

TC Document

I. Basic Information for TC

▪ Country/Region:	Colombia
▪ TC Name:	Assessing Tropical Dry Forest Biodiversity and Ecosystem Services
▪ TC Number:	CO-T1395
▪ Team Leader/Members:	Co-Team leaders: Eirivelthon Lima (RND/CPE); and Onil Banerjee (INE/RND). Members: Michele Lemay; Enrique Ibarra; Melanie Argimon; Yolanda Valle (INE/RND); and Javier Jimenez (LEG/SGO)
▪ Indicate if: Operational Support, Client Support, or Research & Dissemination	Research & Dissemination
▪ If Operational Support TC, give number and name of Operation Supported by the TC:	N/A
▪ Date of TC Abstract authorization:	August 27, 2015
▪ Beneficiary (countries or entities which are the recipient of the technical assistance):	Colombia
▪ Executing Agency and contact name (Organization or entity responsible for executing the TC Program) {If Bank: Contracting entity} {If the same as Beneficiary, please indicate}	Alexander von Humboldt Biological Resources Research Institute
▪ Donors providing funding:	Agencia Presidencial de Cooperación Internacional de Colombia
▪ IDB Funding Requested:	US\$549,400 – Multidonor Fund for Biodiversity and Ecosystem Services (MDB)
▪ Local counterpart funding, if any:	US\$117,600
▪ Disbursement period (which includes Execution period):	36 months
▪ Required start date:	December, 2015
▪ Types of consultants (firm or individual consultants):	Firm
▪ Prepared by Unit:	INE/RND
▪ Unit of Disbursement Responsibility:	INE/RND
▪ TC Included in Country Strategy (y/n):	N/A
▪ TC included in CPD (y/n):	n
▪ GCI-9 Sector Priority:	Climate change, sustainable (including renewable energy), and environmental sustainability

II. Objectives and Justification of the TC

- 2.1. **Objective.** The objective of this TC is to generate scientifically rigorous baseline data on biodiversity and ecosystem services supply and value from Tropical Dry Forests (TDF) in Colombia to support conservation planning and sustainable management. The specific objectives of this TC are to (i) quantify plant biodiversity of TDF across environmental and successional gradients; (ii) quantify carbon and nutrient cycling in TDF across these gradients; and (iii) quantify ecosystem service supply, value and change based on the TDF's original and actual extent. Implementation of this TC will support the collection of data required to inform site-specific evidence-based policy

to support sustainable management and conservation of Colombia's remaining dry forests.

- 2.2. **Justification.** TDF are considered now the most heavily utilized and disturbed ecosystem in the world, especially in the Americas¹. Yet, despite their importance TDF have received little attention from researchers and policy makers² resulting in their over-exploitation³. Globally, over 54% of the TDF are located in Latin American and Caribbean (LAC) where they are at very high risk of deforestation: 66% of the region's TDF have been converted to other uses and only 4.5% of the remaining TDF are under some form of protection⁴. Colombia's TDF once covered almost 9 million hectares and hold high levels of biodiversity and endemism with almost 2,600 plant species, 230 bird species, 60 mammal species, and 58 amphibian species⁵.
- 2.3. Colombia's TDF have been and continue to be under immense pressure as a consequence of increasing anthropogenic disturbance. It is estimated that approximately six million people reside within areas where TDF currently exists. Only 4% of the original cover of mature TDF remains in the country⁶ and only 5% of what is left, equivalent to 1.7% of its original extension is protected.⁷ Moreover, 65% of the area deforested has been degraded to the degree of desertification.⁸ With 95% of TDF occurring on private lands the remaining forests are threatened by clearing for agriculture, mining and hydropower purposes. This information indicates that dry forests in Colombia are extremely fragmented, and their biodiversity in critical condition. Given this precarious scenario, urgent efforts are required if the remaining TDF and their unique and rich biodiversity is to be protected. Research to fill existing information gaps on Colombia's TDF biodiversity and their value to people (ecosystem services) represents a critical building block for comprehensive decision making and ensure future management strategies that secure TDF's long-term maintenance are well informed.
- 2.4. The Ecosystem Services (ES) provided by TDF in Colombia and the livelihoods these forests support are not yet well understood⁹. Studies that have been conducted in Colombia and in the LAC region have shown that they provide life-sustaining and economically valuable ES¹⁰ with climate and nutrient regulation among the most highly valued¹¹. For instance, due to the degradation of the TDF in

¹ Janzen, D. H. 1988. Tropical dry forests; the most endangered major tropical ecosystems. Chapter 14:130–136; Portillo-Quintero, C. A., and G. A. Sánchez-Azofeifa. 2010. Extent and conservation of tropical dry forests in the Americas. *Biological conservation* 143:144–155.

