

TC Document

I. Basic Information for TC

▪ Country/Region:	REGIONAL
▪ TC Name:	Flagship study of agricultural productivity growth in Latin America and the Caribbean
▪ TC Number:	RG-T4539
▪ Team Leader/Members:	Schling, Maja (CSD/RND) Team Leader; Gonzalez Flores, Mario (CSD/RND) Alternate Team Leader; Centeno Lappas, Monica Clara Angelica (LEG/SGO); De Salvo, Carmine Paolo (CSD/RND); Restrepo, Lisa Sofia (CSD/RND); Bonilla Merino Arturo Francisco (LEG/SGO); Munoz, Gonzalo P. (CSD/RND); Morales Franco Ericka Marleny (CSD/RND); Salazar, Lina Piedad (CSD/RND)
▪ Taxonomy:	Research and Dissemination
▪ Operation Supported by the TC:	.
▪ Date of TC Abstract authorization:	22 May 2024.
▪ Beneficiary:	Regional
▪ Executing Agency and contact name:	Inter-American Development Bank
▪ Donors providing funding:	OC SDP Window 2 - Sustainability(W2A)
▪ IDB Funding Requested:	US\$350,000.00
▪ Local counterpart funding, if any:	US\$0
▪ Disbursement period (which includes Execution period):	24 months of disbursement; 24 months of execution
▪ Required start date:	August 1, 2024
▪ Types of consultants:	Firms, individual consultants
▪ Prepared by Unit:	CSD/RND-Env, Rural Dev & Disaster Risk
▪ Unit of Disbursement Responsibility:	CSD/RND-Env, Rural Dev & Disaster Risk
▪ TC included in Country Strategy (y/n):	No
▪ TC included in CPD (y/n):	No
▪ Alignment to the Update to the Institutional Strategy 2024-2030:	Environmental sustainability; Productivity and innovation; Social inclusion and equality

II. Objectives and Justification of the TC

2.1 **Objective.** This TC aims to support the Bank’s borrowing member countries in improving their knowledge on agricultural productivity growth by providing knowledge products as key inputs to the IDB’s flagship study focused on understanding the drivers and dynamics of agricultural productivity growth in the region, and subsequently promoting the dissemination of the main knowledge products generated, to be used in technical dialogue and the design of public policies. The knowledge products generated will contribute to strengthening the monitoring and evaluation tools needed for agricultural support policies financed through Bank operations.

2.2 Between 2000 and 2010, the Total Factor Productivity (TFP) of the agricultural sector of Latin America and the Caribbean (LAC) grew at 2.2% annually; however, between 2010 and 2020 the annual growth rate declined to 1.5% (Nin-Pratt et al., 2023)¹. To feed its growing population, the agricultural sectors of LAC need to increase food production and productivity while preserving the natural resource base. The objective

¹ [Nin-Pratt et al. \(2023\)](#)

of this TC is to support the implementation of the Bank's applied research agenda in the agricultural sector in LAC to identify the main drivers of the slowing rate of agricultural productivity growth and to provide policy recommendations for borrowing countries on the most cost-effective policies to boost agricultural productivity.

- 2.3 Increasing agricultural productivity in a sustainable manner is a fundamental pillar for feeding a growing population, reducing pressure on natural resources, and improving the livelihoods of the rural population in LAC. The reduction of rural poverty has been shown to be strongly correlated with agricultural productivity growth, and the productivity growth in this sector can contribute two to four times more to poverty reduction than growth in other sectors.² In order to boost food production without increasing greenhouse gas emissions and expanding the agricultural frontier to the detriment of natural resources and biodiversity, increasing agricultural productivity in the region is imperative. However, the growth rate of agricultural productivity in LAC has slowed significantly in recent years. While the region as a whole has shown solid productivity growth rates during the first decade of the century, this masks a profound variation within the region. While Brazil, Argentina and Mexico contributed 82% to productivity gains relative to OECD countries, other countries in the region experienced negative (Trinidad and Tobago, Belize, Uruguay) or near zero TFP growth rates (Bolivia, El Salvador, Venezuela).^{3,4}
- 2.4 The agricultural sector in LAC faces several challenges going forward. Climate change is increasingly causing adverse impacts on agricultural production, with significant consequences for food security, rural livelihoods, and environmental sustainability in the region. The main climatic factors causing increasing agricultural productivity losses are changes in temperature and precipitation, causing shorter production cycles with less time for grain filling and reduction in water availability, especially in tropical regions⁵ Additionally, a range of factors are inhibiting productivity growth and, therefore, rural incomes in LAC. These include:⁶ (i) inadequate infrastructure; (ii) low levels of investment in R&D; (iii) limited coverage of rural advisory services; (iv) inadequate animal and plant health and food safety services; (v) weak land administration systems; (vi) outdated and incomplete statistics to guide investment decisions and policy making; (vii) limited access to credit; (viii) limitations to access foreign markets; (ix) low levels of connectivity and AgTech adoption; and (x) gender and ethnic gaps.
- 2.5 Despite existing knowledge and empirical evidence about some of the main drivers and dynamics of agricultural productivity growth in LAC, no comprehensive regional analysis has been undertaken to better understand agricultural productivity in terms of historical trends, the role of agricultural support policies, and the impacts of climate change on agricultural productivity. Moreover, while the Bank has supported the region in financing several agricultural and population censuses, as well as a growing number of impact evaluations in the sector, these data sets have not been systematically analyzed to better understand agricultural productivity. Finally, there might be innovative ways in which agricultural productivity growth can be analyzed in the absence of census data for countries that lack this information, including remote sensing technology. In this context, it is crucial to gain an in-depth understanding of

