

## **IABIN's call for proposals for the Development of Value-Added Tools for Decision-Making**

A proposal by the International Centre for Tropical Agriculture (CIAT)  
Decision and Policy Analysis program

Prepared by: Andy Jarvis and Julian Ramirez

### **A. Title of proposed project**

*“Providing means for a better understanding of biodiversity: improving primary data and using it for threat assessment and in situ conservation planning in South America”*

### **B. Cover letter signed by the authorized representative of the firm**

Institution name: International Center for Tropical Agriculture (CIAT)  
Representative: Dr. Ruben Echeverria  
Position: Director General

Please see the attached letter signed (digitally) by Dr. Ruben Echeverria.

### **B. Contact information of the firm**

- Institution: International Centre for Tropical Agriculture, CIAT
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- Institutional Contact Person
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### **D. Contact information of associated researchers involved on the project**

- Institution: International Centre for Tropical Agriculture, CIAT
- Name: Andrew Jarvis
- Position: Program leader, Decision and Policy Analysis
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**Note:** Any notification in regards of the scientific development of this proposal, its acceptance or related issues should be addressed to Dr. Andrew Jarvis.

## **E. Project summary**

### *Abstract*

Spatial datasets have become a fundamental source of information when trying to assess environmental, social, economic and biodiversity-related issues. Recent developments in Geographic Information Systems (GIS) and with ecological niche modeling (ENM) applications have added value to data, and permit researchers to provide highly policy-relevant analyses to direct our conservation interventions. Through ENM techniques, potential distributions of species can be analysed using fairly limited or biased datasets containing primary data to determine current biodiversity hotspots, and likely threats from anthropogenic activities and climate change in order to define current and future in situ and ex situ conservation priorities.

However, one of the most relevant issues regarding the analyses and latter conclusions derived from the usage of primary biodiversity data is the reliance on its quality. Poor quality biodiversity data could lead to incorrect and biased conclusions as well as cause inefficient and/or wrong investment of the available resources and inadequate policy development.

Checking of biodiversity data quality as well as using it adequately is a key issue in order to aid decision-making processes. We propose to (1) assess and improve the quality of IABIN's terrestrial holdings using automated scripts, (2) use the primary biodiversity data to develop niche models, (3) couple those results to assess the extent at which South American taxa are both under threat and conserved by the current Protected Area network, and (4) implement an interface through which all results will be made available to policy-makers. The timeline to develop the project is six months, and the total budget that will be used is 120,800 USD, from which 50% will be matched via CIAT, and the other 50% to be financed by IABIN.

### *Resumen*

Los datos espaciales se han convertido en una fuente de informacion fundamental cuando se intentan analizar una gran variedad de temas ambientales, sociales, economicos, y aquellos relacionados con la biodiversidad. Especialmente con los desarrollos recientes en Sistemas de Informacion Geografica (SIG) y con las aplicaciones para modelacion de nicho ecologico (MNE). A traves de tecnicas MNE, se pueden analizar las distribuciones potenciales de las especies incluso cuando solo se cuenta con informacion muy limitada y sesgada, facilitandose los analisis de biodiversidad actual, y de probables amenazas por

actividades antropogenicas y cambio climatico de tal manera que se pueden definir las prioridades para conservacion actuales y futuras tanto ex situ como in situ.

No obstante, una de las cosas mas relevantes en relacion a los analisis y posteriores conclusiones derivadas del uso de datos primarios de biodiversidad es la dependencia en su calidad. Datos de poca calidad pueden conducir a conclusiones incorrectas y sesgadas, asi como tambien causar uso ineficiente o inapropiado de recursos financieros y desarrollo de politicas inadecuadas.

La verificacion de los datos de biodiversidad y su adecuado uso es un proceso clave para lograr brindar soporte a los procesos de toma de decisiones. Nosotros proponemos (1) evaluar y mejorar la calidad de los datos terrestres en la red de IABIN usando procesos automatizados, (2) usar los datos primarios para desarrollar modelos de nicho ecologico, (3) unir los resultados anteriores para evaluar el nivel de amenaza y conservación de las especies que habitan en Sur America, y (4) implementar una interface interactiva a través de la cual los resultados se hagan publicos para los tomadores de decisiones. El tiempo de duracion del proyecto esta estimado en seis meses, y el presupuesto total a ser usado es de 120,800 USD, de los cuales el 50% sera cubierto por el CIAT, y el otro 50% seria financiado por IABIN.

## **F. Project description**

### *1. Rationale*

The International Centre for Tropical Agriculture (CIAT) is a not-for-profit international research organization, supported by the CGIAR (Consultative Group on International Agricultural Research), and with headquarters in Cali (Colombia). The mission of CIAT is to alleviate rural poverty in developing countries, and contribute to enhanced management of the natural resource base. CIAT has been working during the last 40 years in helping poor farmers by providing agricultural technologies (i.e. management practices, improved varieties, better policies), with a special focus in four mandate crops: rice, cassava, beans and tropical forages. The centre works throughout the tropics, but with an strong focus in Latin America, and with the aim of developing an eco-efficient agriculture for the tropics.

The Decision and Policy Analysis program (DAPA) in CIAT uses and generates spatial and economic analyses in order to provide the informational base for decision makers from the farm- (farmers themselves) to the global- (UN organizations, governments, NGOs) level to make the most rational decisions that contribute to the mission of the institution. We have participated in the development of different spatial analysis tools and datasets, that aim to provide the necessary background and technology in order to analyze biodiversity. These tools include the biodiversity-analysis software DIVA-GIS (Hijmans et al., 2005a, available at <http://www.diva-gis.org>), the very high resolution climatic datasets WorldClim (Hijmans et al., 2005b, available at <http://www.worldclim.org>), the SRTM hole filled elevation data (Jarvis et al. 2008, available at <http://srtm.csi.cgiar.org>),

high resolution future climate datasets (Ramirez & Jarvis, 2008, available at <http://gisweb.ciat.cgiar.org/GCMPPage>), amongst others.