² Becknell, J. M. et al. 2012. Aboveground biomass in mature and secondary seasonally dry tropical forests: A literature review and global synthesis. *Forest Ecology and Management* 276:88–95.

³ Miles, L. et al.. 2006. A global overview of the conservation status of tropical dry forests. *Journal of Biogeography* 33:491–505; Portillo-Quintero and Sánchez-Azofeifa, 2010.

⁴ Portillo-Quintero, C. A., and G. A. Sánchez-Azofeifa. 2010. Extent and conservation of tropical dry forests in the Americas. *Biological conservation* 143:144–155.

⁵ Pizano, C. and García, H. editors. 2014. *El Bosque Seco Tropical en Colombia*. Instituto de Investigación en Recursos Biológicos Alexander von Humboldt. Bogotá, Colombia.

⁶ *Ibid*

⁷ Portillo-Quintero, C. A., et al. 2010.

⁸ García, H., et al.. 2014. Distribución y estado actual de los remanentes del bioma de bosque seco tropical en Colombia: insumos para su gestión. Pages 229-251

⁹ Maass, J. M. et al. . 2005. Ecosystem services of tropical dry forests: insights from long-term ecological and social research on the Pacific Coast of Mexico. *Ecology and Society* 10:1–17.

¹⁰ Quesada, M. et al. 2009. Succession and management of tropical dry forests in the Americas: Review and new perspectives. *Forest Ecology and Management* 258:1014–1024;

¹¹ Jaramillo, V. et al. 2003. Biomass, carbon, and nitrogen pools in Mexican tropical dry forest landscapes. *Ecosystems* 6:609–629;

Colombia's Caribbean region, flooding damage precipitated by the 2010-2011 "El Niño" event was estimated at US\$5.5 million in flood regulation services alone¹². As a response to the loss of regulatory ES provision, the Government of Colombia allocated over US\$11 billion for the 2011 to 2014 wet seasons¹³. TDF also represent a critical carbon sink for climate change mitigation, while they are estimated to hold a total of 8.7 gigatons of carbon worldwide¹⁴. In addition, nutrient cycling and retention enrich forest soils and sustain soil, plant and animal biodiversity, all of which underpin an economically important agricultural sector.

- 2.5. Lack of understanding of the economic value of Colombia's TDF and the ES they provide has translated in the absence of explicit policies for their preservation, management and use, which has led to their continued destruction and degradation. Private landowners depend on ES supply for sustaining agricultural operations. In particular, TDF stabilize soils, stop erosion, and regulate water, preventing land desertification and assuring the productivity of natural, agricultural and livestock systems. Hydropower companies depend on ES supply for the clean water free of sediment to fill their reservoirs and pass through their turbines. Residents and tourists count on the recreational and aesthetic services TDF provide. TDF canopies sustain microclimates and mitigate climate change through regulatory ES. Hence, a better understanding of the ES supplied by TDF and their respective economic value is needed to inform cost-benefit analysis and ensure these are captured in decision making and contribute to better policies for enhanced conservation, expansion and sustainable management of TDF. Clearly communicating the multiple ecosystem services that standing TDF can provide will be crucial for moving towards raising awareness on the importance of implementing conservation programs or making efforts to change land-use policies in TDF areas legally bound to be cleared for agricultural or urban development.
- 2.6. In the context of Colombia, where most of TDF can be found on private lands, finding incentives that guarantee future conservation by private landowners is critical if the remaining TDF are to be sustainably managed. Information on the value of ES supply from these forests can inform landowner decisions to protect TDF forest from further development and conversion to other uses. Under the right conditions, at the landscape level, these values can be used to help inform the design of payment for ecosystem service (PES)¹⁵ programs to compensate landowners for conservation of standing TDF, their biodiversity, and the ecosystem services they provide for which markets or incentive mechanisms do not exist. PES schemes can be a means to improving forest and other natural resource management practices, generating income and sustaining livelihoods for rural (or urban) populations. As pressures from agricultural expansion, mining and hydropower mount, PES schemes could provide sufficient incentive to counteract these pressures and contribute to maintaining standing TDF. Moreover, information on the economic value of TDF and their importance for watershed stability and climate change adaptation will allow a better understanding of trade-offs between alternative management actions and policy

