicle insurance, maintenance and repair; local travel, communication, translation and interpretation, bank charges, and other miscellaneous costs

directly associated with the Project, all based on periodic budgets and procured using the Implementing Agency’s administrative procedures acceptable to the Bank. Operating costs would not include salaries of government officials and civil servants.

27. *Training Costs:* The Project would finance trainings (workshops, etc.), as needed. The trainings would be carried out according to training plans, which the Project staff will revise semi-annually and as needed and submit to the Bank for approval prior to implementation. The expenses will be covered under training category and disbursed based on SOE.

28. *Procurement methods thresholds and prior review thresholds:* The following procurement methods thresholds and prior review thresholds will be used:

Expenditure Category	Contract Value (Thresholds) US\$ thousands	Procurement Method	Contracts Subject to Prior Review
1. Works			
	>1,500	ICB	All
	150 – 1,500	NCB	1 st contract and all > US\$750,000
	<150	Shopping	None
	Regardless of value	Direct Contracting	All
2. Goods			
	>150	ICB	All
	50-150	NCB	1 st two contracts
	<50	Shopping	None
	Regardless of value	Direct Contracting	All
3. Consulting Services			
3.1 Firms	>100	QCBS, QBS, FBS, LCS	All
	<100	QCBS, QBS, FBS, LCS, and CQS	1 st two contracts and all TOR’s by TTL
	Regardless of value	Single Source	All
3.2 Individuals	Regardless of value	IC	All TORs by TTL, and all > US\$50,000

Procurement Plan

29. Procurement Plan (PP) has been finalized. It provides information on procurement packages, methods, Bank review and times for procurement and implementation. This Plan has been agreed upon between the Borrower and the Bank team during Negotiations, and will be available at the Implementing Agency's project database and on the Bank's external website. The PP would be updated in agreement with the Bank team annually or as required to reflect the actual project implementation needs.

Frequency of Procurement Supervision

30. In addition to the prior review supervision to be carried out by the Bank team, post reviews would be carried out once per year. It is expected that a supervision mission in the field would be conducted every six months during implementation. As a minimum, one post review report, which will include physical inspection by the Bank's technical expert of sample contracts, including those subject to prior review, will be prepared each year.

Assessment of the agency's capacity to implement procurement

31. An assessment of the capacity of the Implementing Agency to implement procurement actions for the Project was carried out by the Bank's Procurement Specialist (PS). The assessment reviewed the organizational structure for implementing the Project and the interaction between the Project's staff responsible for procurement and the Ministry's relevant central unit for administration and finance.

32. Procurement would be carried out by the procurement team of the MOE's Planning Unit led by a Project Coordinator and in particular by a PS who has been working on the Improving Teacher Education Project (GITEP). GITEP is still on-going and it is expected that most of its procurement activities would be completed by the third quarter of 2014 and that the procurement workload would allow the PS to also handle procurement under SEIP. The PS has gained significant experience in Bank procurement during the implementation of the GITEP and EFA-FTI Projects. Additional procurement and technical support would be provided in the process of the procurement of civil works under SEIP by the PS handling procurement under the University of Guyana Science and Technology Support Project. The PS is a civil engineer and has gained significant experience in Bank procurement of works under the EFA-FTI Project. Additional assistance would be provided by a qualified civil engineer/s and a procurement assistant as needed.

33. Given the limited engineering capacity of the MOE, the preparation of the detailed design and works supervision of the three secondary schools envisaged to be financed under the SEIP would be handled by a qualified consulting firm.

34. As with any construction works and their supervision, there is a risk of the contractors' nonobservance of the contracts' standards for works and materials and the building designs. Indeed, visitation by the task team to one GSS recently built with GoG funds found examples of shoddy workmanship. To mitigate this risk, the MOE's civil engineer would need to increase oversight of the consulting firm supervising school construction and conduct site visits to all

schools on a regular basis.

35. The overall risk for procurement under the SEIP is considered Moderate, subject to the risk mitigation measures.

Environmental and Social (including safeguards)

36. This Project is not expected to have any significant long-term negative environmental impacts. The main negative environmental impacts of the Project are related to the construction of the four new GSS. For example, incorrect site location and/or poor quality site work for the new GSS might result in drainage problems for rainwater and sewage, which could affect neighboring areas. There are also possible negative impacts during operations, such as improper disposal of laboratory waste materials. Disposal of solid waste generated by the school (papers, soft drink bottles, food waste, etc.) is another possible environmental issue. For these reasons, OP/BP 4.01 Environmental Assessment was triggered during Project preparation.

37. To mitigate these environmental risks, the MOE has prepared an Environmental Assessment and Management Plan (EAMP), which all contractors would have to follow. This EAMP would be supervised by both the engineering firm hired to oversee the construction contractors, as well as by the MOE civil works engineer overseeing the entire construction process. Once the construction phase is completed, additional education and awareness-raising efforts are likely to be required at the school level, to ensure students and teachers behave in environmentally sensitive ways (avoiding litter, using sanitary facilities properly, etc.). The EAMP includes procedures for grievance-handling and for monitoring and evaluation.

