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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT  
PROJECT APPRAISAL DOCUMENT  
ON A  
PROPOSED LOAN  
IN THE AMOUNT OF US\$90.5 MILLION  
TO THE  
REPUBLIC OF ECUADOR  
FOR A  
TRANSFORMATION OF THE TERTIARY TECHNICAL AND TECHNOLOGICAL INSTITUTES PROJECT  
November 2, 2016

Education Global Practice  
Latin America and the Caribbean Region

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## CURRENCY EQUIVALENTS

(The U.S. dollar is the official currency of Ecuador, effective January 2000)

Currency Unit = U.S. dollar

FISCAL YEAR

January 1 - December 31

### ABBREVIATIONS AND ACRONYMS

B40	Bottom 40 Percent of the Population by Poverty
BCE	Central Bank of Ecuador ( <i>Banco Central de Ecuador</i> )
CAF	<i>Development Bank of Latin America (Corporación Andina de Fomento-Banco de Desarrollo de América Latina)</i>
CEAACES	Council of Evaluation, Accreditation, and Quality Assurance in Higher Education ( <i>Consejo de Evaluación, Acreditación Aseguramiento de la Calidad de la Educación Superior</i> )
CES	Higher Education Council ( <i>Consejo de Educación Superior</i> )
CGE	Comptroller General of the State ( <i>Contraloría General del Estado</i> )
DA	Designated Account
DISC	Directorate for Implementation, Monitoring and Control ( <i>Dirección de Implementación, Seguimiento y Control</i> )
DPA	Directorate for Academic Planning ( <i>Dirección de Planificación Académica de la Subsecretaría de Formación Técnica y Tecnológica</i> )
ECMP	Ecuador Productive Matrix
EF	Environmental Form
EIB	European Investment Bank ( <i>Banco Europeo de Inversión</i> )
EMIS	Education Management Information System
EMP	Environmental Management Plan
E-Sigef	Financial Administration System ( <i>Sistema de Administración Financiera</i> )
ESMF	Environmental and Social Management Framework
FM	Financial Management
FMIS	Financial Management Information System
GDP	Gross Domestic Product
GoE	Government of Ecuador
GRS	Grievance Redress Service
ICT	Information and Communications Technology
INEC	National Institute of Statistics ( <i>Instituto Nacional de Estadísticas y Censo</i> )
IP	Indigenous Peoples
IPP	Indigenous Peoples Plan
IPPF	Indigenous Peoples Planning Framework
IRR	Internal Rate of Return
IST	Technical and Technological Training Institute ( <i>Institutos Superiores Técnicos y Tecnológicos</i> )
LOES	Organic Law of Higher Education ( <i>Ley Orgánica de Educación Superior</i> )
M&E	Monitoring and Evaluation
MAE	Ministry of Environment ( <i>Ministerio del Ambiente</i> )
MCTH	Ministry of Human Talent Coordination ( <i>Ministerio Coordinador de Talento</i> )



## BASIC INFORMATION

Is this a regionally tagged project? No	Country (ies)	Lending Instrument Investment Project Financing
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Situations of Urgent Need or Assistance/or Capacity Constraints

Financial Intermediaries

Series of Projects

Approval Date 23-Nov-2016	Closing Date 31-Dec-2021	Environmental Assessment Category B - Partial Assessment
Bank/IFC Collaboration No		

## Proposed Development Objective(s)

The objectives of the Project are: to increase enrollment and persistence in public technical and technological programs designed and implemented in collaboration with Employers, and to strengthen the institutional management of Tertiary Technical and Technological Education.

## Components

Component Name	Cost (USD Million)
Component 1: Optimizing and Upgrading the Supply in Targeted Provinces.	76.40
Component 2: Improving Programs Relevance, Quality of Teaching and IST Management Capacity.	5.00
Component 3. Strengthening Mechanisms for Institutional Coordination, Boosting Demand, and Management, Monitoring and Evaluation of the Project.	9.10

## Organizations

Borrower :	Republic of Ecuador
Implementing Agency :	Ministry of Education



<input checked="" type="checkbox"/> Counterpart Funding	<input checked="" type="checkbox"/> IBRD	<input type="checkbox"/> IDA Credit <input type="checkbox"/> Crisis Response Window <input type="checkbox"/> Regional Projects Window	<input type="checkbox"/> IDA Grant <input type="checkbox"/> Crisis Response Window <input type="checkbox"/> Regional Projects Window	<input type="checkbox"/> Trust Funds	<input type="checkbox"/> Parallel Financing
Total Project Cost: 102.47		Total Financing: 102.47		Financing Gap: 0.00	
		Of Which Bank Financing (IBRD/IDA): 90.50			

Financing (in USD Million)

Financing Source	Amount
Borrower	11.97
International Bank for Reconstruction and Development	90.50
<b>Total</b>	<b>102.47</b>

Expected Disbursements (in USD Million)

Fiscal Year	2017	2018	2019	2020	2021	2022
Annual	15.00	25.00	20.00	15.00	10.50	5.00
Cumulative	15.00	40.00	60.00	75.00	85.50	90.50

INSTITUTIONAL DATA

Practice Area (Lead)

Education



**Contributing Practice Areas**

Social Protection & Labor

**Gender Tag**

Does the project plan to undertake any of the following?

a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF

Yes

b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment

Yes

c. Include Indicators in results framework to monitor outcomes from actions identified in (b)

Yes

**SYSTEMATIC OPERATIONS RISK- RATING TOOL (SORT)**

**Risk Category**

**Rating**

1. Political and Governance

● High

2. Macroeconomic

● High

3. Sector Strategies and Policies

● Moderate

4. Technical Design of Project or Program

● Moderate

5. Institutional Capacity for Implementation and Sustainability

● Substantial

6. Fiduciary

● High

7. Environment and Social

● Moderate

8. Stakeholders

● Moderate

9. Other

10. Overall

● Substantial



**COMPLIANCE**

**Policy**

Does the project depart from the CPF in content or in other significant respects?

Yes  No

Does the project require any waivers of Bank policies?

Yes  No

**Safeguard Policies Triggered by the Project**

**Yes**

**No**

Environmental Assessment OP/BP 4.01

✓

Natural Habitats OP/BP 4.04

✓

Forests OP/BP 4.36

✓

Pest Management OP 4.09

✓

Physical Cultural Resources OP/BP 4.11

✓

Indigenous Peoples OP/BP 4.10

✓

Involuntary Resettlement OP/BP 4.12

✓

Safety of Dams OP/BP 4.37

✓

Projects on International Waterways OP/BP 7.50

✓

Projects in Disputed Areas OP/BP 7.60

✓

**Legal Covenants**

Sections and Description

SCHEDULE 2, Section I, A (i)

Operate and maintain, until the completion of the Project, the Project Management Unit (PMU), comprised of key staff with functions, experience, and qualifications acceptable to the Bank, as described in the Operational Manual, including a Project coordinator, and specialists for the monitoring and evaluation, procurement, financial management, social, environmental and infrastructure aspects under the Project, and responsible for the management, coordination, supervision, monitoring and evaluation of the Project activities.

Sections and Description

SCHEDULE 2, Section I, A (ii)

SECOB and INEC until the completion of the Project will maintain a separate Project team comprised of key staff with functions, experience, and qualifications acceptable to the Bank, as described in the Operational Manual,



including an infrastructure specialist for SECOB and a technical coordinator, and procurement and financial management specialists for INEC, and responsible for the management, coordination, supervision, monitoring and evaluation of the Project activities under their responsibility.

Sections and Description

SCHEDULE 2, Section I, A (iii)

Not later than thirty (30) days after the Effectiveness Date, ensure that the Project coordinator, procurement and financial management specialists mentioned in (i) above, and the technical coordinator and procurement and financial management specialists mentioned in (ii) above, in respect of within SECOB and INEC, respectively, have been assigned to work full time in said entities.

Sections and Description

SCHEDULE 2, Section I, A (iv)

Not later than sixty (60) days after the Effectiveness Date, ensure that the monitoring and evaluation, social, environmental and infrastructure specialists mentioned in (i) above, are assigned to work full time.

Sections and Description

SCHEDULE 2, Section I, A (v)

Not later than sixty (60) days after the Effectiveness Date, ensure that a complementary information system has been established in SENESCYT and is operational, all in a manner acceptable to the Bank.

Sections and Description

SCHEDULE 2, Section I, B (1) -SECOB AGREEMENT

To facilitate the carrying out of Component 1 of the Project, the Borrower, through SENESCYT shall enter into an agreement with SECOB (the SECOB Agreement) under terms and conditions acceptable to the Bank including, among other things: (a) the Borrower's obligation to transfer, on a non-reimbursable basis, part of the proceeds of the Loan to SECOB ; and (b) SECOB's obligations to carry out the activities of Component 1 of the Project in accordance with the relevant provisions of this Schedule, including the provisions of Sections I.D, I.E, I.F and III of the Loan Agreement.

Sections and Description

SCHEDULE 2, Section 1, C (1) -INEC AGREEMENT

To facilitate the carrying out of Subcomponent 3.2 of the Project, the Borrower, through SENESCYT shall enter into an agreement with INEC (the INEC Agreement) under terms and conditions acceptable to the Bank including, among other things: (a) the Borrower's obligation to transfer, on a non-reimbursable basis, part of the proceeds of the Loan to INEC and; (b) INEC's obligations to carry out the activities of Subcomponent 3.2 of the Project in





accordance with the relevant provisions of this Schedule, including the provisions of Sections I.D, I.E, I.F and Section III of the Loan Agreement.

Sections and Description

SCHEDULE 2, Section I, D (1)

The Borrower shall adopt and carry out the Project in accordance with the provisions of a manual (the Operational Manual), acceptable to the Bank, which shall include, inter alia: (a) a detailed description of Project activities and institutional arrangements for the Project; (b) the Project administrative, budgeting, accounting, auditing, reporting, financial (including cash flow aspects), procurement and disbursement procedures; (c) the monitoring indicators for the Project; (d) the institutional and administrative mechanisms established to ensure inter-institutional coordination; (e) the regulations concerning the design and micro-planning for IST consolidation ; and (f) the ESMF, IPPF and RPF [and the Existing EMPs, the Existing IPPs and the Existing SMP.

Sections and Description

SCHEDULE 2, Section I, F (6)

The Borrower, through SENESCYT shall, not later than ninety (90) days after the Effective Date, develop, in form and substance acceptable to the Bank, and following the guidelines set forth in the Operational Manual, a grievance redress mechanism that encompasses transparent, timely and fair procedures, for the purposes of ensuring that all complaints received from beneficiaries and other interested stakeholders related to any activity under the Project are properly and timely addressed in a manner acceptable.

Sections and Description

SCHEDULE 2, Section II, B (1)

The Borrower, through SENESCYT, shall, and shall cause SECOB and INEC to maintain or cause to be maintained a financial management system in accordance with the provisions of Section 5.09 of the General Conditions.

Sections and Description

SCHEDULE 2, Section II, B (2)

The Borrower, through SENESCYT, shall prepare and furnish to the Bank not later than forty five (45) days after the end of each calendar semester, interim unaudited financial reports for the Project covering the pertinent calendar semester, in form and substance satisfactory to the Bank.

Sections and Description

SCHEDULE 2, Section II, B (3)

The Borrower, through SENESCYT, shall have its Financial Statements audited in accordance with the provisions of Section 5.09 (b) of the General Conditions. Each audit of the Financial Statements shall cover the period of one fiscal year of the Borrower, or any other period acceptable to the Bank. The audited Financial Statements for each such period shall be furnished to the Bank not later than six months after the end of such period.



Sections and Description

SCHEDULE 2, Section II, B (4)

The Borrower, through SENESCYT, shall, not later than 120 days before the end of: (i) the first calendar year of Project implementation or (ii) the period subject to audits, (whichever occurs first), submit to the Bank for its no-objection the terms of reference for the hiring of an independent auditor.

Sections and Description

SCHEDULE 2, Section V (1)

Without limitation to the provision of Section 5.03 of the General Conditions, the Borrower shall provide, promptly, as needed, the counterpart funds required for Project implementation estimated in the amount of approximately twelve million Dollars (US\$12,000,000), as further detailed in the Operational Manual and distributed in accordance with the table set forth in the Annex to this Agreement, as such counterpart fund amounts reflected in said table may be revised from time to time by mutual agreement between the Borrower and the Bank, and reflected in a written notice from the Bank to the Borrower, which notice shall constitute an amendment to this Agreement.

Sections and Description

SCHEDULE 2, Section V (2)

The Borrower, through SENESCYT, shall not later than eighteen months after the Effective Date, select and contract an entity, independent from the Borrower with experience and qualifications acceptable to the Bank, and in accordance with terms of reference satisfactory to the Bank, for purposes of carrying out the technical reviews referred in the Subcomponent 2.1 of the Project, and assessing said process of collaboration to determine if said programs need to be revised by the Employers.

**Conditions**

Type  
Effectiveness

Description

ARTICLE IV. 4.01 (a)

The SECOB Agreement has been executed on behalf of the Borrower, through SENESCYT, and SECOB in a manner acceptable to the Bank.

Type  
Effectiveness

Description

ARTICLE IV. 4.01 (b)

The INEC Agreement has been executed on behalf of the Borrower, through SENESCYT, and INEC, in a manner acceptable to the Bank.

Type  
Effectiveness

Description

ARTICLE IV. 4.01 (c)



The pertinent administrative act (Acuerdo Ministerial) approving the Operational Manual has been issued.

**PROJECT TEAM****Bank Staff**

Name	Role	Specialization	Unit
Marcelo Becerra	Team Leader(ADM Responsible)	Education	GED04
Nelson Gutierrez	Team Leader	Social Protection	GSP04
Jose Yukio Rasmussen Kuroiwa	Procurement Specialist(ADM Responsible)	Procurement	GGO04
Ana Lucia Jimenez Nieto	Financial Management Specialist	Finance	GGO22
Ana Maria Oviedo Silva	Team Member	Economist	GPV04
Catarina Isabel Portelo	Counsel	LEGLE	LEGLE
Dianna M. Pizarro	Safeguards Specialist	Social Development	GSU04
Javier Botero Alvarez	Team Member	Higher Education	GED04
Maria Caridad Gutierrez Cordoba	Team Member	Team Assistant	LCCEC
Maria Elena Paz Gutzalenko	Team Member	Program Assistant	GED04
Maria Virginia Hormazabal	Team Member	Finance	WFALA
Mariana Margarita Montiel	Team Member	LEGAL	LEGAM
Patricia De la Fuente Hoyes	Team Member	Finance	GGO22
Raul Tolmos	Environmental Specialist	Safeguards	GEN04
Renata Freitas Lemos	Team Member	Economist	GED04
Silvia Del Pilar Larreamendy Ricardo	Safeguards Specialist	Safeguards	GSU02
Silvia Guallar Artal	Team Member	Analyst	GED04

**Extended Team**

Name	Title	Organization	Location
Irayda Ruiz Bode	School Infrastructure Specialist		Guatemala



Leandro Chalela	Economist consultant	Ecuador
Luis Castro	Economist Consultant	United States
Marcelo Rodriguez	Operational Manual Consultant	Ecuador
Pilar Larreamendy	Social Development Specialist	
Priscila Vera Jibaja	Analyst	Ecuador

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**ECUADOR**

**TRANSFORMATION OF THE TERTIARY TECHNICAL AND TECHNOLOGICAL INSTITUTES PROJECT**

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## I. STRATEGIC CONTEXT

### A. Country Context

1. During the past decade, Ecuador experienced a period of political stability that allowed the Government of Ecuador (GoE) to invest unprecedented levels of resources in infrastructure and social programs aimed at reducing inequality and promoting shared prosperity. Between 2006 and 2014, the poverty rate<sup>1</sup> fell from 38.3 percent to 25.8 percent; extreme poverty (less than US\$1.25 a day in purchasing power parity) fell from 16.9 percent to 8 percent. In the meantime, Ecuador raised the income of the bottom 40 percent of the population (B40) by nearly 7 percent annually, compared with only about 4 percent nationwide. However, Ecuador is facing severe external and fiscal challenges linked to the fall in oil prices and the appreciation of the U.S. dollar, and, as a result, the GoE has started to do some fiscal adjustments since 2015, such as: (a) the postponement of non-priority public investment, except for strategic projects; (b) a temporary freeze of public sector wages; and (c) a tax amnesty and import tariff measures that increased fiscal revenues.

2. To advance in the reduction of poverty and inequality, the GoE defined two major strategies in its National Development Plan (*Plan Nacional de Desarrollo y Buen Vivir 2013–2017*, NDP): (a) the reduction of extreme poverty, and (b) the transformation of the Ecuador Productive Matrix (ECMP). The ECMP transformation aims at developing a production matrix intensive in innovation, technology, knowledge, productivity, and quality; increasing Ecuador's value added share in production; diversifying production, exports, and markets; and strategically substituting imports—all of these with the objective of generating quality jobs and reducing sectoral and territorial gaps with environmental sustainability. In this regard, the GoE developed an ambitious training program focused on science and technology areas, which includes the transformation of Technical and Technological Training Institutes (*Institutos Superiores Técnicos y Tecnológicos*, ISTs), to provide employers with the set of skills they need in their workforce.

### B. Sectoral and Institutional Context

3. The tertiary education system includes two types of institutions (based on the types of degrees granted): universities (at least 4-year programs) and ISTs (2 or 3-year programs). In 2014 the number of enrolled students in higher education reached 627,506, 90 percent of whom attended universities and polytechnic schools<sup>2</sup>; and the remaining 10 percent (65,033 students) attended 280 ISTs (25 percent of

<sup>1</sup> Measured by the national poverty line.

<sup>2</sup> Besides SENESCYT, the Ministry of Education (*Ministerio de Educación*, MINEDUC, for secondary general and technical education), the Technical Secretary of Qualification and Professional Training (*Secretaría Técnica de Capacitación y Formación Profesional*, SETEC), SECAP, MT, and the Ministry of Production (*Ministerio de la Producción*) are in charge of promoting improvements in employability and productivity, especially for the sectors deemed as priority in the productive matrix. SETEC promotes and facilitates professional training of quality, especially to build competencies for work. SECAP manages the provision of quality public training for work or entrepreneurship targeted to high-priority vulnerable groups, for whom there is special financing. MT has among its strategic objectives the promotion of policies for employment and training. The most emblematic program for employment promotion is Employment Partner (*Socio Empleo*) which was created by the Ministry of Labor Relations and which works as an electronic platform of exchange to match employment seekers and providers of the available pool of jobs.



whom attended the 140 public ISTs, and 75 percent the 140 private institutions, including 12 ISTs that are privately managed and publicly financed institutions). With regard to gender, based on household data, overall enrollment by gender in tertiary non-university programs is 48 percent for men and 52 percent for women. Nevertheless, there is very little gender-disaggregated administrative data on enrollment and completion, overall and by program (where there may be significant gender differences in participation by gender).

4. Three major actors lead the governance of the tertiary education system: (a) The Higher Education Council (*Consejo de Educación Superior*, CES); (b) the Secretary of Higher Education, Science and Technology (*Secretaría de Educación Superior, Ciencia y Tecnología*, SENESCYT); and (c) the Council of Evaluation, Accreditation, and Quality Assurance in Higher Education (*Consejo de Evaluación, Acreditación y Aseguramiento de la Calidad de la Educación Superior*, CEAACES). The main functions of the CES are: (a) to approve the creation (or to order the closure) of Tertiary Education Institutions (TEIs), including universities<sup>3</sup> and ISTs, (b) to approve the creation of new programs, and (c) to monitor compliance with academic and legal regulations. SENESCYT, is the governing authority over public policies for tertiary education, with competences in the following spheres: (a) the identification programs of public interest and their prioritization within the NDP, (b) the design and management of policies on scholarships, and (c) the development of policies for science and technology. CEAACES is a technical, public, and autonomous body in charge of governing the evaluation, accreditation, and quality assurance of TEIs, as well as of their programs. Continuous external evaluations help CEAACES monitor the compliance with institutional and national objectives.

5. The GoE has made significant efforts to improve its tertiary education system. The past eight years have seen multiple reforms in Ecuador's legal and institutional framework for the tertiary education system, including the constitutional reform in 2008, the Organic Law of Higher Education (*Ley Orgánica de Educación Superior*, LOES) in 2010, and the creation of CEAACES the same year. The reform of the legal framework encompassed all aspects of the system, including: (a) the right to free tertiary education, (b) the reorganization of the system (new and reinforced roles of Subsecretary of Technical and Technological Training [*Secretaría de la Formación Técnica y Tecnológica*, SFTT], CEAACES, CES, and individual ISTs), (c) the diversification of education offerings (universities and technical institutions), (d) the reform of institutional governing structures, (e) the regulation of the approval process for institutions and programs, and (f) the improvement of quality-assurance procedures. The objectives of the strategy for tertiary education, established in the LOES, is to “guarantee the right to quality higher education that fosters excellence, universal access, completion, and mobility”<sup>4</sup>. The strategy for tertiary education is also framed within the 10-year education plans (2006–2015 and the 2016–2025 plans<sup>5</sup>) as well as the NDP (2013–2017). Political commitment to strengthen tertiary education is further demonstrated by the steep increase in expenditures, from 1.3 percent of GDP in 2007 to 2.1 percent in 2014. This increase has been led by investment in scholarships, new infrastructure and equipment facilities, and regularization of full-time professors.

<sup>3</sup> The category ‘universities’, includes four polytechnic schools, which have university’s degree levels.

<sup>4</sup> Ley Orgánica de Educación Superior (LOES), Título 1, Capítulo 1, Artículo 2: Esta Ley tiene como objeto definir sus principios, garantizar el derecho a la educación superior de calidad que propenda a la excelencia, al acceso universal permanencia, movilidad y egreso sin discriminación alguna.

<sup>5</sup> The 2016-2025 education plan hasn't been published yet. For more information, see <https://educacion.gob.ec/pde>





6. Efforts from the GoE have already produced positive results. The net enrollment rate in tertiary education grew from 28 percent in 2006 to 39 percent in 2014. The evaluation process of CEAACES is beginning to have an impact on overall quality of TEIs, notably through the closure, to date, of 14 low-quality universities. Regarding the ISTs, CEAACES has carried out a comprehensive evaluation of all ISTs. The results of this evaluation, disclosed in July 2016, classify the ISTs into three categories: 56 accredited (11 public ISTs), 154 allowed for the implementation of an Institutional Development Plan (98 public ISTs), and 51 ISTs to be closed (29 public ISTs)<sup>6</sup>. In this context, SENESCYT has decided to fully transform the public IST system through the consolidation of the supply for technical and technological education at the provincial level into around approximately 40 'hub' ISTs<sup>7</sup>. Each 'hub' would consist of an IST with upgraded infrastructure and equipment, with capacity to cover most of the public enrollment at the provincial level. The location and dimensioning of the 'hub' would be determined by a geographical optimization analysis at the provincial level, which includes IST mergers and closures.

7. However, important challenges remain with regard to access and graduation. The current student composition by income quintile reflects disparities in access to tertiary education: enrollment of students from the two bottom quintiles is 15 percent, compared to 50 percent for the richest quintile. Additionally, only 18 percent of university students and 27 percent of IST students are enrolled in science, technology, engineering, and mathematics programs, while the rest study in programs on administration, humanities, education, and services. Finally, the graduation rate continues to be low for both universities (55.2 percent) and ISTs (although 71 percent of students complete their programs, around half of them do not formally graduate because they do not fulfill the final conditions such as completion of final internship or project and/or do not undertake the administrative procedures to get the diploma).