¹² Comisión Económica para América Latina y el Caribe (Cepal). 2012. Valoración de daños y pérdidas. Ola invernal en Colombia, 2010-2011. Bogotá: Misión BID-Cepal. Bogotá, Colombia;

¹³ DNP, 2011. National Development Plan, 2011 – 2014, Prosperity for All. Bogotá: DNP.

¹⁴ Saatchi, et al. 2011. Benchmark map of forest carbon stocks in tropical regions across three continents. Proceedings of the National Academy of Sciences 108:9899–9904.

¹⁵ PES schemes can be defined as a contractual transaction between a buyer and a seller for an ES, or a land use/management practice likely to secure that service (UNECE, 2007, Recommendations on PES in Integrated Water Resources Management)

options, and facilitate dialogue and closer engagement between landowners, decision makers and other stakeholders.

- 2.7. With respect to the actual degradation and loss of TDF, it is necessary to include in the decision making processes, guidelines about priority areas and carry out needed assessments to inform well-targeted investments in restoration activities that sustain a dynamic and resilient forest mosaic. Accordingly, project findings will enable the identification of priority areas for restoration at a landscape level. Furthermore, at a detailed scale, indicators to inform whether restoration efforts should be done first in soil or in vegetation will be established. This is fundamental to maximize the resources invested in restoration activities and to increase the efficiency of such programmes. The landscape-level diversity that characterizes TDF makes it a very complex ecosystem in terms of the research that is needed to fully understand its ecological patterns and processes. Therefore, this type research which uses methods in landscape ecology are especially needed in human-dominated TDF landscapes as a step to suggest proper management schemes for TDF conservation at particular ecoregions or sites.
- 2.8. **Corporate Alignment.** Environmental sustainability and risk prevention feature prominently in Colombia's National Development Plan, "Prosperity for All"¹⁶ and the environment and climate change are key Areas for Dialogue in the IDB's Country Strategy for Colombia¹⁷. The National Development Plan acknowledges that Colombia's wealth of environmental and cultural resources have underpinned the country's development, though improved welfare has come at the cost of environmental degradation, conservatively estimated at 3.7% of Colombia's GDP¹⁸. Furthermore, the importance of the TDF for Colombia and for the region was reinforced by the Agencia Presidencial de Cooperación Internacional (APC) de Colombia. This TC presents a unique opportunity for regional collaboration under the APC's Programa Regional de Cooperación con Mesoamérica which aims to foster south-south development cooperation through sharing of experiences.
- 2.9. The proposed TC will contribute to the GCI-9 lending program priority target of climate change, sustainable (including renewable) energy, and environmental sustainability. Strengthening the evidence –base for informing future environmental management and planning will help improve decision making with regards to climate change mitigation/adaptation and support sustainable management and conservation of Colombia's remaining dry forests through the preparation of targeted research to inform sustainable management of TDF and knowledge dissemination activities to key stakeholders.
- 2.10. The proposed TC is also aligned with IDB's Biodiversity and Ecosystem Services Program, as it will contribute to three of its four components: (i) assessing and integrating the economic value and importance of biodiversity and ES into strategic economic sectors; (ii) investing in priority regional ecosystem conservation; and (iii) strengthening and fostering environmental governance.
- 2.11. This operation is aligned with the Bank's Country Strategy (CS) to Colombia for 2015-2018 (document GN- 2648-1), while the TC as mentioned above will contribute

¹⁶ DNP, 2011. National Development Plan, 2011 – 2014, Prosperity for All. Bogota: DNP.