We have been also working during the last years within the context of climate change in a variety of different analyses ranging from evaluation of ecosystem quality, species threats, to crop responses. Under that framework, we have a collaborative project with the Global Biodiversity Information Facility (GBIF) to develop and implement Java-based automated tools for both correction and analysis of biodiversity data. This project is currently in course. The project includes five main topics:

- (1) cross-checking and correction of currently reported geographic references,
- (2) adding of new geographic references via the reported locations on passport data and a georeferencing algorithm,
- (3) modeling of the geographical distribution of species for a baseline climatic scenario,
- (4) projection of geographical distributions under future climatic scenarios, and
- (5) implementation of an enhanced and interactive visualization tool to analyze the results of the former modeling exercises.

We acknowledge the importance of the relationship between biodiversity with socio-economic data, but in order to assess the former with the latter, we believe that reliable geographic data is a key issue to be addressed in order to improve the understanding of the geographies of the species (and therefore the geography of biodiversity), and for that reason we propose both the assessment and improvement of the geographic data held by IABIN and its usage within the context of threats to ecosystems in South America.

We consider our current work with GBIF provides a strong framework and basis for any further implementation on other datasets, such as those on the IABIN portal. However, based on the fact that IABIN has partnerships with institutions which are not currently within the GBIF consortium, we propose to integrate some of the current tools we have been developing with GBIF to the biodiversity data within the IABIN network, plus a couple of new tools in order to assess threats to species in South America. This will be done for terrestrial taxa, as our approaches rely on data available only for land-masses. The fundamental objective would be to transfer (including language shifts when needed) as many tools as we can to the IABIN portal based on the similarities and/or compatibility of the applications between GBIF and IABIN, but keeping in mind the different regional focus of the institutions.

The tools we propose to integrate to the IABIN network are oriented to improve primary data quality and reliance, which we believe is a fundamental issue to overcome before performing further analyses, and are intended to provide support in regards of the understanding of current geographies of species and the better planning of in situ conservation networks, based on the current threats to ecosystems. All the tools will be properly documented (i.e. usage manuals, source codes) in both spanish and english and will be developed in a transferable way that will allow them to be further implemented and modified according to IABIN's needs.

## *2. Project goals and objectives*

1. To finalize and implement a Java-based algorithm to cross-check coordinates of IABIN's terrestrial biodiversity data.
2. To finalize and implement Java-based algorithm to add value to non-georeferenced records within the IABIN network.
3. To assess all the primary data using the algorithms in (1) and (2) and provide IABIN with a detailed evaluation of all its primary biodiversity data.
4. To finalize and implement a Java-based algorithm for the training of niche models (using a maximum entropy approach) and apply it to plant taxa with enough data located in South America.
5. To overlay the developed geographic distributions with ecosystem threat, and protected areas layers, generate analysis metrics to provide the necessary background data for scenario assessment and policy making for South America.
6. Development of an interactive Google-maps based interface to navigate through the biodiversity data and the modeling and overlaying results.
7. To generate the appropriate documentation and reports on the developed tools.

Details on the capabilities of the proposed software and/or interactive tools are provided in section 3 of this proposal.

## *3. Project activities and methodologies*

*Objective 1: To finalize and implement a Java-based algorithm to cross-check coordinates of IABIN's terrestrial biodiversity data.*

Using the Java source code which is currently being developed for GBIF, we will make the necessary regional adjustments in order for this tools to be implemented within the IABIN network. These automating quality-checking scripts will assess IABIN's terrestrial biodiversity data at the following levels:

(a) Continental level: using a detailed mask of land areas, the algorithm will first check if the terrestrial records (taxonomically discriminated), are within the land areas, and will separate those occurrences with errors from those others which are correct at this first level. The incorrect ones will be separated into three groups: near land records (less than 5km far from the nearest land area), ocean-located land records (more than 5km far from the nearest land area), and records outside global boundaries.

(b) Country-level: using an administrative divisions layer, the algorithm will test whether each occurrence is actually located where the database reports it is located. The algorithm will use an ISO-country names dictionary as basis for interpretation of names, and will separate the erroneous records in two groups: records with no valid information in the country field, and records located in a wrong country.

(c) Environmental level: using the dataset developed by Hijmans et al. (2005b), 19 bioclimatic indices will be derived at 30 arc-seconds of spatial resolution. The SRTM hole filled digital elevation model (Jarvis et al., 2008) will be also used as source of elevation values. Using these 20 variables, the Java-based script will first extract the values corresponding to each of the coordinates and will perform a Tukey outliers test (Tukey, 1977) for each of the taxa held in the IABIN's database for each of the variables. Records flagged as outliers in at least 80% of the variables will be separated from the others and will be tested for validity of their coordinates through a georeferencing script.

*Objective 2: To finalize and implement Java-based algorithm to add value to non-georeferenced records within the IABIN network.*

Using the developed Java code for GBIF, modifications will be implemented in order to suit it into IABIN's network. This script will use the biogeomancer georeferencing method (Guralnick et al., 2006, available at <http://www.biogeomancer.org/>), which makes use of the reported locality names on the database and a detailed administrative boundaries layer. The method assesses each record for which locality and country names are available, and generates a coordinate with its respective precision. Only coordinates with less than 5km of precision will be considered as reliable and these new references will be added to the database.