38. OP/BP 4.09 Pest Management was not triggered, as it is unlikely that the construction of new schools and rehabilitation works would involve the procurement or significant use of pesticide given the small scale of the intervention.

39. OP/BP 4.11 Physical Cultural Resources was not triggered, as the locations of the proposed school sites have been reviewed in the field and such resources were not encountered.

40. OP/BP 4.04 Natural Habitats and OP/BP 4.36 Forests were not triggered, as the sites for new schools are within urban or suburban areas, on or adjacent to previously developed school yards or agricultural lands.

41. With respect to social safeguards, the Project is expected to have significant benefits, particularly for the poor and/or indigenous Amerindian groups residing in the targeted regions. These marginalized groups would benefit from improved access to and quality of secondary education, which in turn would offer increased income-generating opportunities when they enter the labor market upon leaving school. No land acquisition (voluntary or involuntary) would be required under the Project as all new school construction will be on Government land.

42. Given that the Project's intended intervention areas include those inhabited by indigenous groups, an Indigenous Peoples Plan (IPP) was prepared and associated consultations took place. The expected impacts of the Project on indigenous communities are both positive and discrete;

the main impact is expected to be improved mathematics instruction for indigenous youth, which should contribute to increasing their secondary level completion rates and opportunities to continue on to higher education and/or succeed in the labor market. There is no school construction or rehabilitation planned in indigenous areas.

Monitoring & Evaluation

43. The MOE's Planning Unit would be responsible for project monitoring and evaluation. It would send Quarterly and Annual Progress Reports to the Bank, including on progress toward targets described in the Results Framework, and report on Grade 9 and CSEC Mathematics exam results and dropout rates. Past experience with previous and ongoing Bank education projects provides the evidence that the Planning Unit has the necessary M&E capacity to generate reliable data using existing country systems. The MOE's M&E capacity to carry out project monitoring and evaluation would be further strengthened through the rollout of the proposed EMIS. The Planning Unit would also participate in formal implementation supervision missions along with Bank supervision teams, to track progress in achieving Project outcomes.

44. External technical assistance, both national and international, would be contracted under the Project for the evaluation of the pilot technology-assisted program to improve learning in mathematics. The cost of this technical assistance and related operational costs (travel, supplies, etc.) is estimated at US\$30,000 and would be financed by the IDA credit.

Annex 4: Operational Risk Assessment Framework (ORAF)

CO-OPERATIVE REPUBLIC OF GUYANA
Secondary Education Improvement Project (P147924)

Risks							
Project Stakeholder Risks							
Stakeholder Risk	Rating	Moderate					
Risk Description: There is a concern that students in grades 7 and 8 in the primary schools might be negatively affected due to the moving to these New schools. For instance, certain students may have to travel longer distances to new schools. As a result, some of these the students may drop out if the consolidation processes are not adequately managed.	Risk Management: The MOE and Project will ensure that transportation to these new schools is in place to manage stakeholder fears and complaints. A complaint mechanism will be established to collect feedback from stakeholders during Project preparation and implementation. The MOE will begin early communication activities to ensure selection decisions are transparent and communicate the rationale behind its decisions and the anticipated benefits for all stakeholders (i.e., relocated students benefiting from higher quality education services, and additional training efforts to be provided for Teachers of Primary “ToPs”). During implementation, communication measures will actively continue, both to manage/facilitate the transition of students to new schools, and to continue to communicate messages about the benefits of the changes for all stakeholders.						
	Resp: Client	Status: Not Yet Due	Stage: Both	Recurrent <input checked="" type="checkbox"/>	Due Date:	Frequency: Yearly	
Implementing Agency (IA) Risks (including Fiduciary Risks)							
Capacity	Rating	Moderate					
Risk Description: There is a risk that insufficient MOE fiduciary capacity for an added project delays implementation.	Risk Management: The MOE has extensive experience implementing externally-financed projects, and the Project would leverage and build on this capacity and experience. The Bank has taken and continues to undertake measures (i.e., fiduciary and M&E training for the MOE and Project staff, on-the-job training and the provision of advice on an on-going basis) to strengthen the MOE Planning Unit and its fiduciary capacities. The Project will continue to support analytical work and capacity- building for existing staff, as well as the hiring of additional technical and fiduciary specialists as needed.						

