

Technical Cooperation Document

I. BASIC PROJECT DATA

▪ Country/Region:	Regional
▪ TC Name:	Innovation and Competitiveness in Mining Value Chains
▪ TC Number:	RG-T2915
▪ Team Leader/Members:	Juan Carlos Navarro (IFD/CTI), Team Leader; Maria Carina Ugarte (IFD/CTI), Alternate Team Leader, Jocelyn Olivari (IFD/CTI); Monica Salazar Acosta (CTI/CCO); Michael Hennessy (CTI/CDR); Alejandra Carrasco (IFD/CTI); Ramon Espinasa (INE/ENE); Martin Walter (INE/ENE); Lenin Balza (INE/ENE); and Margie-Lys Jaime (LEG/SGO)
▪ Taxonomy:	Research and Dissemination
▪ Date of TC Abstract authorization:	N/A
▪ Beneficiary	IDB Latin American and the Caribbean member countries
▪ Executing Agency:	Inter-American Development Bank (IDB) through the Competitiveness and Innovation Division (IFD/CTI)
▪ Donors providing funding:	Canadian Facility for the Extractives Sector (CANEF) RG-X1262
▪ IDB Funding Requested:	US\$400,000
▪ Local counterpart funding, if any:	N/A
▪ Disbursement period (which includes execution period):	24 months
▪ Required start date:	December 1 st 2016
▪ Types of consultants:	Firm and/or Individuals Consultants
▪ Prepared by Unit:	IFD/CTI
▪ Unit of Disbursement Responsibility:	IFD/CTI
▪ Included in Country Strategy (y/n):	Yes ¹
▪ TC included in CPD (y/n):	No
▪ Updated Institutional Strategy Priority (2016-2019)	Innovation and productivity

II. OBJECTIVE AND JUSTIFICATION

- 2.1 Mining is a high share of Gross Domestic Product (GDP) and exports in many countries in Latin American and the Caribbean (LAC). It contributes to 12% of GDP in Chile and Peru, and 4% in Brazil. Regarding exports, the mining sector represents 60% of Chilean exports, 52% of Peruvian exports and 21% of Brazilian exports. Chile and Peru are major players in copper mining, while Brazil is a key player in iron mining. Chile led the rank of world copper production in 2014 with a share of 31%, while Peru, in fourth place, has a share of 7.5% (ECLAC, 2016). On the other hand, Brazil was the third producer of iron in the world in 2014, with a share of 9.9%. Also, driven by high commodity process, global investments in mining increased nearly ten-fold between 2000 and 2013, from US\$86 billion to US\$735 billion (Walter, 2016 and ECLAC 2013). Over the past decade, the LAC region has been the recipient of an important portion of global investment flows. In 2014, the region received approximately 25% of

¹ The Bank's current country strategy with Peru (2012-2016) identifies encouraging the formation of agglomeration economies in the form of clusters and value chains as a strategy for increasing the economy's competitiveness. The new country development challenges document (CDC) identifies increasing the economy's productivity as one of the three challenges. Similarly, Innovation and Competitiveness is signaled as the most pressing issue in Dominican Republic's and in Colombia's latest CDC.

global exploration investment flows and held more than 28% of the world's mineral investment portfolio (Walter, 2016 and SNL, 2015). Still, the mining industry has had limited success in sparking a process of economic transformation and diversification spreading to other activities. As the experience of fast industrializers shows, this process is intrinsically related to the process of innovation and spillovers leading to the creation of value in existing sectors, as well as to the emergence of new sectors in the economy. Local provision of intermediate inputs and services is still limited, and confined to the second and third lower value added tiers of the mining value chains.