¹⁷ IDB, 2015. Colombia Country Strategy (2015-2018). Washington DC: IDB.

¹⁸ DNP, 2011. National Development Plan, 2011 – 2014, Prosperity for All. Bogota: DNP.

to addressing climate change, one of the three transversal challenges identified¹⁹ in the CS that affects productivity, effectiveness of public administration and social mobility. Climate change is considered along the strategic areas and as stated the CS “seeks to contribute to a sustainable Colombia through various strategic areas, strategic objectives and cross-cutting areas”.

III. Description of Activities

- 3.1. The current project comprises four components, namely: (i) TDF plant and fauna diversity assessment; (ii) Vegetation processes ES assessment; (iii) ES landscape level economic valuation; and (iv) Communication and dissemination.
- 3.2. The following is a summary description of the methodological approach and TC components.
- 3.3. **Component 1. TDF plant and fauna diversity assessment.** TDF occurs across the environmental gradients of six regions in Colombia, namely: the Caribbean Coast, the Northeast Andean region, the Cauca Valley, the Magdalena Valley, the Patía Valley, and the Orinoco region. The actual distribution of dry forests in Colombia results from both variations in geographical and environmental factors (soils, precipitation, etc.), and anthropogenic factors associated to the historical environmental disturbances and degradation. All these factors determine variations in species diversity and therefore in the ability to provide ecosystem services. It has been well documented that the principle proxy of ecosystem functioning is determined by taxonomic and functional plant diversity. This project proposes a design to evaluate changes in both taxonomical and functional plant diversity in contrasting regions and in successional gradients as a proxy to anthropogenic transformation. Plant diversity will be quantified across this natural environmental gradient and across successional gradients as follows: (i) a detailed plant inventory of TDF will be conducted on a total of 11 permanent research plots (each 1 ha in size) already established in four of the six TDF regions: the Caribbean Coast (2 plots), the Patía Valley (1 plot), the Cauca Valley (4 plots), and the Magdalena valley (4 plots)²⁰; and (ii) 3 smaller plots (0.18ha plots) will be established in the same 4 study regions in early, intermediate, and late TDF across the four study regions. Altogether 36 successional plots will be established, all individuals with dbh ≥ 1 cm will be identified, and a herbarium sample will be taken. Likewise, new technologies such as camera traps and biosensors will be established to characterize and monitor terrestrial vertebrates and birds' biodiversity.
- 3.4. **Component 2. Vegetation processes ES assessment - Carbon, Nutrient cycling.** Dry forests are fundamental for the conservation of biodiversity and regulation ecosystem services generating income and sustaining livelihoods for rural (or urban) populations. They also provide habitat for several endemic species and endangered plant species, birds and terrestrial vertebrates. On the other hand, TDF are important carbon sinks²¹ due to their capacity to capture and stock carbon in

¹⁹ Country Strategy (2015-2018) identifies the following three main themes as cross-cutting challenges: “gender and diversity”, “climate change” and “integration”.

²⁰ Plot establishment started in June 2013 by Instituto Humboldt and has been funded by Colombia's Ministry of the Environment. In all plots, all plant individuals (including lianas) with diameter at breast height (dbh) ≥ 2.5 cm have been identified and labelled. In addition, at least one herbarium sample has been collected per species in each plot

²¹ TDF restoration in the Americas could potentially add 8 Pg of carbon to the potential total ecosystem carbon stock, see Portillo-Quintero C. et al (2014), The role of tropical dry forests for biodiversity, carbon and water conservation in the neotropics: lessons learned and opportunities for its sustainable management

soils and vegetation. Likewise, dry forests have the capacity to incorporate nutrients rapidly into the regional biochemical cycle, which is key for the maintenance of soil productivity, due to the dynamic of leaf loss associated with the dry season.