8. In this context, the NDP establishes that by 2019, enrollment has to increase to 50 percent (primarily through an increase in enrollment in ISTs) and the graduation rate has to increase to 80 percent (both at universities and ISTs). Additionally, the NDP launched two key initiatives to enhance the inclusiveness of tertiary education: (a) the diversification of tertiary technical education by making the non-university technical education provided by ISTs more relevant, attractive, and of higher quality, and (b) the scholarships programs, including one that provides half of a minimum salary to students who maintain good performance in tertiary studies and whose families are beneficiaries of *Bono de Desarrollo Humano* (a conditional cash transfer targeted at the poorest).

9. To expand relevant and high-quality non-university technical and technological education, SENESCYT has developed the 'Program of Transformation of Tertiary Technical and Technological Public Education in Ecuador' (*Programa de Reversión de la Educación Técnica y Tecnológica Superior Pública del Ecuador*, PRETyT). Its main goals are: (a) to increase enrollment in public ISTs, from 21,015 in 2015 to 38,000 by 2019; (b) to increase enrollment in ISTs as a proportion of the total tertiary education enrollment from 10.9 percent in 2015 to 13.6 percent in 2019; and (c) to create about 35 new programs aligned with labor market and local development needs and designed and implemented with participation of the employers. The main pillars of this strategy are: (a) the creation of a new academic offer, well-articulated with private and public sector demands, including piloting a 'dual program

<sup>6</sup> The evaluation results for 19 ISTs is not available.

<sup>7</sup> Indeed 127 ISTs have been closed between 2010 and 2014.



system' in some ISTs in which students would dedicate part of their time to on-the-job learning in relevant receiving firms (*entidades receptoras*), arranged through strategic partnerships<sup>8</sup>; (b) the upgrading of facilities through new infrastructure and equipment; (c) the strengthening of teacher training; (d) the enhancement of SENESCYT institutional and management capacity; and (e) the consolidation of the public system in around 40 'hub' ISTs, which in principle would constitute the supply of public tertiary technical education 10 years from now. This group of ISTs, selected for their scale and local impact, would benefit from new or improved infrastructure, first-class equipment, and new core programs.

10. The new academic offerings would be determined by their relevance to the ECMP (see paragraph 2) of the country and to sectors prioritized by the Government. In this context, SENESCYT has developed multiple criteria for determining the curricular content of programs and the number of places to be offered to provide employers with the set of skills they need. It includes: (a) at the macro level, the employability of the graduates; and (b) at the micro level, the qualification of the ISTs according to CEACES evaluation and the availability of competent professors. Additional activities support this process, particularly the institutionalization of partnerships with employers for program design, implementation, and monitoring, and analysis of the demand and supply of employment at local level.

11. PRETyT seeks the construction or rehabilitation of approximately 40 'hub' ISTs<sup>9</sup>, 5 of which have already been constructed, and the remaining would be built or rehabilitated within the next 10 years. These new ISTs were designed under standardized models based on the topographic conditions, availability, and accessibility of land. Their standardized and modular design allows for a scalable growth of ISTs if expansion is needed in the future and an optimal use of the built space. There are four typologies based on optimal capacity: (a) 'Type B' with capacity for 940 students per shift, (b) 'Type A' with 480 students per shift, (c) 'Modular' with 240 students per shift, and (d) 'Basic' with 150 students per shift. There would be three shifts per building (morning, afternoon, and evening), resulting in a threefold increase in the enrollment capacity of these institutions. In all these cases, the new institutions would receive equipment for information technology and laboratories.

12. A key concern of PRETyT is the improvement of teacher quality in the new or redesigned programs. More and better teachers with relevant competences is a strategic priority of PRETyT. To improve teachers', rectors', and pedagogic coordinators' skills, SENESCYT would introduce a training program run by an international firm which, in addition, would create trainers' capacity. These in-service training courses would help teachers maintain their practical knowledge, with specific emphasis on 'Dual

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<sup>8</sup> The Bank NLTA 'Ecuador-Technical Education: What the Labor Market Needs?' (2015) mentioned on dual education: "Regarding the exchange of experience of the Dual Technical Training, as the model chosen by the GoE, this NLTA made a rapid revision of the evidence available as the factors that facilitate their replication: (i) agreements for a professional training system focused in the practice, (ii) positive perception from students (expressed as the demand and ending of programs), from employers (expressed as their demand, remuneration of graduates, and their willingness to training agreements); (iii) flexibility on the implementation of replica to respond to the sectoral economic dynamic ; and (iv) decentralization in the design of the academic offer and implementation of the managerial model. Among the factors associated with the failure for the replication, are (i) insufficient articulation with national priorities or insufficient adaptation to regional particularities; (ii) incompatible legal and regulatory framework with a dual focus; (iii) high prevalence of informal economy; (iv) lack of institutional capacities to implementation; and (v) lack of dissemination of results between the parts involved.

<sup>9</sup> Although some cases will be rehabilitation or expansion of existing infrastructure, the vast majority of the new ISTs will be a completely new construction, most of them in new sites.



Programs'. Finally, to increase teacher retention and incentives, SENESCYT is designing a selection process and career path to provide open-ended contracts to about 80 percent of the teachers in the medium term<sup>10</sup>.

13. Technical tertiary education, in particular PRETyT, requires the coordination of a number of institutions. At the highest level, the Ministry of Human Talent Coordination (*Ministerio Coordinador de Talento Humano*, MCTH) has two strategic objectives: (a) articulate the tertiary education offering and the professional and vocational training of different institutions with quality criteria based on performance, and (b) facilitate the mobility between vocational training and the secondary and tertiary technical levels. To achieve these goals, MCTH coordinates the bodies in charge of providing education services and training. PRETyT is under the responsibility of SENESCYT and therefore belongs to the complex institutional network that promotes technical training and alignment with the needs of the productive sector. In this regard, between MCTH and SENESCYT there is coordination and complementarity. To provide timely information for students and employers, SENESCYT is planning to develop a system that disseminates information on the needs of the labor market and professional profiles, through an information system to follow up on graduates at IST level and in partnership with the private sector. Moreover, articulation with secondary education in collaboration with the Ministry of Education (*Ministerio de Educación*, MINEDUC) would be established to foster awareness and attractiveness of Tertiary Technical and Technological Education (*Educación Terciaria Técnica y Tecnológica*, TTTE) among secondary students. Finally, strengthening engagement between public and private providers of TTTE is planned, with the objective of articulating on issues such as the supply of programs, academic curriculum, teachers and student profiles, institutional management, and engagement with the employers.

### C. Higher Level Objectives to which the Project Contributes

14. The proposed Project is aligned with the GoE strategy. It specifically addresses in a comprehensive manner two of the challenges and strategic priorities highlighted in the World Bank Group's Country Engagement Note for the Republic of Ecuador for the Period FY2016–FY2017 (Report No: 100012-EC), discussed by the Board of Executive Directors on March 15, 2016: (a) strengthening productivity to provide enhanced economic opportunities for all; and (b) increased access to high-quality social services, including the increase of quality and coverage in the non-university tertiary education subsystem, thus providing the skills needed by the employers.

15. The proposed Project also contributes to the Bank's twin goals of eliminating extreme poverty and boosting shared prosperity by improving access to and retention in tertiary technical education, including for students in disadvantaged areas and indigenous communities, and by ultimately improving their employability. These objectives would be achieved through the combination of a more relevant curricula aligned with labor market needs, high-end infrastructure and learning facilities, more qualified professors, better articulation of the tertiary and secondary curricula, and an enhanced management of the system under PRETyT. The supply-side and institutional interventions supported by the Project are complemented by demand-side interventions: communication campaigns (with, when relevant, a focus on gender specific elements), information and awareness programs on the employment prospects of

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<sup>10</sup> Currently, teachers are contracted on a yearly basis.



tertiary programs, and the scholarship programs for the poorest (financed by the Government). Together, these interventions are expected to significantly increase the attractiveness of tertiary technical education by increasing perceived benefits and reducing its associated costs for secondary students from the lower quintiles of the population. Moreover, the proposed Project also includes a Gender Plan to monitor access and retention rates by gender and ensure equality of opportunities in TTTE.

## II. PROJECT DEVELOPMENT OBJECTIVES

### A. PDO

16. The objectives of the Project are: to increase enrollment and persistence in public technical and technological programs designed and implemented in collaboration with EmployersE; and to strengthen the institutional management of Tertiary TechnicalTT and Technological EducationTE.

17. The activities planned under the three components of the Project are expected to impact the Project Development Objective (PDO) through an improvement of the quality of services and attractiveness of TTTE programs, which would lead to an increase in access, retention, and graduation. The PDO is defined at the national level because, even if the intervention in infrastructure would only affect seven provinces, the other two components are nationwide and would certainly have an impact on the students' enrollment and persistence in the technical and technological tertiary education programs as explained before.

### B. Project Beneficiaries

18. The main beneficiaries of the Project would be the students of TTTE, who would benefit from a higher quality education that is aligned with the labor market needs. Additionally, all professors, most employers, SENESCYT's staff, targeted provinces, and the general public would benefit from the activities of the Project.

### C. PDO-Level Results Indicators

19. The proposed Project would have the following results indicators:

- (a) Enrollment in public technical and technological programs designed and implemented in collaboration with the employers;
- (b) Persistence rate in public technical and technological programs designed and implemented in collaboration with the employers;
- (c) Reliable data from the new integrated administrative and academic management system is available and used for decision making by main stakeholders.



### III. PROJECT DESCRIPTION

#### A. Project Components

**Component 1. Optimizing and Upgrading the Supply in Targeted Provinces** (Total: US\$86.3 million, IBRD/IBRD: US\$76.4 million)

20. The objective of this component is to improve the actual and perceived quality of education services, accessed by students, which would lead to increases in enrollment and graduation. It would also enable more efficient allocation of the existing resources, both physical (for example, infrastructure facilities and science and technical labs) and in human resources, through the reorganization of IST supply by consolidation of institutes into new ‘hub’ ISTs and upgrading the infrastructure and facilities. The component would finance the following activities in the targeted provinces: (a) the construction of new ISTs; (b) the rehabilitation, expansion, and/or completion of existing ISTs; (c) the supervision of civil works; (d) the acquisition of laboratories and information and communication technology (ICT) equipment and furniture; (e) the carrying out of technical and feasibility studies for the works; and (f) preparation and consolidation of individual IST Transformation Plans. In particular, 11 ISTs would be supported through the: (a) construction of 3 new ISTs, and (b) rehabilitation/expansion/completion of 6 ISTs (completion of 1 IST and rehabilitation or expansion of 5 ISTs) and (c) provision of equipment for 2 ISTs. The plan to consolidate ISTs at the provincial level, the dimension of the infrastructure and equipment packages, and the academic supply to each of the 11 ISTs where the project would be implemented be based on the ‘Transformation Plans’ (also known as ‘microplannings’, for more details, see annex 6). These 11 ISTs would serve up to 78 percent of the total enrollment in public ISTs in the targeted provinces and about 47 percent of total public IST enrollment, by the end of the Project.

21. **Targeted provinces**<sup>11</sup>. The Project is aligned with the GoE’s PRETyT national program, which is being implemented in most of the country’s territory and would be financed through three main financial sources: domestic fiscal, European Investment Bank (EIB), and World Bank (IBRD). With regard to ISTs’ construction and equipment, out of Ecuador’s 24 provinces, 20 are currently supported: GoE is supporting 5 provinces (5 ISTs) with its own resources, EIB is supporting 8 provinces (8 ISTs), and the Bank would support 7 provinces (11 ISTs). The provinces that will receive the Bank support were selected in complementarity with the interventions from the GoE and EIB, based on two criteria: (a) the TTTE enrollment rates, to maximize beneficiaries, and (b) the poverty rate and the presence of Indigenous Peoples (IP), to target the poorest and promote shared prosperity. Out of the provinces selected, four (Sucumbíos, Manabí, Bolívar, and Tungurahua) have poverty rates much higher than the national average (25 percent, based on Life Conditions Survey, Encuesta de Condiciones de Vida 2014); out of which, two are among the poorest (Bolívar and Sucumbíos, with a poverty rate of 43 percent) and have a large indigenous population; and three are among the largest provinces (Pichincha, Guayas, and El Oro). The seven provinces altogether would cover almost half of the total enrollment of the public TTTE.

**Component 2. Improving Program Relevance, Quality of Teaching and IST Management Capacity**

<sup>11</sup> The list of the targeted provinces is included in the Operations Manual. Any change in targeted provinces during implementation would need to be agreed between the GoE and the World Bank.



(estimated cost US\$5.7 million; IBRD/IBRD: US\$5 million)

22. The specific objective of this component is to improve the technical and operational capacity of SENESCYT; to design new and relevant academic programs according to the labor market demand (public and private); to develop and carry out new training programs for teachers, tutors, and rectors; and to introduce a new administrative and academic management system at IST level.

- (a) **Subcomponent 2.1. Development of Relevant Programs.** This subcomponent would finance technical assistance (TA) to the design of new TTTE programs according to labor market demand, the review of the process of collaboration with the employers in designing the programs and the continuous review of all the programs by employers every two years.
- (b) **Subcomponent 2.2. Training of Teachers and Management Staff of ISTs.** This subcomponent would finance a TA for: (i) the design and carrying out of training programs, including training programs for management staff (rectors, vice-rectors, and academic coordinators), teachers and tutors of dual programs of ISTs; and (ii) the design of the selection process and teacher career pathway.
- (c) **Subcomponent 2.3. Administrative and Academic Management System.** This subcomponent would finance TA for the development of an integrated information technology system that would facilitate and optimize the administrative and academic management system of ISTs. The new tool would be shared at the national and IST levels. At the national level, the main users would be authorities and technical units of SENESCYT, and at IST level the management staff, teachers, students, graduates, and tutors.

**Component 3. Strengthening Mechanisms for Institutional Coordination, Boosting Demand, and Management, Monitoring and Evaluation of the Project** (Total: US\$10.5 million; IBRD/IBRD: US\$9.1 million).

23. The specific objectives of this component are to support the improvement of the governance of the public technical and technological tertiary education. This would include: (a) institutional mechanisms for effective public-private coordination in the development and continuous revision of programs; (b) institutional mechanisms to monitor and inform public and private sector decision makers on employment opportunities and the employability of graduates of the tertiary technical and technological training system; (c) activities to boost the demand of technical and technological tertiary education; and (d) the management and monitoring of the Project and carrying out of impact evaluations.

- (a) **Subcomponent 3.1. Institutional Partnerships with Employers and Private ISTs.** This subcomponent would finance TA, training, and workshops for: (i) strengthening of institutional arrangements for public-private association, namely between SENESCYT and employers' associations; and (ii) strengthening engagement between public and private ISTs.



- (b) **Subcomponent 3.2. Estimation of Labor Market Demand.** This subcomponent would finance TA, training, and surveys for: (i) the design of a methodology for estimating the demand by SENESCYT through surveys carried out in collaboration with employers; and (ii) the evaluation of existing administrative data to estimate the employers demand, and if necessary, include a module for TTTE in the surveys of employment of the National Institute of Statistics (*Instituto Nacional de Estadísticas y Censo*, INEC) to complement the existing data.
- (c) **Subcomponent 3.3. Boosting the Demand for ISTs.** This subcomponent would finance training, communication strategy, and TA to: (i) boost the demand for TTTE through the design and carrying out of media campaigns among students of secondary education on the advantages of TTTE, in collaboration with MINEDUC; and (ii) the design and carrying out of a program for raising awareness among students from the most vulnerable part of the population on scholarships to finance TTTE studies.
- (d) **Subcomponent 3.4. Management, Monitoring and Specific Impact Evaluations.** This subcomponent would finance: (i) the technical and administrative management of the project, including the hiring of FM, procurement, M&E, and social management specialists and other technical temporary staff needed during Project implementation; (ii) the carrying out of Project external audits; (iii) the carrying out of research studies on the state of TTTE and the impact of institutional improvement of educational outcomes.

### B. Project Cost and Financing

24. The proposed Investment Project Financing would be financed by an IBRD loan in the amount of US\$90.5 million. The Project includes three components that would be co-financed by the GoE with matching funds for value added tax (VAT,) plus incremental recurrent costs for Component 1.

Project Components	Project Cost (US\$, millions)	IBRD Financing (US\$, millions)	Counterpart Funding
1. Optimizing and Upgrading the Supply in Targeted Provinces.	86.3	76.4	9.9
2. Improving Programs Relevance, Quality of Teaching, and IST Management Capacity.	5.7	5.0	0.7
3. Strengthening Mechanisms for Institutional Coordination, Boosting Demand and Management, Monitoring and Evaluation of the Project.	10.5	9.1	1.4
<b>Total Costs</b>	<b>102.5</b>	<b>90.5</b>	<b>12.0</b>

### C. Lessons Learned and Reflected in the Project Design

25. Several lessons from education reform experiences and specifically reforms of technical education globally have informed the design of the proposed Project. First, the proposed Project has been conceived on the basis of, and is embedded in, the country and sector strategies in Ecuador. Second, an important design feature of the proposed Project—the alignment skills provided with labor





market demands, through alliances with employers—has benefited from lessons on governance arrangements in successful technical education initiatives globally, such as the Industrial Councils of Australia and the Mining Skills Councils of Chile. Third, the German ‘Dual Training Model’ has informed interventions related to ensuring workplace learning and teacher training, benefiting from German cooperation. Fourth, the dissemination of information to students, through the design of the graduate tracking module and the use of surveys and administrative data to estimate labor demand has benefited from successful experiences in Brazil (National Service for Industrial Training [*Serviço Nacional de Aprendizagem Industrial*]), Malaysia, Turkey, and Tunisia as well as the labor observatories of Chile and Colombia. Finally, the design of the proposed Project was informed by a previous non-lending technical assistance (NLTA) on Skills Development Strategy for Effective Social Inclusion in Ecuador (P152751), which identified economic subsectors with the highest employment and income generation potential in Ecuador and reviewed the experience of dual education systems around the world. The proposed Project design incorporates several recommendations of the study, specifically: (a) prioritization of training in the sectors with the highest potential, as determined by the gap of projected demand over supply and higher returns to demand and supply, and (b) best practices in the implementation of dual education.

## IV. IMPLEMENTATION

### A. Institutional and Implementation Arrangements

26. SENESCYT would be the implementing agency of the Project. The SFTT would be responsible for the general governance of the Project, accountability, and approval of the Annual Operational Plans and Procurement Plan. As part of the SFTT, the general coordination role would be played by the Project Management Unit of PRETyT (*Gerencia del Proyecto de Reconversion de los Institutos Técnicos y Tecnológicos*, PMU), led by a technical manager, who would be the general coordinator and main interlocutor with the Bank, in charge of coordinating the operational relationship with each of the agents involved in the Project, including the specialized units of the SFTT as well as all the fiduciary management and M&E, including planning and supervision of all the technical inputs required by the Project (except for Component 1 and Subcomponent 3.2). The technical manager would be supported by a team of six specialists in (a) financial management; (b) procurement; (c) M&E/microplanning; (d) social aspects; (e) environmental aspects; and (f) infrastructure. In addition, the Directorate for Implementation, Monitoring and Control (*Dirección de Implementación, Seguimiento y Control*, DISC) would be strengthened with one technical resource specialized on labor market analysis to support the creation of new career paths and the dialogue with the private sector and INEC. Detailed implementation arrangements are described in annex 3.

27. There would be two different provisions: (a) for management of Component 1, a specific arrangement would be made to delegate fiduciary and execution management of civil works of new ISTs to a public executing agency, Work Contracting Service (*Servicio de Contratación de Obras*, SECOB). SECOB would be in charge of procurement and contract management of technical studies, environmental management plans (EMPs), works, and supervision of those new ISTs. A subsidiary agreement would be signed between SENESCYT and SECOB to establish duties and responsibilities for





both parties, including procurement, FM, accounting, payments, and civil works supervision. Key personnel for the project's management at SECOB and arrangements for implementation of Component 1 are described in detail in annex 3; (b) for management of Subcomponent 3.2, a specific arrangement would be made to delegate fiduciary and execution management of activities to the INEC, which would be in charge of procurement and contract management of consultancy services and surveys costs (including contracting enumerators and operational costs). A subsidiary agreement would be signed between INEC and SECOB to establish duties and responsibilities for both parties, including procurement, FM, accounting, and payments. Arrangements for implementation of Subcomponent 3.2 are described in detail in annex 3.

## **B. Results Monitoring and Evaluation**

28. Progress toward achieving the PDO and intermediate indicators would be monitored by the PMU, which would be responsible for collecting and compiling the data on all indicators presented in section VII. The PMU would work closely with the DISC, which would be the main source for providing administrative data to the PMU. The PMU would send progress reports semiannually to the Bank, including progress toward targets in the Result Framework.

## **C. Sustainability**

29. The proposed Project builds on the GoE's current sound 'PRETyT' program. Many of the interventions supported by the Project have a recent developments track record; for instance, 5 new ISTs have been built and 48 programs have been redesigned, including existing pilot experiences with dual programs. Moreover, CEAACES has carried out an evaluation of all public ISTs on which the upcoming conclusion would recommend closures and merging of most ISTs, a key element of the whole reorganization of the TTTE subsystem. In addition, the employers' involvement is a key mechanism for sustainability, providing for the links for the needed demand. Finally, the proposed Project would support an analysis of the ongoing process and its effects on outcomes, allowing for reform program interventions to be adapted/revised in the medium term and helping to ensure sustainability in the long term.

## **D. Role of Partners**

30. The EIBTEIB would invest US\$74.3 million for the construction of eight new ISTs in eight provinces (Los Ríos, Chimborazo, Morona Santiago, Zamora, Azuay, Esmeraldas, Guayas, and Pichincha), following the same standards, criteria, and requirement defined by the GoE and supported by the Bank. The PP, EIB-financed by BEIPBEIP, would have its own fiduciary arrangements but would be supported under the same institutional framework that has been defined by SENESCYT for the Bank-financed project. In addition, there is a complementary TA financed by the Belgium Development Agency (BTC) designed to improve articulation with the Technical Education Unit of MINEDUC and SENESCYT in the Manabí province that is being coordinated with the activities planned by the proposed Project. The financial and institutional arrangements of this cooperation are independent of the project financed by the Bank.



## V. KEY RISKS

### A. Overall Risk Rating and Explanation of Key Risks

31. The overall risk for the proposed Project is assessed as Substantial. The political and governance risks are High due to the current fiscal crisis and political uncertainties in view of the upcoming presidential elections in February 2017, as well as public debate about SENESCYT's role. However, the higher education agenda enjoys broad-based political support. To manage these complexities, the proposed Project has ensured buy-in from all levels of Project implementation units through institutional arrangements that clearly define the roles and responsibilities of SENESCYT's different management levels, ensuring proper coordination.

32. The macroeconomic risk is rated High due to the stunted flow of national revenue, largely resulting from current oil prices and an inability to control monetary policy with the rapid appreciation of the U.S. dollar. Moreover, budget adjustment may affect availability of counterpart funds (which mainly covers the VAT). This risk is mitigated by the fact that the GoE has systematically prioritized investments in education. The GoE has started to make some fiscal adjustments since 2015 such as the postponement of non-priority public investment, except for strategic projects; a temporary freeze of public sector wages; and a tax amnesty and import tariff measures that increased fiscal revenues.