<p>Additionally, there is a risk of inadequate management and supervision capacity for the new GSS that would be created under the Project, which could negatively affect anticipated education quality improvements.</p>	<p>To address remaining fiduciary risks, regular internal audits would be conducted by the MOE, in addition to the annual external Project audit, with all reports shared with the Bank and posted on-line for maximum transparency.</p>					
<p>Governance</p>	<p>Rating</p>	<p>Low</p>				
<p>Risk Description:</p> <p>There is a risk that continuing GoG challenges with respect to improving weak accountability mechanisms (leading to inaccurate reporting of data from schools; and inefficiencies in placement of students in secondary schools, grading of schools and appraisal of employees) may hinder progress on the in-service teacher training/upgrading activities and accurate reporting on the monitoring of secondary education access and quality.</p>	<p>Risk Management:</p> <p>In recognition of these challenges, the Project (Sub Component 1.2) would include specific assistance for reviewing and improving teacher appraisal policy as well as a diagnostic and measures to improve processes and capacity for teacher appraisal and upgrading.</p> <p>By supporting the MOE’s EMIS and the local (school) level of the education system—to report data directly to the central level—the Project would promote improved accountability and transparency in sector management, and would contribute to the MOE’s objective of increasing the periodicity of data availability.</p>					
	<p>Resp: Both</p>	<p>Status: In Progress</p>	<p>Stage: Both</p>	<p>Recurrent: <input checked="" type="checkbox"/></p>	<p>Due Date:</p>	<p>Frequency: Yearly</p>
<p>Project Risks</p>						
<p>Design</p>	<p>Rating</p>	<p>Moderate</p>				
<p>Risk Description:</p> <p>There is a risk that—given that outward migration/ brain drain of Guyanese teachers is a current phenomenon due in part to inadequate incentives—in-service training efforts by the Project, because they would upgrade teacher qualifications, may make Guyanese teachers more marketable in the international arena and could increase their chances of outward migration.</p> <p>There is a risk that the new teacher appraisal instrument to be developed under Sub-Component 1.2 “Revising Secondary School Teacher Appraisal Instruments” would cause resistance to the introduction and implementation from teachers and administrative staff at the MOE.</p>	<p>Risk Management:</p> <p>The Project would benefit from the design of the existing IDA-financed Improving Teacher Education Project, through which the Government continues to fund the training of more teachers than it needs, taking into account the attrition rate. In addition, the MOE, in negotiation with the Teachers’ Union, has and continues to work to offer an adequate and sensible incentives package for recruiting qualified student teachers and retaining skilled teachers. Furthermore, newly recruited MOE teachers are bound for a period of five years in order to discourage loss of qualified teachers due to outward migration.</p> <p>In response to the risk of outward migration of beneficiary teachers, the MOE, in negotiation with the Teachers’ Union, has and continues to work to offer an adequate and sensible incentives package for recruiting qualified student teachers and retaining skilled teachers, encouraging the qualified to stay. In addition, newly recruited MOE teachers are bound for a period of five years in order to discourage loss of qualified teachers due to outward migration.</p> <p>This risk would be mitigated by communicating benefits and other country experiences with all teachers and staff at the MOE to ensure understanding.</p>					
	<p>Resp: Both</p>	<p>Status: In Progress</p>	<p>Stage: Both</p>	<p>Recurrent: <input checked="" type="checkbox"/></p>	<p>Due Date:</p>	<p>Frequency: Yearly</p>

Social and Environmental	Rating	Moderate				
<p>Risk Description:</p> <p>Social: Component 1 “Strengthen the Capacity of Secondary School Mathematics Teachers Nationwide” covers GSS and SD. Given that Hinterland Regions are home to the country’s Amerindian population, the Bank’s Policy on Indigenous Peoples is triggered by the Project.</p> <p>Environmental: Although environmental impacts are expected to be relatively minor, there is a moderate risk that the MOE, as Implementing Agency, may not appropriately address environmental aspects in siting, screening, and supervision.</p>	Risk Management:					
	<p>Social: Consultations with the Amerindian population residing in the Project area has been completed by the MOE in order to assess the impacts of the Project on the communities and to garner broad community support. An Indigenous Peoples Plan is finalized and will be published and disclosed to public, and the Indigenous populations, prior to Project negotiations. The Bank team will ensure due diligence in project supervision and provide the necessary capacity-building to the Implementing Agency.</p> <p>Environmental: An Environmental Assessment and Management Plan (EAMP) has been developed and published on the MOE’s website during project preparation, and has contained specific protocols for screening and assessment, for including environmental aspects in contracting documents, and for monitoring compliance during construction. The Operations Manual will define the responsibilities and actions for addressing environmental aspects and will contain an EAMP with contracting clauses addressing environmental protection. Periodic supervision by Bank environmental specialists will provide support to MOE and ensure that environmental safeguard issues are addressed.</p>					
	Resp: Both	Status: In Progress	Stage: Both	Recurrent: <input checked="" type="checkbox"/>	Due Date:	Frequency: Yearly
Program and Donor	Rating	Low				
<p>Risk Description: Donor coordination is in place, but more regular and efficient meetings is needed to assist the GoG’s overarching objective of achieving quality of education.</p>	Risk Management: The Bank team will work in close coordination and collaboration with other development partners/donors (and particularly UNICEF and the IDB) to ensure complementary support from other donors, which is crucial for successfully achieving the country assistance strategy, including universal secondary education.					
	Resp: N/A	Status: N/A	Stage: N/A	Recurrent: N/A	Due Date: N/A	Frequency: N/A
Delivery Monitoring and Sustainability	Rating	Low				
<p>Risk Description:</p> <p>There is a risk that the budget does not exist or is not sufficient to ensure proper maintenance of the newly built schools and equipment.</p>	Risk Management:					
	<p>The Government has an existing asset management plan to guide maintenance of facilities. The Bank will draw upon technical experts to support the Government in its integration into the project design with respect to school construction, and its application during project implementation.</p>					
	Resp: Both	Status: In Progress	Stage: Both	Recurrent: <input checked="" type="checkbox"/>	Due Date:	Frequency: Yearly