- 3.5. Carbon and nutrient cycling will be quantified across the same environmental and successional gradients detailed in Component 1. Measurements related to (i) carbon storage and fluxes²²; and (ii) nutrient and carbon cycling²³ will be conducted by vegetation functional traits. These measurements will be taken at least twice each year in the dry and wet seasons²⁴ in the four study TDF regions. This information combined with plant diversity data collected will allow quantification of how ecosystem-level carbon and nutrient pools and fluxes vary in TDF across environmental and successional gradients, as well as explore the relationship between plant biodiversity and regulatory ES supply.
- 3.6. **Component 3. Landscape level ES quantification.** A detailed map (1:25,000 scale) of the current distribution and successional stage of TDF will be developed for the following two regional areas (10,000ha): the Honda-Armero-Guayabal-Líbano region in the Magdalena valley, and the Pintada-Medellín-Santa Fé de Antioquia region in the Northern Cauca Valley. In order to generate maps on a more detailed scale, Bee Drone Technology will be used. This will allow the identification of both the distribution of dry forest land cover and the estimation of successional stages and level of degradation of the forest. The two regions have been selected because their TDF experience heavy threats to further degradation from mining and flooding from hydroelectrical power development. Equally the results obtained for these two regions could be use as reference for territorial planning in different regions that share similar socio-ecological contexts. The actual distribution and successional stage of TDF and land uses will be detailed in each area based on the map of the actual distribution of TDF previously prepared by the Instituto Humboldt and collaborating institutions (scale 1:100,000) in 2014, high-resolution satellite images, and field work using drone technology. Subsequently, based on diversity measures, carbon stocks, carbon and nutrient cycling estimated in Component 2 for these two areas, their economic value will be estimated²⁵ and aggregated up to the landscape level and estimated based agricultural and forest land cover in the two regional scales at different successional age. It is expected that a direct relationship between net ecosystem value and TDF plant diversity will be found. Information produced under this component will be relevant to define environmental determinants in regional territorial plans, identifying priority areas for biodiversity and ecosystem services conservation, their relationship with agricultural and livestock productive systems and identifying priority areas to implement ecological restoration measures. Finally, results will be confirm with social consultations with local stakeholders (e.g. Private landowners) also carried out in parallel to confirm also the contribution of TDF to rural livelihoods.

²² include aboveground tree biomass, soil carbon contents to 1 m depth, wood density, tree height, stem growth, litter fall, and fine root production

²³ Measurements will be taken in soil, wood, and litter fall. Nutrient contents will also be measured in the green leaves of the 10 most abundant plant species at each plot.

²⁴ The key defining feature of tropical dry forests is the occurrence of a distinct dry period that lasts between 3 and 7 months

²⁵ Quantification and mapping of TDF ES supply will follow the guidance provided in the United Nations Framework for Experimental Ecosystem Accounting; European Commission, OECD, United Nations, & World Bank. (2013). System of Environmental-Economic Accounting 2012: Experimental Ecosystem Accounting White Cover Publication.

3.7. **Component 4. Communication and dissemination with national and local stakeholders.** This project aims to produce information that serves as a scientific baseline that is relevant to decision makers and for the generation of communication products for dissemination to local stakeholders. The results of the above will be articulated and incorporated into a portfolio of knowledge products on key conservation areas, differentiation between preservation actions, sustainable management and ecological restoration. Likewise, the project will generate sets of information for dissemination through social networks (Instagram, Facebook, twitter) and for use in schools and local radio stations. Finally, the scientific validation of methods and results will take place by presenting the project at national and international scientific venues and will include the publication of at least one scientific article and a policy paper.

Table 1. Indicative Results Matrix

Activity	Outputs	Unit of Measure	Target	Outcomes
1. Assess TDF plant and fauna diversity.	Detailed plant inventory and herbarium samples collected, scanned and published through the TDF digital herbarium ²⁶ .	Inventory	1	<ul style="list-style-type: none"> Improved understanding of TDF plant and fauna diversity in the context of Colombia. Improved understanding of the correlation between plant and fauna diversity and variations in geographical, environmental (soils, precipitation, etc.), and anthropogenic factors.
	Data on plant community composition of TDF across environmental gradients collected and published through SiB-Colombia ²⁷ .	Database	4	
	Data on terrestrial vertebrates and birds composition across environmental gradients and available in the I2D (Institutional Data Infrastructure)	Database	4	
2. Vegetation processes assessment	Methodological protocols for ecosystem processes measurement developed.	Protocol	1	<ul style="list-style-type: none"> Quantification of ecosystem processes and variability of carbon and nutrient cycling supply across environmental and successional gradients.
	Database of functional traits related to carbon and nutrient cycling.	Database	4	

