TC Abstract

I. Basic project data

▪ Country/Region:	Region
▪ TC Name:	Regional Agricultural Biosciences Platform[1]
▪ TC Number:	RG-T2349
▪ Team Leader/Members:	Cesar Falconi, Team Leader (INE/RND); Pedro Martel (INE/RND); Fernando Balcazar (RND/CCO); Guillermo Eschoyez (LEG/SGO); and Lisa Sofia Restrepo (INE/RND)
▪ Indicate if: Operational Support, Client Support, or Research & Dissemination.	Research and Dissemination
▪ If Operational Support TC, give number and name of Operation Supported by the TC:	No
▪ Reference to Request: (IDB docs #)	IDBDOCS: 38986776
▪ Date of TC Abstract:	August 14, 2014
▪ Beneficiary:	Regional and National Agricultural Research Institutes
▪ Executing Agency and contact name	International Center for Tropical Agriculture-CIAT Ruben Echeverria, Director General
▪ IDB Funding Requested:	US$600,000
▪ Local counterpart funding, if any:	US$290,000 in-kind
▪ Disbursement period:	Execution: 18 months, Disbursement: 24 months
▪ Required start date:	October 1, 2014
▪ Types of consultants (firm or individual consultants):	Firm or individual consultants
▪ Prepared by Unit:	INE/RND
▪ Unit of Disbursement Responsibility:	INE/RND
▪ Included in Country Strategy (y/n); ▪ TC included in CPD (y/n):	No No
▪ GCI-9 Sector Priority:	poverty reduction and equity enhancement; support for regional cooperation and integration; and environmental protection, climate change response and increased food security

[1] Biosciencies in general refer to use of biological sciences in the solution of health and agricultural problems and the exploitation of natural resources based opportunities. The qualification "advanced" is used to highlight - within that general framework - the emphasis on the application of molecular biology based tools and their interphase with other emerging bodies of knowledge in information and physical sciences to the same purpose.

II. Objective and justification

2.1 For many reasons the LAC region has a distinctive role to play in achieving the required global food/feed/fuel balances of the future, while enhancing environmental sustainability. Its biodiversity and land resources are vast, but its past and present productivity performance is far from the levels that could sustain this role. In practice, however, while some countries – such as those of the southern cone, Brazil, and Peru– have experienced unprecedented agricultural transformations which have catapulted them to playing key roles in international agricultural markets. The rest, to a large extent have remained stagnant showing significant productivity gaps in many of their major crops. A situation that in many cases weakens their food security, in-spite that their natural resources base points to a reasonable potential of self-sufficiency and even prospects of becoming net exporters. Furthermore is the need for the countries of interest, signatories of recent Free Trade Agreements, to become more competitive in light of lower-costs imports and/or opportunities for new export markets. Many factors account for this situation, but the lack of a reliable and affordable supply of new technologies is a common variable affecting most of these countries.

2.2 Directly linked to this situation are weak agricultural research capacities in general and in particular in the area of biotechnology, which are considered essential for these countries to make full and effective use of the potential of their natural resources riches in general and those of biodiversity in particular. A study by Sain and Ardila (PROCISUR 2009) places Colombia, Ecuador and Peru as having mid-level capacities in terms of being able to take advantage of spill-ins from research done in other countries, but not being able to generate innovations on their own. Investments in agricultural biotechnology are low or almost nonexistent, preventing the countries for consolidating their capacities to effectively exploit its biodiversity riches. By the middle of the past decade over all investments in this area was only a little over $7.5 million a year (Colombia $4.4, Ecuador $2.4 and Peru $ 0.9 million a year).

2.3 At the same time, a variety of centers in the region, particularly at the international level and in the larger countries, have developed strong scientific and technological capacities to support the demands from their agricultural sectors and beyond. Given these conditions, CIAT's Biosciences Platform represents an ideal resource to mobilize and support the needed processes of human resources development and technology transfer.

2.4 In this context, the objective of this operation is to improve the agricultural productivity and to contribute to the conservation of national agro biodiversity in three Andean countries (Colombia, Ecuador and Peru) through CIAT agricultural biosciences platform, as a facilitating and support mechanism for improving the countries' capacities to use advanced biosciences in the development and transfer of effective technological options. As the platform consolidates, it is expected that it will be extended to other countries of the region.