Overall Risk

Overall Implementation Risk: Moderate

Risk Description:

The implementation risk rating is driven largely by moderate stakeholder, design, capacity, and social/environmental risks linked to the construction of GSS. These risks are mitigated by several low risk ratings including sector, delivery monitoring and sustainability risks.

Annex 5: Implementation Support Plan
CO-OPERATIVE REPUBLIC OF GUYANA
Secondary Education Improvement Project

Strategy and Approach for Implementation Support

1. The purpose of this Implementation Support Plan (ISP) is to focus on the inputs and actions required to facilitate better risk management, better results, and increased institutional development, while ensuring compliance with the Financing Agreement to meet the Bank’s fiduciary obligations. In particular, emphasis is placed on monitoring and evaluation results on the ground, facilitating the timely implementation of risk mitigation measures identified in the ORAF, and providing the necessary technical advice to the MOE to build capacity and promote project implementation. The ISP described below would be reviewed on an annual basis as part of Implementation Supervision Missions, and revised as necessary to ensure that it continues to meet the implementation support needs of the project.

Implementation Support Plan

2. Table A5.1 below indicates the main areas of implementation support during different phases of the Project.

Table A5.1: ISP Matrix

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First twelve months	Project start-up, execution of Procurement Plan, hiring of auditors, architectural/engineering design work for new GSS, development and administration of teacher diagnostic assessment and classroom observation,; hiring of EMIS technical assistance and procurement of EMIS hardware.	Project implementation task team leader	6 weeks	N/A
		Procurement Specialist	3 weeks	
		FM Specialist	2 weeks	
		Architectural/engineering expert	4 weeks	
		Teacher training specialist	4 weeks	
		EMIS specialist	4 weeks	
		Environment Specialist	0.5 week	
		Social Specialist	0.5 week	
			US\$100,000	
12-24 months	Bidding and contracting for civil works; Training of Trainers for Mathematics; Procurement of Mathematics-focused	Project implementation task team leader	4 weeks	N/A
		Procurement Specialist	3 weeks	
		FM Specialist	1 week	
		Architectural/engineering expert	3 weeks	

	technology program hardware and software; Configuration and installation of EMIS hardware and software and rollout of pilot.	Teacher training specialist Mathematics Expert EMIS specialist Environment Specialist Social Specialist	4 weeks 2 weeks 2 weeks 0.5 week 0.5 week US\$100,000	
24-48 months	Completion and furnishing of new GSS; completion of at least 12 days of face-to-face training for all mathematics teachers; institutionalization of monthly Mathematics Subject Committee meetings at regional and school levels (this could be monthly or as necessary); revision of EMIS and rollout to additional secondary schools; initiation of pilot technology-assisted Mathematics learning program.	Project implementation task team leader Procurement Specialist FM Specialist Architectural/engineering expert Teacher training specialist Mathematics Expert EMIS specialist Environment Specialist Social Specialist	4 weeks/year 2 weeks/year 1 week/year 1 week/year 2 weeks/year 1 week/year 2 weeks/year 2 weeks/year 2 weeks/year US\$100,000/year	N/A
48-60 months	Independent evaluation of pilot technology-assisted program for Mathematics	Project implementation task team leader Procurement Specialist FM Specialist Teacher training specialist Evaluation Expert EMIS specialist Environment Specialist Social Specialist	4 weeks 1 week 1 week 1 week 2 weeks 2 weeks 0.5 week 0.5 week US\$100,000	N/A

Skills Mix Required

<i>Skills Needed</i>	<i>Number of Staff Weeks</i>	<i>Number of Trips</i>	<i>Comments</i>
Project Implementation Task Team Leader	22	10	
Procurement Specialist	6	6	
FM Specialist	6	6	
Architect/Engineer	9	9	
Teacher Training Expert	13	10	
Mathematics Expert	4	2	
EMIS Specialist	8	4	
Evaluation Expert	2	1	