33. SENESCYT lacks experience managing infrastructure and as a result, the institutional capacity for implementation and sustainability risk is assessed as Substantial. Therefore, the proposed Project would finance activities to build capacity in the institution to take over this new task and ensure the sustainability of the TTTE system.

34. Fiduciary risks are High, due to the lack of fiduciary staffing at SENESCYT's PMU, INEC, and SECOB. The procurement capacity of the aforementioned units would need to be strengthened as the technical and fiduciary teams do not have sufficient knowledge of Bank financial management (FM), procurement procedures, and contract monitoring. Additional risks include the quality of works and implementation delays related to: (a) delays in payments by SENESCYT, INEC, and SECOB; (b) timely supply of materials for the civil works; (c) SENESCYT's, INEC's, and SECOB's insufficient experience to manage Bank contracts; and (d) high staff turnover in the entities. Moreover, the new procedures established by the Ministry of Economy and Finance (*Ministerio de Economía y Finanzas*, MEF), requires that the budget for each contract be approved (*'certificación presupuestaria específica'* and *'avales'*), which implies additional steps in implementation. To mitigate this, the following measures would need to be taken: (a) appointment of experienced procurement and FM professionals, fully dedicated to the Project; (b) implementation of tailored processes and procedures regarding funds flow and financial reporting between SENESCYT and SECOB and SENESCYT and INEC; (c) signing of a subsidiary agreement between SENESCYT and SECOB and another between SENESCYT and INEC with clear FM and procurement roles and responsibilities to assure suitable project implementation; (d) preparation of an operational manual that describes in detail the FM arrangements under the project; (e) agreement with MEF to speedily approve individual activity's budget (*'certificación presupuestaria específica'* and *'avales'*); and (f) monitoring of payments.



## VI. APPRAISAL SUMMARY

### A. Economic and Financial (if applicable) Analysis

35. The economic and financial analysis addresses three key questions: (a) What is the proposed Project's development impact with regard to expected benefits and costs? (b) Is public sector provision of financing the appropriate vehicle? (c) What is the Bank's value added? First, as a result of further investments in education, a greater number of graduates from technological institutes would enter the labor market with higher productivity and, as a result, have higher future earnings. Public sector provision is justified by the expected social returns. Because the program is expected to attract students from lower socioeconomic strata, who would otherwise not have access to tertiary education, public financing can also be justified due to equity considerations. Public sector intervention is also key to address coordination failures among the key stakeholders in provision of quality and relevant tertiary technical education (including, for example, local government and the private sector stakeholders), which cannot be organized by employers themselves or the private ISTs providers. Finally, to address information gaps and attract high-school graduates (through articulation with MINEDUC) and workers to these new offerings, which are normally perceived to be less prestigious than universities, public intervention is needed to implement the communication strategy and student awareness programs at the high-school level.

36. The Bank's contribution would be important from two angles: the Bank has extensive experience supporting tertiary education reforms, including, among others, the strengthening of the institutional and management capacities of the Government, the expansion of infrastructure and equipment, reforms to programs and institutions, quality assurance systems, and improvement of the quality of professors. Moreover, the Bank's extensive knowledge of evidence-based best practices, results, and M&E would support the development of a strong M&E system directed to the monitoring of the employability of graduates and the development of instruments to better estimate labor and skills demand. Finally, the Bank would guarantee an important part of the program financing.

37. The Project's economic and financial analysis includes two dimensions. First, the model makes use of a conventional cost-benefit analysis, that is, it considers the economic benefits and costs associated with a greater number of graduates in technical and technological education in the whole country, considering a time horizon of 14 years from 2017 to 2030. Second, the economic analysis discusses potential efficiency gains resulting from SENESCYT's institute consolidation strategy. Finally, the economic analysis includes a brief fiscal sustainability study related to the Project, wherein it considers the impact of related investments in SENESCYT's overall budget.

38. The Project's economic benefits consider that further investments in education increases an individual's productivity and, as a result, his or her future earnings, while its economic cost includes: (a) the investment costs associated with carrying out the Project, and (b) the additional recurring costs which are incurred by SENESCYT as a result of the completion of the Project. Based on the effectiveness hypothesis and Project's expected impact, the net present value (NPV) is expected to be approximately US\$220 million with an internal rate of return (IRR) of 10 percent, if the present value of the benefits and investment costs are discounted at a rate of 5 percent.



39. On the other hand, financial sustainability analysis of the flow of Project funds on SENESCYT's overall budget during the period of the Project's implementation has been done. The model utilizes a budget projection of nominal values without Project implementation, estimated from the initial budget expenditures as reported by SENESCYT and the Ministry of Finance (MEF), assuming that SENESCYT's budget would remain constant, increasing alongside the GDP. Three scenarios are constructed based on: (a) a base projection of nominal GDP growth sourced from the IMF, (b) an optimistic projection adding 1 percentage point, and (c) a conservative scenario subtracting 1 percentage point from projections for 2020 onwards. Under the base projection, the economic impact of the Project on SENESCYT's annual total budget is 27.7 percent in the Project's first year and decreasing to 7.6 percent in the final year of Project implementation, while in the optimistic scenario, the economic impact of the Project on SENESCYT's budget decreases to 7.3 percent, and the conservative scenario shows that the economic impact of the Project on SENESCYT's budget decreases to 7.9 percent.

## B. Technical

40. The activities planned under the three components of the Project are expected to contribute to the PDO through the improvement of the quality of services and attractiveness of TTTE programs, which would lead to an increase in access, retention, and graduation. The reforms and the interventions proposed in this Project are based on international evidence and best practices. There is evidence (very limited for higher education, but significant for basic education) that (a) improvements in infrastructure positively impact enrollment rate and students' outcomes<sup>12</sup>; (b) teacher training and teacher evaluation demonstrate positive effect on students outcomes, though the outcomes largely depend on how they are delivered<sup>13</sup>; (c) improvements in school management practices may lead to better teaching and learning results<sup>14</sup>; and (d) communication campaigns may lead to an increase in the demand and enrollment in higher education<sup>15</sup>.

41. Moreover, short-cycle technical and professional programs have played a key role in boosting enrollment and graduates in countries from the Organization for Economic Co-operation and Development (OECD): in 2012, while in the OECD one-third of individuals aged 25 to 34 with a higher education degree received a degree from a technical/vocational program, only one-fifth of students chose a short-cycle program in Latin America and the Caribbean (LAC). With regard to economic returns, although the average graduate with a bachelor degree has higher returns than the average technical short-cycle graduate, being in the 25th percentile of the bachelor program distribution of returns is similar to being in the 75th percentile of the short-cycle program distribution. Moreover, in some countries (Chile and Peru in Latin America and the Caribbean), the labor market returns to technical short-cycle programs are, for some fields, higher than academic/bachelor programs. The Project's interventions are adequately providing the incentives to secondary education graduates to follow technical programs, by providing relevant information, programs with high employability, high quality of education services (notably facilities and better teachers), and better institutional support.

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<sup>12</sup> Cellini, Ferreira and Rothstein (2010); Duflo (2000); Neilson and Zimmerman (2014).

<sup>13</sup> Anglist and Lavy (2001); Isenberg, Glazerman, Bleeker, Johnson, Lugo-Gil, Grider and Britton (2009); Newman, Finney, Bell, Turner, Jaciw, Zacamy, and Gould (2012); Popova, Evans and Arancibia (2016).

<sup>14</sup> McCormack, Propper and Smith (2014); Bloom, Lemos, Sadun and Van Reenen (2015); Fryer (2014).

<sup>15</sup> Bettinger, Long, Oreopoulos and Sanbonmatsu (2009); Hastings, Neilson and Zimmerman (2015); Oreopoulos and Dunn (2012)



### **C. Financial Management**

42. An FM Assessment was carried out to evaluate the adequacy of the proposed FM arrangements for SENESCYT and its co-implementing entities, SECOB and INEC, to implement the Project.

43. According to the Project institutional arrangements, SENESCYT through the existing PMU (including its Project Coordination team) and with the support of co-implementing entities, SECOB and INEC, would be responsible for implementing the Project FM tasks.

44. The FM assessment has considered the capacity and experience of the existing implementing entities to implement multilateral financed projects as well as manage recurrent staff turnover in the public sector entities which challenge their capacity to effectively respond to the Project implementation demands. The Project design requires the participation of several internal and external entities calling for strong and close coordination. The Government would require SENESCYT and SECOB to begin implementing project activities before the signing of the Loan Agreement, where SENESCYT and SECOB must have acceptable arrangements in place before loan signature to accurately account for pre-financed activities. Annex 3 includes further details on FM challenges and risks, as well as corresponding mitigating measures.

### **D. Procurement**

45. Procurement activities would be carried out by SENESCYT through its PMU, INEC's, and SECOB's. During Project preparation, the Bank carried out a preliminary assessment of SENESCYT's and SECOB's procurement capacities in April 2016 and in September 2016, respectively. In September 2016, the Bank and SENESCYT agreed to include INEC as a co-implementing agency. The INEC assessment has been carried out. SENESCYT, INEC, and SECOB would implement procurement processes under the following conditions: (a) establish an organizational structure according to the legal covenants; (b) maintain facilities and support capacity; (c) set qualifications and experience of the staff who would work in procurement; (d) maintain the personnel who have been previously trained; (e) organize record keeping and filing systems; (f) carry out best practice procurement planning and monitoring/control systems; and (g) maintain the capacity to meet the Bank's procurement contract reporting requirements.

46. Procurement activities under SENESCYT, INEC, and SECOB would be conducted by a dedicated procurement specialist and procurement analyst for each entity and supported by technical and administrative staff. As a result, the following corrective measures were agreed upon: (a) the Project Operational Manual (POM) includes procurement and contracting; (b) the Procurement Plan includes additional provisions related to Project implementation on procurement; and (c) the Bank's work in Ecuador includes a comprehensive procurement training program for existing and new lending operations, with close monitoring and support from the Bank<sup>16</sup>, particularly during the first two years of Project implementation. Additional details are presented in annex 3.

### **E. Social (including Safeguards)**

47. The Social Assessment (SA) conducted during the Project design confirmed that negative social impacts relate mainly to potential obstacles to accessing ISTs, especially among IP, and potential land

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<sup>16</sup> At least quarterly missions in the first two years.



impacts. Concurrently, the SA identified challenges and obstacles that students would face to successfully access tertiary technical education. The SA findings informed the Project's design and defined the safeguards instruments to be prepared.

48. Although this Project supports investments that would significantly increase access to TTTE, the merging of the ISTs presents social risks in areas of Project's intervention, including those with IP's presence. During the SA preparation and consultation processes some concerned IP questioned the cultural appropriateness of certain curriculums and others pointed potential mobility constraints to access the new IST locations. In light of the above risks, the Project triggered the Indigenous Peoples (OP/BP 4.10). SENESCYT prepared an IPPF because not all IST locations were known during early stages of the project preparation. The broad community support, during consultation involved local IPs organizations (tier and second grade organizations), which are affiliated to national IPs organizations (e.g FENOCIN, CONAIE, FEI<sup>17</sup>). The IPPF established a robust SA, both for IP as well as for other vulnerable communities such as Afro-descendants, where IST merging would take place. The IPPF defined the procedures for the preparation of IPPs in locations known during the later stages of project preparation, namely three ISTs at the Sucumbíos, Tungurahua, and Bolivar provinces, which have been approved by the Bank and disclosed on September 2 and 6, 2016. In addition, in light of the results of the SA, social management plans (SMPs) were prepared for the provinces of El Oro, Guayas, Manabí, and Pichincha. The SA, IPPF, Resettlement Policy Framework (RPF), three individual IPPs (Sucumbíos, Tungurahua, and Bolivar), and four individual SMPs (El Oro, Guayas, Manabí, and Pichincha) were approved by the Bank and disclosed on August 30, 2016 in SENESCYT's website and the Bank's external website on September 2, 2016, for El Oro, Guayas, and Manabí and September 6, 2016, for Pichincha.

49. Moreover, a Gender Plan was prepared and disclosed on SENESCYT's website and the Bank's external website on August 30 and September 2, 2016, respectively. Because there is currently no accurate information about access, persistence, and graduation rates disaggregated by gender, the first gender-related action under this Project would be to monitor these indicators for women and men separately, as well as the gender ratio among teachers and administrative staff. A detailed description of Gender Plan is in Annex 2.

50. Finally, because land acquisition may be necessary for some ISTs, Involuntary Resettlement (OP/BP 4.10) has been triggered and an RPF was prepared and disclosed on August 30 and September 2, 2016, in both SENESCYT and the Bank's external websites, respectively. It is estimated that land acquisition would be minimal, as (a) the majority of ISTs are located in their current property; and (b) in the case of expansion and rehabilitation, the land to be used for this purpose would be available mainly through public land donation among the parties involved (ISTs and other public institutions). Grievances and Redress Mechanisms defined in the RPF through a process to uptake, sort, verify and provide feed locally, to claims, complaints, regarding OP 4.12, OP 4.10 or and other social project-related issues. This GRM will be implemented by SENESCYT and will be reported to the Bank in quarterly basis.

<sup>17</sup> FENOCIN: *Confederación Nacional de Organizaciones Campesinas, Indígenas y Negras*; CONAIE: *Confederación de Nacionalidades Indígenas del Ecuador*, FEI: *Federación Ecuatoriana de Indios*.





## **F. Environment (including Safeguards)**

51. The Project does not foresee significant environmental impacts that could jeopardize the natural environment. The 'Category B' is justified by the fact that the civil works to be supported under the Project would generate temporary, low, and reversible environmental impacts. Also, installation of certain types of equipment in workshops and laboratories might generate health, safety, and environmental risks and impacts. Safeguard OP/BP 4.01 on Environmental Assessment was triggered because the Project would directly finance civil works (construction or renovation of ISTs) that could generate potential environmental impacts. Also, environmental, safety, and health impacts could be generated during installation and operation of associated facilities such as workshops and laboratories. The Project is classified as Category B and the following environmental safeguard policies apply: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Physical Cultural Resources (OP/BP 4.11) and Forest (OP 4.36). This last policy was triggered, as some ISTs to be built would require minor excavations in the Andean areas of the Bolivar Province where chance finds could occur. The Environmental and Social Management Framework (ESMF) includes the relevant national procedures in case of chance finds.

52. Since not all locations were known during the project preparation stage, an ESMF was developed for this Project. This ESMF covers civil works as well as installation and operation of associated facilities (workshops, laboratories, equipment, and so on). An Environmental Form (EF) and corresponding Environmental Management Plan (EMP) have been prepared during Project preparation for those ISTs (El Oro, Sucumbíos, and Bolivar) for which the location is known, and technical studies were completed before appraisal and disclosed on October 3, 2016, for Sucumbíos and October 4, 2016, for El Oro and Bolívar in the Bank's external website. The remaining EMPs would be developed during implementation stage, after final sites are known and feasibility studies are completed. Such feasibility studies would be financed with loan funds. The ESMF was consulted among relevant stakeholders (e.g. MAE, SECOB and principals of ISTs) and no major feedback was received. With regard to the EMPs for each ITs, these were consulted through informative meetings that are described in each EMP (e.g. lists of participants, date of meetings, etc.) in the section on mechanisms for social participation. Also, for each IST whose location is already known, a matrix of environmental, health, and safety impacts during operation of laboratories and workshops and corresponding mitigation measures, was prepared.

53. The ESMF was disclosed on September 14, 2016, both in the Bank's and SENESCYT's websites. In the case of ISTs for which the location is already known, an EF and its corresponding EMP were prepared according to the national environmental regulations. Also, given that these ISTs would involve installation and operation of equipment and tools in laboratories and workshops, a matrix containing information on environmental, health, and safety risks and impacts was prepared for each of those ISTs for which the location is already known and technical studies have been completed. Risk and impact mitigation measures were also included in this matrix. For those ISTs that require a wastewater treatment plant, information on these plants was included too.

54. Ecuador has a well-established national system for environmental impact assessment and management in education infrastructure construction and renovation projects. This system, including principles and procedures, is described in detail in the ESMF formulated by SENESCYT and describes institutional arrangements for environmental supervision. For a given IST, SECOB would prepare or outsource the preparation of the EF and an EMP—covering construction and operation stages—to a private consulting firm. Both instruments are prepared on the basis of engineering and soil studies.



SECOB has an environmental team of four professionals (environmental engineers and geographers) that reviews and comments on the EFs and EMPs. SECOB then sends these EFs and EMPs to the MAE through the MAE's Unified System on Environmental Information (*Sistema Unificado de Información Ambiental*) portal. MAE issues an Environmental License upon approval of the EFs and EMPs, which is then sent to SENESCYT through the Internet. Environmental supervision during construction and operation phases would be undertaken by SECOB and a team of social and environmental specialists (consultants) based at SENESCYT.

#### **G. Other Safeguard Policies (if applicable)**

55. No other safeguard policies are triggered for the project.

#### **H. World Bank Grievance Redress**

56. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For information on how to submit complaints to the World Bank Inspection Panel, please visit [www.inspectionpanel.org](http://www.inspectionpanel.org).





**VII. RESULTS FRAMEWORK AND MONITORING**

**Results Framework**

COUNTRY : Ecuador

Transformation of the Tertiary Technical and Technological Institutes Project

**Project Development Objectives**

The objectives of the Project are: to increase enrollment and persistence in public technical and technological programs designed and implemented in collaboration with Employers, and to strengthen the institutional management of Tertiary Technical and Technological Education.

**Project Development Objective Indicators**

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source / Methodology	Responsibility for Data Collection
Name: PDO Indicator 1: Enrollment in public technical and technological programs designed and implemented in collaboration with employers.		Number	9061.00	32242.00	Annual	DISC	PMU



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source / Methodology	Responsibility for Data Collection
<p><i>Description:</i> Number of students in public ISTs attending programs that have been designed and implemented in collaboration with the employers. That is: (a) whose curriculum has been revised with the collaboration of the employers and (b) which have been approved by CES, have the minimum required enrollment and alliances with employers for periodically reviewing them. The percentage of women will be monitored.</p> <p>Baseline information will be revised on the first year of implementation, after the consultancies to collect historical data from public ISTs and to verify the design process of the programs in collaboration with the employers have been conducted.</p>							
<p><b>Name:</b> PDO Indicator 2:  Persistence rate in technical and technological programs designed and implemented in collaboration with employers.</p>		Percentage	0.00	74.10	Annual	DISC	PMU
<p><i>Description:</i> Number of students enrolled in the last semester of a program designed and implemented in collaboration with the employers divided by the number of students enrolled in the first semester of these same programs in year t-2 and t-3 for the technical and technological programs respectively. This indicator will also be monitored for women and men separately.</p> <p>Baseline information will be revised on the first year of implementation, after the consultancies to collect historical data from public ISTs and to verify the design process of the programs in collaboration with the employers have been conducted.</p>							



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source / Methodology	Responsibility for Data Collection
<b>Name:</b> PDO Indicator 3: Availability of reliable data produced by the new integrated administrative and academic management system, is used for decision making by main stakeholders.		Yes/No	N	Y	Annual	DISC	PMU
<p><i>Description:</i> Availability of reliable date will be considered the followings “products” of the management system: (a) dashboards for teachers at ISTs level (to organize classes, syllabus, register students); (b) results of labor/skills demands from surveys at provincial level (used by SENESCYT, ISTs and key employers); (c) financial and budget reports at ISTs and SENESCYT level.</p>							

**Intermediate Results Indicators**

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source / Methodology	Responsibility for Data Collection
<b>Name:</b> IRI 1: Percentage of students attending transformed public ISTs in		Percentage	0.00	78.30	Semi-Annual	DISC	PMU



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source / Methodology	Responsibility for Data Collection
the Targeted Provinces.							
Description: Number of students attending transformed public ISTs (new or rehabilitated infrastructure and/or new equipment), in the Targeted Provinces, divided the total number of students attending public ISTs in the Targeted Provinces.							
<b>Name:</b> IRI 2: Number of ISTs built or rehabilitated in the targeted provinces.		Number	0.00	9.00	Semi annual	PMU	PMU
Description: Number of ISTs built, completed or rehabilitated, financed by the Project, in the targeted provinces.							
<b>Name:</b> IRI 3: Number of ISTs fully equipped in the targeted provinces.		Number	0.00	11.00	Semi-Annual	PMU	PMU
Description: Number of ISTs fully equipped by the Project, in the targeted provinces. "Fully equipped" includes: lab and workshop equipment for all programs offered by each ISTs; ICT equipment and full new furniture for each ISTs.							
<b>Name:</b> IRI 4: Number of teachers and management staff trained.		Number	0.00	3400.00	Annual	DPA	PMU
Description: Number of teachers and management staff from public ISTs in the Targeted Provinces who have attended and successfully completed the training program.							
<b>Name:</b> IRI 5: Percentage of programs designed and		Percentage	30.00	100.00	Semi-Annual	DPA	PMU



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source / Methodology	Responsibility for Data Collection
implemented in collaboration with employers.							
<p><b>Description:</b> Number programs whose curriculum has been revised with the collaboration of the employers divided by the total number of programs.</p> <p>Baseline information will be revised on the first year of implementation, after the consultancy to verify the design process of the programs in collaboration with the employers has been conducted.</p>							
<b>Name:</b> IRI 6: Development and implementation of the administrative and academic management system of ISTs.		Yes/No	N	Y	Semi-Annual	DISC	PMU
<p><b>Description:</b> Development and implementation of the administrative and academic management system in all public ISTs.</p>							
<b>Name:</b> IRI 7: Development and implementation of the module to track graduates.		Yes/No	N	Y	Annual	DISC	PMU
<p><b>Description:</b> Development and implementation of the system to track graduates through a module in the administrative and academic management system in all public ISTs.</p>							
<b>Name:</b> IRI 8: Percentage of programs designed and implemented that have been continuously reviewed by		Percentage	0.00	100.00	Annual	DPA	PMU



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source / Methodology	Responsibility for Data Collection
the consultive councils.							
<p><b>Description:</b> Number of programs that, in addition to having been designed and implemented in collaboration with the employers, receive feedback from the consultive councils formed by employers and SENESCYT/public sector representatives every approximately two years.</p>							
<b>Name:</b> IRI 9: Percentage of graduates tracked out of total graduates.		Percentage	0.00	80.00	Semi-Annual reports	DPA	PMU
<p><b>Description:</b> Number of graduates from public ISTs, who graduated in the last three years (before the measurement) who have been tracked through the new developed module, divided by the total number of graduates who graduated in the last three years. One student will be considered “tracked” if the following information is available for the year after graduation and three years after graduation: time passed until obtain the job, type of job (if related to the program or not); salary level.</p>							
<b>Name:</b> IRI 10: Implementation of Gender Plan.		Text	Very limited gender specific information available.	Monitoring of access, persistence and graduation by gender and program institutionalized through the administrative and	Annual	DISC	PMU