2.5 This effort aligns to the recently approved Sector Framework Document on Agriculture and Natural Resources Management (OP-1009-3), in which

increasing agricultural productivity in a sustainable manner is a priority. In addition, this operation is closely aligned to the Bank's Biodiversity Initiative for Latin America and the Caribbean. Advanced biosciences capacities are a key resource for the achievement of these objectives. The system emerging from a more sustainable use of biodiversity and other natural capital assets is one intensive in knowledge, where scientific and technological capacities are essential for the value added process leading to new options. But in many cases in the three target countries, they are in short supply and this operation aims precisely to contribute to closing the capacity gaps that today exists among the countries of the region.

2.6 Working from the basis of CIAT's state of the art laboratory infrastructure and human resources in this phase, the platform will extend the network of institutional relations with all the major actors in the development cooperation area, to effectively incorporate the capacities placed in national and international institutions such as EMBRAPA (Brazil), CINVESTAV-Langbio (Mexico), INTA (Argentina), CIRAD-IRD (France), and others that have expressed interest in opening their resources and capacities to this type of collaboration. Furthermore, it will also encourage the diffusion of long-standing work with partners from outside the region in the solution of key problems limiting the productivity of the region's resources.

2.7 The current CIAT Bioscience platform offers a unique opportunity for a concentrated technological "leap-frogging" effort with direct impact on the capacity of national institutions and their scientists to work not only on improving the productivity of existing production alternatives, but also to explore their biodiversity and natural resources base to identify and develop new options for the improvement food security in participating countries.

III. Description of activities and outputs

3.1 The platform will concentrate in this first phase of 18 months in three countries from the Andean region: Colombia, Ecuador and Peru. The platform's components include:

A. **Training program**, in key scientific and technological areas and designed to complement existing national and international programs (MSc or PhD levels) through short- term (up to one month) courses with a heavy emphasis on tool use capacities. Curricula planning and delivery will be a joint effort by CIAT and platform partners on the basis of a needs assessment. Program development and participants selection will be on the basis of scientific background and achievement, targeting: (i) young researchers, to accelerate their insertion in existing R&D programs and formal training later on in their careers; and (ii) senior researchers aiming to re-train them with advanced techniques and tools to upgrade their research. Initially training[2] will be

[2] Training areas will include, among others, integrating advanced molecular techniques into breeding and crop improvements programs, germplasm management systems, combining molecular techniques, GIS and genetics, bioinformatics and other support tools, in-vitro propagation techniques, and seed production technology.

carried out at CIAT with participation of partner's scientists depending on program needs. However, as the platform consolidates and funds are secured for a second phase, specific courses organized at partners' facilities are also envisaged. Within this component funding will be directed to fellowships (travel and living expenses) and other direct costs of the training events, including those of invited scientists from partner institutions. A planning and coordination meeting will be held with representatives from Colombia, Ecuador and Peru at the very start of the project. At the end of the first year, a planning meeting will be organized with selected representatives from LAC to discuss a second phase and will aim at proposing a model for the establishment of a sustainable platform involving the major national programs in LAC.

B. **Research services and support**, aimed at offering access to scientists in national (public and private) research institutions to advanced infrastructure and advice in support of their research efforts. It is projected that 10 researchers will be selected to spend each a month using CIAT Bioscience platform. This platform includes, but is not limited to: (i) genetic resources conservation tools, such as tissue culture systems and development of low cost rapid propagation system for vegetative propagated species, and cryoconservation; (ii) genomics and phenomics platforms for accelerated domestication and traits identification;[3] and (iii) crop information management and bioinformatics. Project selection criteria will include the relative (socio-economic) importance of the crop, scientific-technological interest, institutional commitment, among other aspects.[4] This component will function under competitive grants conditions, and will fund travel costs of the beneficiaries and direct research costs.