*Objective 3: To assess all the primary data using the algorithms in (1) and (2) and provide IABIN with a detailed evaluation of all its primary biodiversity data.*

A Java based multi-processing server-client architecture will be modified from the current one developed with GBIF and a single run of the three automated Java scripts will be done for the entire set of terrestrial species records within the IABIN network. A detailed report on the quality of the geographic information, and the improvements done to the database will be produced after a this run. Depending on IABIN's needs, the process will be scheduled to execute every certain period of time (i.e. monthly).

*Objective 4: To finalize and implement a Java-based algorithm for the training of niche models (using a maximum entropy approach) and apply it to taxa with enough data located in South America.*

A Java based script will be generated for the training of niche models for all terrestrial taxa with at least 10 unique presence records (Hernandez et al., 2006) within the IABIN network. The maximum entropy model (Phillips et al., 2006) will be used to achieve this. This approach has been largely evaluated by several authors and has demonstrated to

perform very well under several sampling bias conditions or with very limited information, with increased accuracy compared with other niche models (Phillips & Dudik, 2008; Dormann, 2006; Elith et al., 2006; Hijmans & Graham, 2006).

Niche models will be trained using a baseline climatic scenario as provided by WorldClim (Hijmans et al., 2005b), at 10 arc-minute spatial resolution. Selected model performance metrics will be provided for all the modeled species (i.e. area under the ROC curve, correlation, logistic deviation and euclidean distance).

The potential distributions will be thresholded to the average probability of presence records (prevalence), and binary (presence/absence) as well as thresholded probability distribution grids in ESRI-ASCII format will be generated. This will ensure the potential distributions of the species are not over-estimating the range of the modeled taxa. A biodiversity layer (species richness and/or weighted diversity) for flora, fauna and all species together will be produced based on the binary layers.

*Objective 5: To overlay the developed geographic distributions with ecosystem threat and protected areas layers, generate analysis metrics to provide the necessary background data for scenario assessment and policy making for South America.*

A Java-based script will be created to perform the spatial overlays and calculate the proper metrics to assess all the terrestrial taxa within the IABIN network. Each of the predicted distributions will be overlaid with the following threat layers:

1. Conversion to agriculture threat: a representation of the likelihood of a pixel to be completely converted to agriculture, based on FAOSTAT agricultural census data.
2. Fire threat: a representation of the likelihood of a fire to be occurring in pixel, based on satellite data.
3. Grazing pressure threat: represents the likelihood of a pixel to be pressed by the presence of livestock (i.e. cattle, sheep and goats), based on the FAO Atlas of Livestock of 2004.
4. Infrastructure: represents the likelihood of a pixel to be destructed by the presence of big structures (i.e. airports, dams), based on the Digital Chart of the World (DCW)
5. Oil and gas: represents the likelihood of a pixel to be affected by oil or gas extraction, based on the presence of oil and gas drill sites from the World Petroleum Assessment 2000.
6. Recent conversion threat: represents the likelihood of a pixel to be affected by a significant land use change, based on changes on the "greenness" of the vegetation measured by satellite.
7. Accessibility threat: a representation of the likelihood of a pixel to be altered by anthropogenic activities based on its closeness to roads, rivers and rails.

Layers 1 to 7 comprise the influence of environmental, social and economic factors on ecosystems where a taxon or a group of taxa might be present. Detailed information on the methods with which these seven layers were developed can be found in Jarvis et al. (2009). The following metrics will be calculated for each taxon and threat-layer:

- a. The average threat in the area where the species is potentially present
- b. The percent of suitable area under high-level, mid-level and low-level threat
- c. An score of the level of threat, based on the percent of area under high level-threat and the average threat of the species

The level of threat of all biodiversity will be calculated using the comprised species richness layer and each of the threat layers. The average threat of different diversity-category areas will be calculated.

In addition to that, all the above will be overlaid with the protected area networks in south America. The following metrics will be calculated for each taxon:

- a. The percent of potential area which is protected and unprotected (falls within a protected area)
- b. The average probability of presence within protected areas and outside protected areas

The level of protection of all modeled taxa will be assessed using the comprised species richness/diversity layer by calculating the average, maximum and minimum amount of taxa held in each protected area, and the percent of different diversity-category areas which is protected and unprotected.

All the above will be given to IABIN as Geographic Information System layers, maps, tables, databases, and report results.

These results will provide the necessary background data in order to **assess other conservation and biodiversity threat scenarios** in South America. As the level of threat of a taxon is being analysed, the major threat (from the set of threats) on that taxon can be determined and thus a qualitative scenario analysis could be proposed by the policy-maker himself, by asking the pertinent questions such as “*what would happen if threat X is reduced in Y area?*”. Complementary conservation options could be analysed via the interface also in a qualitative way by using the range of the geographic distributions of the taxa that are currently conserved, and the areas more likely to be threatened.

*Objective 6: Development of an interactive Google-maps based interface to navigate through the biodiversity data and the modeling and overlaying results.*

Development of a Google-Maps based interface to select a desired taxon, navigate through the niche modeling results as well as through the occurrence data, with the ability to differentiate between incorrect, corrected, new (georeferenced) and discarded locations (due to errors).

This interface will also allow to query the threat assessment and conservation status metrics calculated in (5) and stored in a database within the IABIN servers, and will allow showing it as a small box for the selected taxon. A query on the total biodiversity layers can also be dynamically analyzed, and the metrics queried as well.