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source / Methodology	Responsibility for Data Collection
				academic management system.			
<p><b>Description:</b> Implementation of the Gender Plan, published on September 2, 2016, and annexed to the Operational Manual. The plan considers the following activities: (a) diagnosis to better understand enrollment and persistence or completion by gender in ISTs, and in particular will identify programs where there are significant gender differences in participation; (b) identification of barriers, either for students or for IST staff; (c) design of gender-specific actions to guarantee equality of opportunities for both women and men; (d) promotion of equal access to the technical and technological tertiary education through the communication strategy; and (e) design of mechanisms to prevent gender-based violence or any type of discrimination at the IST level.</p> <p>The data collection will be conducted in two steps, first, with an ad-hoc exercise that gathers historical data and information of the current status and, once the administrative and academic management system is implemented, monitoring will be done through this tool.</p>							
<b>Name:</b> IRI 11: Monitoring of scholarship coverage and access, persistence and graduation rates of students from the B40.		Text	Very limited information available.	Monitoring of scholarship coverage and access, persistence and graduation rates for students from the B40 by program institutionalized through the administrat	Annual	DISC	PMU



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source / Methodology	Responsibility for Data Collection
				ive and academic management system.			
<p><b>Description:</b> Series of studies as part of component 3.4 that monitor scholarship coverage and access, persistence and graduation rates of students from the B40.</p> <p>The data collection will be conducted in two steps, first, with an ad-hoc exercise that gathers historical data and information of the current status and, once the administrative and academic management system is implemented, monitoring will be done through this tool.</p>							
<b>Name:</b> IRI 12: Survey on beneficiary communities' satisfaction in the targeted provinces regarding: (a) the process of social management and (b) the results of the implemented new ISTs (Text).		Text	Not available	Two surveys	Two surveys: In 2018 and 2020.	DISC	PMU
<p><b>Description:</b> Two surveys will be conducted (during 2018 and 2020) on beneficiary communities (students, teachers and management staff) to ask their level of satisfaction about: (a) the process of social management and consultation; and (b) quality of the education in the new or rehabilitated ISTs.</p>							





**Target Values**

**Project Development Objective Indicators**

Indicator Name	Baseline	YR1	YR2	YR3	YR4	End Target
PDO Indicator 1: Enrollment in public technical and technological programs designed and implemented in collaboration with employers.	9061.00	14375.00	22933.00	28218.00	31972.00	32242.00
PDO Indicator 2: Persistence rate in technical and technological programs designed and implemented in collaboration with employers.	0.00	71.10	71.80	72.60	73.30	74.10
PDO Indicator 3: Availability of reliable data produced by the new integrated administrative and academic management system, is used for decision making by main stakeholders.	N	N	Y	Y	Y	Y

**Intermediate Results Indicators**

Indicator Name	Baseline	YR1	YR2	YR3	YR4	End Target
IRI 1: Percentage of students attending transformed public ISTs in the Targeted Provinces.	0.00	18.00	45.20	71.00	78.00	78.30
IRI 2: Number of ISTs built or rehabilitated in the targeted provinces.	0.00	5.00	9.00	9.00	9.00	9.00
IRI 3: Number of ISTs fully equipped in the	0.00	7.00	11.00	11.00	11.00	11.00



Indicator Name	Baseline	YR1	YR2	YR3	YR4	End Target
targeted provinces.						
IRI 4: Number of teachers and management staff trained.	0.00	0.00	850.00	1700.00	2550.00	3400.00
IRI 5: Percentage of programs designed and implemented in collaboration with employers.	30.00	56.00	87.00	100.00	100.00	100.00
IRI 6: Development and implementation of the administrative and academic management system of ISTs.	N	N	Y	Y	Y	Y
IRI 7: Development and implementation of the module to track graduates.	N	N	Y	Y	Y	Y
IRI 8: Percentage of programs designed and implemented that have been continuously reviewed by the consultive councils.	0.00	0.00	27.00	27.00	100.00	100.00
IRI 9: Percentage of graduates tracked out of total graduates.	0.00	0.00	20.00	60.00	70.00	80.00
IRI 10: Implementation of Gender Plan.	Very limited gender specific information available.	Diagnostic of access, persistence and graduation rates disaggregated by gender and program.	a) Design, based on the diagnostic results, of gender specific actions to guarantee equality of opportunities in technical and technological education for	a) Implementation of the gender specific actions previously defined. b) Monitoring of access, persistence and graduation by	Monitoring of access, persistence and graduation by gender and program through the administrative and academic management	Monitoring of access, persistence and graduation by gender and program institutionalized through the administrative and academic



Indicator Name	Baseline	YR1	YR2	YR3	YR4	End Target
			women and men as needed. b) Monitoring of access, persistence and graduation by gender and program.	gender and program through the administrative and academic management system.	system.	management system.
IRI 11: Monitoring of scholarship coverage and access, persistence and graduation rates of students from the B40.	Very limited information available.	Diagnostic of scholarship coverage and access, persistence and graduation rates for students from the B40 by program.	Monitoring of scholarship coverage and access, persistence and graduation rates for students from the B40 by program.	Monitoring of scholarship coverage and access, persistence and graduation rates for students from the B40 by program through the administrative and academic management system.	Monitoring of scholarship coverage and access, persistence and graduation rates for students from the B40 by program through the administrative and academic management system.	Monitoring of scholarship coverage and access, persistence and graduation rates for students from the B40 by program institutionalized through the administrative and academic management system.
IRI 12: Survey on beneficiary communities' satisfaction in the targeted provinces regarding: (a) the process of social management and (b) the results of the implemented new ISTs (Text).	Not available	Not available	Survey conducted and reports published.	Not available	Survey conducted and reports published.	Two surveys



## ANNEX 1: DETAILED PROJECT DESCRIPTION

COUNTRY : Ecuador

### Transformation of the Tertiary Technical and Technological Institutes Project

#### A. Project Policy Background

1. The GoE has made significant efforts to improve its tertiary education system. The past eight years have seen multiple reforms in Ecuador's legal and institutional framework for the tertiary education system, including the constitutional reform in 2008, the LOES in 2010, and the creation of CEAACES the same year. The reform of the legal framework encompassed all aspects of the system, including: (a) the right to free tertiary education, (b) the reorganization of the system, (c) the diversification of the education offerings (universities and technical institutions), (d) the reform of institutional governing structures, (e) the regulation of the approval process for institutions and programs, and (f) the improvement of quality assurance procedures. The objective of the strategy for higher education, established in the LOES, is to 'guarantee a right to quality higher education that fosters excellence, universal access, completion, and mobility.' The strategy for higher education is also framed within the 10-year education plans (2006–2015, and the 2016–2025 plans<sup>1</sup>) as well as the NDP (2013–2017). Political commitment to strengthen tertiary education is further demonstrated by the steep increase in expenditures, which increased from 1.3 percent of GDP in 2007 to 2.1 percent in 2014. This increase has been led by investment in scholarships, new infrastructure and equipment facilities, and regularization of full-time professors.

2. To expand relevant and high-quality non-university technical and technological education, SENESCYT has developed the PRETyT. Its main goals are: (a) to increase enrollment in public ISTs, from 21,015 in 2015 to 38,000 by 2019, (b) to increase enrollment in ISTs as a proportion of the total tertiary education enrollment from 10.9 percent in 2015 to 13.6 percent in 2019; and (c) to design relevant core programs aligned with labor market needs, which are designed with participation of the private sector. The main pillars of this strategy are: (a) the creation of a new academic offer, well-articulated with private and public sector demands, including piloting a 'dual system' in some ISTs; (b) the upgrading of facilities through new infrastructure and equipment; (c) the strengthening of teacher training; and (d) the enhancement of SENESCYT institutional and management capacity. Moreover, CEAACES has carried out a comprehensive evaluation of all ISTs, which distinguishes three categories of ISTs: (a) those accredited (achieving more than 0.6 rating); (b) those that have not reached the minimum standard (between 0.2 and 0.6 rating) but could be merged or would implement an 'Institutional Development Plan' to improve their quality and potentially get accreditation; and (c) those ISTs that would be closed (less than 0.2 rating). The results of this evaluation, disclosed in July 2016, accredited 47 ISTs, allowed for the implementation of an Institutional Development Plan in 147 ISTs, and closed 28 ISTs. In this context, SENESCYT has decided to fully transform 40 'hub' ISTs, which at first may constitute most of the public supply of public technical tertiary education, merging or closing the remaining ISTs.<sup>2</sup> These 40 'hub' ISTs, selected for their scale and local impact would benefit from new infrastructure, first-class

<sup>1</sup> The 2016-2025 education plan hasn't been published yet. For more information, see <https://educacion.gob.ec/pde>.

<sup>2</sup> Indeed, 127 ISTs have been closed between 2010 and 2014.



equipment, and new programs, which would be determined by their potential employability. In addition to the project's interventions, the BEI would support the construction of eight new ISTs in eight provinces, following the same standards and criteria. It is expected that by 2012, more than 20 'hubs' would be fully functioning. Finally, it is important to note that some ISTs would provide a 'dual' academic structure, in which students would dedicate part of their time to on-the-job learning in relevant receiving firms (*entidades receptoras*), arranged through strategic partnerships.<sup>3</sup>

## B. Description of the Project Components

**Component 1. Optimizing and Upgrading the Supply in Targeted Provinces** (Total: US\$86.3 million, Bank: US\$76.4 million)

3. The objective of this component is to improve the actual and perceived quality of education services, accessed by students, which would lead to increases in enrollment and graduation. It would also enable more efficient allocation of the existing resources, both physical (for example, infrastructure facilities and science and technical labs) and in human resources, through the reorganization of IST supply by consolidation of institutes into a new 'hub' IST and upgrading the infrastructure and facilities. The component would finance the following activities in the targeted provinces: (a) the construction of new ISTs; (b) the rehabilitation, expansion, and/or completion of existing ISTs; (c) the supervision of civil works; (d) the acquisition of laboratories and ICT equipment and furniture; (e) the carrying out of technical and feasibility studies for the works; and (f) preparation and consolidation of individual IST Transformation Plans. In particular, 11 ISTs would be supported: (a) construction of 3 new ISTs, and (b) rehabilitation/expansion/completion of 6 ISTs, (completion of 1 and rehabilitation or expansion of 5 ISTs) and (c) provision of equipment for 2 ISTs. These 11 ISTs would serve up to 78 percent of the total enrollment in public ISTs in the targeted provinces and about 47 percent of total public IST enrollment, by the end of the Project.

4. Each of the ISTs intervened through this component would be a 'hub' for the province where they are located, that is, the ISTs with capacity to cover most of the public enrollment at the provincial level. The location and dimensioning of the 'hub' would be determined by a geographical optimization analysis at the provincial level, which includes IST mergers and closures. Only ISTs that are further than 60 minutes away from the 'hub' location would remain in place in the province, in addition to the 'hubs'. The plan to consolidate ISTs at the provincial level, the dimension of the infrastructure and equipment packages, and the academic supply to each of the 11 ISTs where the project would be implemented would be based on the 'Transformation Plans' (also known as 'microplannings'). Each plan consists of a comprehensive document, including (a) a description of the current state of the public technical and

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<sup>3</sup> The Bank NLTA "Ecuador-Technical Education: What the Labor Market Needs?" (2015) mentioned on dual education: "Regarding the exchange of experience of the Dual Technical Training, as the model chosen by the GoE, this NLTA made a rapid revision of the evidence available as the factors that facilitate their replication: (a) agreements for a professional training system focused in the practice, (b) positive perception from students (expressed as the demand and ending of programs) and from employers (expressed as their demand, remuneration of graduates, and their willingness to training agreements); (c) flexibility on the implementation of replica to respond to the sectoral economic dynamic ; and (d) decentralization in the design of the academic offer and implementation of the managerial model. Among the factors associated with the failure for the replication are (a) insufficient articulation with national priorities or insufficient adaptation to regional particularities; (b) an incompatible legal and regulatory framework with a dual focus; (c) high prevalence of informal economy; (d) lack of institutional capacities for implementation; and (e) lack of dissemination of results between the parts involved."



technological education in the province; (b) the expected demand for technical and technological education up to 2022; (c) a plan for the provincial consolidation of the supply, including the expected mergers/closures of ISTs; (d) sizing of infrastructure of the new ISTs; (e) labor demand projections; (f) quota allocations by program; and (g) a social or indigenous management plan (for more details, see annex 5). The decisions from point (f) on the supply of each program (known as 'cupos' or quotas) according to the employers' needs would be ratified through a survey on labor demand at the provincial level. In the medium term, once the graduates' monitoring system is in place and the INEC's ad hoc survey is implemented (Subcomponent 3.2), more precise information would be available to estimate the 'quota' by program at the local level. The content and methodology of the 'Transformation Plans' are detailed in annex 6 and in the POM.

5. **Construction of new infrastructure** (Total: US\$23.6 million, IBRD: US\$20.9 million). The component would support the construction of three new public ISTs as well as the completion of civil works in one new IST partially built, whose construction has been paused due to lack of funding. These new ISTs would be of four different sizes or typologies and, consequently, four different costs as stated in table 1.1. The actual size and types of workshops (with specialized equipment) of each IST would be determined by the individual 'Transformation Plan', as referred in the preceding paragraph. Each typology includes specialized technical laboratories and ample spaces for authorities and administrative personnel, teachers, students, a library, an auditorium, and sports/physical activities.

Table 1.1. Construction Cost per IST Type

Typology	Number of Classrooms	Optimal Capacity per Shift	Maximum Capacity in Three Shifts	Estimated Average Cost of Infrastructure (US\$)
Type B	32	960	2,880	8,200,000.00
Type A	16	480	1,440	6,000,000.00
Module	8	240	720	2,800,000.00
Basic	5	150	450	1,700,000.00

6. **Rehabilitation of existing infrastructure** (Total: US\$18.6 million, IBRD: US\$16.5 million). This component would also support the rehabilitation and/or expansion of the existing infrastructure, belonging to National Service of Vocational Training (*Servicio Ecuatoriano de Capacitación Profesional, SECAP*), which is currently a MINEDUC property (for technical education). SECAP's property would be transferred to SENESCYT through the recently signed agreement between SENESCYT and MINEDUC. As for the construction of new infrastructure, the actual size and type of workshop (with specialized equipment) of each rehabilitated IST would be determined by the individual 'Transformation Plan', as referred previously. The rehabilitated ISTs follow the facilities standards of the new ISTs.

7. **Equipment and furniture** (Total: US\$40.4 million, IBRD: US\$35.7 million). This component would also finance the furniture and basic and specialized lab and ICT equipment needed for each IST to fulfill the quality standards. It also considers the management costs of importing, storing, and moving the furniture and equipment.

8. **Technical studies** (Total: US\$1.2 million, IBRD: US\$1.1 million). The component would finance the elaboration of all technical studies required before the beginning of civil works and technical



specifications for equipment and furniture. For civil works, it would include geotechnical, topographic, and structural engineering calculation studies as well as optimization of constructive plans. For labs and ICT equipment, it would comprise the detailed technical specifications. These studies would be carried out by consultant firms or individuals.

9. **Supervision of civil works** (Total: US\$2.5 million, IBRD: US\$2.2 million). This component would finance the consultancy (individual or firms) that would carry out 'contract management', including the supervision of civil works (*'fiscalización'*). This supervision would ensure the timely completion of works and sustainability and maintenance plans, including budgets and operations manuals.

**Component 2. Improving Relevance, Quality of Teaching, and IST Management Capacity** (estimated cost US\$5.6 million; Bank: US\$5 million).

10. The specific objective of this component is to improve the technical and operational capacity of SENESCYT to design new and relevant academic programs according to the labor market demand (public and private); to develop and carry out new training programs for teachers, tutors, and rectors; and to introduce a new administrative and academic management system at the IST level.

**Subcomponent 2.1. Design of Relevant Programs** (Total: US\$1.9 million, IBRD: US\$1.7 million)

11. This subcomponent would finance TA to support the development of programs through a defined methodology comprising: (a) the design of new TTTE programs according to labor market demand and (b) the review of the process of collaboration with the employers in designing the programs. The design of the new programs would follow a defined methodology containing (a) a 'relevance' analysis including macro and micro labor market studies by technical specialty through surveys and available data; (b) the institutionalized involvement of employers through the Consultative Councils (*Consejos Consultivos*); (c) an evaluation and approval by the CES. It is estimated that around 35 new programs would be developed, approved, and introduced in ISTs during the lifetime of the Project. Finally, all programs would be continuously reviewed by employers every two years, approved and introduced in ISTs during the lifetime of the Project.

12. Additionally, this subcomponent would finance TA to review and document rigorously the process of collaboration with the employers in designing the programs, to assess which approved programs need to be revised by the employers to be considered as designed in collaboration with them. For those programs that do not meet this criterion, the Project would support the revision process of the curriculum in collaboration with the employers. It is estimated that about 210 out of the 299 programs currently approved by the CES were not designed in collaboration with the employers.

13. Furthermore, given that all programs expired every four years and need to be resubmitted for approval to the CES at the institute level, this subcomponent would finance TA and training to support the institutionalization of the accreditation process. The main goal is to develop a module, which would be included in the administrative and academic management system described under Subcomponent 2.3, that provides guidance to the management staff of each institute in the application process to the CES for a new or redesigned program, to ensure the homogeneity of contents in the same area of knowledge across provinces and standardize the methodology used in the relevance analysis. While the



module is being developed and implemented, the Project would also provide TA to the ongoing program development processes.

14. Finally, the Project would also finance the programs' continuous reviews by employers through the Consultative Councils every two years.

**Subcomponent 2.2. Training of Teachers and Management Staff of ISTs** (Total: US\$2.1 million, IBRD: US\$1.9 million)

15. This subcomponent would finance TA for (a) the design and carrying out of training programs, including training programs for management staff (rectors, vice rectors, academic coordinators), teachers, and tutors of dual programs of ISTs, and (b) the design of the selection process and teacher career pathway.

16. The duration of the training would be two full weeks for a total of 80 hours. The first week would focus on the importance of dual or traditional training, its operative principles, and the processes required to implement it successfully. During the second week of training, academic coordinators and teachers would receive instruction and guidance on teaching practices in the classroom while management staff would continue to receive training on operations management and human resources practices

17. The training would be organized in two phases: the first phase would be provided by a specialized consultant firm that would train a first group of trainees and at least one academic coordinator per institute; in the second phase, the academic coordinators would be responsible for training teachers at their respective institute. Diagnostic evaluations of all participants would be carried out before as well as after training to ensure its quality over time. Additionally, mechanisms to ensure the quality of the training provided by the academic coordinators, such as a required minimum performance at an evaluation before the start of the training, would be designed and implemented. For the medium term, the aim is that each IST can have its own 'professional training center'.

18. Finally, to promote the retention of teachers in the TTTE system, SENESCYT is planning to replace its current term contract, which is not renewable after four years in service, by an open-ended one through merit-based competition. This reform would be accompanied by the development of a teacher career path. The Project would help with the design of the selection process and teacher career through TA. The design of the teacher career should consider career incentives for the academic coordinators to provide the training to the teachers in their IST.

**Subcomponent 2.3. Administrative and Academic Management System** (Total: US\$1.6 million, IBRD: US\$1.4 million)

19. This subcomponent would finance TA for the development of the administrative and academic management system of ISTs. The new tool would be an integrated information technology system that would facilitate and optimize the management of ISTs, specifically, through (a) registering, controlling, and evaluation of academic processes, including modules for programs, the library, and diplomas; (b) FM, budgeting, accounting, and auditing processes; and (c) a specific module for the continuous gathering of information of IST graduates' employment. The system would be a common platform





shared for national and IST levels. At the national level, the main users would be authorities and technical units of SENESCYT and, at the IST level, management staff, teachers, students, graduates, and tutors.

20. The administrative and academic management system would have a modular structure, with six different modules: (a) academic management, (b) administrative and FM, (c) library management, (d) e-learning, (e) management of the school year, and (f) tracking of graduates. The module on academic management would gather information at the student, program, and teacher levels.

21. There would be a registry with information on the students' personal information, socioeconomic status, academic records, and assistance and subjects taken. At the program level, this online tool would gather information on enrollment, curricula, diplomas, and research projects. It would also allow submission of an application for a new curriculum to be approved by the CES. At the teacher level, information on teacher performance, attended trainings and evaluations, class records, hours taught, and tutors of dual programs would be collected. Finally, this module would also produce education statistics that it would then translate into a tailored report to inform teachers, school management staff, and policy makers.

22. The module on administrative and FM would keep records on the funds received by each IST, the ISTs' assets, FM, budgeting, accounting, and auditing processes, while the library management module would allow the students to make online consultations, manage lending of physical books, and generate statistics on the use of the knowledge resources in the different ISTs.

23. The e-learning module for students would foster the interaction between students, teachers, and tutors, allowing teachers to post homework, additional materials, and grades. Additionally, students and teachers would be able to communicate through online surveys, blogs, and chats. There would also be an e-learning module for teachers to participate in online trainings and be evaluated before and after each training.

24. Finally, the module on TTTE graduates would collect information on employment outcomes such as the time devoted to find a job after graduation, type of job found, whether it is related to the program studied or not, wages, and so on for those individuals who graduated from the ISTs.

**Component 3. Strengthening Mechanisms for Institutional Coordination, Boosting Demand, and Management, Monitoring, and Evaluation of the Project** (Total: US\$10.5 million; Bank: US\$9.1 million)

25. The specific objectives of this component are to support the expansion and the improvement of the governance of public technical and technological tertiary education, including (a) institutional mechanisms for effective public-private coordination in the development and continuous revision of programs; (b) institutional mechanisms to monitor and inform public and private sector decision makers on employment opportunities and the employability of graduates of the tertiary technical and technological training system; (c) activities to boost the demand of technical and technological tertiary education; and (d) the management and monitoring of the Project and the carrying out of impact evaluations.



**Subcomponent 3.1. Institutional Partnerships with Employers and the Private ISTs** (Total: US\$0.8 million, IBRD: US\$0.7 million)

26. This component would finance TA, training, and workshops for (a) strengthening of institutional arrangements for public-private association, namely, between SENESCYT and employers' associations, and (b) strengthening engagement between public and private ISTs. The execution of permanent institutional arrangements for collaboration between employers, SENESCYT, and ISTs would be carried out through the *Consejos Consultivos*, including their involvement in collaboration for redesigning of programs, estimation of the labor demand, implementation, follow-up, and evaluation of dual and traditional programs. The strengthening engagement between public and private providers of technical and technological education would be carried out through a series of meetings and workshops to discuss the supply of technical and technological education, the academic curriculum, teacher and student profiles, institutional management, and engagement with the employers. These meetings would result in a number of studies describing the public-private collaboration proposals, which would be presented at a congress to stakeholders.

**Subcomponent 3.2. Estimation of Labor Market Demand** (Total: US\$3.4 million, IBRD: US\$2.9 million)

27. This subcomponent would finance TA, training, and surveys for (a) the design of a methodology for estimating the demand by SENESCYT through surveys carried out in collaboration with employers and (b) the evaluation of existing administrative data to estimate future employers' demand and, if necessary, include a module for TTTE in the INEC's surveys of employment to complement the existing data. The approach is twofold: (a) a methodology for estimating the demand by SENESCYT through surveys carried out in collaboration with employers and (b) an agreement with the INEC to use existing administrative data to estimate future demand through a series of studies carried out by their labor observatory and to complement the existing data as needed by including a module for technical higher education in their surveys of employment, carried out semiannually, including all productive and services sectors at the national level and all sizes of firms (big, medium, and small).

28. For adequate design and implementation of policies and programs for technical training, it is mandatory to know the existing labor supply and demand conditions in Ecuador. Currently, there is a complete labor supply survey. The data comprise vital information on schooling, wages, employment sector and conditions, and demographics. On the other hand, there is a lack of information on the labor demand side. This subcomponent seeks to strengthen the labor market analysis by financing TA, training, and labor demand surveys.