C. **Capacity building in R&D policy, regulatory and management areas, and bioeconomy strategic planning and development**. This component is aimed at developing, wherever relevant: (i) a supporting policy and regulatory environment for effective use of biosciences-based technology solutions for agricultural development and food security; and (ii) effective technology transfer capacities in participating institutions and scientists. The emerging "new bioeconomy" – interpreted as that segment (of the economy) building on improved uses of biomass and the opportunities emerging from the new biology and associated sciences – offers the countries of the LAC region in

[3] Using CIAT high throughput sequencing lab to generate single nucleotide polymorphism (SNP) markers, molecular characterization of genetic diversity and implementation of novel and innovative strategies for conservation and allele mining, expert system for mapping and Integration of markers in breeding programs, high throughput phenotypic screening for nutritional traits, water and nitrogen use efficiencies.

[4] Crops potentially covered under this component include (besides CIAT's mandated crops) (i) Added value" crops (semi domesticated species –with identified income / market and employment potential), such as tropical fruits which can offer opportunities both at the farm level as well as at the broader local economy level through labor and income effects; and (ii) Underinvested commercial crops (traditional crops poorly covered by R&D investments, where lack of technology has affected competitiveness).

general and those piloted in this project in particular (Colombia, Ecuador and Peru), a wide range of new opportunities. However for them to be exploited to their full potential, new information and policy perspectives have to be developed both to guide both private and public investments in the field. This component will include a variety of activities such as foresight analysis in support of R&D policy development, biosafety regulatory management support, and technology validation and transfer, based on the partners' long standing programs and experiences in these fields, as a contribution to support policy design and decision making processes. Whenever possible, these activities will be implemented in close coordination with component (A) and will aim to strengthen existing regional and national capacities. Funding will be directed to fellowships, travel expenses and the costs of invited scientists as required by each specific case. Wherever possible, synergies will be sought with ongoing European Commission funded bi-regional Science & Technology Cooperation projects aimed at the Bioeconomy development in Latin America.

3.2 Expected products from this initiative include:

- Research institutions with better capacities to apply state of the art science and technology in their mandated areas, including the emerging challenges of mitigating and adapting to climate change, and reducing environmental impact of agricultural production,
- Researchers better equipped to deal with the research implementation challenges implicit in their respective programs,
- Improved technologies to better address productivity limitations in key crops,
- Regulatory systems better able to facilitate technology adoption and equipped to promote and exploit natural resources for market possibilities.

IV. Indicative budget

Activity /component	Description	IDB/Fund funding	Counterpart funding*	Total Funding
Overall platform coordination	Technical consultant, administrative support, travel	114,000	75,000	189,000
A. Training Program	Training specialist, visiting scientist, fellowships	237,200	140,000	377,200
B. Research and Service Support	Post Docs, specific projects operational cost	120,000	60,000	180,000
C. Capacity building in R&D policy	Visiting scientist, fellowships, project support	108,000	25,000**	133,000
Monitoring and Evaluation		10,000		10,000
Audit		10,800		10,800
Total		600,000	300,000	900,000

*In-kind funding contribution from CIAT for program management, supervision, IT, bioinformatics laboratory, SNP marker and Next Generation Sequencing lab facilities. **Co-financing from the EC FP7 INCO-NET project, in which CIAT collaborates through its French partner CIRAD, on the development of the Bioeconomy in Latin America.

V. Implementation structure and executing agency

5.1 The platform is conceived to bring together the capacities of a variety of partners – both within the LAC region and in other parts of the world – linked by the shared interest to make their resources and (complementing) competences available in a structured way to help bridge the knowledge gap that exists today in many of the smaller countries and which is expected to grow in the future as the advanced biosciences consolidate as the basis for the agricultural technology development processes. In this context CIAT will be the implementing agency for the Platform through a Platform Executive Unit, headed by a manager. The platform will benefit from the full range of financial, administrative and support facilities present at the Centre. CIAT has a long integrative experience in plant genetic resources conservation, characterization with agronomic and molecular–cellular techniques, geographic information.

VI. Project Risks and issues

6.1 The Project does not face any particular risks as it is aimed at supporting already existing initiatives complementing its reach into a more institutional environment.

VII. Environmental and Social Classification

7.1 At this time it is not anticipated that there will be open field activities under this project. Over all the activities of the platform will be performed in full compliance with CIAT environmental and other regulations that are all in line with internationally accepted standards.