- 2.2 For larger formal mining operations, which account for the vast majority of Foreign Direct Investment in the sector, the provision of intermediate inputs is dominated by first tier providers that follow mining companies in their activities overseas, and that tightly control access to these niches. However, the recent evolution of the industry is creating interesting opportunities for local suppliers. These opportunities are related to: (i) the need that mining companies are facing to outsource and make production more efficient; (ii) the emergence of new solutions to extracting and manufacturing activities derived from advances in relevant branches of science and technology, such as biotechnology and ICT; (iii) the search for local solutions required to address technological, environmental, and social challenges that are increasingly local; and (iv) the emerging accumulation of scientific, technological and manufacturing skills in several layers of local companies. Still, these opportunities for domestic suppliers and local content can only be exploited provided that some underlying conditions are fulfilled. These conditions are related, for example, to the development of local technological competences, and the availability of an institutional setting that allows encompassing the social, environmental, and production-related demands within a coherent framework.
- 2.3 In order to transform the mining industry into an engine of dynamic and sustainable development, decision-makers require a clearer understanding of: (i) the evolution of the industry and of the challenges it is facing; (ii) the technological capabilities needed to meet the new demands coming from mining companies; (iii) the expectations of civil society stakeholders about production conditions and impact on their livelihoods; and (iv) the impact of environmental regulations in place and in preparation. It is critical to identify the type of knowledge, human capital and capabilities that are currently available; and those that are required to address the challenges that the mining industry is facing along the entire value chain. This information will enable the identification of the knowledge, human capital and institutional gaps that must be addressed to promote the accumulation of local innovative technological capabilities that are sources of competitiveness in the future.
- 2.4 The extractives sector is particularly vulnerable to international demand swings and cycles in commodity prices, exposing economies to the threat of Dutch disease. Recessionary cycle phases affect extractive companies as well as those associated with derived demand for intermediate inputs and services for mining. Capabilities and local knowledge accumulated during boom years may be lost with the downturn, threatening structural transformations upon which long-term competitive advantages are built. This threat calls for clever public policies to face the macroeconomic framework that go beyond mechanisms to create buffer

stocks and funds to mitigate the volatility of the business cycle on fiscal revenues, and that protect and nurture the local capabilities created.

- 2.5 This Technical Cooperation (TC) will focus on the value chain of metallic mining in at least two countries among those prioritized by Canadian Facility for the Extractives Sector (CANEF), which include Colombia, Peru and Dominican Republic. In addition, the dissemination of the knowledge and experience gathered in the context of these countries will provide insights for the benefit of other LAC mining countries. The criteria to select the countries to be covered in this TC are: i) Availability of the required information to conduct quantitative and qualitative analysis; and ii) Interest of the country on the study and the policy implications that may be produced as a consequence of this TC.
- 2.6 The main objectives of this TC are to: (1) Characterize the mining global value chain; (2) Identify technological, knowledge, human capital and capabilities gaps that need to be addressed by the countries under study in order to promote local innovation and higher sector productivity, and the ensuing policy actions; (3) Analyze if and how the current macroeconomic downturn is impacting local technological and innovation capabilities accumulated during the commodity boom; and (4) Propose specific policy actions to protect local technological and innovation capabilities from the macroeconomic cycles that characterize commodity markets.
- 2.7 This TC consistent with the Update to the Institutional Strategy (UIS) 2010-2020 (AB-3008) and is strategically aligned with the development challenge of low productivity and innovation by identifying the knowledge, human capital and institutional gaps that need to be addressed to promote higher levels of innovation and productivity in the metallic mining industry, which has high incidence in economic activity in some countries of the region. This TC will contribute to the overarching goals of the CANEF, in its efforts to strengthen resources governance in the LAC region. Specifically, it will contribute to generating regional knowledge products on the domestic channels that enable sector development and maximizing its contribution to the local and national economy; providing input for resource governance policy-making. In addition, it will support enhanced stakeholder engagement effectiveness, through networking efforts between involved project stakeholders.

III. DESCRIPTION OF ACTIVITIES AND OUTPUTS

- 3.1 **Component 1: Cutting-edge knowledge of mining value chains in two countries through evidence-based knowledge products (US\$290,000.00).** This component will support the generation of cutting-edge and applied knowledge to map and characterize the mining value chains. A methodology will be developed that will initially be applied in at least two countries among those identified as prioritized by VPC and PRE for CANEF. This methodology may be applied to other countries and cases later on. The work will make use of trade and macroeconomic data, firm-level data, interviews, and case studies depending on information availability. The goal will be to provide a better understanding of the following dimensions of the mining sector adopting a systemic and value chain approach:

- i. The activities that intervene in the different stages of the mining chain (i.e., exploration, mine construction, mining, concentration, refining), identifying those associated with higher local economic contribution (in terms of value added);
 - ii. The actors involved in these activities (i.e., mining companies, suppliers, universities), distinguishing local from foreign origin; the required services and inputs (i.e., geochemical and geophysical services, engineering products, mining support services, construction services, ICT services, among other); The specific technologies and scientific/technical knowledge involved in the different stages and activities of the chain, establishing comparisons between LAC countries under analysis, and advanced countries in the productivity frontier;
 - iii. The conditions to ensure the development of a critical mass of competitive and innovative local suppliers. Most attention will be devoted to the study of the capabilities required in each stage of the value chain, and of the capability levels and gaps faced by local firms in the value chain.
 - iv. This component will contribute to generating and compiling quantitative data available in each country (e.g. economic and industrial census, trade data, data available to private sector organizations etc.).
- 3.2 A partnership will be developed with international experts and with research organizations in the targeted countries for the execution of the component.
- 3.3 This component will produce 4 reports: (i) a **conceptual and methodological framework** that will guide country case studies; (ii) at least **two country case studies** applying the methodological guidelines proposed in the framework; and (iii) a **synthesis report**. **Two technical workshops** will be carried out in this component: i) one to discuss the conceptual and methodological framework with the external advisor and the country research teams; and ii) another one at the end of the activities of component 1 to discuss the main results.
- 3.4 **Component 2: The volatility of the macroeconomic framework and capability creation (competitiveness) (US\$50,000)**. Recent research has shown that the volatility of the macroeconomic framework and the swings in commodity prices can affect not only on fiscal revenues and macroeconomic variables, but also microeconomic processes of innovation, learning, and capability creation that are essential for the competitiveness of local producers. This component aims at two main results: (i) measure the impact of the evolution of the macroeconomic framework on capabilities creation in firms in mining value chains; and (ii) identify possible policy alternatives to anticipate and mitigate the damages caused by the macroeconomic volatility. This component will provide decision-makers with feasible alternatives to protect and encourage the firm-level learning required to increase the resiliency of local content and suppliers' development.
- 3.5 This component will produce 2 reports: (i) a **study about the effects of macro-instability** on the development of local capabilities in the mining industry; and (ii) a document containing a **proposal of policy measures** that could be

implemented to prevent losing these capabilities during the downside of the business cycle.

- 3.6 **Component 3: Dissemination (US\$60,000).** To ensure dissemination and engagement with critical stakeholders, this component will finance the organization of an event. In close collaboration with CANEF communications team, the component will support the organization of **an event**² to socialize the results of the project and engage relevant stakeholders in the region.

Table 1. Indicative Results Matrix

CANEF Intermediate Outcome	CANEF Immediate Outcome	Outcome	Output	Unit	Baseline	2017	2018	Project Target	Observations	Method of Verification
Intermediate Outcome: Resource governance capacity at a country and regional level improved	Immediate Outcome: Access to resource governance knowledge and information increased	Improved understanding of mining value chains and suppliers capabilities, and of the effects of macro volatility, through evidence-based knowledge	Component I: Cutting-edge knowledge of mining value chains in two countries through evidence-based knowledge products							
			Conceptual and Methodological Framework produced	Framework	0	Q1	0	1	Published with 500 downloads by Q4 2018	CANEF's online hub (analytics); IDB systems and repository; media sources
			Country Case Studies based on framework produced	Study	0	0	Q2	2	Published with 1000 downloads by Q4 2018	
			Synthesis Report (encompasses framework, country studies and recommendations) produced	Report	0	0	Q3	1	Published with 1000 downloads by Q4 2018	
			Technical Discussion Workshop executed	Workshop	0	Q2	0	1	10+ sector experts	Participant list
			Technical Discussion Event executed	Workshop	0	0	Q3	1	20+ participants from Government, Civil Society and Private sector, age groups, gender and countries 30% technical knowledge increase (measured by workshop survey)	Pre and post survey answers; workshop participant list
Component II: The volatility of the macroeconomic framework and capability creation.										

² Prior to the implementation of these activities, non-objection letters will be obtained.

CANEF Intermediate Outcome	CANEF Immediate Outcome	Outcome	Output	Unit	Baseline	2017	2018	Project Target	Observations	Method of Verification
			Macro-instability Study produced	Study	0	0	Q1	1	Published with 1000 downloads by Q4 2018	CANEF's online hub (analytics); IDB systems and repository; media sources.
			Policy recommendations produced	Policy Brief	0	0	Q3	1	2 times knowledge products have been used for policy advice (by Q4 2018)	
Intermediate Outcome: Stakeholder engagement effectiveness enhanced	Immediate Outcome: Regional and Country Level Opportunities for alignment of stakeholder priorities/ expectations promoted		Component III: Dissemination							
			Dissemination Event delivered	Event	0	0	Q4	1	50+ of high-level Participants in event from different communities, gender, positions, sectors	Event participant list; media sources