**Subcomponent 3.3. Boosting the Demand for ISTs** (Total: US\$3.4 million, IBRD: US\$3.0 million)

29. This subcomponent would finance training and TA for (a) boosting the demand for TTTE through the design and carrying out of media campaigns among students of secondary education on the advantages of TTTE, in collaboration with MINEDUC and (b) the design and carrying out of a program for raising awareness among students from the most vulnerable part of the population on scholarships to



finance TTTE studies. It would also include an agreement with MINEDUC to raise awareness of the benefits of technical higher education among upper secondary students. More specifically, this subcomponent would finance TA and training to (a) define the general communication strategy, which includes initial surveys of stakeholders to investigate the reasons for low engagement in technical and technological education, aiming to inform the rationale of each communication product and target audience (students, parents, and employers); (b) implement this strategy through an integrated multichannel communication strategy; and (c) implement perception surveys to adjust the target for each communication product during the project.

30. On the other hand, to ensure access of the B40 to TTTE, the project would also finance door-to-door campaigns to raise awareness about the existence of government scholarships to finance their studies and help eligible students apply for them.

**Subcomponent 3.4. Management, Monitoring, and Specific Impact Evaluations** (Total: US\$2.9 million, IBRD: US\$2.5 million)

31. This subcomponent would finance (a) the technical and administrative management of the project, including the hiring of FM, procurement, M&E, and social management specialists and other technical temporary staff needed during Project implementation; (b) the carrying out of Project external audits; (c) the carrying out of TTTE research studies on the composition of the existing offer of TTTE by type of program; the academic curriculum; teachers' recruitment, incentives, and skills; students' education profile, socioeconomic background, and financial assistance and scholarships, with a particular emphasis on gender disparities and students from the most vulnerable part of the population; institutional management practices; and engagement with the employers; and (d) the carrying out of the following research studies on the impact of institutional improvement of educational outcomes:

- (a) First, the project would measure the overall impact of improvements in infrastructure (Component 1) on direct effects such as enrollment rates, persistence rates, and dropout rates in technical and technological education as well as indirect effects such as dropout rates in universities (expecting that there is better matching of supply and demand in the higher education system overall) and better labor market outcomes. These outcomes of interest would be sourced from administrative data. For the design of this study, the Project proposes to create a synthetic control group of provinces to be compared with target provinces based on historical data and apply a 'differences in differences approach' for the analysis.
- (b) For the second study (to be confirmed by December 2016), the Project proposes a two-stage randomized control trial at the institute and the program level to measure the direct impact and potential spillover effects of (1) offering public servant provisional contracts and (2) offering public servant provisional contracts combined with director and teacher training (Component 2) on a range of teachers and student outcomes. More specifically, the focus would be on measuring teacher effort and student engagement through creating an innovative methodology to collect information during classroom observations. Other outcomes such as teacher/student absenteeism and tardiness would be sourced from administrative data.



- (c) Third, in partnership with SENESCYT and local researchers, the Project would provide TA to carry out a series of studies to document practices of both public and private providers of TTTE. These studies would feed directly into the activities planned in Subcomponent 3.1, aiming to engage private institutes in dialogue with public institutes through sharing best practices. These studies would focus on six major themes: (1) supply of programs in technical and technological education; (2) the academic curriculum; (3) teachers' recruitment, incentives, and skills; (4) students' education profile, socioeconomic background, and financial assistance and scholarships, with a particular emphasis on gender disparities and monitoring access and scholarship coverage of students from the B40; (5) institutional management practices; and (6) engagement with the employers.



## ANNEX 2: IMPLEMENTATION ARRANGEMENTS

COUNTRY : Ecuador

Transformation of the Tertiary Technical and Technological Institutes Project

### Project Institutional and Implementation Arrangements

1. Institutional arrangements have been designed to promote mechanisms that facilitate implementation, effective accountability, sufficient technical supervision, and adequate M&E. At the same time, institutional arrangements aim at leveraging existing complex structures within the Government and making project implementation more dynamic. While implementation arrangements require a certain degree of complexity, the Project would include a general coordinating unit and a POM detailing project implementation arrangements.
2. SENESCYT would be the implementing agency of the Project. The SFTT would be responsible for the general governance of the Project, accountability, and approval of the Annual Operational Plans and Procurement Plan. As part of the SFTT, the general coordination role would be played by the PMU, led by a technical manager (already in place), who would be the general coordinator, in charge of coordinating the operational relationship with each of the agents involved in the Project, including the specialized units of the SFTT. His/her responsibility would be (except for part of Component 1 and Subcomponent 3.2; see below paragraphs 3 and 4 respectively) the fiduciary management and M&E, including the planning and supervision of all the technical inputs for the preparation of the Annual Operational Plan, Procurement Plan, terms of references (ToRs), technical specifications, and bidding documents needed for implementation of these plans. The technical manager would also be the main interlocutor with the Bank. The technical manager would be supported by a team, composed of a group of six specialists: (a) FM; (b) procurement; (c) M&E/microplanning; (d) social; (e) environment; and (f) infrastructure. Moreover, the DISC would be strengthened with one technical resource specialized in labor market analysis to support the creation of new careers and the dialogue with the private sector and the INEC. Not later than 60 days after the effectiveness date, the M&E, social, environmental, and infrastructure specialists have to be assigned to work full time.
3. For management of Component 1, there would be two different management provisions:
  - (a) a specific arrangement would be made to delegate fiduciary and execution management of civil works of new ISTs to a public executing agency SECOB, which would be in charge of procurement and contract management of technical studies, EMPs, works, and supervision of those new ISTs. A subsidiary agreement would be signed between SENESCYT and SECOB to establish duties and responsibilities for both parties, including procurement, FM, accounting, payments, and civil works supervision. Key personnel for Project management at SECOB would be in place before the Project's effectiveness, specifically: a coordinator, a procurement specialist and a FM specialist. SECOB would receive ad hoc general coordination, procurement, and FM support from specialists as needed to ensure the timely implementation of Project activities.
  - (b) SENESCYT, through the PMU, would be responsible for the elaboration of consolidated individual IST 'Transformation Plans' (also known as 'microplanning') for all ISTs (the PMU



would carry out this task jointly with the Directorate for Academic Planning [*Dirección de Planificación Académica de la Subsecretaría de Formación Técnica y Tecnológica*], DPA); the procurement, contract management, and oversight of supervision for technical studies, EMPs, works, and supervision of rehabilitation of existing ISTs; and purchase of furniture and lab and ICT equipment for all ISTs and social management of all ISTs. Moreover, to ensure SENESCYT involvement and ultimate responsibility in the whole process (design, construction, and supervision), a technical team would participate with a decision vote in the Works Technical Committee (*Comité Técnico de Obras*).

4. For management of Subcomponent 3.2, a specific arrangement would be made to delegate fiduciary and execution management of activities to the INEC, which would be in charge of procurement and contract management of consultancy services and survey costs (including contracting enumerators and operational costs). A subsidiary agreement would be signed between the INEC and SECOB to establish duties and responsibilities for both parties, including procurement, FM, accounting, and payments. Key personnel for Project management at the INEC would be in place before Project effectiveness, specifically, a coordinator, a procurement specialist, and a FM specialist.

5. Not later than 30 days after the effectiveness date, the project coordinator and procurement and FM specialists in SECOB and the INEC, respectively, have to be assigned to work full time.

6. Table 2.1 shows the responsible unit for each subcomponent.

Table 2.1 Responsible technical unit for each subcomponent

Component	Responsible Technical Unit
1	(a) SECOB would be in charge of implementation and oversight of supervision for the construction of new ISTs, including procurement and contract management of technical studies, EMPs, works, and supervision of construction ( <i>'fiscalización'</i> ).  (b) SENESCYT, through the PMU, would be responsible for the elaboration of consolidated individual IST 'Transformation Plans' (also known as 'microplanning') for all ISTs (the PMU would carry out this task jointly with the DPA); the procurement, contract management, and oversight of supervision for technical studies, EMPs, and oversight of implementation of rehabilitation for existing ISTs; and purchase of furniture and lab and ICT equipment for all ISTs and social management of all ISTs. Moreover, to ensure SENESCYT involvement and ultimate responsibility in the whole process (design, construction, and supervision), a technical team would participate with a decision vote in the Works Technical Committee ( <i>Comité Técnico de Obras</i> ).
2.1.	Directorate for Academic Planning (DPA)
2.2.	Counsel for Dual Training (AFD, <i>Asesoría de Formación Dual</i> )
2.3.	Directorate for Implementation, Monitoring and Control (DISC, <i>Dirección de Implementación, Seguimiento y Control</i> )
3.1.	AFD
3.2.	Directorate for Implementation, Monitoring and Control (DISC would be technically responsible on behalf of SENESCYT for overseeing the agreement with the INEC to carry out labor demand surveys)
3.3	DISC
3.4	PMU of PRETyT



### Financial Management and Disbursements Arrangements

7. An FM assessment was carried out to evaluate the adequacy of the proposed FM arrangements for SENESCYT and its co-implementing entities, SECOB and INEC, to implement the Project.

8. In accordance with the proposed institutional arrangements, the Project would be implemented by SENESCYT through the existing PRETYT (includes the Project coordination team) and with the support of co-implementing entities, SECOB and INEC. The staff of the Financial Administration Unit (*Unidad de Administración Financiera*, UDAF) of these three entities would be responsible for implementing FM activities under the Project. The FM assessment has considered SENESCYT's and INEC's lack of experience in implementing multilateral financed projects and SECOB's experience in implementing multilateral financed projects, which is undermined by the recurrent staff turnover that challenges their existing capacity to effectively respond to the Project implementation demands.

9. The Project design requires the participation of several internal and external actors (that is, the INEC, CEAACES, CES, SECAP, internal directorates of implementing entities, and private sector) calling for strong and close coordination. In addition to this, the Government would require SENESCYT and SECOB to begin implementing project activities before the signing of the Loan Agreement. The Government would pre-finance these activities using its own fiscal resources and then request a reimbursement once the Project becomes effective. Therefore, SENESCYT and SECOB must have acceptable arrangements in place before the loan signature to accurately account for pre-financed activities.

10. The inherent risks and challenges faced by the Project include (a) delays in implementation due to lengthy budgeting approvals at the MoF and National Secretariat for Planning and Development (*Secretaría Nacional de Planificación y Desarrollo*)<sup>4</sup>; (b) unavailability of funds, either counterpart or external financing, due to the country's economic liquidity issues; and (c) lack of capacity to manage the complex design of the project, which requires coordination among several entities. The control risks include (a) delays in processing budgeting, financial reporting, and payments procedures under the project due to lack of administrative and financial autonomy of project teams; (b) recurrent staff turnover that would disrupt the timely execution of project activities including FM responsibilities related to accounting and financial reporting; and (c) lack of clarity regarding the roles and responsibilities of each implementing entity due to the multiple procedures and processes that must be followed at the technical and administrative levels.

11. Given the risks and challenges listed, we recommend the following mitigation measures: (a) regularly review the procedures imposed by the MEF and National Secretariat for Planning and Development (*Secretaría Nacional de Planificación y Desarrollo*) on the Project to ensure the Project is in full compliance to avoid implementation delay; (b) implement FM arrangements that closely monitor the liquidity needs of the project, thus anticipating and, if possible, avoiding a shortage of funds; (c) strengthen the institutional and human resource capacity of the implementing entities so they can respond to the technical and administrative requirements of a complex project; (d) build into the ToRs and contracts of staff hired for the Project, a requirement indicating clear performance objectives and

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<sup>4</sup> (That is, prior approval—available before entities submit budget certification; and serious delays in payments processing due to liquidity constraints).





metrics that would avoid the turnover of staff for reasons other than performance issues; and (e) include in the inter-institutional agreements and operations manuals clear roles and responsibilities as well as financial and administrative autonomy structures to ensure that the implementing entities and other external actors have a clear framework to follow for coordination and collaboration of project implementation.

12. Considering these risks and challenges, the FM risk is rated High.

13. The following activities are required to have in place adequate FM arrangements:

(a) **Effectiveness**

(i) The POM is officially adopted by SENESCYT.

(ii) Signed subsidiary agreements between SENESCYT and SECOB and between SENESCYT and INEC are submitted.

(b) **Dated covenant in the Loan Agreement**

(i) Not later than thirty (30) days after Effective Day, the FM within SENESCYT, SECOB and INEC have been assigned to work full time in said entities.

(ii) Not later than sixty (60) days after the Effective Date, ensure that a complementary financial management system has been established in SENESCYT and is operational, all in a manner acceptable to the Bank.

(iii) Not later than 120 days before the end of: (i) the first calendar year of Project implementation or (ii) the period subject to audits referred to in said Section, (whichever occurs first), SENESCYT shall submit to the Bank for its no-objection the terms of reference for the hiring of an independent auditor for the duration of the Project.

14. On the basis of the review performed, actions taken by SENESCYT, SECOB, and INEC, and the satisfactory implementation of recommended mitigating measures, the FM team concludes that the proposed FM arrangements are acceptable to the Bank.

**Summary of FM Arrangements**

15. **Organization and staffing.** For Project implementation purposes, the UDAF's staff of SENESCYT would be responsible for managing operational FM aspects under the Project with the PMU and coordinating FM tasks with the UDAF's staff of SECOB and INEC.

16. The FM specialists would be hired under each implementing entity, under ToRs agreed with the Bank, and financed out of loan proceeds. Considering that SENESCYT and SECOB would be responsible for carrying out important contracting processes and payments before the loan signature, it is expected that the FM specialists at SENESCYT and SECOB would be hired before the loan signature, while the INEC's FM specialist would be on-board not later than one month after effectiveness.



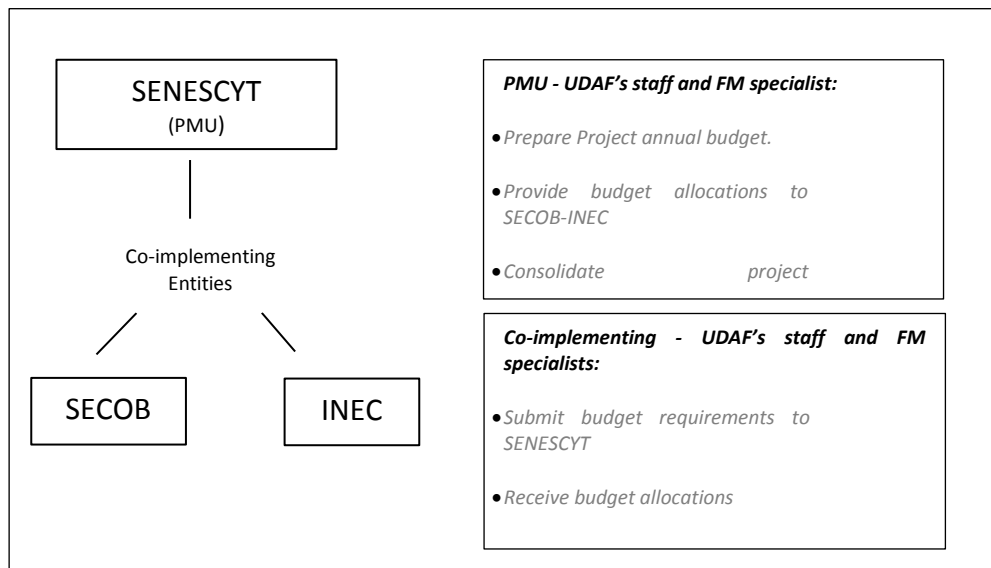


17. All the UDAFs have qualified and experienced staff, though experience in implementing multilateral financed projects varies among implementing entities. The UDAF's staff of SENESCYT have experience implementing locally financed projects. The UDAF's staff of SECOB are familiar with processes and procedures implemented under projects financed by Development Bank of Latin America (*Corporación Andina de Fomento-Banco de Desarrollo para America Latina, CAF*) and Inter-American Development Bank projects and would adopt some processes and financial reporting mechanisms for the project purposes. However, the recurrent staff turnover could undermine their existing capacity to effectively respond to the Project implementation demands. The UDAF's staff of the INEC have very limited experience, having implemented just a project with International Labor Organization and would start implementation of a Trust Fund administered by the Inter-American Development Bank; so there is not much experience implementing projects.

18. SENESCYT's FM specialist would be responsible for: (a) preparation of the annual Project budget; (b) carrying out a preliminary review of supporting documentation (ex ante control) before the UDAF's staff process payments; (c) review of SECOB's and INEC's forecasts and financial information related to the execution of their respective activities; (d) preparation of compiled Project financial information including Project financial statements and withdrawal applications on the basis of the Financial Administration System (*Sistema de Administración Financiera, e-Sigef*) and complementary information system; (e) providing advice to SENESCYT and co-executing entities on FM-related aspects; and (f) maintenance of adequate files of the Project.

19. SECOB's and INEC's FM specialists would assume the following responsibilities: (a) preparation of the annual budget for activities allocated under Component 1; (b) carrying out a preliminary review of supporting documentation (ex ante control) before processing payments; (c) coordination with SENESCYT on the forecasts, budget allocation required, and financial information on the execution; (d) preparation of recurrent financial information; and (e) maintenance of adequate files of the Project.

Figure 2.1. Responsibilities of SENESCYT and Co-Execution agencies (SECOB and INEC)





20. **Programming and budgeting.** SENESCYT, SECOB, and INEC would follow local procedures regulated by the Organic Code for Planning and Public Finance (*Código Orgánico de Planificación y Finanzas Públicas*), MoF and their own UDAF's staff<sup>5</sup> and planning directorates regarding regulations for the programming, formulation, and execution of annual budgets.

21. The PMU in coordination with the SECOB- and INEC-assigned team would prepare the Project's Annual Operational Plan (*Plan Operativo Anual - POA -*) and budget to incorporate into SENESCYT institutional budget, POA, and Procurement Plan. SENESCYT's annual budget would be approved by the line authority of SENESCYT and the MoF. Timely recording of approved budget in e-Sigef, including commitments, accruals, payments, and transfers of budget allocations,<sup>6</sup> is essential. SENESCYT would transfer budget allocations to SECOB and INEC that consist of a decrease or debit of SENESCYT's allocated budget segregated in one or several budgetary items.

22. SECOB and INEC as co-implementing entities would prepare an annual forecast of the activities assigned under the Project. Both entities' requirement of funds would be channeled to SENESCYT, which would provide transfer of budget allocations required for each period through e-Sigef. This arrangement would consist of an increase or credit of SECOB's and INEC's institutional budget (in one or several budgetary items). During the Project implementation, additional budget allocations might be required and would follow the same process and coordination with SENESCYT.

23. It is important that both entities ensure timely budget allocations during the Project implementation and carry out permanent follow up on project implementation and needs of funds to immediately coordinate with or request SENESCYT. All implementing entities have committed to produce monthly budgetary reports on the activities planned versus executed (*Cédulas Presupuestarias*). SENESCYT as a main implementing entity would request the MoF to provide access to SECOB and INEC execution in e-Sigef, under the option 'consult' to carry out close monitoring of activities implemented.

24. SENESCYT and SECOB envisage anticipated contracting before the loan signature for activities under Components 1 and 3 related to some works, consulting services (*fiscalización*), and staff contracting, all pre-financed with the local counterpart and following Bank procurement processes. SENESCYT would assure they have an updated Prioritization Report (*Dictamen de Prioridad*) for the whole project and specific budget allocation submitted by the MoF (*certificación presupuestaria plurianual*) for these activities to enable all implementing entities to use Bank procurement processes.

25. SENESCYT has prepared a matrix with a planned programmatic budget structure to be used by itself, SECOB, and INEC to record and monitor the project activities. This structure would be included in the POM.

26. **Internal control.** SENESCYT, SECOB, and INEC are subject to a local internal control framework regulated by the Comptroller General of the State (*Contraloría General del Estado-CGE*). Under such requirement and based on the experience of SECOB with other international financed projects, and

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<sup>5</sup> Financial and Administrative Units of the public entities of the Government.

<sup>6</sup> Transfer of budget allocation means a decrease or debit of one entity's amount allocated in the budget (of one or several budget items) and increase or credit of one entity's budget in one or several budget items.



SENESCYT and INEC managing similar activities with local counterpart funding, some internal processes and procedures already established would also be applied to the Project. These processes have been enhanced with the intention to have adequate monitoring of studies, civil works, and procurement of equipment.

27. For instance, (a) specific roles and responsibilities as well as processes and procedures have been agreed with each implementing entity and between each other; (b) e-Sigef would be able to provide project financial information complemented by the additional information system; (c) SENESCYT, SECOB, and INEC organizational structures—technical and administrative teams—would be expected to be strengthened with additional experienced professionals to support project implementation; (d) SECOB would hire an exclusive contract administrator to coordinate with the *Zonales* (field) contract administrator to supervise civil work progress, approve the external supervision report (*reporte del fiscalizador*), approve processing of payments, and ensure that adequate supporting documentations are in place; (e) SENESCYT as a main implementing entity would request the MoF to provide access to SECOB and INEC execution through e-Sigef, to carry out close monitoring of activities implemented under the project; (f) the INEC would ensure operating costs eligible under the Project as well as other activities required under the Project are adequately authorized, implemented, and documented; (g) SECOB and INEC commit to maintain separate files on the Project and send information to SENESCYT on a timely basis; and (h) SENESCYT would sign subsidiary agreements with SECOB and another one with the INEC to reflect specific roles and responsibilities under the Project. Detailed process and procedures are being reflected in the POM.

28. **Accounting and information system.** The regulatory FM framework in Ecuador for central government entities consists of (a) the Organic Code for Planning and Public Finance (*Código Orgánico de Planificación y Finanzas Públicas*); (b) Accounting Technical Norms (issued by the MoF), which comprise governmental accounting policies and accounting standards (the use of the accrual accounting basis and chart of accounts applicable to the public sector entities); and (c) the mandatory use of the governmental FM information system (FMIS), e-Sigef,<sup>7</sup> for entities under the general budget of the state<sup>8</sup> (central government level).

29. SENESCYT, SECOB, and INEC would use the FMIS, e-Sigef, and the budgeting structure and chart of accounts utilized by the Government, which allows identification of specific transactions by the type of expenditure, financing source, and component level.

30. Because e-Sigef has information constraints and does not allow implementing entities to record detailed information and produce information by subcomponents, main activities, payments, cash advances, and expenditures documented, the project would need the support of auxiliary information tools. Considering SENESCYT and SECOB would manage approximately 96 percent of the total loan amount, they have embedded the use of a complementary information software (currently used by other projects) to be financed under loan proceeds and expected to be fully installed not later than two months after effectiveness. Because the INEC would manage the remaining 4 percent and would mostly implement the operating costs, over which current existing processes are adequate and comply with FM

<sup>7</sup> *Sistema de Gestión Financiera del Estado.*

<sup>8</sup> *Presupuesto General del Estado.*



minimum requirements, Excel spread sheets would be used to record more detailed information on the activities under the project and by financing source.

31. **Financial reporting.** SENESCYT would be responsible for preparing consolidated project financial statements in coordination with SECOB and INEC to provide information on sources, uses of funds, and cash balances in accordance with project disbursement categories and components. SENESCYT has prepared a matrix associating project components/subcomponents/activities with the chart of accounts and budget to ensure adequate parametrization of the project information in the FMIS, e-Sigef.