Annex 6: Economic and Financial Analysis
CO-OPERATIVE REPUBLIC OF GUYANA
Secondary Education Improvement Project

Introduction

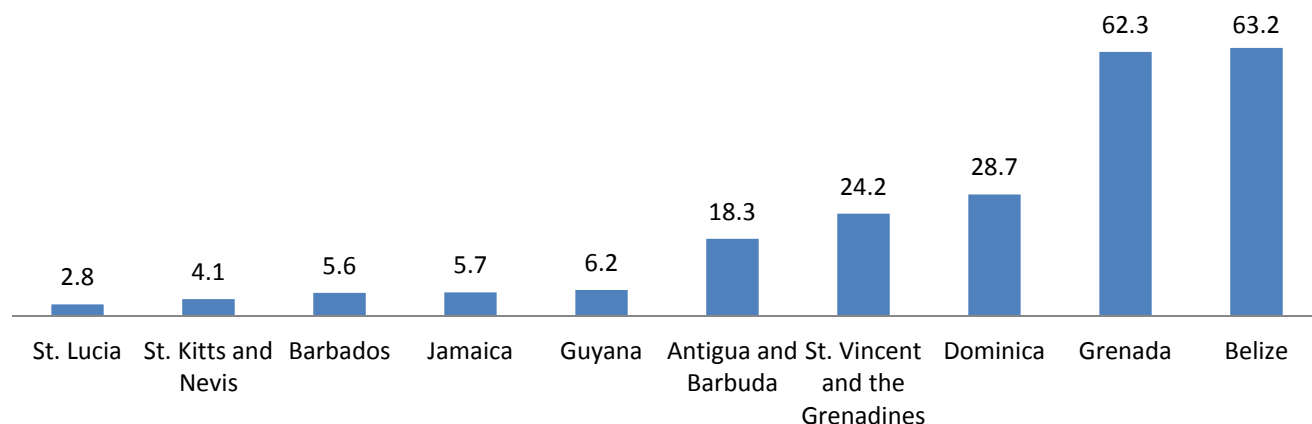
1. The economic and financial analysis provides the rationale for investment in secondary education in Guyana, which will have a long-term influence on economic growth and poverty reduction. Empirical studies using country-level data reveals a close relationship between the increased demands for skilled labor with secondary education and skill-biased technological change in countries around the world. Barro (1999) analyzed a panel of about 100 countries observed in 1960-1995 and found that economic growth is positively related to the starting level of average years of adult male school attainment at secondary and higher levels.
2. The following sections detail the economic and social rationale for public investment in secondary education, the Bank's comparative advantage in supporting secondary education, and the project-specific economic and financial analysis.

Rationale for Public Investment in Secondary Education

3. Both theory and empirical research have shown that human capital accumulation plays a key role in economic growth. At the individual level, skills and knowledge developed through formal school education has a tremendous contribution to individual labor productivity, which leads to personal lifetime income growth (Mincer 1981). At the national level, long run economic growth is closely related to the level of cognitive skills of the population (Hanushek and Woessmann 2007). Economic growth driven by sustainable education development has the potential to reduce poverty and narrow the social gap between the rich and the poor.
4. Secondary education affects social behavior. Lochner and Moretti (2001) used the U.S. data and found that high rates of dropout from secondary school increase the probability of incarceration for both white and black males, and that a 10 percent increase in the high school graduation rate reduces the arrest rate by 14 to 27 percent. It is expected that this project in Guyana will decrease the secondary level dropout rate, particularly among males, with corresponding decreases in anti-social and other at-risk behaviors (e.g. teen pregnancy, drug and alcohol abuse, etc.).
5. Besides its economic and social contribution, secondary education also serves as a bridge between primary education and tertiary education. A powerful secondary education system, on the one hand, can be a strong motivation to attract graduates from primary schools. On the other hand, secondary schools with well-trained teachers and good teaching/learning environment can prepare students adequately for successful transitions to either employment or tertiary education.
6. Gains from public investment in secondary education outweigh those from private investment. Glomm and Ravikumar (1992) showed in their paper that public investment in the quality of schools reduces income inequality more quickly than private education. Guyana relies

heavily on public secondary schooling: just 6 percent of secondary enrollment is private (see Figure 1), which is almost exclusively restricted to Georgetown. To gear up for a takeoff in the nation’s secondary education, government intervention can be the most efficient way to reallocate resources to improve the access and the quality of secondary schools.

**Figure 1: School Enrollment, Secondary, Private 2010
(% of Total Secondary)**



7. The Government’s sustained commitment to Education for All, along with the support of external partners, has enabled Guyana to achieve Universal Primary Education (UPE). Building on this success, attainment of University Secondary Education (USE) is a major priority in the current Education Strategic Plan (ESP) 2008-2013, and is expected to remain so in the new ESP 2014-2018. The proposed SEIP would contribute to achieving this strategic goal.

