

Leticia - Artificial intelligence and semantic data analysis as a model for managing IDB Lab supported digital platforms.

(CO-T1605)

I. Basic Information for TC

▪ Country/Region:	Colombia
▪ TC Name:	Leticia - Artificial intelligence and semantic data analysis as a model for managing IDB Lab supported digital platforms.
▪ TC Number:	CO-T1605
▪ Team Leader/Members:	Yves Lesenfants (IDB Lab/STI), Greg Watson (CSD/CSD), Svante Persson (IDB Lab/DIS), Julien Collaer (IDB Lab/STI), Camilo Santa Pena (CSD/CSD), Christine Tement (IDB Lab/DIS), Oscar del Barrio (IDB Lab/STI), Patricia Guevara, (IDB Lab/DIS)
▪ Taxonomy:	
▪ Operation Supported by the TC:	
▪ Date of TC Abstract authorization:	11-30-2020
▪ Beneficiary:	
▪ Executing Agency and contact name:	IDB Lab – Yves Lesenfants
▪ Donors providing funding:	Spanish General Cooperation Fund FGE
▪ IDB Funding Requested:	US\$300,280
▪ Local counterpart funding, if any:	None
▪ Disbursement period (which includes Execution period):	24 months
▪ Required start date:	April 30 2021
▪ Types of consultants:	Firm
▪ Prepared by Unit:	IDB Lab – DIS
▪ Unit of Disbursement Responsibility:	DB Lab - DIS
▪ TC included in Country Strategy (y/n):	Y
▪ TC included in CPD (y/n):	
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	

II. Objectives and Justification of the TC

2.1 The Leticia platform is aimed to foster the financing of conservation and sustainable investments within the Herencia Colombia program (HECO)¹. The platform will use the most advanced technologies and algorithms to provide in one place intelligent data and tools to connect governments, investors, donors, philanthropists with carefully identified investment, projects and actors in high priority locations identified by programs such as Herencia Colombia.

¹ HECO is implemented by a consortium of NGOs who each leverage funds and implement projects to achieve the program's aims – WWF coordinates the group, but each organization is responsible for individual projects which range from value chain and agroforestry to protected area creation, management, ecotourism, and other bioeconomy initiatives aligned to achieve NDCs and Biodiversity targets.

- 2.2 The objective of this technical cooperation is to contribute to the deployment of an artificial intelligence (AI) capability for the Leticia platform in order to improve its user experience and impact. Additionally, an additional consultancy will ensure the integration and interoperability of Leticia's AI engine within IDB Lab IT infrastructure.
- 2.3 Knowledge integration at the speed and complexity required by current challenges in environmental sustainability requires the assistance of computer-based intelligence. To this end, an Artificial Intelligence (AI)-facilitated technological approach based on the use of semantics² and machine reasoning offers the most feasible path forward to connect the data that can be held by different players within academia, public and private sectors. The [k.LAB technology](#), developed at the Basque Centre for Climate Change (BC3), is designed specifically for this purpose and this project opens the way for its adoption at IDB Lab. k.LAB is a technology that supports decision-making in private and public domains such as governments, non-profit organizations and scientists. The system is presented as a user-transparent and automatic way to combine external data and models, allowing to access them through simple queries.
- 2.4 This TC is associated with the operation CO-T1601 "TECHNOLOGY AND INNOVATION TO CLOSE THE CONSERVATION FINANCE GAP IN THE AMAZON BASIN. THE COLOMBIA PILOT HERITAGE" approved by the Donors Committee on December 18th, 2020, which complements by providing all the BC3 experience and knowledge on Artificial Intelligence into the conceptualization and development of the platform. The approved Donor Memo for CO-T1601 already includes all details on the technical and financial contribution of the present CO-T1605 operation. Additionally, this cooperation includes a general support component to the IDB Lab on the systematized application of Artificial Intelligence in other platforms and/or initiatives.
- 2.5 The execution of this TC will be contextualized within the execution plan of CO-T1601, which it will complement. The execution will be supervised directly by IDB Lab in coordination with WWF who is the executing agency of CO-T1601.
- 2.6 The program has been co-designed by IDB Lab and the Climate Change and Sustainable Development Department and is aligned with the Institutional Strategy Update (UIS) 2020-2023 (AB-3190-2), specifically with the development challenges of: (i) social inclusion and equality through seeking to serve companies particularly in vulnerable areas in Colombia; (ii) productivity and innovation, through the targeting and eventual financing of micro, small and medium-sized companies that invest in sustainable use in protected areas; and (iii) with the cross-cutting areas of Climate Change and Environmental Sustainability, through the promotion of biodiversity, the reduction of CO2 emissions and socio-environmentally sustainable practices.

III. Description of activities/components and budget

- 3.1 The proposal is divided into **two components**. Component 1 covers the incorporation of AI technologies and the participation of BC3 for the design and implementation of k.LAB in the overall architecture and infrastructure of the Leticia platform. Component 2 makes available to IDB Lab an additional AI technical support for transferring the knowledge and assets acquired in Component 1 to other user cases within IDB Lab.

² A method of organizing data that reflects the basic meaning of data items and the relationships among them.

3.2 Component 1: Implementation of k.LAB components and knowledge transfer from the Basque Center for Climate Change (BC3) on semantic data analysis capabilities for the Leticia platform (\$225,280).