32. The core content and frequency of the reports include the following:

(a) **Financial reporting - SENESCYT level.** SENESCYT would prepare consolidated project interim and annual financial statements as follows:

Project interim financial statements would be used for monitoring purposes and would reflect loan proceeds and local counterpart funds under the project, prepared in U.S. dollars and submitted to the World Bank on a semiannual basis, not later than 45 calendar days after the end of each calendar semester. Interim financial reports would comprise the following:

- (i) Statements of sources and uses of funds.
- (ii) Statement of cumulative investments
- (iii) Budgetary report
- (iv) Designated account (DA) reconciliation
- (v) Report of payments requested from the MoF and not paid
- (vi) Explanatory notes to the financial statements

Annual financial statements for the project would include (i), (ii), and (vi).

(b) **Financial reporting - SECOB level.** SECOB would prepare financial information on the activities executed—under Component 1—for the construction of assigned ISTs. The financial information would comprise some reports already used by SECOB: (i) statement of sources and uses of funds and cumulative Investments; (ii) budgetary report (*Cédula Presupuestaria*); (iii) summary report of the contract status (*Resumen Presupuestario y Ficha de Seguimiento por Contrato*); and (iv) report of payments requested to the MoF and not paid. Financial information would have the responsible signatures of SECOB officials (preparer, reviewer, and approver). SENESCYT has decided to request this information on a monthly basis.

(c) **Financial reporting - INEC level.** INEC would prepare financial information on the activities executed—under Component 3.2—for the establishment of labor market demands. The financial information would comprise some reports already used by INEC and the following



information as requested by SENESCYT: (i) statement of sources and uses of funds and cumulative investments; (ii) budgetary report (*Cédula Presupuestaria*); and (iii) report of payments requested from the MoF and not paid. Financial information would have the responsible signatures of INEC officials (preparer, reviewer, and approver). SENESCYT has decided to request for this information on a monthly basis.

- (d) **For disbursement purposes.** SENESCYT would be the entity responsible for preparing withdrawal applications to submit to the Bank.
  - (i) For retroactive financing, SENESCYT and SECOB would prepare statements of expenditures (SoE) to reflect pre-financed eligible expenditures paid during the time established in the Loan Agreement and SENESCYT would send consolidated information to the Bank.
  - (ii) Advances to the DA of the project would be requested by SENESCYT to the World Bank based on a consolidated three-month forecast report broken down by component and the disbursement category for disbursement of loan proceeds, including SECOB and INEC requirements.
  - (iii) Reporting of eligible expenditures would be requested by SENESCYT to the Bank based on individual SOEs prepared by SECOB and INEC.

**Table 2.2 Summary of Financial Reports**

Statements/Reports	Purpose	Frequency	Deadline
Project interim financial statements	FM monitoring	Semester	45 calendar days after the end of each semester
Project audited financial statements	FM monitoring	Annual	Before June 30, after the end of each year
Project forecasts for disbursement	To request advances to the DA	As required by the project	—
SOE	To document eligible expenditures	As required by the project	At least quarterly

**Audit Arrangements**

33. **Internal audit.** SENESCYT’s, SECOB’s, and INEC’s internal audit units’ review the compliance of operations and procedures with the MoF law and internal control manual submitted by the CGE. Internal auditors submit internal audit reports to the MoF, CGE, SENESCYT, SECOB, and INEC. Internal auditors may include Project activities in their annual work plan and would provide and/or facilitate any additional information requested by external auditors.

34. **External audit.** SENESCYT would be responsible for selection and appointment of an independent private auditor acceptable to the Bank. SENESCYT would be responsible for preparing audit ToRs for Banks’ ‘no objection’. An external financial audit would be performed for the entire project in accordance with International Standards on Auditing issued by the International Federation of Accountants. The audit scope would include activities implemented by SENESCYT, SECOB, and INEC.



Audit costs would be financed out of loan proceeds. Audit requirements are specified in table 2.3.

Table 2.3. Audit Requirements

Audit Report	Due Date
Project financial statements	June 30
Management Letter	June 30

35. As part of the agreements reached with the project, SENESCYT would send audit ToRs for Bank’s ‘no objection’ and the audit firm should be appointed for the entire life of the Project. The audit firm should be appointed for the first year, four months before the end of the first period subject to audit.

**Funds Flow and Disbursement Arrangements**

36. **Funds flow.** The MoF<sup>9</sup> in coordination with SENESCYT would open the DA in the Central Bank of Ecuador (*Banco Central de Ecuador, BCE*)<sup>10</sup> to receive loan proceeds under the Project. Funds deposited in the DA would be withdrawn against payments officially requested by SENESCYT (including payments from co-implementing entities). Loan proceeds would be identified by the Project, financier (Bank), and loan number.

37. SENESCYT and SECOB would manage centralized funds flow arrangements unlike the INEC, which plans to make payments at the provincial level (three offices—*zonales*). Detailed processes would be described in the POM.

38. Local counterpart financing allocated for the Project would be available in the treasury single account<sup>11</sup> to finance VATs and other administrative costs. As requested by the MoF, the INEC’s operating costs would be financed with loan proceeds as decided during Project appraisal.

39. SENESCYT would be responsible for coordinating payment requests for all co-implementing entities (SECOB and INEC) including their own. The consolidated payment request would include the following documentations: (a) an official letter by SENESCYT with instructions to *Tesorería de la Nación* of the MoF to request the BCE to carry out payments under the DA of the Project and under the given loan number; (b) the number of *Comprobante Único de Registro de Transferencia de Pago*<sup>12</sup> to be processed; and (c) the payment amount. Payments would be processed by the BCE through the Interbank Payment System that allows for electronic cash transfers to deposit in beneficiaries’ private bank accounts. Payments would have joint financing and would comprise two vouchers (one for the cost and one for the VAT).

40. SENESCYT would be responsible for archiving all supporting documentations (original records) for all the Project activities, except for activities under SECOB and INEC, in which case original supporting

<sup>9</sup> The MoF through the *Subsecretaría de Financiamiento Público*.

<sup>10</sup> In accordance with local regulations, an exclusive bank account called ‘CX’ is opened in the BCE by the MoF to receive international financing.

<sup>11</sup> *Cuenta Corriente Única* or treasury single account, where loan proceeds are identified by project, *Organismo* and *Correlativo*.

<sup>12</sup> Includes the number of *Comprobante Único de Registro de Transferencia de Pago*.



documentations would remain at the respective co-implementing entities and copies would be maintained by SENESCYT.

41. **Disbursement of funds from the Bank to SENESCYT.** As in other projects, the Bank would disburse loan proceeds using the disbursement methods of advance, reimbursement, and direct payment. Under the advance method, a segregated DA in U.S. dollars would be opened and maintained by the MoF in the BCE. Funds deposited into the DA as advances would follow the Bank's disbursement policies and procedures, as described in the Disbursement Letter.

42. Funds deposited in the DA would be withdrawn only against payments requested by the project through SENESCYT to the MoF. SENESCYT would prepare withdrawal applications in coordination with the FM specialist of the PMU. The ceiling of the DA would be based on quarterly forecasts and expenditures would be documented in SOEs. Supporting documentation and SOE report formats would be annexed to the Disbursement Letter.

43. **Disbursement of funds from SENESCYT to SECOB and INEC.** On an annual basis, SENESCYT would reassign from their annual budget the amount requested by SECOB and INEC (based on their annual forecasts submitted to SENESCYT). Budget assignments incorporated by SECOB and INEC would enable both entities to have sufficient resources to carry out payments under the project.

44. SECOB and INEC would prepare their payment requests on a weekly basis and submit them to SENESCYT, which would be responsible for consolidating all payment requirements (by implementing entity) and request the MoF to authorize the BCE to carry out payments from the DA.

45. On a monthly basis, SECOB and INEC would report to SENESCYT on execution of project activities and would prepare an SOE to report their expenditures.

46. **Retroactive financing.** SENESCYT, SECOB, and INEC also plan to begin implementing some project activities using their own fiscal resources and then requesting a reimbursement once the project becomes effective. These activities would be under Component 1 and 3 and eligible expenditures made by SENESCYT, SECOB, and INEC would comprise the period after the appraisal date and before the loan signing date. For payments made prior to the date of the Loan Agreement, except that withdrawals up to an aggregate amount not to exceed \$18,000,000 may be made for payments made prior to this date but on or after October 28, 2016, for Eligible Expenditures, under all Categories. Both entities would prepare a SoE summarizing eligible expenditures incurred before the date of the legal agreement. SENESCYT would collect all this information, confirm eligibility of expenditures, and submit them for Bank's reimbursement. The advance contracting and retroactive financing would be in accordance with paragraphs 5.1 and 5.2 in Section V of the Procurement Regulations; the advance contracting would start after the appraisal date.

47. Table 2.4 specifies the categories of eligible expenditures that may be financed out of the proceeds of the Loan (Category), the allocation of the amounts of the Loan to each category, and the percentage of expenditures to be financed for eligible expenditures in each category.





Table 2.4. Eligible Expenditure Categories

Category	Amount of the Loan Allocated (Expressed in US\$)	Percentage of Expenditures to be Financed (Exclusive of Taxes)
(1) Goods, works, and consulting services under Part 1 in respect of SENESCYT and SECOB	76,400,000	100%
(2) Goods, consulting services, and training under Parts 2 and 3 (a), (3) (b) (i), (3) (c) and (3) (d) of the Project in respect of SENESCYT	11,200,000	100%
(3) Goods, consulting services, survey costs, and training under Part 3 (b) (ii) of the Project in respect of INEC	2,900,000	100%
<b>Total Amount</b>	90,500,000	—

**Procurement**

48. Procurement activities would be carried out by SENESCYT, INEC, and SECOB. As part of Project preparation, an assessment of the procurement capacity of the implementing agencies was carried out in April 2016 and in September 2016. In September 2016, the Bank and SENESCYT agreed to include INEC as a co-implementing agency; the INEC’s assessment has been carried out, where the team agreed to ensure that SENESCYT and SECOB would: (a) have adequate organizational structures, (b) have facilities and support capacity, (c) have qualifications and experienced procurement staff, (d) maintain the personnel who have been previously trained; (e) organize record keeping and filing systems, (f) carry out best practice procurement planning and monitoring/control systems, and (g) maintain the capacity to meet the Bank’s procurement contract reporting requirements.

49. For the procurement activities, SENESCYT, INEC, and SECOB would be staffed with a dedicated procurement specialist, and the procurement specialist in SECOB would be supported by SENESCYT’s technical and administrative staff. Procurement risks are related to the procurement capacity of SENESCYT and SECOB, as the technical and fiduciary teams do not have adequate knowledge of Bank procurement procedures or contracting and they suffer from staff turnover; therefore, the institutional procurement capacity is considered weak. Based on the information available at the time of the assessment, the procurement risk is deemed High; the risk may be upgraded to Substantial based on SENESCYT’s and SECOB’s performance during implementation.

50. Additional risks include: (a) contractors winning at significantly lower prices than engineer’s estimates; (b) timely supply of materials for the civil works; (c) lack of financial liquidity and delays in the monthly payments to contractors, surveyors, and consultants; and (d) inadequate management of large contracts due to the lack of proper experience within SECOB. Mitigating measures include: (a) frequent monitoring (at least monthly for each contract) on quality assurance and physical progress, and including monitoring indicators for payment justifications, based on the annual monitoring plan; (b) SENESCYT and SECOB, with the support of the Bank, would verify all justifications for any variation in price before executing the works; (c) gearing up in SENESCYT through the contract managers to acquire





proper contract management skills to face a large quantity of contracts ; and (d) special conditions in the contracts related to payments and the use of Letters of Credit or direct payments by the Bank.

51. The Bank and SENESCYT agreed to the suggested corrective measures: (a) a POM including, inter alia, procurement and contracting procedures, would be adopted as a condition of effectiveness of the Loan Agreement; (b) additional procurement provisions relating to Project implementation have been incorporated in the Procurement Plan; and (c) the Bank's work in Ecuador includes a systematic training program on procurement for existing and new lending operations, and close monitoring by the Bank,<sup>13</sup> particularly, during the first two years of Project implementation.

52. Procurement for the proposed Project would be carried out in accordance with the Bank's 'Procurement Regulations for Borrowers: Procurement in Investment Project Financing, July 2016' and the provisions stipulated in the Loan Agreement. For each contract to be financed by the Loan, a Project Procurement Strategy for Development (PPSD) would be prepared. The 'microplanning' and other component activities would include the PPSD at different stages of the Project implementation. The different procurement methods or consultant selection methods, estimated costs, prior review requirements, special conditions of the contracts related to payments and timeframe, would be agreed between SENESCYT and the Bank in the Procurement Plan. The Procurement Plan would be updated as each PPSD is agreed or as required to reflect the actual Project implementation needs and improvements in institutional capacity.

53. **Procurement of works.** Works procured under this Project may include the construction and remodeling of TTTEs and other related civil works infrastructure, and so on. Requests for Bids, Request for Quotations, Request for Proposals (RFP), Direct Selection, Alternative Procurement Arrangements, and Force Account packages would be required. Procurement of works would be based on bidding documents satisfactory to the Bank. The procurement of works would not start until the 'microplanning - *Microplanificación* of each IST' and social or indigenous people management plans have been cleared.

54. **Procurement of goods.** Goods procured under this Project would include, among others: furniture, equipment for the schools, laboratories and computers, items deemed necessary to carry out Project activities, and goods (equipment, furniture, materials, and so on) purchased for the implementation of each component. Requests for Bids, Request for Quotations, RFP, Direct Selection, Alternative Procurement Arrangements, and Force Account packages would be required. Procurement of works would be based on bidding documents satisfactory to the Bank. Also for the procurement of technical equipment the fit for purpose and value for money approach would be applied.

55. All procurement notices shall be advertised on the Project's website (SENESCYT's, INEC's, and SECOB's websites), and at least one local newspaper of national circulation.<sup>14</sup> International Open Competition notices and contract award information shall be advertised in the United Nations Development Business online, in accordance with the provisions of paragraphs 5.22, 5.23, and 5.24 of the Procurement Regulations.

<sup>13</sup> Recommended quarterly procurement missions in the first two years.

<sup>14</sup> The use of local newspaper of national circulation would be replaced by the use of the National Procurement Portal at the Service for Public Purchases (*Servicio de Compras Públicas*).



56. **Selection of consultants.** Consulting firm services may be contracted for technical design studies, supervision, audits, and evaluations. The procurement of consulting firms would be carried out using Bank standard RFP documents. International/national firms should have the opportunity to participate in all RFPs. Consulting firms would be selected following Quality- and Cost-based Selection (QCBS) for all contracts in the estimated amount of more than US\$200,000.

57. **Selection of individual consultant services.** Individual consultant services would be contracted mostly for project management and for technical advice, mainly in the substantive matters of the Project, but also for design, supervision, and TA. The ToR, job descriptions, minimum qualifications, terms of employment, selection procedures, and the extent of the Bank review of these procedures to contract, and documents shall be described in the POM and the contract shall be included in the Procurement Plan. The Project implementation support personnel may be selected by the executing agency according to its personnel hiring procedures for such activities, as reviewed and found acceptable by the Bank.

58. Project websites (SENESCYT's, INEC's, and SECOB's websites) and a national newspaper<sup>15</sup> shall be used to advertise expressions of interest as the basis for developing short lists of consulting firms and individual consultants and to publish information on awarded contracts in accordance with the provisions of paragraphs 5.22, 5.23, and 5.24 of the Procurement Regulations and as mandated by local legislation. Contracts expected to cost more than US\$200,000 shall be advertised in United Nations Development Business online.

59. **Training.** Training would include expenditures (other than those for consultants' services) incurred by SENESCYT to finance logistics for workshops, meetings, and seminars, reasonable transportation costs and per diem of trainees and trainers (if applicable), and training registration fees. Transfers may be used for the payment of registration fees or university fees for teachers training (up to a ceiling amount to be established annually in the POA, as well as training facilities and equipment rental. Procurement would be done using Requests for Bids, Request for Quotations, RFP, Direct Selection, Alternative Procurement Arrangements, and Force Account packages. Required procedures are discussed in the following paragraphs.

60. **Operating costs.** The project incremental operational costs would be financed with counterpart funds, except all operational costs related to the implementation of Subcomponent 3.2., which would be financed with loan proceeds. Operational costs include those of implementing institutions, including travel costs and subsistence for missions of project staff (excluding civil servants); establishment and operation of the monitoring and supervision and technical and financial audits; newspaper advertisements; operation and maintenance of project offices, including utilities and telecommunication; and acquisition, operation, and maintenance of office and field equipment, needed for project activities. These operating costs would be administered in accordance with the Bank's Procurement Regulations, as appropriate. Procurement also would be carried out using the Bank's standard bidding document agreed with the Bank.

61. **POM.** The POM would include all procedures, rules, and standards for the implementation of all

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<sup>15</sup> Idem above.



aspects of the Project including, but not limited to: institutional arrangements; operation of the Project coordination team; project planning, M&E; social and environmental management, reporting, communication, human resources; procurement; administrative and FM; and procedures for amending the POM.

62. **Procurement Plan.** A Procurement Plan covering the first 18 months of Project implementation has been prepared based on the PPSD and agreed by negotiations. The Procurement Plan activities would consider the special nature of the Project, updating the Procurement Plan once each IST is ready and cleared from the technical, social, and environmental standpoints. It would also be available in the Project's database and in the Bank's external website. The Procurement Plan would be updated as required to reflect the actual Project implementation needs and improvements in institutional capacity. The Procurement Plan shall set forth those contracts that shall be subject to the Bank's prior review. All other contracts shall be subject to post review by the Bank, except for those contracts terminated by the implementing agency for which SENESCTY shall seek the Bank's 'no objection' before the proposed termination.

63. **Frequency of procurement implementation support.** In addition to prior review and implementation support missions carried out by the Bank, the capacity assessment has recommended quarterly missions in the first two years and semiannual missions thereafter, including field visits to analyze contract implementation and monitoring and post reviews of procurement actions. Contracts subject to post review would be reviewed by the Bank and, based on the findings of these reviews and the proposed ratings, the Bank may determine the revision of the prior review requirements.

64. Thresholds for procurement methods and prior review are as described in table 2.5.

Table 2.5. Thresholds for Procurement Methods and Prior Review

Expenditure Category	Contract Value (Threshold) (US\$, thousands)	Procurement Method	Market Approach	Bank Prior Review or as Indicated in the Procurement Plan
1. Works	> 8,000	Request for bids	Open, limited, international, single stage	All
	200–8,000	Request for bids	Open, limited, national, single stage	All above US\$5 million
	< 200	Request for quotations	Open, limited, national, single stage	
	Regardless of value	DC	Direct, single stage	All above US\$100.000
2. Goods	> 500	Request for bids RFP	Open, limited, international, single stage	All above US\$1.5 million
	50 – 500	Request for bids RFP	Open, limited, national, single stage	Post review



Expenditure Category	Contract Value (Threshold) (US\$, thousands)	Procurement Method	Market Approach	Bank Prior Review or as Indicated in the Procurement Plan
	< 50	Request for quotations	Open, limited, international national, single stage	
	Regardless of value	DC	Direct, single stage	All above US\$100.000
3. Consultant Services	> 200	QCBS	Open, International, short list	All
	< 200	QCBS, QBS, CQS, FBS, LCS (according to Procurement Plan)	Open, national, short list	All ToRs Selection process reviewed twice yearly (ex post)
	> 200	Direct Selection	Direct	All
4. Individual Consultants	> 200	IC	Open, limited	All
	< 200	IC	Open, limited	All ToR. Selection Process reviewed twice yearly (Ex Post).
	> 200	Direct Selection	Direct	All above US\$100.000

Note: CQS = Selection Based on the Consultants’ Qualifications; DC = Direct Contracting; FBS = Selection under a Fixed Budget; IC = Individual Consultant; LCS = Least-cost Selection; QBS = Quality-based Selection.

**Environmental and Social (including safeguards)**

**Social Safeguards**

65. The SA conducted during the Project design confirmed that negative social impacts relate mainly to minor land acquisition for premises improvement, and potential obstacles to accessing ISTs, especially among indigenous peoples. Concurrently, the SA identified challenges and obstacles that students would face to successfully access tertiary technical education. The SA findings informed the Project’s design and defined the safeguards instruments to be prepared.

66. Although this Project supports investments that would significantly increase access to TTTE, the merging of the ISTs present social risks in areas of the Project’s intervention, including those with indigenous peoples’ presence. During the SA preparation and consultation processes, some concerned indigenous peoples questioned the cultural appropriateness of certain curriculums and others pointed to potential mobility constraints to access the new IST locations. In light of the above risks, the Project triggered OP/BP 4.10. SENESCYT prepared an IPPF, because not all IST locations were known during early stages of the Project preparation. The IPPF established a robust SA, both for indigenous peoples as well as for other vulnerable communities such as Afro-descendants, where IST merging would take place. The IPPF defined the procedures for the preparation of IPPs in locations known at later stages of the Project's preparation, namely three ISTs in the Sucumbíos, Tungurahua, and Bolivar provinces, which have been approved by the Bank and disclosed on September 2 and 6, 2016. In addition, in light of the



results of the SA, SMPs were prepared for the provinces of El Oro, Guayas, Manabí, and Pichincha. The SA, IPPF, RPF, three individual IPPs (Sucumbíos, Tungurahua, and Bolívar), and four individual SMPs (El Oro, Guayas, Manabí, Pichincha) were approved by the Bank and disclosed on August 30 in SENESCYT's website and the Bank's external website on September 2, 2016, for El Oro, Guayas, and Manabí and September 6, 2016, for Pichincha.

67. Moreover, a Gender Plan was prepared and disclosed on SENESCYT's website and the Bank's external website on August 30 and September 2, 2016, respectively. Because there is currently no accurate information about access, persistence, and graduation rates disaggregated by gender, the first gender-related action under this Project would be to monitor these indicators for women and men separately, as well as the gender ratio among teachers and administrative staff.

68. Finally, because land acquisition may be necessary for some ISTs, OP/BP 4.12 has been triggered and an RPF was prepared and disclosed on August 30 and September 2, 2016, in both SENESCYT's and the Bank's external websites. It is estimated that land acquisition would be minimal, as (a) the majority of ISTs are in their current property; and (b) in the case of expansion and rehabilitation, the land to be used for this purpose would mainly involve public land donation among the parties involved (ISTs and other public institutions). In addition to the instruments mentioned, the project prepared a Gender Plan that defined the activities to address potential gender-related issues and ensure inclusion. In addition, SMPs were prepared for El Oro, Guayas, Manabí, and Pichincha.

## **Environment**

69. The Project does not foresee significant environmental impacts that could jeopardize the natural environment. Civil works to be supported under the Project would generate temporary, low, and reversible environmental impacts. Also, installation of certain types of equipment in workshops and laboratories might generate health, safety, and environmental risks and impacts. Safeguard OP/BP 4.01 on Environmental Assessment was triggered because the Project would directly finance civil works (construction or renovation of ISTs) that could generate potential environmental impacts. Also, environmental, safety, and health impacts could be generated during installation and operation of associated facilities such as workshops and laboratories. During Project preparation, environmental and social screening was conducted according to the Bank's OP 4.01. The Project is classified as Category B and the following environmental safeguard policies apply: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), and Physical Cultural Resources (OP/BP 4.11). This last policy was triggered, as some ISTs to be built would require minor excavations in Andean areas of the Bolívar Province where chance finds could occur. The ESMF includes the relevant national procedures in case of chance finds.