The Bank Value-Added

8. The Bank offers best practices and guidance for improving access to and quality of secondary education unmatched by any other organization. In the past 25 years, the Bank has engaged in over 300 projects in secondary education development around the world, of which 68 are in the Latin America and Caribbean region. Its unique global vision and international experience brings the Bank great successes in helping countries building up their secondary education. Furthermore, at the country level, the Secondary Education Improvement Project perfectly complements and generates synergy with other Bank-financed projects, i.e., Improving Teacher Education Project, the University of Guyana Science and Technology Support Project, and the EFA-FTI (now) support for primary education. The Project would also contribute to leverage existing Ministry of Education (MOE) project management capacity that has been strengthened by the Bank.

Project Development Impact: Economic and Financial Analysis

9. Economic Analysis: As with virtually all education investments, the economic benefits are uncertain and manifest themselves over long time periods (i.e. during the employment histories of project beneficiaries). In addition, in the case of this Project the benefits are expected to begin

only after the project's conclusion, with the first cohort of secondary education completers to benefit from the project expected in 2019.

10. For the purposes here, there are two sets of direct project beneficiaries: those students who graduate from the three new GSS who would not complete secondary education without the project (estimated at 446/year), and those students attending other GSS around the country who benefit from the improved instruction in mathematics due to the project and complete secondary education because of this support (estimated at 595/year).

11. The first set of project beneficiaries was determined by taking the total number of additional secondary education places made possible under the project (3 new GSS, one for 1,000 students and two for 800 students, for a total of 2,600 students), and spreading the enrollment of these 2,600 students across the five years of secondary schooling (grades 7-11) based on prevailing dropout rates to calculate the increased number of grade 11 students made possible by the infrastructure component (525). It is assumed that 85 percent of these additional grade 11 students will complete secondary education, for a total of 446 students.

12. The second set of project beneficiaries was calculated as follows: the total number of grade 11 students in 2012 (most recent year for which data is available) was 9,909. Of this number, only 50 percent, or 4,955 passed their mathematics CXC exam. The economic analysis assumes that improved mathematics instruction enabled by the project will increase these pass rate to 56 percent, equivalent to 5,549 students (assuming no change in the total number of grade 11 students, which is conservative). The difference between these two numbers is 595 students.

13. Some of these completers (estimated 50 percent) go on to higher education, while the remainder joins the labor force. Of those who continue on to higher education, only some will finish (estimated 70 percent); the others dropout and enter the labor market. Benefits for secondary education completers are projected to begin in 2019, when the first cohort of students benefitting from this project completes the cycle. Benefits for higher education completers are projected to begin in 2023, after the four years cycle. This yields a total estimated number of increased secondary and higher education graduates per year largely attributable to the Project.

14. The economic value of a secondary education is measured as the earnings differential between primary and secondary education completers (calculated at \$1,323/year), which accumulates over time in the labor market. Similarly, the value of higher education is measured as the earnings differential between secondary and higher education completers (calculated at \$2,214). For purposes of the economic analysis, a portion (20 percent) of this additional value of higher education is attributed to the project's interventions, but only for those who complete higher education (an estimated 70 percent of those who begin it). This additional value is added to the value of a secondary education. For those higher education students that drop out, (30 percent), their earnings are expected to be the same as secondary education completers.

15. To estimate the Project's benefits, the numbers of increased secondary and higher education graduates per year are multiplied by the respective annual values of secondary and higher education projected out over a 45-year lifetime of employment and income generation.

16. In terms of costs, the Project's investment costs are distributed across the 5-year implementation period according to the disbursement schedule, after which estimated annual recurrent expenditures required to sustain the project's investments (US\$320,000) are applied every year thereafter.

17. Subtracting the Project's costs from its benefits each year yields a net economic income stream, shown in Table A6.1 below. From this net income stream the Project's Internal Rate of Return (IRR) and Net Present Value (NPV) can be calculated. Using estimates of annual income by education level from data gathered from the Ministry of Labor and International Labor Organization (ILO)⁹, the project's internal rate of return (IRR) is calculated at 9 percent with a Net Present Value (NPV) of US\$6.7 million (using a 5 percent discount rate).