² [De Janvry & Sadoulet \(2010\)](#)

³ [Fuglie \(2018\)](#)

⁴ [Nin-Pratt & Valdés Conroy \(2020\)](#)

⁵ [Confalonieri et al. \(2012\)](#)

⁶ IDB (2019). Agriculture Sector Framework Document

the main factors that accurately predict future productivity growth and determine what policy tools can be most effective at boosting agricultural productivity throughout the region, while preserving natural resources.

- 2.6 The flagship study intends to examine agricultural productivity growth in LAC both at the regional and national level. An introductory chapter will present a systematic literature review which will be conducted using latest artificial intelligence technology to comprehensively assess the current state of empirical research on agricultural productivity growth in the region and identify areas where additional research is needed. A regional analysis will then explore trends in total factor productivity (TFP), which represents the most comprehensive measure and considers all land, labor, capital, and material resources utilized in farm production relative to the total gross output of crop, animal, and aquaculture products which a given farm is able to produce. Using this measure, the regional analysis examines the evolution of annual TFP over the last 60 years (1961-2021) across all but one borrowing member countries in the LAC region⁷, comparing TFP trends across countries and permitting a closer examination of the contributions of different production inputs (land, labor) and technological change over time, and the regional differences therein. To shed further light on how public policy may have contributed to differential TFP trends in the region, the study will take advantage of available data from IDB's Agrimonitor Platform to assess the relationship between fiscal support to the agricultural sector and TFP during the last ten years.
- 2.7 Additionally, while extensive theoretical and empirical research has been conducted on agricultural TFP growth, most studies have not integrated non-market agricultural inputs (such as climate conditions, water, and soil resources) and environmental outputs (such as pollutants and carbon emissions) into their frameworks. To fill this gap, a chapter of the study will be dedicated to developing a quantitative measure of agricultural TFP growth that integrates the environmental sustainability of agricultural systems, with the goal of: (i) measuring sustainable growth of agriculture in LAC and comparing its performance with that in other regions; (ii) evaluating sustainable growth performance of countries in the region and identifying drivers of growth and environmental impacts; and (iii) identifying challenges and policy options to achieve sustainable agricultural growth in the region. This will further be complemented by a regional analysis that will take advantage of available satellite imagery to understand the role that climate change plays in the agricultural sector, by examining the relationship between the evolution of TFP and remotely sensed deforestation rates.
- 2.8 In addition to this in-depth regional analysis, the study will build upon identified differences across countries to conduct national analyses of TFP growth, in order to highlight and shed light on the heterogeneity of agricultural production and growth in the region. The selection of countries aims to be representative of the geographic and sectorial diversity in the region, while also considering the availability of data for rigorous analysis. A preliminary selection of country studies according to these criteria includes Argentina, Bolivia, Brazil, Colombia, Ecuador, El Salvador, Mexico, Paraguay, Peru, and Uruguay. For each of these countries, agricultural census data and other nationally representative agricultural survey data will be used to examine the drivers and determinants of agricultural productivity growth in each country. Where possible, climate change related data will be included in the analysis. Results will serve

⁷ The only country not included is Barbados, given that no TFP data is reported for this country in the relevant USDA database.

to highlight and compare national productivity growth and what factors contribute to its performance in each country. Lastly, a chapter will be dedicated to presenting and reviewing various rigorous impact evaluations that have estimated the causal effects of IDB interventions in the sector on agricultural productivity, including projects which have supported irrigation systems and agroforestry systems, fostered technology adoption, invested in land titling and plant health. This will serve to identify such public policies that can effectively promote agricultural productivity growth and complement the primary drivers of TFP growth that were identified in the regional and national analyses. As a result of this set of studies, the flagship knowledge product will be able to identify concrete areas of public policy that should be prioritized going forward to cost-effectively promote agricultural productivity growth in a sustainable and inclusive manner.