*Objective 7: To generate the appropriate documentation and reports on all the developed tools*

Reporting of development and implementation of tools will be done as requested by IABIN on the Terms of Reference of this call for proposals, as follows:

1. Detailed work plan by Jan 15 2010
2. First progress report by March 1 2010
3. Second progress report by April 1 2010
4. Beta version of the tools by April 15 2010
5. Draft manual and user guide by May 1 2010
6. Two demonstration events to the IABIN participants and decision-makers by June 2010
7. Final report by June 30 2010

All the information (i.e. documents, source codes) and datasets will be available according to the conditions described in the "Access to information and intellectual property regulation" section.

Utilization manuals and technical documents will be prepared by the technical and scientific staff participating in the project, and will be given to IABIN in the proper languages (i.e. english, spanish).

#### **4. Time frame / work plan**

In order to achieve the reporting schedule requested by IABIN, and according to the complete time-frame of the project we propose the following work plan:

<b>Activity</b>	<b>Person(s) in charge*</b>	<b>Tentative accomplishment date</b>
Detailed work plan	Julian Ramirez (L)	Mid January 2010
Objective 1: cross checking of coordinates scripts	Daniel Amariles (L) Hector Tobon (L) Louis Reymondin (CS)	End January 2010
Objective 2: georeferencing script	Daniel Amariles (L) Hector Tobon (L) Louis Reymondin (CS)	Mid February 2010
Objective 3: assessment of all IABIN records	Daniel Amariles (L) Hector Tobon (L)	End February 2010
First progress report (incl. in objective 7)	Julian Ramirez (L) Andy Jarvis (CS)	March 1 2010
Objective 4: Training of niche models script	Daniel Amariles (L) Hector Tobon (L) Julian Ramirez (CS)	End March 2010

Second progress report (incl. in objective 7)	Julian Ramirez (L) Andy Jarvis (CS)	April 1 2010
Beta version of the tools	All	April 15 2010
Objective 5: threat and conservation assessment	Hector Tobon (L) Daniel Amariles (L) Julian Ramirez (CS)	End April 2010
Objective 6: google-maps based navigation tool	Hector Tobon (L) Daniel Amariles (L) Louis Reymondin (CS)	End May 2010
Draft manuals and user guides (incl. in objective 7)	Julian Ramirez (L) Louis Reymondin (L) Andy Jarvis (CS)	May 1 2010, and transversally during the project
Demonstration events	Any selected/available personnel of the project	June 10 2010
Final Report	Julian Ramirez (L) Louis Reymondin (L) Andy Jarvis (CS)	June 30 2010
Final version of all tools, manuals and user guides	All	June 30 2010
Review of products and scientific support	Andy Jarvis (L)	N/A (transversal)

\*(L) indicates lead, and (CS) conceptual and scientific support

## 5. Team composition and task assignment

### 5.1. Scientific leader:

#### **Dr. Andy Jarvis**

Program Leader

Decision and Policy Analysis program

International Centre for Tropical Agriculture, CIAT

PhD Geography, King's College London, University of London. Thesis: "Terrain controls on the distribution of tree species diversity and structure in tropical lowlands and tropical montane forest"

Area of expertise: exploring spatial analysis and environmental modeling and its relationship for the better planning of conservation of plant genetic and natural resources. Plenty experience on the deployment and analysis of global databases of climatic, topography, water resources and biodiversity, as well as on the development on tools and software. Plenty expertise in the coordination and formulation of projects as well.

Position assigned: Project coordinator

Task(s) assigned: Review of products, coordination of staff, scientific support and writing of partial and final reports.

### *5.2. Coordination of specific tasks and background*

#### **Julian Ramirez, BSc**

Research assistant

Decision and Policy Analysis program

International Centre for Tropical Agriculture, CIAT

BSc Agricultural Engineering (with honours). Thesis: "Black leaf streak disease pressure spatial variability and potential productivity of different Musa cultivars using multi-site trial data"

Area of expertise: niche modeling of species distributions, statistical and spatial analyses of biodiversity data through the usage of global and local environmental datasets, assessment of biodiversity threats, and conservation issues. Two-year expertise working with spatial analysis, GIS, and biodiversity.

Task(s) assigned: support in the development of niche modeling automated algorithms and planning of analysis metrics towards the threat assessment using the available spatial datasets.

#### **Louis Reymondin, DEng**

Visiting researcher

Decision and Policy Analysis program

International Centre for Tropical Agriculture, CIAT

Diploma Engineer in Software development. Thesis: "Analysis of satellite image data for environmental applications".

Area of expertise: development of Java software for the analysis of environmental datasets, and creation of models, including the management of parallelization algorithms to improve the efficiency during the analysis of large datasets.

Task(s) assigned: design and support for the development of the automated scripts to be used over the IABIN biodiversity data, review of source codes, and comprehensive analysis of the general implementation of all tools within a framework.

### *5.3. Technical programming and software development*

#### **Daniel Amariles, BSc**

Java Programmer

Decision and Policy Analysis program  
International Centre for Tropical Agriculture, CIAT

BSc, Computer Science. Thesis: "Windows Workflow Foundation applied to software engineering projects"

Area of expertise: development of Java-based software for a range of different applications, including the analysis of large datasets, generation of interactive visualization tools, and parallelization of processes in view of the improvement of the efficiency of applications.

Task(s) assigned: design, coding, and implementation of the Java-based software to be developed under the present project proposal.