Table A6.1
Guyana Secondary Education Project

YEAR	COSTS	BENEFITS	NET
1	\$700,000	\$0	-\$700,000
2	\$1,500,000	\$0	\$1,500,000
3	\$2,500,000	\$0	\$2,500,000
4	\$3,500,000	\$0	\$3,500,000
5	\$1,800,000	\$0	\$1,800,000
6	\$320,000	\$895,168	\$575,168
7	\$320,000	\$895,168	\$575,168
8	\$320,000	\$895,168	\$575,168
9	\$320,000	\$895,168	\$575,168
10	\$320,000	\$1,538,505	\$1,218,505
11	\$320,000	\$1,538,505	\$1,218,505
12	\$320,000	\$1,538,505	\$1,218,505
13	\$320,000	\$1,538,505	\$1,218,505
14	\$320,000	\$1,538,505	\$1,218,505
15	\$320,000	\$1,538,505	\$1,218,505
16	\$320,000	\$1,538,505	\$1,218,505
17	\$320,000	\$1,538,505	\$1,218,505
18	\$320,000	\$1,538,505	\$1,218,505
19	\$320,000	\$1,538,505	\$1,218,505
20	\$320,000	\$1,538,505	\$1,218,505
21	\$320,000	\$1,538,505	\$1,218,505
22	\$320,000	\$1,538,505	\$1,218,505

⁹ National Employment Report – Guyana, ILO, 2006.

23	\$320,000	\$1,538,505	\$1,218,505
24	\$320,000	\$1,538,505	\$1,218,505
25	\$320,000	\$1,538,505	\$1,218,505
26	\$320,000	\$1,538,505	\$1,218,505
27	\$320,000	\$1,538,505	\$1,218,505
28	\$320,000	\$1,538,505	\$1,218,505
29	\$320,000	\$1,538,505	\$1,218,505
30	\$320,000	\$1,538,505	\$1,218,505
31	\$320,000	\$1,538,505	\$1,218,505
32	\$320,000	\$1,538,505	\$1,218,505
33	\$320,000	\$1,538,505	\$1,218,505
34	\$320,000	\$1,538,505	\$1,218,505
35	\$320,000	\$1,538,505	\$1,218,505
36	\$320,000	\$1,538,505	\$1,218,505
37	\$320,000	\$1,538,505	\$1,218,505
38	\$320,000	\$1,538,505	\$1,218,505
39	\$320,000	\$1,538,505	\$1,218,505
40	\$320,000	\$1,538,505	\$1,218,505
41	\$320,000	\$1,538,505	\$1,218,505
42	\$320,000	\$1,538,505	\$1,218,505
43	\$320,000	\$1,538,505	\$1,218,505
44	\$320,000	\$1,538,505	\$1,218,505
45	\$320,000	\$1,538,505	\$1,218,505
46	\$320,000	\$1,538,505	\$1,218,505
47	\$320,000	\$1,538,505	\$1,218,505
48	\$320,000	\$1,538,505	\$1,218,505
49	\$320,000	\$1,538,505	\$1,218,505
50	\$320,000	\$1,538,505	\$1,218,505
		NPV	\$6,705,425
		IRR	9%

18. During project implementation, actual data regarding the number of secondary education completers from these regions, and the number of those completers who continue on to higher education, would be collected on an annual basis during project supervision missions. During the Mid-Term review and during preparation of the ICR, current data regarding average earnings by education level would be collected. This will enable revised calculations of the Project's IRR and NPV.

Sensitivity Analysis

19. Key variables to the economic analysis are:
1. The number of project beneficiaries per year;
 2. the economic value of a secondary education; and
 3. the discount rate.

20. IRR sensitivity analyses of the first two key variables were performed, shown in Table A6.2 below. If the actual number of project beneficiaries increases from the projected 1,041 to 1,200 per year, and if the value of secondary education increases slightly from \$1300 to \$1400, the IRR would increase to 11%. Given the Project's coverage of all 75,000 secondary students, if the project interventions have the causality intended, this hypothetical increase in the numbers of beneficiaries (an increase in the numbers of students who successfully complete secondary education) is entirely possible. The IRR only falls to 6% if the economic value of secondary education (the wage differential between primary and secondary education completers) drops to \$1,000 per year, and if the number of beneficiaries per year slips to less than 1,000 per year. This is not expected; if anything, as the Guyanese economy modernizes over time this wage differential can be expected to increase, not decrease, and because rising secondary enrollments will increase the number of likely beneficiaries.

Table A6.2: IRR Sensitivity Analysis to Number of Beneficiaries Per Year and Value of Completing Secondary Education

IRR	9%	Beneficiaries Per Year							
		1,000	1,100	1,200	1,300	1,400	1,500	1,600	
Value of	\$1,000	6%	7%	8%	8%	9%	10%	11%	
Secondary	\$1,100	7%	8%	9%	9%	10%	11%	11%	
Education	\$1,200	8%	8%	9%	10%	11%	12%	12%	
	\$1,300	8%	9%	10%	11%	12%	12%	13%	
	\$1,400	9%	10%	11%	12%	12%	13%	14%	
	\$1,500	10%	10%	11%	12%	13%	14%	15%	
	\$1,600	10%	11%	12%	13%	14%	15%	16%	
	\$1,700	11%	12%	13%	14%	15%	15%	16%	
	\$1,800	11%	12%	13%	14%	15%	16%	17%	
	\$2,000	12%	14%	15%	16%	17%	18%	18%	