70. Because not all locations were known during the project preparation stage, an ESMF was developed for this Project. This ESMF covers civil works as well as installation and operation of associated facilities (workshops, laboratories, equipment, and so on). An EF and corresponding EMP have been prepared during Project preparation for those ISTs (El Oro, Sucumbíos, and Bolívar) for which the location is known and technical studies were completed before appraisal and disclosed on October 3, 2016, for Sucumbíos and October 4, 2016, for El Oro and Bolívar in the Bank's external website. The remaining EMPs would be developed during the implementation stage, once final sites are known and feasibility studies are completed. Such feasibility studies would be financed with loan funds.



Consultations were carried out both in the preparation of the ESMF and the EF/EMPs. These consultations involved relevant institutions such as the MAE and provosts of ISTs to be built or upgraded. Also, for each IST whose location is already known, a matrix of environmental, health, and safety impacts during operation of laboratories and workshops and corresponding mitigation measures, was prepared.

71. The ESMF was disclosed on September 14, 2016, both in the Bank's and SENESCYT's websites. ISTs would be located in already populated urban and rural areas in coastal region provinces and Andeans. In the case of ISTs for which the location is already known, an EF and its corresponding EMP were prepared according to the national environmental regulations. Also, given that these ISTs would involve installation and operation of equipment and tools in laboratories and workshops, a matrix containing information on environmental, health, and safety risks and impacts was prepared for each of those ISTs for which the location is already known and technical studies have been completed. Risk and impact mitigation measures were also included in this matrix. For those ISTs that require a wastewater treatment plant, information on these plants was included too.

72. Ecuador has a well-established national system for environmental impact assessment and management in education infrastructure construction and renovation projects. This system, including principles and procedures, is described in detail in the ESMF formulated by SENESCYT, which also describes institutional arrangements for environmental supervision. For a given IST, SECOB would prepare or outsource the preparation of the EF and an EMP—covering construction and operation stages—to a private consulting firm. Both instruments are prepared on the basis of engineering and soil studies. SECOB has an environmental team of four professionals (environmental engineers and geographers) that reviews and makes comments on the EFs and EMPs. SECOB then sends these EFs and EMPs to the MAE through the MAE's Unified System on Environmental Information (*Sistema Unificado de Información Ambiental*) portal. MAE issues an Environmental License upon approval of EFs and EMPs, which is then sent to SENESCYT through the Internet. Environmental supervision during the construction and operation phases would be undertaken by SECOB and a team of social and environmental specialists (consultants) based at SENESCYT.

### **Monitoring and Evaluation**

73. Progress toward achieving the PDO and intermediate indicators would be monitored by the PMU, wherein it would be responsible for collecting and compiling the data on all indicators presented in annex 1. The PMU would work closely with the National Information System in Higher Education (*Sistema Nacional de Información de Educación Superior del Ecuador*), which would be the main source for providing administrative data to PRETyT. PRETyT would send Biannual Progress Reports to the Bank, including progress towards targets in the Result Framework. CEAACES would be responsible for the analysis of the direct and indirect effects of the consolidation of tertiary technical and technological institutes on student outcomes and potential spillover effects on neighboring schools.

### **Role of Partners (if applicable)**

74. A key partner would be the EIB that would invest around \$80 million for the construction of eight new ISTs in eight provinces (Los Ríos, Chimborazo, Morona Santiago, Zamora, Azuay, Esmeraldas, Guayas, and Pichincha), following the same standards and criteria defined by the GoE in coordination



with the Bank requirements. The EIB-financed project would have their own fiduciary arrangements but would be supported by the same institutional framework that has been defined for SENESCYT with the Bank's project. In addition, there is a complementary intervention on TA supported by the Belgium Cooperation addressed to improve articulation with the Technical Education Unit of MINEDUC and SENESCYT in Manabí Province that is being coordinated with the activities planned by the Project. The financial and institutional arrangements of this cooperation are independent of the project supported by the Bank.

### ANNEX 3: IMPLEMENTATION SUPPORT PLAN

COUNTRY : Ecuador

Transformation of the Tertiary Technical and Technological Institutes Project

#### Strategy and Approach for Implementation Support

1. This Implementation Support Plan has been developed on the basis of the specificities of the Project and its risk profile. It aims at making implementation support to SENESCYT both flexible and efficient.
2. The strategy for implementation support in this Project places strong emphasis on close support and good communication between the Bank and the PMU's Coordination Unit.

#### Implementation Support Plan and Resource Requirements

3. The Bank would provide strong implementation support to the Project's PMUs (SENESCYT, SECOB, and INEC) as well as guidance regarding technical, fiduciary, social, and environmental issues. Formal implementation support and field visits would be carried out semiannually, and would focus on the following areas:
  - (a) **Technical inputs.** The Bank would count on the inputs from three international experts on (i) infrastructure; (ii) teachers policies; and (iii) the education management information system (EMIS), whose support would focus on the follow up of activities under Component 1 and 2.
  - (b) **Fiduciary requirements and inputs.** Training would be provided by the Bank's FM specialist during Project implementation, as needed. This would allow building FM capacity in the PMU, particularly regarding the Bank procedures. Supervision of FM arrangements would be carried out semiannually as part of the Project supervision plan and support would be provided on a timely basis to respond to Project needs. Procurement supervision would be carried out annually or as required.
  - (c) **Safeguards.** The Bank's social development and environmental specialists would ensure that training is provided to relevant counterpart staff. On the social side, supervision would focus on the implementation of the agreed (i) ESMF in compliance with OP/BP 4.01, and (ii) Social Management, focused on IPP to ensure compliance with safeguard policies on Indigenous Peoples (OP/BP 4.10) and Involuntary Resettlement (OP/BP 4.12).





- (d) **Country relations.** The team leader would coordinate within the Bank to ensure Project implementation is consistent with Bank requirements, as specified in the legal documents. As stated above, constant channels for information exchange would be maintained with senior officials, taking advantage of trust and communication capacity.

**Table 3.1. Main Focus of Support to Implementation**

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First 12 months	Monitoring of implementation progress and results	-Team leaders -Education economist	N.A	N.A
	Follow up and supervision of civil works	-School infrastructure specialist		
	Supervision of SMPs and IPP	-Social development specialist		
	Supervision of EMPs	-Environment specialist		
	Supervision and training in fiduciary matters	-FM specialist -Financial sector specialist -Procurement specialist		
12-60 months	Monitoring of compliance with fiduciary guidelines	-FM specialist -Financial sector specialist -Procurement specialist	N.A.N.A	N.AA
	Follow up and supervision of civil works	-School infrastructure specialist		
	Monitoring of compliance with Safeguards Policies and instruments	-Social development specialist -Environment specialist		
	Monitoring of implementation progress and results	-Team leader -Education economist		
	Supervision of teachers and EMIS	-Teachers policy specialist -EMIS specialist		

**Table 3.2. Bank Staff Skills Mix Required for the Project's Implementation Support**

Skills Needed	Number of Staff Weeks	Number of Trips
Team leader/s	30 annually	Twice a year
Education economist	2 annually	Twice a year
FM Specialist	2 annually	Twice a year
School infrastructure specialist	10 annually	Five a year the first two years, then twice a year





Skills Needed	Number of Staff Weeks	Number of Trips
Procurement specialist	8 annually	Four a year
Social development specialist	4 annually	Twice a year
Environment specialist	4 annually	Twice a year
Teachers policy specialist	3 annually	Once a year
EMIS specialist	2 annually	Once a year

**ANNEX 4: ECONOMIC ANALYSIS**

**COUNTRY: Ecuador**

**Transformation of the Tertiary Technical and Technological Institutes Project**

**Introduction**

1. This annex presents the economic and financial analysis for the Transformation of the Tertiary Technical and Technological Institutes Project that falls under the Education Sector reforms currently being carried out by Ecuador’s MINEDUC.

2. The Project’s economic and financial analysis includes two dimensions. First, the model makes use of a conventional cost-benefit analysis, that is, it considers the economic benefits and costs associated with a greater number of graduates in technical and technological education. The analysis considers a time horizon of 14 years from 2017 to 2030. The estimations are based on the difference between (a) an intervention scenario where the number of graduates is based on a projected demand for technical and technological education taking into consideration the activities related to the transformation of the technical and technological education, and (b) a counterfactual scenario where the number of graduates follows its trajectory as if the Project did not exist.

(a) The Project’s economic benefits considers that further investments in education increases an individual’s productivity and, as a result, his or her future earnings. Estimations are based on the difference in future earnings for those who have completed technical and technological education and those who have completed secondary education and would not have enrolled in technical and technological education if the Project did not exist.

(b) The Project’s economic costs consider (i) the investment costs associated with carrying out the Project, and (ii) the additional recurring costs as determined on a per student basis, which are incurred by SENESCYT as a result of the completion of the Project. The latter includes teacher and administrative salaries and employment benefits and operational costs associated with the additional number of students.

3. Second, the economic analysis discusses potential efficiency gains resulting from SENESCYT’s institute consolidation strategy. The new institute construction, renovation, and expansion activities in the seven targeted provinces would require the consolidation of teachers, students, and administrative personnel and, as a result, would lead to efficiency gains.

4. Finally, the economic analysis includes a fiscal sustainability study related to the Project, wherein it considers the impact of related investments in SENESCYT’s overall budget.



5. The economic analysis utilizes data from Ecuador's Labor Force Surveys (*Encuesta de Empleo, Desempleo y Subempleo*), administered by MINEDUC, from September 2014 to September 2015, to estimate the returns from across different levels of education, labor force participation rates, and employment rates in the calculation of the Project's benefits. The analysis also utilizes data detailing overall allocation of funds by the MoF in 2015, associated with operational costs by institutes and data detailing 2015 salaries and benefits, provided by SENESCYT, to determine costs on a per student basis.

### **Technical and Technological Education, Productivity, and Economic Growth**

6. The macroeconomic growth accounting and analysis based in the Mincer Model regarding the benefits of schooling in the labor markets have demonstrated that education is a key factor in economic growth and investment in education results in positive returns. The evidence demonstrates that more and better education can lead to an increase in human capital, which translates to an increase in productivity and resulting improved economic growth. More productive individuals receive higher salaries and a more productive society results in greater economic growth in the long term. Technical and technological education can play a central role in improving and refining specific technical skills of young people who are about to or have recently joined the workforce.

7. Evidence indicates that the returns on investment in education are higher in lower-middle-income countries than those who have achieved a higher income level. A recent study on Ecuador presents evidence of a 15 percent average salary increase for each additional year of education between 2004 and 2014 regardless of the educational level. This study shows that this return on investment is even greater in most manufacturing sectors, mainly lumber and crude oil extraction, as well as the services sector, mainly construction<sup>16</sup>.

8. More generally, a population with more years of schooling can generate important public benefits and positive externalities. There is extensive literature regarding the measurement of benefits resulting from education with regard to tax payments resulting from greater incomes, lower crime and violence rates, and better health outcomes.

### **Projected Graduate Numbers**

9. This Project supports the following principal activities for the transformation of SENESCYT's technical and technological institutes, which would have an impact on the number of graduates in the system:

- (a) Optimize and upgrade the supply of technical and technological education in targeted provinces;
- (b) Improve program relevance, quality of teaching, and IST management capacity;
- (c) Increase demand through the communication strategy and strengthen institutional coordination with private providers and partnerships with employers.

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<sup>16</sup>Gutiérrez et al. 2015. "Formación Técnica: ¿Qué espera el mercado?" *World Bank working paper*.



10. **The counterfactual scenario.** Predicted enrollment numbers without the project (the counterfactual scenario) are calculated using the following methodology.<sup>17</sup> Secondary school graduates are projected using (a) calculations for population projections for seventeen year olds based on the INEC's population estimations; (b) estimated enrollment and graduation rates based on the NDP; and (c) estimated net attendance numbers in secondary education based on historical averages. From these estimations, the potential number of secondary school graduates who would enroll in technical and technological education is calculated based on historical trends in the proportion of secondary school graduates accepting an offer in technical and technological institutes. A cap is applied to these projections once they reach the current capacity of the technical and technological education institutes in each province. Finally, the historical average dropout rate is used to determine the number of graduates in technical and technological education.

11. **The intervention scenario.** Given the multidimensionality aspect of the components of this project, estimating its impact on enrollment is challenging. This estimation is based on three assumptions. First, as a result of the communication strategy throughout the country, a positive impact on the demand for technical and technological education is estimated. For this estimation, existing evidence of the (mostly positive) impact of communication or information campaigns on student applications and enrollment was reviewed. More generally, Scott-Clayton (2012)<sup>18</sup> suggests that information gaps have arguably played an increasing role in education trends over time. Bettinger, Long, Oreopoulos, and Sanbonmatsu (2009)<sup>19</sup> find that small changes to the college application process can have large effects on enrollment. Information about likely grant and loan eligibility on its own did not increase applications and enrollment, but this information plus personal assistance with filling out a simplified application form such as the Federal Application for Financial Aid increases enrollment rates of students from low-to-moderate-income families by 29 percent. Bleemer and Zafar (2014)<sup>20</sup> focus on information gaps about college benefits and costs where they found substantial heterogeneity in beliefs, with larger biases for the more disadvantaged groups, lower-income, and non-college households. They find that by providing the correct information about college costs and returns, the intended child's college attendance would increase significantly, by about 0.2 of the standard deviation in the baseline intended likelihood. Avery and Kane (2004)<sup>21</sup> studied the student perceptions of college opportunities from the Boston COACH Program based on two surveys applied at the beginning and at the end of high school. They found that the percentage of students planning to attend four-year colleges dropped by more than 20 percentage points from the baseline survey, while the percentage planning to attend a two-year college increased by more than 15 percentage points. This suggests that these students either exaggerated their educational plans or that their coaches helped them to realize that they did not have the qualifications to be admitted to a four-year college. Oreopoulos and Dunn (2012)<sup>22</sup> measure the

<sup>17</sup> SENESCYT has prepared a more in-depth documentation detailing the steps of these projections.

<sup>18</sup> Scott-Clayton, J. 2012. "Information constraints and financial aid policy". National Bureau of Economic Research (No. w17811).

<sup>19</sup> Bettinger, E. P., B.T. Long, P. Oreopoulos, and L. Sanbonmatsu. 2009. "The role of simplification and information in college decisions: Results from the H&R Block FAFSA experiment". *National Bureau of Economic Research* (No. w15361).

<sup>20</sup> Bleemer, Z. and B. Zafar. 2014. "Information heterogeneity and intended college enrollment". *FRB of New York Staff Report*, no 685.

<sup>21</sup> Avery, C. and T.J. Kane. 2004. "Student perceptions of college opportunities. The Boston COACH program". In *College choices: The economics of where to go, when to go, and how to pay for it* (pp. 355-394). University of Chicago Press.

<sup>22</sup> Oreopoulos, P. and R. Dunn. 2012. "Information and College Access: Evidence from a Randomized Field Experiment". Working



impact of exposing students from disadvantaged backgrounds to online information in their decision to enroll in post-secondary education (PSE). Most students' perceived returns to PSE were high, even among those not expecting to continue. Those exposed to the information, especially those initially unsure about their own educational attainment, reported significantly higher expected returns, lower concerns about costs, and expressed greater likelihood of PSE attainment. In fact, 3.3 percent fewer report being unsure compared to the control group, while 3.5 percent more maintain their intention of obtaining a PSE degree. This result is consistent with Jensen (2010)<sup>23</sup>, Nguyen (2007)<sup>24</sup>, and Dinkelman and Martinez (2011)<sup>25</sup> findings. More recently, Hastings, Neilson, and Zimmerman (2015)<sup>26</sup> test the impact of information about institution and major-specific labor market outcomes on college enrollment decisions using a randomized controlled trial administered within the online Chilean federal student loan application process. Despite not finding an impact on the extensive margin choice to enroll in any degree program, the authors find a positive effect on the intensive margin choice on where to enroll. They find that treated students are 2.11 percent more likely to enroll in science/technology and 1.98 percent less likely to enroll in health fields than control when they received information of having a higher return. From these studies, it is seen that there is a lot of heterogeneity in findings of studies estimating the (positive) effect of communication campaigns on demand and enrollment in higher education, which is most likely due to differences in communication strategies and targeted beneficiaries. Given the difficulty in estimating the effect of this Project's communication campaign based on the past studies using different communication strategies, a 3 percent increase in the demand for technical and technological education based on the studies reviewed is conservatively estimated, taking as a premise that students might make better/more informed decisions based on better information about the process of application and the returns to higher education (starting in 2018).

12. Second, it is assumed the largest impact would come from the increase in the supply of education in each province, that is, future projected capacity. Although the evidence related to how improvements in infrastructure impacts the enrollment rate in tertiary education is limited, there is some evidence on enrollment and other outcomes in basic education. Duflo (2000)<sup>27</sup> evaluates the effect of the Indonesian Government Program, which constructed over 61,000 primary schools throughout the country between 1973 and 1978 (the largest school construction program on record), on education and wages. The author finds that children ages 2 to 6 years in 1974 increased from 0.12 to 0.19 more years of education for each school constructed per 1,000 students in the region of birth while the returns to education improved from 6.8 percent to 10.6 percent. Cellini, Ferreira, and Rothstein (2010)<sup>28</sup> employ a regression discontinuity around the outcomes of school district-level votes on the

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Paper 18551.

<sup>23</sup> Jensen, R. 2010. "The (perceived) returns to education and the demand for schooling". *Quarterly Journal of Economics*, 125(2).

<sup>24</sup> Nguyen, T. 2008. "Information, role models and perceived returns to education: Experimental evidence from Madagascar". *Unpublished manuscript*, 6.

<sup>25</sup> Dinkelman, T. and C. Martínez A. 2014. "Investing in schooling in Chile: The role of information about financial aid for higher education". *Review of Economics and Statistics*, 96(2), 244-257.

<sup>26</sup> Hastings, J., C.A. Neilson and S.D. Zimmerman. 2015. "The effects of earnings disclosure on college enrollment decisions". *National Bureau of Economic Research* (No. w21300).

<sup>27</sup> Duflo, E. 2000. "Schooling and labor market consequences of school construction in Indonesia: Evidence from an unusual policy experiment". *National Bureau of Economic Research* (No. w7860).

<sup>28</sup> Cellini, S. R., F. Ferreira and J. Rothstein. 2010. "The value of school facility investments: Evidence from a dynamic regression discontinuity design". *Quarterly Journal of Economics*, 125(1).



bond issues used to finance school construction projects to estimate the effects of school construction spending in California, the United States, on test scores and home prices. They find that a dollar of expenditure on school facilities raises home prices by roughly US\$1.50, but do not find strong effects for student test scores. However, Neilson and Zimmerman (2014)<sup>29</sup> take advantage of the staggered implementation of a comprehensive school construction project in a poor urban district in Connecticut, the United States, to provide evidence that US\$10,000 of per-student investment in school construction did raise reading scores for elementary and middle school students by 0.027 standard deviation, and raised home prices and public school enrollment in zoned neighborhoods. Despite the evidence suggesting potentially positive effects on enrollment and possibly test scores, the predicted enrollment numbers associated with the project (the intervention scenario) were conservatively calculated utilizing the same procedure as detailed above for calculations without the project, then increased the projected demand by 3 percent for every year from 2018 onward, and relaxed constraints on the institutional capacity to absorb additional demand in each province from 2017 onwards, reaching 85 percent of full capacity in four years after institutes are constructed or renovated and fully equipped. The capacity of each province was estimated based on the capacity of the new or renovated institutes and the capacity of smaller satellite institutes that would not merge with the new or renovated institutes.

13. Third, there is an added impact of teacher training on student knowledge and consequently, dropout rates. There is well-documented international evidence in basic education that more knowledgeable teachers are associated with better learning outcomes of students (measured as test scores). In the absence of randomized evaluations of pre-service teacher training given the inevitably long timeframes involved, most of this evidence is obtained by estimating value-added models of student achievements. These models estimate the annual gain in student test scores (measured as standardized effects sizes) associated with higher teacher knowledge (again measured using standardized tests). In general, effects tend to be larger for student achievement in math than for reading. The focus was on recent studies in Latin America and one prominent study from the United States. For Mexico, Santibañez (2006)<sup>30</sup> finds effect sizes of 0.013 primary students and 0.177 for secondary students in Mexico City, and Luschei (2012)<sup>31</sup> reports 0.04 for Aguascalientes and 0.09 for Sonora (across levels). Marshall (2009)<sup>32</sup> reports effects of 0.11 of teacher math knowledge on overall achievement in rural Guatemala and 0.03 for teacher pedagogical knowledge. Metzler and Woessmann (2012)<sup>33</sup> find effects of 0.094 on math and 0.027 on reading for a nationally representative sample of sixth graders in Peru. Finally Clotfelter et al. (2007)<sup>34</sup> report effects sizes of 0.015 on math scores and 0.004 on reading scores for elementary school students in North Carolina, using a decade of administrative data and an improved estimation methodology that allows for student fixed-effects and

<sup>29</sup> Neilson, C. A. and S.D. Zimmerman. 2014. "The effect of school construction on test scores, school enrollment, and home prices". *Journal of Public Economics*, 120, 18-31.

<sup>30</sup> Santibañez, L. (2006). "Why we should care if teachers get A's: Teacher test scores and student achievement in Mexico". *Economics of Education Review*, 25(5), 510-520.

<sup>31</sup> Luschei, T. F. (2012). In search of good teachers: Patterns of teacher quality in two Mexican states. *Comparative Education Review*, 56(1), 69-97.

<sup>32</sup> Marshall, J. H. (2009). School quality and learning gains in rural Guatemala. *Economics of Education Review*, 28(2), 207-216.

<sup>33</sup> Metzler, J., & Woessmann, L. (2012). The impact of teacher subject knowledge on student achievement: Evidence from within-teacher within-student variation. *Journal of Development Economics*, 99(2), 486-496.

<sup>34</sup> Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2007). Teacher credentials and student achievement: Longitudinal analysis with student fixed effects. *Economics of Education Review*, 26(6), 673-682.



within-student variation in exposure to teachers with different skills. Increase in student knowledge through better trained teachers in the classroom is likely to alter the distribution of educational attainment. Unfortunately, while this link is acknowledged, the quantitative evidence is very scarce. Most studies treat this either as a nuisance to be controlled for or restrict the sample to only non-dropouts. Carnoy et al. (2001)<sup>35</sup> provide the only report of elasticity of test scores on dropouts, focusing on high school students in Texas. They find that in schools where standardized test scores increased by 10 percent, the dropout rates fell by 0.24 percent on average and fell by 1.04 percent in urban schools. Without prior evidence and data on means and standard deviations of student knowledge in technical and technological education in Ecuador, it is difficult to translate their estimates to the needed context. It can be seen from the first set of studies reviewed that teacher training has a positive effect of student achievement and estimates are conservatively taken from Carnoy et al (2001), with the assumptions of a 10 percent increase in student knowledge through better teacher training, a larger share of the student beneficiaries being urban, and a reduction in dropouts of 1.04 percent per year from 2017 to 2021 (from 28.9 to 25.90 percent).<sup>36</sup> This estimation is used to make yearly adjustments to the dropout rate for cohorts beginning in 2017 until 2021 (when training is completed), reaching 25.90 percent from 2021 onward to estimate the final number of graduates with the project.