**Hector Tobon, BSc**

Java Programmer  
Decision and Policy Analysis program  
International Centre for Tropical Agriculture, CIAT

BSc, Computer Science. Thesis: "Modeling, interaction and visualization techniques of 3D graphs"

Area of expertise: development of Java-based software for a range of different applications, including the analysis of large datasets, generation of interactive visualization tools, and parallelization of processes in view of the improvement of the efficiency of applications.

Task(s) assigned: design, coding, and implementation of the Java-based software to be developed under the present project proposal.

**6. CVs of proposed staff**

Curriculum vitae of all the involved staff can be found attached in word documents (.doc) following the naming structure: "cv\_name-of-person.doc"

**7. Staffing schedule**

Time allocation ranges from 0 (no allocation) to 1 (100% allocation).

No.	Name of staff	Staff input						Total
		1	2	3	4	5	6	
1	Andy Jarvis	0.4	0.3	0.3	0.3	0.3	0.4	2.0

2	Julian Ramirez	0.7	0.6	0.6	0.7	0.7	0.7	4.0
3	Louis Reymondin	0.7	0.7	0.7	0.6	0.6	0.7	4.0
4	Hector Tobon	1	1	1	1	1	1	6.0
5	Daniel Amariles	1	1	1	1	1	1	6.0
							<b>Total</b>	22.0

## 8. Work schedule

Activities	Months					
	1	2	3	4	5	6
Detailed work plan	X					
Objective 1	X					
Objective 2	X	X				
Objective 3		X				
Objective 4			X			
Objective 5			X	X		
Objective 6				X	X	
Objective 7		X	X	X	X	X
Demonstration events						X
Final report						X

## 9. Relevant literature cited

Dormann, C. F. 2006. Promising the future? Global change projections of species distributions. *Basic applied ecology*, 8: 387-397.

Elith, J. Graham, C. H., Anderson, R. P., Dudik, M., Ferrier, S., Guisan, A., Hijmans, R. J., Huettmann, F. Leathwick, R., Lehmann, A., Li, J., Lohmann, L. G., Loiselle, B., Manion, G., Moritz, C., Nakamura, M., Nakazawa, Y., Overton, J. McC., Peterson, A. T., Phillips, S. J., Scachetti-Pereira, R., Schapire, R., Soberon, J., Williams, S., Wisz, M., and Zimmermann, E. 2006. Novel methods improve prediction of species' distributions from occurrence data. *Ecography* 29: 129-151.

Guralnick, R. P., Wicczorek, J., Beaman, R., Hijmans, R. J., and the BioGeomancer Working Group. 2006. Biogeomancer: Automated georeferencing to Map the World's Biodiversity Data. *PLoS Biology* 4(11): 1908-1909.

Hernandez, P. A., Graham, C. H., Master, L. L., and Albert, D. L. 2006. The effect of sample size and species characteristics on performance of different species distribution modeling methods. *Ecography* 29: 773-785.

Hijmans, R. J., Guarino, L., Jarvis, A., O'Brien, R., Mathur, P., Bussink, C., Cruz, M., Barrantes, I., and Rojas, E. 2005a. DIVA-GIS version 5.2 manual. Internet Resources Retrieved at <http://www.diva-gis.org>.

Hijmans, R. J., Cameron, S. E., Parra, J. L., Jones, P. G., and Jarvis, A. 2005b. Very high resolution interpolated climate surfaces for global land areas. *International Journal of Climatology* 25: 1965-1978

Hijmans, R. J., and Graham, C. H. 2006. The ability of climate envelope models to predict the effect of climate change on species distributions. *Global Change Biology* 12: 2271-2281.

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Phillips, S. J., Anderson, R. P., and Schapire, R. E. 2006. Maximum entropy modeling of species geographic distributions. *Ecological Modelling*, 190: 231-259.

Phillips, S. J. and Dudik, M. 2008. Modeling of species distributions with Maxent: New Extensions and Comprehensive Evaluation. *Ecography* 31: 161-175.

Ramirez, J. and Jarvis, A. 2008. High resolution statistically downscaled future climate surfaces. International Centre for Tropical Agriculture (CIAT), available at <http://gisweb.ciat.cgiar.org/GCMPage>

Tukey, J. W. 1977. Exploratory data analysis. Addison-Wesley, Reading.

## G. Summary of costs

Budget item	Time allocation	Cost month/USD	IABIN	CIAT counterpart	Total
<i>Staff</i>					
Hector Tobon	6.0	2,400	14,400	-	14,400
Daniel Amariles	6.0	2,400	14,400	-	14,400
Julian Ramirez	4.0	2,800	5,600	5,600	11,200
Louis Reymondin	4.0	3,200	9,400	3,400	12,800
Andrew Jarvis	2.0	11,900		23,800	23,800
<b>Subtotal</b>			<b>43,800</b>	<b>32,800</b>	<b>76,600</b>
<i>Operations</i>					
Travel costs			2,500		2,500
Goods (office supplies and services (email, internet, library, telephone, fotocopies etc).			-	6,000	6,000
Computers and licenses software			3,700	15,000	18,700
Data management				7,000	7,000
<b>Subtotal</b>			<b>6,200</b>	<b>28,000</b>	<b>34,200</b>
<i>Overhead 20%</i>			10,000	-	<b>10,000</b>

<b>TOTAL</b>			<b>60,000</b>	<b>60,800</b>	<b>120,800</b>
<b>Percent of total (%)</b>			50	50	