- 2.9 **Strategic alignment.** The TC is consistent with the IDB Group Institutional Strategy: Transforming for Scale and Impact (CA-631) and is aligned with the objectives of: (i) reduce poverty and inequality; (ii) address climate change; and (iii) bolster sustainable regional growth, by generating knowledge about the key drivers that limit or contribute to agricultural productivity growth and the policies that can improve agricultural productivity, which in turn can improve rural incomes, food security, and the ability of the agricultural sectors to adopt to, and mitigate, the effects of climate change. The CT is also aligned with the Ordinary Capital Strategic Development Program (OC-SDP) Window 2 Sustainability (W2A) (GN-2819-14), in particular with Priority Area 1 – Climate Change and Environmental Sustainability and Priority Area 6 – Inclusive Economic Growth. Furthermore, the TC is aligned with the Agriculture Sector Framework (GN- 2709-12) by generating knowledge products that help better understand how investments can increase productivity in the agricultural sector with sustainable management of natural resources; the Food Security Sector Framework (GN-2825-9), as agricultural productivity growth is a main contributor food and nutrition security in rural settings; as well as the Climate Change Sector Framework (GN-2835-8) by integrating climate change into our understanding of what drives and hinders agricultural productivity growth in the region.

III. Description of activities/components and budget

- 3.1 The TC is structured in two components:
- 3.2 **Component I: Support for the Bank’s Flagship Regional Study on Agricultural Productivity (US\$300,000).** This component aims to generate the main inputs to prepare key chapters of the Flagship Study, including macro- and microeconomic analyses based on administrative data such as national agricultural censuses and agricultural household surveys, as well as processing and analyzing satellite imagery used to measure changes in yields, environmental and climate change related variables. To that end, the component will finance individual consultancies to carry out: (i) expert-led regional and national studies of agricultural productivity growth; and (ii) research assistance to support the preparation of necessary knowledge inputs.
- 3.3 **Component II: Dissemination of Knowledge Products (US\$50,000).** This component aims to effectively disseminate the Flagship Study and its individual knowledge products with internal and external audiences. To that end, the component will finance: (i) the printing and distribution of dissemination materials such as monographs, infographics, and policy briefs; and (ii) dissemination events of study results, including the organization of an in-person seminar (expected to be held at IDB Headquarters) with relevant internal and external policy stakeholders, as well as a

virtual seminar to facilitate the participation of a wider audience. Any knowledge product generated within the framework of this technical cooperation will be the property of the Bank and may be made available to the public under a *creative commons* license. The main dissemination channels for the Flagship study will be an IDB book publication directed at policy makers in the region and beyond, edited by the TC project team. Additionally, to reach an academic audience, the project team aims to prepare all knowledge products in an academic paper format in order to elaborate a special edition for a relevant academic, peer-reviewed journal that will be determined in the coming months.

- 3.4 **Expected results.** The expected result of this TC is to generate robust empirical evidence about the drivers and dynamics of agricultural productivity growth in the region, thereby contributing to evidence-based policy making in the agricultural sector of LAC.
- 3.5 The fund that will finance this non-reimbursable technical cooperation in support of the client, is W2A - OC SDP Window 2 - Sustainability, for a total amount of US\$350,000.

Indicative Budget

Activity/Component	IDB Funding (W2A)	Counterpart Funding	Total Funding
<u>Component I</u>	300,000.00	0.00	300,000.00
Product 1: Regional studies on agricultural productivity growth completed	150,000.00	0.00	150,000.00
Product 2: National studies on agricultural productivity growth completed	150,000.00	0.00	150,000.00
<u>Component II</u>	50,000.00	0.00	50,000.00
Product 1: Dissemination materials designed and printed	10,000.00	0.00	10,000.00
Product 2: Dissemination events (in-person and virtual) organized and held	40,000.00	0.00	40,000.00
Total	350,000.00	0.00	350,000.00

- 3.6 **Supervision.** The IDB, through the project team leader, will have the responsibility for the implementation and overall supervision of the project. Supervision will be closely coordinated with the relevant stakeholders in the region through the responsible RND country specialist, on a case-by-case basis dependent on the respective study.
- 3.7 **Monitoring and evaluation.** Monitoring of the TC will be carried out by the project team, comprised of CSD/RND members at HQ and at the relevant country offices. On an annual basis, the team will produce progress reports on each of the components and expected results of the TC. The final evaluation report will be available by the end of TC execution.