3.7 The total budget for this technical cooperation is US\$400,000 as shown in Table 2. This TC operation will be financed by and under the Canadian Facility for the Extractives Sector (CANEF) (RG-X1262). Furthermore, it will report to CANEF semi-annually and annually following the report guidelines.³

Table 2. Indicative Budget (US\$ dollars)

Activity/Component	Description	IDB/Fund Funding
Component 1 Cutting-edge knowledge of mining value chains in two countries through evidence-based knowledge products		290,000
Setting a Conceptual and Methodological Framework for Country Case Studies	Review of available methodologies aimed at characterizing mining value chains, both quantitatively and qualitatively; methodological strategy to implement the country studies; monitor implementation of the methodology in targeted countries.	55,000
Country studies	Implementation of the analytical methodology; identification of the main capability gaps and recommendations to address them.	180,000
Synthesis report	Comparison between country studies	25,000
Technical workshop	Discussion of conceptual and methodological framework (Workshop 1). Discussion of final results (Workshop 2).	30,000
Component 2 The volatility of the macroeconomic framework and capability creation (competitiveness)		50,000
Study on macro-instability	Macroeconomic framework and business cycle analysis, focusing on conditions for the development of local capabilities in the mining industry.	25,000
Policy recommendations	Proposal on policies and tools to mitigate, anticipate,	25,000

³ Contractual and staff travel will be allowed for project execution purposes, as per the provisions of the Amended & Restated Cooperation Framework Agreement between the IDB and Canada (§4.1.7.), reinstated in §5 of the Administration Agreement with Canada for the CANEF Facility. These contributions may not supplement the budget of a Bank Department or Division for routine or customary activities.

Activity/Component	Description	IDB/Fund Funding
	finance, and provide insurance in a context where the business cycle negatively affects the buildup of capabilities.	
Component 3 Dissemination		60,000
Knowledge and Dissemination	To present the main results of the project. Expected audience: main stakeholders of the countries under study; IDB; other key sector stakeholders.	60,000
TOTAL		400,000

IV. EXECUTING AGENCY AND EXECUTION STRUCTURE

- 4.1 This TC will be executed by the Inter-American Development Bank through the Competitiveness and Innovation Division (IFD/CTI). This is due to the regional nature of this TC, which requires the Bank to work as an intermediary to connect and coordinate the different members of the innovation ecosystem within the region. In addition, the technical capacities of the Bank staff can ensure the effective implementation of the TC. CTI has previously conducted related studies in Chile, Brazil and Peru (see for example RG-K1396) and therefore has developed relevant knowledge and experience in the mining industry (see for example the publication <https://publications.iadb.org/handle/11319/7895>). Prior experience of the Bank will serve as a catalyzer of knowledge, consultations and policy analyses within the region, making the regional coordination of the IDB a necessary condition of this TC. The Bank will contract individual consultants, consulting firms and non-consulting services in accordance with the Bank's current procurement policies and procedures.

V. PROJECT RISKS AND ISSUES

- 5.1 The main implementation risk of this TC is that the planned analytical products may not be produced in a timely manner (due to availability and access to reliable data and information) and/or at the desired level of quality. In order to mitigate these risks, the project team will engage strategic country in all the phases of the project. In the context of CANEF, the Bank has established relations with key stakeholders of the three countries prioritized (Colombia, Peru and Dominican Republic). This project will exploit the relations made by the CANEF team to ensure the engagement of key partners with this TC and to improve access to key data and information. In addition, the team will prepare proper survey instruments when needed to collect information required to complete the activities considered in each component. In addition, this TC will simultaneously pursue several different avenues of research, and budgeting several layers of peer reviewing throughout the process to ensure quality and relevance.
- 5.2 Another potential relates to the appropriation of the results by each participating country. To mitigate this risk, to the extent possible, we will engage within the studies key actors from the public sector, private sector, academic sector and civil sector (i.e. through interviews that feed the country case studies). This collaboration will be further supported through a dissemination strategy (Component 3), where the major stakeholders related to the extractive industries

in each country studied by this TC will be invited to participate from the presentation and discussion of the main results of this TC. Key actors from other LAC countries where mining is also important, or that show interest in the topic, will be invited too.

VI. ENVIRONMENTAL AND SOCIAL CLASSIFICATION

- 6.1 Given the nature of the program, there are no associated environmental or social risks. Based on the Environment and Safeguards Compliance Policy (OP-703) this operation is classified as “C.” (see [Safeguards Policy Filter Report and then Screening Form](#)).

Required Annexes:

Annex I - [Terms of Reference](#).

Annex II - [Procurement Plan](#).