**Note:** A copy of the document stating the legal status of the organisation is attached as CIAT-legal-status.pdf

**BUDGET IABIN- CIAT**

Budget item	Time allocation	Cost month/USD	IABIN	Counterpart	
				CIAT	Total
<b>Staff</b>					
Hector Tobon	6.0	2,400	14,400		14,400
Daniel Amariles	6.0	2,400	14,400		14,400
Julian Ramirez	4.0	2,800	5,600	5,600	11,200
Louis Reymondin	4.0	3,200	9,400	3,400	12,800
Andrew Jarvis	2.0	11,900		23,800	23,800
<b>Subtotal</b>			<b>43,800</b>	<b>32,800</b>	<b>76,600</b>
<b>Operations</b>					
Travel costs			2,500		2,500
Goods (office supplies and services (email, internet, library, telephone, fotocopies etc).			-	6,000	6,000
Computers and licenses software			3,700	15,000	18,700
Data management				7,000	7,000
<b>Subtotal</b>			<b>6,200</b>	<b>28,000</b>	<b>34,200</b>
Overhead 20%			10,000	-	10,000
<b>TOTAL</b>			60,000	60,800	<b>120,800</b>
<b>Percent of total (%)</b>			50	50	



New CIAT  
By-Laws  
Original

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AGREEMENT BETWEEN

THE INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

AND

THE UNITED NATIONS DEVELOPMENT PROGRAMME

ON THE ESTABLISHMENT OF THE

CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL

DATED *May 28*, 1986

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**AGREEMENT BETWEEN  
THE INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT  
AND  
THE UNITED NATIONS DEVELOPMENT PROGRAMME  
ON THE ESTABLISHMENT OF THE  
CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL**

**WHEREAS**, the Consultative Group on International Agricultural Research (hereinafter called "CGIAR") is a group of national governments, multilateral aid agencies, private foundations and others that have caused to be established and are supporting a network of international agricultural research centers for the purpose of improving and increasing agricultural production throughout the developing world;

**WHEREAS**, the promotion of international agricultural research for the benefit of developing countries is, within their broad purposes, a common objective of the International Bank for Reconstruction and Development (hereinafter called "the Bank") and the United Nations Development Programme (hereinafter called "UNDP");

**WHEREAS**, the Bank, UNDP and the Food and Agriculture Organization of the United Nations are the Co-Sponsors of CGIAR;

**WHEREAS**, the Centro Internacional de Agricultura Tropical (hereinafter called "CIAT"), established in the Republic of Colombia as a private, non-profit organization by Public Deed No. 4717 dated October 18, 1967 and recognized as a legal person by Resolution No. 4939 dated December 4, 1967 of the Ministry of Justice of the Republic of Colombia, is the center within the CGIAR system having primary responsibility for fostering improved agricultural production in the tropics and other developing regions of the world;

**WHEREAS**, on October 12, 1983, the Government of the Republic of Colombia and the Co-Sponsors declared their special interest in the continued success of CIAT and their belief that it was essential that CIAT have the status and characteristics appropriate to its international mandate, its international sources of financing and the international character of its staff;

**WHEREAS**, CIAT has requested assistance in acquiring such legal status as will permit its continued full effectiveness in the Republic of Colombia and in other countries;

WHEREAS, in order to provide such assistance, the members of CGIAR have requested the Bank and UNDP to sign this Agreement on their behalf;

WHEREAS, the Bank and UNDP, convinced that the continued effective attainment of the objectives for which CIAT was established will thereby be fostered, have agreed to sign this Agreement on behalf of CGIAR;

WHEREAS, CIAT shall continue to form part of the CGIAR system, it being understood; however, that neither the Co-Sponsors nor any member of CGIAR shall be responsible or liable, individually or collectively, for any debts, liabilities or obligations of CIAT;

NOW, THEREFORE, the **Centro Internacional de Agricultura Tropical** is hereby established as an international organization possessing full juridical personality in accordance with the Constitution set forth in the Annex attached hereto.

INTERNATIONAL BANK FOR  
RECONSTRUCTION AND DEVELOPMENT

By Is/ S. Shahid Husain  
Authorized Representative

Date: May 28, 1986

UNITED NATIONS DEVELOPMENT  
PROGRAMME

By Is/ Timothy Rothermel  
Authorized Representative

Date: May 28, 1986

Annex

CONSTITUTION OF THE  
CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL

ARTICLE ONE  
Establishment

The Centro Internacional de Agricultura Tropical (hereinafter referred to as "CIAT") is hereby established and is governed by the present Constitution.

ARTICLE TWO  
Status

CIAT is organized exclusively for educational and scientific purposes. It enjoys international status and shall operate as an integral part of the Consultative Group on International Agricultural Research (hereinafter called "CGIAR") system as a non-profit autonomous international agency, non-political in management, staffing and operations.

ARTICLE THREE  
Purposes and Activities

1. The purposes of CIAT shall be to promote accelerated agricultural development and increased agricultural production in the tropical and other developing regions of the world, as well as to contribute to the development of national programs and institutions of agricultural research throughout such regions.
2. In order to accomplish its purposes, CIAT may engage in the following types of activities:
  - (a) developing and making available production systems for specific crops and animals in specific environments;
  - (b) conducting research on, and developing procedures for, the bringing into economical production of areas not yet developed or fully utilized;
  - (c) developing and making available effective techniques and strategies for the widespread adoption of improved varieties and agricultural practices;

- (d) assisting national institutions to develop staffs, programs and facilities for research and education;
- (e) establishing an information center for the collection and retrieval of materials relevant to the agricultural and economic development of the tropical regions;
- (f) providing a facility to collect, preserve, supply and exchange plant and animal germplasm;
- (g) conducting training programs, conferences, forums and seminars on topics related to CIAT's purposes; and
- (h) such other activities as CIAT may find necessary to further its purposes.