21. NPV sensitivity analyses were performed with respect to the discount rate and the value of secondary education, shown in Table A6.3. Assuming the value of secondary education remains at least US\$1,300 per year, the NPV remains positive until a 9 percent discount rate is applied, but the NPV becomes positive again at this high discount rate if the value of secondary education increases just slightly to \$1400 per year (a likely scenario given the modernizing economy). Assuming a 5 percent discount rate, the NPV remains positive even if the value of secondary education drops to \$1,000 per year, but this is considered highly unlikely. In other words, the estimated economic value of the proposed project is clearly sensitive, but the variables which might render the Project un-economic are not deemed likely to occur. In fact, the reverse is anticipated as Guyana's economy continues to modernize and wage differentials by education levels increase.

Table A6.3: NPV Sensitivity Analysis to Discount Rate and Value of Completing Secondary Education

NPV	\$6,705,425	Discount Rate							
		3%	4%	5%	6%	7%	8%	9%	10%
Value of	1000	\$7,927,716	\$4,700,903	\$2,347,806	\$615,209	-\$670,970	-\$1,631,885	-\$2,352,909	-\$2,894,941
Secondary	1200	\$12,096,667	\$8,028,544	\$5,044,291	\$2,830,682	\$1,172,329	-\$80,731	-\$1,034,213	-\$1,763,572
Education	1300	\$14,181,142	\$9,692,365	\$6,392,533	\$3,938,419	\$2,093,979	\$694,847	-\$374,865	-\$1,197,888
	1400	\$16,265,617	\$11,356,186	\$7,740,775	\$5,046,156	\$3,015,628	\$1,470,424	\$284,484	-\$632,203
	1500	\$18,350,092	\$13,020,007	\$9,089,018	\$6,153,893	\$3,937,277	\$2,246,001	\$943,832	-\$66,519
	1600	\$20,434,567	\$14,683,828	\$10,437,260	\$7,261,630	\$4,858,927	\$3,021,578	\$1,603,180	\$499,166
	1700	\$22,519,042	\$16,347,649	\$11,785,502	\$8,369,367	\$5,780,576	\$3,797,155	\$2,262,528	\$1,064,850
	1800	\$24,603,517	\$18,011,470	\$13,133,745	\$9,477,104	\$6,702,225	\$4,572,732	\$2,921,876	\$1,630,535
	1900	\$26,687,992	\$19,675,290	\$14,481,987	\$10,584,841	\$7,623,875	\$5,348,310	\$3,581,224	\$2,196,219
	2000	\$28,772,467	\$21,339,111	\$15,830,229	\$11,692,578	\$8,545,524	\$6,123,887	\$4,240,572	\$2,761,903

22. **Financial Analysis:** In terms of the estimated financial costs of the Project, the team focused primarily on civil works, which make up three-quarters of total expected project costs. Two methodologies were used. The first relied on recent actual costs for the construction of two new GSS financed by the GoG. To these actual costs, adjustments were made to reflect recent inflation and proposed qualitative improvements in school design. The alternative methodology applied current square footage construction costs in Guyana for covered and uncovered space, as well as for external works, and used the square footage specifications in the schools recently built by the GoG. Both methodologies yielded very similar results, such that the financial estimates for civil works are considered quite robust. For teacher training costs, the team referred to recent experience with other Bank-funded projects in Guyana, while for the EMIS system two international MIS experts with over 40 years of cumulative experience were consulted to estimate required financing. In summary, the financial analysis indicates reliable cost estimates and efficient use of funds.

23. As discussed in the Sustainability section above, the financial appraisal of the Project indicates recurrent expenditures of US\$230,000 to maintain the 3 GSS financed by the Project, to which is added another US\$90,000 in estimated costs to sustain the teacher professional development and EMIS systems, for total incremental recurrent costs of US\$320,000. This represents less than 0.25 percent of total annual education expenditures and is considered by the task team to be financially sustainable.

66. **Financial Analysis:** In terms of the estimated financial costs of the Project, the team focused primarily on civil works, which make up three-quarters of total expected project costs. Two methodologies were used. The first relied on recent actual costs for the construction of two new GSS financed by the GoG. To these actual costs, adjustments were made to reflect recent inflation and proposed qualitative improvements in school design. The alternative methodology applied current square footage construction costs in Guyana for covered and uncovered space, as well as for external works, and used the square footage specifications in the schools recently built by the GoG. Both methodologies yielded very similar results, such that the financial estimates for

civil works are considered quite robust. For teacher training costs, the team referred to recent experience with other Bank-funded projects, while for the EMIS system two different international MIS experts with over 40 years of cumulative experience were consulted to estimate required financing. In summary, the financial analysis indicates reliable cost estimates and efficient use of funds. The total incremental recurrent costs will be of US\$320,000. This represents less than 0.25 percent of total annual education expenditures.