14. Table 4.1 presents the total estimations for the number of students enrolled in the first year, the number of students enrolled in total, and the number of students enrolled who graduate in technical and technological education institutes. Figure 4.1 presents the total projection for the new number of students enrolled who graduate in the seven targeted provinces. It is important to clarify the consideration that those starting from 2017 onward would receive the full benefits of the project. However, those already in the system, who are due to graduate in the next two years might also partially enjoy the benefits of the project, are not quantitatively estimated here.

**Table 4.1. Projection for the Number of Students Enrolled and Number of Students who Graduate with and without the Project**

Year	Without the Project			With the Project		
	Number of Students Enrolled in Total	Number of Students Enrolled in Year 1	Number of Students Enrolled in Year 1 Who Graduate	Number of Students Enrolled in Total	Number of Students Enrolled in Year 1	Number of Students Enrolled in Year 1 Who Graduate
2017	24,657	9,817	0	24,715	9,840	0
2018	25,679	9,895	0	25,737	10,027	0
2019	26,265	9,937	0	26,413	10,571	0
2020	26,151	9,978	6,980	28,218	11,959	6,996
2021	26,263	10,015	7,035	31,972	12,059	7,202
2022	26,331	10,051	7,065	32,242	12,162	7,676
2023	26,392	10,088	7,095	32,492	12,261	8,772
2024	26,453	10,110	7,120	32,740	12,343	8,936

<sup>35</sup> Carnoy, M., S. Loeb and T.L. Smith. 2001. "Do higher state test scores in Texas make for better high school outcomes?"

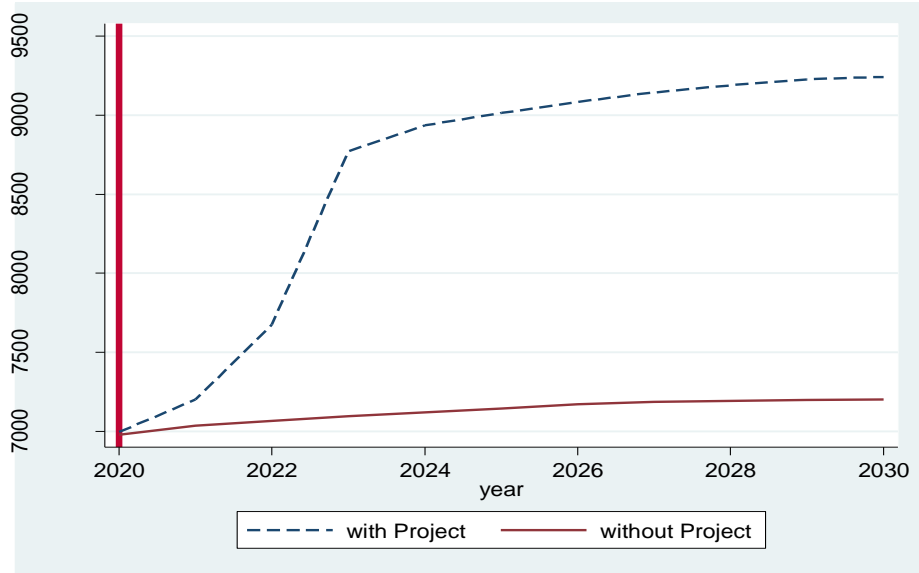
<sup>36</sup> The same strategy for calculating an increase in persistence rates (from 71.10 in 2017 to 74.10 in 2021) is used.



Year	Without the Project			With the Project		
	Number of Students Enrolled in Total	Number of Students Enrolled in Year 1	Number of Students Enrolled in Year 1 Who Graduate	Number of Students Enrolled in Total	Number of Students Enrolled in Year 1	Number of Students Enrolled in Year 1 Who Graduate
2025	26,508	10,122	7,145	32,964	12,402	9,014
2026	26,545	10,129	7,172	33,143	12,451	9,085
2027	26,562	10,132	7,188	33,305	12,476	9,145
2028	26,560	10,129	7,194	33,443	12,483	9,190
2029	26,543	10,113	7,199	33,559	12,482	9,228
2030	26,516	10,096	7,203	33,660	12,481	9,243

Note: Own calculations based on data provided by SENESCYT.

Figure 4.1. Projections for the Number of Graduates with and without the Project



### Projects Costs

15. To achieve the project’s objectives, SENESCYT would incur costs associated with (a) the creation of a new academic offer, well-articulated with private and public sector demands, including piloting a ‘dual system’ in some ISTs; (b) the upgrading of facilities through new infrastructure and equipment; (c) the strengthening of teacher training; and (d) the enhancement of SENESCYT’s institutional capacity.

16. In addition to investment costs, the following additional recurring costs to be incurred by SENESCYT over the next 14 years due to the transformation of the institutes were also considered: compensation costs deriving from additional administrative staff and teachers and operational costs. A conservative intervention scenario was assumed where predicted costs are fully incurred starting in 2017. This is a reasonable assumption given that administrative staff and teachers would need to be hired soon due to the sharp increase in demand in the earlier years and increase in capacity to absorb this demand and operational costs would be increase once institutes are fully functioning (in years 2017





and early 2018).

17. Additional number of teachers and of administrative staff is calculated based on the additional number of enrolled students given the predicted size of each institute. The additional total compensation—salaries plus benefits—was calculated as follows: salaries are based on current salary scales for the different occupational groups provided by the Ministry of Labor (*Ministerio de Trabajo*, MT); benefits are based on Ecuador’s Labor Code and include a 13th salary (8.33 percent of the annual base salary), a 14th salary (equivalent to a minimum monthly salary), reserve funds contributions (8.33 percent, *fondos de reserva*),<sup>37</sup> and employer social security contributions (9.45 percent, *aporte patronal*).

18. Additional operational costs are estimated on a per enrolled student basis using the 2015 allocated costs for technical and technological education institutes for the counterfactual scenario and the predicted costs based on the size of each institute for the intervention scenario. These costs include facility maintenance related costs such as water, electricity, telecommunications, as well as security services, staff transportation, and per diem costs for work-related trips and office supplies.

### Project Benefits

19. Project benefit estimates were calculated using the expected impact of enrolling in technical and technological education in the future incomes of student beneficiaries. The analysis estimates the number of students that would benefit from Project activities and, specifically, those students who are expected to complete technical and technological education, who would not have achieved this level of education without the Project.

20. The analysis assumes the principal economic benefit resulting from the Project activities would be the present value in the difference between future earnings<sup>38</sup> for those students who complete technical and technological education, considering their future possibilities in the workforce that are a direct result of their education.

21. It is important to highlight that the Project analysis is based on the benefits that can be reasonably estimated; however, other benefits from the Project activities exist that are more challenging to quantify. The following are examples of those potential benefits:

- (a) There would be a larger number of graduates due to improved facilities, equipment, and teaching as well as information campaigns beyond increase in number of graduates due to increase in supply of free education;
- (b) Larger number of graduates would generate a positive externality (both non-monetary and monetary) in the economy. While the evidence on technical and technological education is scarce, Moretti (2004) quantifies the monetary impact of externalities, or social returns, of

<sup>37</sup> The Labor Code states that employers are required to pay an additional 8.33 percent of salary to the employee every month, from the second year of work.

<sup>38</sup> Future earnings are estimated based on annual salary plus 13th salary compensation, reserve funds, and employer’s social security contributions as stipulated in Ecuador’s Labor Code.





an increase in the number of university graduates in the United States. Moretti finds, after controlling for other factors, that a rise in 1 percent of the share of the labor force with a university degree in a given area increases salaries for all workers: (i) 1.9 percent for those participants of the labor force without a secondary education diploma; (ii) 1.6 percent for participants in the labor force with a secondary education diploma, and (iii) 0.4 percent for university graduates;

- (c) Use of public resources (not only through greater efficiency in education expenditures by student, but also through indirect future benefits in public health, such as more educated citizens who can better prevent the spread of diseases); and
- (d) Higher levels of achievement in education and greater access to tertiary education would directly impact the rate of teenage pregnancy and, as a result, reduce the infant mortality rate and maternal mortality rate resulting from abortions, operations, and suicide.

**Results of the Cost-Benefit Analysis of the Project**

22. Based on the effectiveness hypothesis and the Project’s expected impact, the net present value is expected to be approximately US\$220 million with an IRR of 10 percent, if the present value of the benefits and investment costs are discounted at a rate of 5 percent. Table 4.2 presents a summary of the present value benefits and costs until 2030.

**Table 4.2. Updated Net Value based on Project’s Baseline Scenario (US\$, Discount Rate 5%)**

Year	Benefits	Costs			
	Present Value of Benefits by New Income Differential	Present Value of Additional Teacher and Administrative Staff Compensation and Operational Costs	Present Value of Investment + VAT	Total Costs	Net Present Value
2017	0	45,698,151	22,800,000	68,498,151	-68,498,151
2018	0	31,198,598	26,666,667	57,865,264	-57,865,264
2019	0	16,637,500	15,238,095	31,875,595	-31,875,595
2020	783,553	16,401,581	19,349,962	35,751,543	-34,967,990
2021	7,788,887	16,225,740	9,214,268	25,440,007	-17,651,120
2022	27,140,062	16,058,690	—	16,058,690	11,081,372
2023	70,943,632	15,897,503	—	15,897,503	55,046,129
2024	73,165,584	15,758,296	—	15,758,296	57,407,288
2025	71,715,168	15,654,257	—	15,654,257	56,060,912
2026	69,908,080	15,594,177	—	15,594,177	54,313,903
2027	68,110,496	15,561,940	—	15,561,940	52,548,556
2028	66,159,832	15,551,683	—	15,551,683	50,608,149
2029	64,051,100	15,575,127	—	15,575,127	48,475,973
2030	61,331,752	15,627,880	—	15,627,880	45,703,872



Year	Benefits	Costs			
	Present Value of Benefits by New Income Differential	Present Value of Additional Teacher and Administrative Staff Compensation and Operational Costs	Present Value of Investment + VAT	Total Costs	Net Present Value
Total	—	—	—	—	220,388,032
IRR	—	—	—	—	10%

23. A sensitivity analysis is performed by considering changes to the benefits accrued as a result of the project by exploring potential differences in the private returns to technical and technological education. Lower (upper) bounds of the benefits calculations are estimated by decreasing (increasing) the private returns to technical and technological education by -5 percent (5 percent) to consider the possibility that more (less) students might enroll in programs/careers with a smaller return. Under these scenarios, the project would have an IRR of 7 percent and 12 percent, respectively.

24. The impact of the project on the local economy was also considered. Valero and Van Reenen (2016)<sup>39</sup> study the economic impact of universities on country growth and find that doubling the number of universities per capita is associated with a 4 percent higher future GDP per capita (in five years). These results indicate that this relationship is not simply driven by the direct expenditures of the university, its staff, and students. They suggest that part of the effect of universities on growth is mediated through an increased supply of human capital and greater innovation. If these findings are extrapolated to the increase of 25 percent in the number of graduate students projected in table 4.1 in the context of technical and technological education in Ecuador, an increase of 1 percent in future GDP per capita can be potentially observed.

**Fiscal Sustainability Analysis**

25. To analyze the Project’s fiscal sustainability, the impact of the flow of Project funds on SENESCYT’s overall budget during the period of the Project’s implementation was estimated.

26. The model utilizes a budget projection of nominal values without Project implementation, estimated from the initial budget expenditures as reported by SENESCYT and the MoF. Under this scenario, the analysis expects SENESCYT’s budget to increase proportionally with Ecuador’s GDP. According to this hypothesis, SENESCYT’s budget would remain constant, increasing alongside the GDP. Three scenarios are constructed based on (a) a base projection of nominal GDP growth sourced from the IMF, (b) an optimistic projection adding 1 percentage point, and a (c) conservative scenario subtracting a 1 percentage point from projections from 2020 onward.

27. SENESCYT total budget is currently divided into a budget for the development of programs and a budget for recurring costs. The budget for the development of programs is allocated to student

<sup>39</sup> Valero, A and J. Van Reenen. 2016. “The economic impact of universities: Evidence from across the globe”. *National Bureau of Economic Research* (No. w22501).



scholarships, research and development projects, entrance exams and other access/admission activities, recruitment, training, and promotion of talent in SENESCYT and its institutes. Recurring costs include operational costs of running the institutes, including teacher and administrative staff compensation.

28. The second piece of the analysis incorporates the US\$90 million in Project investment plus VAT in nominal value that SENESCYT would cover based on the current Project disbursement timeline. This is shown in Table 4.3 (part A).

29. As shown Table 4.3 (part B), the economic impact of the project on SENESCYT’s annual total budget is 27.7 percent in the project’s first year and decreasing to 7.6 percent in the final year of project implementation. Table 4.3 (part C) presents the optimistic scenario and shows that the economic impact of the project on SENESCYT’s budget decreases to 7.3 percent. Table 4.3 (part D) presents the conservative scenario and shows that the economic impact of the project on SENESCYT’s budget decreases to 7.9 percent.

**Table 4.3. Expected SENESCYT Budget With and Without the Project, in US\$, millions**

	2016	2017	2018	2019	2020	2021	2022	2023	2024
<b>A. Additional costs with project</b>									
Loan Disbursements	—	20	25	15	20	10	—	—	—
VAT	—	3	3	2	2	1	—	—	—
Additional Costs	—	46	33	18	19	20	20	21	22
<b>Total</b>	<b>—</b>	<b>68</b>	<b>61</b>	<b>35</b>	<b>41</b>	<b>31</b>	<b>20</b>	<b>21</b>	<b>22</b>
<b>B. Base estimations of budget for existing costs (IMF projections for long-term)</b>									
Nominal GDP Growth (annual %)	-2.5	-1.1	2.0	2.4	3.5	3.5	3.5	3.5	3.5
<b>SENESCYT budget</b>									
--Current Programs	206	201	199	203	207	215	222	230	238
--Recurring Costs	48	47	46	47	48	50	52	54	55
<b>Total</b>	<b>254</b>	<b>248</b>	<b>245</b>	<b>250</b>	<b>256</b>	<b>265</b>	<b>274</b>	<b>284</b>	<b>294</b>
<b>As % of Total Budget</b>	<b>—</b>	<b>27.7</b>	<b>24.8</b>	<b>14.1</b>	<b>16.2</b>	<b>11.7</b>	<b>7.5</b>	<b>7.5</b>	<b>7.6</b>
<b>C. Optimistic estimations of budget for existing costs</b>									
Nominal GDP Growth (annual %)	-2.5	-1.1	2.0	2.4	4.5	4.5	4.5	4.5	4.5



	2016	2017	2018	2019	2020	2021	2022	2023	2024
<b>SENESCYT budget</b>									
--Current Programs	206	201	199	203	207	217	227	237	247
--Recurring Costs	48	47	46	47	48	51	53	55	58
<b>Total</b>	<b>254</b>	<b>248</b>	<b>245</b>	<b>250</b>	<b>256</b>	<b>267</b>	<b>279</b>	<b>292</b>	<b>305</b>
<b>As % of Total Budget</b>	<b>—</b>	<b>27.7</b>	<b>24.8</b>	<b>14.1</b>	<b>16.2</b>	<b>11.6</b>	<b>7.3</b>	<b>7.3</b>	<b>7.3</b>
<b>D. Conservative estimations of budget for existing costs</b>									
Nominal GDP Growth (annual %)	-2.5	-1.1	2.0	2.4	2.5	2.5	2.5	2.5	2.5
<b>SENESCYT budget</b>									
--Current Programs	206	201	199	203	207	213	218	223	229
--Recurring Costs	48	47	46	47	48	50	51	52	53
<b>Total</b>	<b>254</b>	<b>248</b>	<b>245</b>	<b>250</b>	<b>256</b>	<b>262</b>	<b>269</b>	<b>275</b>	<b>282</b>
<b>As % of Total Budget</b>	<b>—</b>	<b>27.7</b>	<b>24.8</b>	<b>14.1</b>	<b>16.2</b>	<b>11.8</b>	<b>7.6</b>	<b>7.7</b>	<b>7.9</b>

Source: Own calculations. 2016 budget figures provided by SENESCYT.

30. A brief financial sustainability analysis was performed to consider whether there are additional expense streams on a per student basis incurred by SENESCYT due to the expansion of the technical and technological education system with the project. The Project is expected to contribute to greater efficiency within the Ecuadorian Technical and Technological Education System in the targeted provinces. The construction of new institutes and consolidation of a considerable quantity of smaller institutes that currently serve fewer students and register low levels of efficiency would result in improvements in the allocation of public resources in the education sector.

31. Table 5.4 includes a projection of the quantity of institutes, the number of teachers (full-time equivalent), teacher compensation per student, the number of administrative staff (full-time equivalent), administrative staff compensation costs per student, and institute maintenance costs per student in the targeted provinces. The calculations indicate that the system in its current state incurs a cost of US\$1,229 per student and in the future, once institutes have reached full capacity, the system would incur a cost of US\$1,394 per student, an increase of US\$164. That is, overall, there would be an increase of 13 percent on the total costs per student.

32. More specifically, the number of teachers would double once institutes reach full capacity, however, the teacher compensation cost per student would decrease by 5 percent. With regard to administrative staff, institute consolidations would allow for better utilization of human capital resources to serve technical and technological education students. Large-size institutes and added responsibilities would require more administrative and managerial staff to ensure high-quality management of additional operational activities, support for student transitions, and human resources activities. The number of administrative staff would also increase by 2.5 times and administrative staff compensation per student would increase by US\$135 per student (increase of 76 percent). Institute maintenance costs per student would also rise, given the new facilities, by US\$77 (increase of 157 percent).



Table 4.4. Costs on a per Student Basis

	Current State	With Project	Change (absolute)	Change (percentage)
Institutes	60	24	(36)	-60
Number of teachers (full-time employment)	702	1,416	714	101
Number of administration staff (full-time employment)	121	424	303	250
Teacher compensation per student	US\$1,002	US\$955	(US\$47)	-5
Administration staff compensation per student	US\$178	US\$313	US\$135	76
Institute maintenance costs per student	US\$49	US\$126	US\$77	157
<b>Total costs per student</b>	<b>US\$1,229</b>	<b>US\$1,394</b>	<b>US\$165</b>	<b>13</b>

Source: Own calculations. With project assumes that institutes reach full capacity.



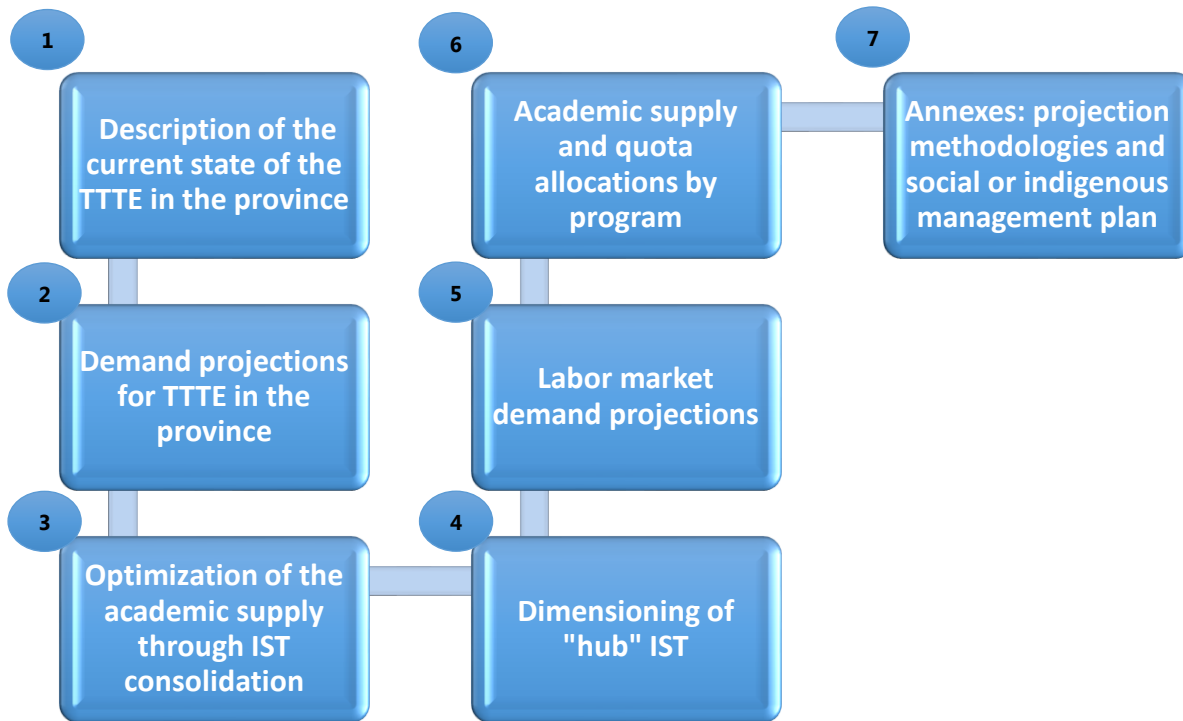
ANNEX 5: ISTs TRANSFORMATION PLANS

COUNTRY: Ecuador

Transformation of the Tertiary Technical and Technological Institutes Project

1. This annex presents a summary description of the content of the Transformation Plans (also called microplanning) to be conducted in each province where the project would intervene through Component 1. The purpose of the microplanning is to optimize the current and projected supply of TTTE according to labor demand projections through rigorous analysis at the provincial level. The DPA is responsible for the preparation of the Transformation Plans.

Figure 6. 1. Microplanning Sections



2. Each document would have the following sections:

- **Section 1: Description of the current state of the TTTE in the province.** This section contains a detailed description of the current state of the TTTE in the province, in particular, number of ISTs in the province, results of the IST evaluation conducted by CEAACES, programs currently offered in the province, and enrollment for the academic period from October 2015 to March 2016.



- **Section 2: Demand projections for technical and technological technical education.** Starting from the enrollment figures for 2015, this section estimates the expected demand up to 2022 for TTTE based on demographic projections and historical data on access, retention, and graduation rates.
- **Section 3: Optimization of the academic supply through IST consolidation.** This section presents the results of an optimization analysis of the academic supply at the provincial level, defining a plan for IST mergers and closures. The selection of the IST hub, which would be the one to be built or renovated and fully equipped by the project, among the existing ISTs is based on four criteria: (a) location, so that it minimizes the commuting time of the students in the entire province; (b) current academic supply; (c) political and historical context; and (d) social context. Those ISTs that are more than 60 minutes away from the selected hub would not be eligible for merging.
- **Section 4: Dimensioning of the 'hub' IST.** This section determines the capacity of the IST to be built or renovated so that it can absorb the residual expected demand for TTTE up to 2022 once the capacity for the ISTs that would not merge nor close in the province is considered.
- **Section 5: Labor market demand projections.** This section presents the estimated labor demand projections by economic area up to 2022, based on historical data from the *Encuesta Nacional de Empleo, Subempleo y Desempleo* labor force survey for 2010 to 2015. This section would be revised once results from the provincial labor demand survey are available.
- **Section 6: Academic supply and quota allocations by program.** This section presents the planned allocation of quotas up to 2022 among the different programs offered in the province, based on their expected labor demand upon graduation that has been estimated in the previous section and the capacity available. Given the dynamic nature of this exercise, the results would be updated biannually with real information on enrollment. This section would also present information on the expected teachers required in the province.
- **Annexes: Projection methodologies and social or indigenous management plan.** Each microplanning would have three annexes with information on (a) the methodology to estimate the demand for TTTE; (b) the methodology employed for the labor demand projections; and (c) the results from the consultations on mergers and the SMP.