Activities:

- 3.2.1. **Semantic conceptualization, annotation of semantic data³ and related web services including:** (i) Pilot Case Development Plan. Analysis of Colombia's Ministry for the Environment core requirements, identifying how to implement k.LAB technologies and identify keys indicators and taxonomy to improve their conservation efforts, (ii) Drafting, editing and amending of Pilot Development Plan, (iii) Data and Models Scoping: identify all reasonably available resources (spatial and non-spatial) meeting the pilot plan's specified requirements, (iv) Semantic annotation of data resources: developing process that is compatible with OGC services and other APIs, so as to meet future external implementation. Deliver these resources online, (v) Algorithms coded in k.IM: Modelling options include multi criteria analysis, data-driven models (machine learning, including Bayesian networks), deterministic models and others to be defined.

Deliverables:

- a) Pilot Plan proposal - Problem analysis at the case study level (Ministry of Environment, Colombia) and scoping of the proposed solution.
- b) Model components for each algorithm, executable in k.Modeler (the modelling interface of k.LAB).

- 3.2.2. **MVP development and technology transfer including:** (i) Contribution to MVP design: Technical documentation on how to connect project components with inputs from all partners, (ii) Documentation of k.LAB APIs, network node setup of the k.LAB Network (k.Node), (iii) Instrumenting partners on the use of k.LAB, focusing on linking online resources to the semantic web, (iv) Set up k.Node outside the BC3 network, (v) Prototype of algorithm to support intelligent search between potential funders with areas and local stakeholders and developing agent-based representation in k.IM, (vi) Support the development of software (backend and APIs) components to represent investors' profiles, (vii) Technical documentation for models and algorithms.

Deliverables:

- a) Documentation of APIs and technical documentation for installation and deployment of k.LAB nodes, to create, maintain and expand the platform.
- b) Leticia's k.Node up and running including any mock-up interfaces on BC3 test engines when needed to demonstrate or test specific use cases.

³ Semantic annotation is the process of attaching additional information to various concepts (e.g. people, things, places, organizations etc) in a given text or any other content.

3.3 Component 2: Technical support for scaling or replicating A.I.-based digital products to other client-facing platforms supported by IDB Lab. (\$75,000).

Activities:

3.3.1. **Knowledge transfer:** The digital products developed and tested under the Leticia project will be systematized and documented in order to facilitate their replication in other client-facing platforms supported by the IDB Lab. In addition, an interoperability model will be defined and documented to ensure the flow of data between the different platforms supported by IDB Lab in order to improve data intelligence, its access by IDB Lab and clients as well as the final impact of these platforms.

Deliverable:

a) Technical documentation to support knowledge transfer and interoperability model.

Indicative Budget

[additional level of detail required in budget will be elaborated to provide good guidance]

Activity/Component	Description	IDB/Fund Funding	Counterpart Funding	Total Funding
Component 1	Implementation of k.LAB components and knowledge transfer from the Basque Center for Climate Change (BC3)			225,280
Component 2	Technical support for scaling or replicating A.I.-based digital products to other client-facing platforms supported by IDB Lab.			75,000
Total				300,280

3.4 The executing agency will be the Inter-American Development Bank through IDB Lab. As this is technical cooperation, intended to be a public good for the region, the Bank is well positioned to execute and disseminate the work to its strong and broad network of public and private sector entities.

3.5 For Component 1, IDB Lab considers directly contracting (sole-sourcing) the services of the Basque Center for Climate Change (BC3) considering the unique qualities of its expertise, as well as the alignment of its mandate with the objectives of the Leticia Platform. BC3's mission is to generate valuable knowledge for policy and decision making, integrating the environmental, socio-economic and ethical dimensions of climate change. Through the production of collaborative and open-source tools such as ARIES, which can track and forecast progress towards sustainable environmental and economic goals, BC3 plays a key role in enhancing regional, national and international economic development.

3.6 BC3 has extensive experience working with different stakeholders in the field of ecosystem services, from NASA to the United Nations, using Artificial Intelligence (AI) to address the world's most complex sustainability problems. Her strong, innovative and transdisciplinary approach to achieve sustainable development, through excellent

research, fits perfectly with Leticia's goal of protecting the natural capital of the Amazon basin. It has been a partner of WWF-US in projects related to the AFOLU sector and is currently working with the IDB on linking the IEEM (Integrated Environmental and Economic Modeling) Platform project with Ecosystem Services Values.

3.7 For Component 2, a competitive process for the selection of a consulting firm will be conducted based on the results and outputs of Component 1.

3.8 Evaluation reports, if any, should also be specified. Include frequency and source of financing.

IV. Executing agency and execution structure

4.1 The IDB Lab will be the executing agency for the project to ensure the most efficient integration between this TC and the CO-T1605 operation.

4.2 **Technical:** The combination of different leading global technological platforms with sophisticated Artificial Intelligence functions represents an important technical challenge whose achievement contributes fundamentally to the platform's value proposal. This risk can be mitigated thanks to a strong involvement of the technology partners and the steering committee. Maintaining a user-centered and simple vision will always be a priority.

V. Exceptions to Bank policy

5.1 This subheading should identify and address any exceptions to Bank policy.

VI. Environmental and Social Strategy

6.1 This operation was screened and classified as required by the IDB's safeguard policy (OP-703) on March 12, 2021. Given the limited impacts and risks, the proposed category for the project is C.