²⁶ <https://www.flickr.com/groups/2287605@N22/>

²⁷ www.sibcolombia.net

3. Landscape-level quantification of ES.	Maps developed for local land-use planning, which will be published through the Humboldt Institute webpage (www.humboldt.org.co).	Maps	2	<ul style="list-style-type: none"> • Quantification of carbon stocks and cycling, and nutrient cycling and their economic value at landscape level. • Estimated value and loss of regulatory ES based on original extension of TDF. • Improved understanding of importance of TDF for rural and urban livelihoods • Identification of priority areas for restoration activities.
	Study collecting current situation, estimated loss and values of regulatory ES on per unit area basis.	Study	1	
	Portfolio of priority areas for biodiversity and ecosystem processes conservation (preservation, sustainable management and ecological restoration)	Portfolio	2	
	Landscape-level methodology to quantify TDF ES developed and disseminated.	Protocol	1	
4. Communication and dissemination	Regional workshops on main findings conducted for key local stakeholders and decision makers.	Workshop	2	<ul style="list-style-type: none"> • Improved data availability on TDF • Improved understanding on importance of TDF among key stakeholders • Information is compiled disseminated to relevant stakeholders to inform future conservation planning and sustainable management of TDF
	Paper on plant community composition submitted for publication.	Paper	1	
	Policy paper on a landscape assessment of TDF ES submitted for publication.	Policy paper	1	

Table 2. Indicative Product Matrix

Activity	Outputs	Unit of Measure	YR1	YR2	YR3
1	Plant inventory and herbarium samples collected, and published through the TDF digital herbarium	Inventory	1	1	1
	Data on plant community composition of published through SiB-Colombia ²⁸ .	Database	1	2	4
	Data on terrestrial vertebrates and birds composition across environmental gradients and available in the I2D (Institutional Data Infrastructure)	Database	1	2	4
2	Methodological protocols for ecosystem processes measurement developed.	Protocol	0	0	1
	Database of Carbon and nutrient cycling	Database	0	2	4
3	Maps developed for local land-use planning be published	Map	1	2	2
	Study on regulatory ES	Study	0	1	1
	Portfolio of priority areas	Portfolio	1	2	2
	Landscape-level methodology developed	Protocol	0	1	1
4	Regional workshop	Workshop	0	1	2
	Paper on plant community composition submitted for publication.	Paper	0	1	1
	Policy paper on a landscape assessment of TDF ES submitted for publication.	Policy paper	0	0	1

IV. Indicative Budget (US\$)

4.1. The total budget for this TC has been estimated at US\$667,000, as shown in the following table.

Table 3. Indicative budget

Activity	Description	IDB Funding (US\$)	Counterpart Funding (in-kind) (US\$)	Total Funding (US\$)
1. Assess TDF plant diversity	<ul style="list-style-type: none"> Plot establishment and plant inventory. 	143,000	63,000	206,000
2. Assess Vegetation processes ES - Carbon, Nutrient cycling	<ul style="list-style-type: none"> Field measurements of carbon and nutrient cycling. Estimation of economic value. 	156,400	24,600	181,000
3. Quantify landscape-level ES.	<ul style="list-style-type: none"> Per unit area values scaled-up to landscape level. 	155,000	25,000	180,000
4. Communication and Dissemination	<ul style="list-style-type: none"> Information relevant to decision makers and for the generation of communication products for dissemination 	95,000	5,000	100,000
TOTAL		549,400	117,600	667,000