**ARTICLE FOUR**  
Principles

1. CIAT may provide assistance to any country upon its request.
2. In carrying out its work, CIAT shall cooperate closely with other national and international agencies concerned with agricultural research and production, and shall seek to avoid unnecessary duplication of the work of such other agencies.

**ARTICLE FIVE**  
Capacities, Location

1. CIAT shall be an international organization possessing full juridical personality. It shall have the capacity to do and perform all acts and things which are necessary for or incidental to the furtherance of its purposes and activities, and in particular, the capacity to:
  - (a) receive, acquire or otherwise obtain from any governmental or international authority, or from any person, firm, foundation or other entity, such rights, charters, licenses, concessions and assistance, financial or otherwise, as are conducive to the attainment of CIAT's purposes;
  - (b) receive, acquire or otherwise obtain from any governmental or international authority, or from any person, firm, foundation or other entity, by donation, grant, bequest or any other means, such properties, real, personal or mixed, including funds, valuable effects, things or interests therein, as may be useful or necessary to carry out CIAT's purposes and activities, and to hold, own, operate, administer, use, sell, convey or dispose of said properties or valuable things or interests;

- (c) contract;
- (d) employ persons; and
- (e) institute, and defend in, legal proceedings.

2. CIAT shall have its headquarters in the territory of the Republic of Colombia and may establish research stations and other programs at other locations in or outside of the Republic of Colombia as may be determined by the Board of Trustees after appropriate consultation with the national programs concerned.

#### **ARTICLE SIX** Organization

CIAT shall have a Board of Trustees (hereinafter called "the Board"), a Director General, and such staff as shall be necessary for CIAT to carry out its activities.

#### **ARTICLE SEVEN** The Board of Trustees

1. The Board shall consist of no more than seventeen members, including the members to be designated by the host country in accordance with the headquarters agreement referred to in Article Ten, paragraph 3, and the Director General who shall be **ex officio** members of the Board. Three of the other members shall be chosen by the Board from among persons nominated by CGIAR.
2. The original members of the Board shall be those mentioned in the Schedule to this Constitution.
3. The terms of the original members of the Board, except for the Director General and the members designated by the host country, shall be as set forth in the Schedule to this Constitution. Thereafter, each member, except those who are designated as ineligible for election in the said Schedule, shall be elected by the Board to serve for three years. Board members shall be eligible for reelection once. The term of a reelected Board member shall be three years or such different period not exceeding four years as the Board may determine in order to ensure that approximately the same number of vacancies arise from year to year. The Board shall elect new members whenever vacancies occur.
4. Members of the Board, other than the members serving **ex officio**, shall serve in their personal capacity and shall not be considered, nor shall they act, as representatives of governments or other organizations.

5. The Board shall be responsible for all of CIAT's affairs. It shall, *inter alia* :

- (a) determine CIAT's policies and priorities of work;
- (b) approve CIAT's programs and operational and capital development plans;
- (c) approve such rules and regulations as may be necessary for the proper conduct of CIAT's affairs;
- (d) approve annual budget estimates and audited financial statements;
- (e) appoint external auditors;
- (f) appoint the Director General and determine the terms of his service;
- (g) consider the annual report on CIAT's activities prepared by the Director General;
- (h) approve the terms of any proposed agreements or categories of agreements of CIAT that the Board may by regulation require to be submitted to it for approval; and
- (i) do and perform all other acts necessary, suitable and proper for the attainment of the purposes for which CIAT is established.

6. The Board shall adopt its rules of procedure. It shall elect a Chairman and a Vice Chairman from among its members who will serve for three years or until the expiry of their respective term on the Board if this is less than three years. The Chairman, and in his absence the Vice Chairman, shall preside over meetings of the Board. A majority of the members shall constitute the quorum for any meeting of the Board. Each member of the Board shall have one vote. Except as otherwise herein provided, decisions of the Board shall be made by a majority of the votes cast.

7. The Board shall hold one annual meeting and such additional special meetings as may be required. The Board may establish a procedure whereby its Chairman may obtain a vote of members of the Board on specific questions between meetings of the Board.

8. (a) The Board shall establish an Executive Committee (hereinafter called "the Committee") consisting of seven of its members, including the Chairman of the Board, the Director General and at least one citizen of the host country. The Committee shall have the power to act for the Board between Board meetings on matters which the Board delegates to it. Members of the Committee shall serve until the expiry of their respective terms on

the Board or such lesser periods as the Board may determine. A majority of the members shall constitute the quorum for any meeting of the Committee. Each member of the Committee shall have one vote. Decisions of the Committee shall be made by a majority vote. All decisions of the Committee shall be reported to the Board at its next meeting.

(b) The Board may establish such other committees as it may consider appropriate to assist it in its work.

#### ARTICLE EIGHT

##### The Director General and Staff

1. CIAT shall be administered by a Director General under the direction of the Board. The Director General's appointment, terms of service, and any termination for cause shall be decided by a three-fourths majority of all members of the Board.

2. The Director General shall implement the policies and programs established by the Board and shall be responsible to the Board for operating and managing CIAT and for assuring that its policies and programs are properly developed and carried out. The Director General shall be CIAT's legal representative and shall, within the limits established by the Board, be empowered to undertake such actions as shall be necessary for the attainment of CIAT's purposes.

3. The Director General shall appoint and manage the staff in accordance with policies and regulations approved by the Board. Subject to the paramount importance of securing the highest standards of integrity, efficiency and technical competence, due regard shall be paid, in the appointment of staff, to CIAT's international character.