IV. Executing agency and execution structure

- 4.1 The Inter-American Development Bank will execute and supervise the fulfillment of the responsibilities derived from this TC, given the regional coverage of the studies to be performed and possible synergies and complementarities with Bank operations and research. The Bank will coordinate the contracting and focus of the studies to be contracted with the resources of this TC. Execution by the Bank will ensure the timely contracting of TC consultancies contracted by the Bank.
- 4.2 The IDB, as executor of this TC, will be responsible for: (i) identifying the necessary studies and technical work; (ii) selecting and contracting consultants to provide the necessary services; and (iii) managing the execution and delivery of the consultancy services. The Climate Change and Sustainable Development Sector (CSD) will act as the Basic Responsibility Unit for these procurements.
- 4.3 Bank staff at Headquarters and in the Country Offices will provide technical and operational expertise in the activities to be implemented in the components. The disbursement and execution time for the TC is estimated at 24 months.
- 4.4 The TC does not present fiduciary management risks since it will be executed by the Bank. For the same reason, no financial audit is required. The activities to be executed under this operation are included in the Procurement Plan (Annex 3) and will be executed in accordance with the Bank's selection and contracting methods.
- 4.5 The principal reason for this execution structure is that the Bank has the expertise, capacity and experience identifying and filling knowledge gaps at the regional scale. A second reason is related to dissemination given that the policy implications from the proposed studies will be informative and helpful to other countries in the region. The RND team has a proven track record of executing similar Technical Cooperation projects (TCs) with satisfactory results. The team has executed similar TCs in the Region to analyze sectorial policies (ATN/OC-20116-RG) and coordinate policy action (ATN/OC-20522-RG). In the past, RND has conducted analyses of agricultural policies and programs in Latin America and the Caribbean (LAC), with a focus on their main trends and commonalities.^{8,9} Additionally, a study was conducted on the effects of the composition of agricultural support on rural incomes.¹⁰ Another related study aimed to shed light on the impacts of specific types of private subsidies and public goods interventions on agricultural growth and productivity.¹¹ These studies have significantly contributed to improving policy dialogue in the Region's agricultural sectors and will be of great help in addressing the challenges faced by the LAC region in the areas of food security, climate change and agricultural development.
- 4.6 For two of the studies to be carried out under Component 1, specifically the systematic literature review and the regional TFP analysis, the TC intends to directly hire a private firm. For the systematic literature review, the firm to be hired is the *Juno Evidence Alliance* (Juno), a global platform that specializes in harnessing artificial intelligence to guide evidence-base policy making in agrifood systems and climate adaptation. Juno is the leader in combining artificial intelligence and established scientific research methods in order to expedite the synthesis of diverse data sources, thereby filling critical gaps in the coordination and standardization of evidence-informed decision-making processes. Given the vast area of research that will have to be reviewed and

⁸ [Gurria et al \(2016\)](#)

⁹ [Egas & De Salvo \(2018\)](#)

¹⁰ [Anríquez et al \(2016\)](#)

¹¹ [López et al \(2017\)](#)

synthesized to summarize and interpret empirical findings on historic agricultural productivity growth in the region and beyond, Juno is uniquely positioned to support this chapter of the Flagship study, in accordance with the Bank's Corporate Procurement Policy (GN-2303-33, paragraph 3.4 (ii) (d)).

- 4.7 The other study that is expected to directly contract a firm is the regional study of the dynamics and determinants of TFP, with a focus on its environmental sustainability. In this context, it is expected that the *International Food Policy Research Institute* (IFPRI) will be hired directly. In accordance with the Bank's Corporate Procurement Policy (GN-2303-33, paragraph 3.4 (ii) (a)), the justification for this anticipated procurement is that it represents a natural continuation of previous work carried out by IFPRI, under the supervision of INT/INT, which will expand the scope of an initial analysis of climate change on agricultural yields, in addition to an update of a research work conducted under the supervision of CSD/RND that was published in 2020. It is therefore intended that the current study will serve to update the existing studies using updated data as well as a refined methodology.
- 4.8 All in-person activities, including dissemination events, are currently expected to take place at IDB Headquarters. In the case that it will be deemed necessary to hold any events or in-person activities in one of the beneficiary countries, the corresponding letter of non-objection will be sought from the Bank's liaison entity in the country prior to the initiation of activities in the beneficiary countries.

V. Major issues

- 5.1 The main risk associated with the implementation of this TC is the delay in contracting the consultancies that will be needed to carry out the different analytical studies. An additional potential risk for delay is the receipt of census data that is made available upon request by the countries' national institute of statistics. To mitigate these risks, the project team has prepared Terms of Reference (TOR) and has initiated the contracting process. In addition, data requests have already been made to ensure that information necessary for all analytical work will be available upon commencement of the different consultancies. The knowledge products generated within the framework of this technical cooperation will be the property of the Bank and may be made available to the public under a *creative commons* license.

VI. Exceptions to Bank policy

- 6.1 There are no exceptions to Bank policy.

VII. Environmental and Social Aspects

- 7.1 This Technical Cooperation is not intended to finance pre-feasibility or feasibility studies of specific investment projects or environmental and social studies associated with them; therefore, this TC does not have applicable requirements of the Bank's Environmental and Social Policy Framework (ESPF).