V. Executing Agency and Structure

- 5.1. The Executing Agency for the operation will be **Alexander von Humboldt Biological Resources Research Institute** (*Instituto de Investigación de Recursos Biológicos Alexander von Humboldt*) referred to as IAVH. The IAVH is an independent non-regulatory research institute of the Executive Branch of the Government of Colombia charged with conducting scientific research on the biodiversity of the country including hydrobiology and genetic research. The Institute is internationally recognized for its research activities in biodiversity and has launched a program of research on TDF. In addition, the IAVH hosts the national biodiversity information system (SiB Colombia²⁹), through which Colombian biodiversity data are made available to the public, and counts with a solid communications team that is constantly publicizing the Institute's scientific results through the Institute webpage³⁰ and social media (Instagram and Facebook). The IAVH will be responsible for administering the TC, including supervision, reporting, monitoring and evaluation, and communications.
- 5.2. Considering that it is the first time Instituto Humboldt is implementing an IDB Project, a Diagnostic of its institutional capacity was recently carried out, which concluded that Instituto Humboldt has a high institutional capacity for the implementation of the financial resources allocated for this operation. With regard to internal control, IAVH has a Senior Professional reporting directly to the General Directorate and performs his duties as internal auditor; likewise, has performed a statutory audit by the firm Nexia International, who issued unqualified opinion on the financial statements for 2014. Moreover, the IAVH is also subject to control of the Controller General of the Republic.

²⁹ www.sibcolombia.net

³⁰ www.humboldt.org.co

- 5.3. The Institute has a defined organizational structure, in which the Directorate General is in charge of strategic processes. This direction is based on three sub-divisions: Branch Research and Scientific Services Branch (these two in charge of the mission processes), and the Finance and Administration Branch in charge of the support processes. Financial Management within the Institute is done through the Finance and Accounting Groups, and administrative processes through the Human Talent and Logistics Support Groups. In addition, the Institute has a Legal and Planning Office. In the context of this TC, the Institute will rely on research capabilities already in place (incl. 4 PhD researchers and 2 researchers with Master degrees). Moreover, a project coordinator will be assigned within the Institute and responsible for overseeing activities and deliverables, and work closely with the 2 researchers that will be hired to work full time in the project (including one expert on soils and one expert in economic studies). The communication team which has more than 6 professionals, along with all the administrative and financial capacities of the Institute will also be made readily available for the project. Additionally, the Institute's work will be supported by research groups from regional universities and thematic experts to facilitate transfer of institutional skills and project results.

VI. Project Risks and Issues

- 6.1. Extreme weather events pose threats for plots established in the field. To mitigate potential damage and loss of field plots, multiple plots in each environmental and successional gradient will be established.

VII. Exceptions to Bank Policy

- 7.1. There are no exceptions to Bank policy.

VIII. Environmental and Social Classification

- 8.1. It is not anticipated that the activities to be financed in this TC will have negative direct or indirect social or environmental effects. According to the Bank's Safeguards Screening Toolkit, this operation is classified with "C": (i) no environmental or social risks; and (ii) direct contribution to solve an environmental issue.

Required Annexes:

- Annex I: [Procurement Plan](#)
- Annex II: [Terms of Reference](#)

ASSESSING TROPICAL DRY FOREST BIODIVERSITY AND ECOSYSTEM SERVICES

CO-T1395

CERTIFICATION

I hereby certify that this operation was approved for financing under the Multidonor Fund for Biodiversity and Ecosystem Services (**MBD**) through a communication dated August 27, 2015 and signed by Felipe Caicedo (ORP/GCM). Also, I certify that resources from said fund are available for up to **US\$549,400** in order to finance the activities described and budgeted in this document. This certification reserves resources for the referenced project for a period of four (4) calendar months counted from the date of eligibility from the funding source. If the project is not approved by the IDB within that period, the reserve of resources will be cancelled, except in the case a new certification is granted. The commitment and disbursement of these resources shall be made only by the Bank in US dollars. The same currency shall be used to stipulate the remuneration and payments to consultants, except in the case of local consultants working in their own borrowing member country who shall have their remuneration defined and paid in the currency of such country. No resources of the Fund shall be made available to cover amounts greater than the amount certified herein above for the implementation of this operation. Amounts greater than the certified amount may arise from commitments on contracts denominated in a currency other than the Fund currency, resulting in currency exchange rate differences, for which the Fund is not at risk.

ORIGINAL SIGNED

12/09/2015

Sonia M. Rivera
Chief
Grants and Co-financing Management Unit
ORP/GCM

Date

APPROVAL

Approved:

ORIGINAL SIGNED

12/10/2015

Pedro Martel
Chief (a.i.)
Environment, Rural Development Disaster Risk
Management Division
INE/RND

Date