4. Within the limits established by the Board, the Director General may: (a) appoint a member of CIAT's senior staff to act in his absence or incapacity to act; and (b) delegate to certain members of the senior staff authority to sign contracts and other instruments on CIAT's behalf.

#### ARTICLE NINE

##### Finance

1. CIAT's financial resources shall be obtained from contributions by the members of CGIAR, to which CIAT's annual budgets shall be submitted for approval. CIAT shall also be authorized to receive contributions from other sources for the furtherance of its purposes and activities.

2. CIAT's financial operations shall be conducted in accordance with regulations approved by the Board.



3. No part of CIAT's earnings shall inure to the benefit of, or be distributed to, its Board members, officers, staff, or other private persons, except that CIAT may pay reasonable compensation for services rendered to CIAT and make payments in furtherance of its purposes and activities.

#### ARTICLE TEN

##### Relationship with CGIAR and Other Entities

1. CIAT shall cooperate closely with CGIAR, its Secretariat, and the other international agricultural research centers included within the CGIAR system. CIAT shall submit its annual programs and operational plans to the members of CGIAR and shall be subject to periodic review by the appropriate committees of CGIAR.

2. CIAT shall enter into such cooperative relationships with such other organizations, agencies or other entities as may be conducive to furthering the efficient implementation of CIAT's programs and objectives.

3. CIAT shall enter into a headquarters agreement with the government of the host country and appropriate agreements with the governments of other countries where it has cooperative relationships.

4. Neither the signatories to the Agreement to which this Constitution is annexed (hereinafter called "the signatories") nor any member of CGIAR shall be liable for any obligations of CIAT. The agreements referred to in paragraph 3 above and all other significant contracts entered into by CIAT shall contain provisions stating that (a) CIAT possesses independent legal personality and (b) neither the signatories nor any member of CGIAR shall be liable for any obligations of CIAT.

#### ARTICLE ELEVEN

##### Rights, Privileges and Immunities

1. CIAT, its officials and staff shall enjoy in the territory of the host country such rights, privileges and immunities as shall be stipulated in the headquarters agreement to be concluded between the host country and CIAT pursuant to Article Ten, paragraph 3.

2. Similarly, CIAT may, pursuant to Article Ten, paragraph 3, enter into agreements with the other countries in which it works for the purpose of granting CIAT, its officials and staff such privileges and immunities as are required for such work.

3. Except as agreements concluded pursuant to Article Ten, paragraph 3 shall otherwise provide, CIAT, its officials and staff shall be subject to the laws of the countries concerned.

**ARTICLE TWELVE**  
Amendments

This Constitution may be amended at any meeting of the Board by a three-fourths majority vote of all of its members, provided that notice of such amendment, together with its full text, shall have been sent to all members of the Board at least eight weeks in advance of such meeting, unless such notice is waived by all members of the Board. Important amendments to this Constitution shall in addition require the approval of: (a) the signatories in the case of amendments to Article Ten, paragraph 4; and (b) the members of CGIAR in the case of all other important amendments, including any substantial modification of provisions relating to the purposes, activities, capacities, principles and dissolution of CIAT. CIAT shall consult with the government of the host country on any amendment which would affect the headquarters agreement referred to in Article Ten, paragraph 3.

**ARTICLE THIRTEEN**  
Dissolution

1. Subject to approval by the members of CGIAR, CIAT may be dissolved by a three-fourths majority of all members of the Board, if it is determined by the Board that CIAT is no longer required or that it will no longer be able to function effectively.

2. In case of dissolution, the assets of CIAT situated in the host or other collaborating countries shall be retained by such countries and used for similar purposes or distributed to institutions having purposes similar to those of CIAT in the respective countries after agreement between the governments of those countries and the Board in consultation with the members of CGIAR.

**ARTICLE FOURTEEN**  
Transitional Provision

CIAT shall enter into such arrangements as shall be necessary and appropriate for the efficient and orderly transfer to CIAT of its predecessor's assets and liabilities upon the latter's dissolution.

**SCHEDULE TO  
THE CONSTITUTION OF THE  
CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL**

Original Members of the Board of Trustees <sup>1/</sup>

<u>Name</u>	<u>Expiry of Term <sup>2/</sup></u>	<u>Eligible for Election <sup>3/</sup></u>
William Tossell	1987	No
Nohra de Junguito	1988	No
Peter Bell	1988	Yes
Eduardo Casas Diaz	1986	Yes
John L. Dillon	1986	No
Dely P. Gapasin	1988	Yes
Fernando Gomez M.*		
Ken-Ichi Hayashi	1988	Yes
Frederick Hutchinson	1988	Yes
Roberto Mejia Caicedo*		
John L. Nickel*		
Marco Palacios Rozo*		
Aston Zachariah Preston	1986	Yes
Erwin Reisch	1987	No
Rodrigo Tarte	1987	Yes
Elmar Wagner	1987	No
Fredrick Wangati	1986	Yes

\* Ex officio member.

1. See Articles 7(1) and 7(2) of the Constitution.
2. See first sentence of Article 7(3) of the Constitution.
3. See second sentence of Article 7(3) of the Constitution.

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

CERTIFICATE

I hereby certify that the foregoing is a true copy of the original in the archives of the International Bank for Reconstruction and Development.

In witness whereof I have signed this Certificate and affixed the Seal of the Bank thereunto this 28<sup>th</sup> day of May, 1986.



FOR SECRETARY

## Dr. Andy Jarvis

Program Leader Decision and Policy Analysis, International Center for Tropical Agriculture (CIAT), Recta Cali-Palmira km17, Cali, Colombia. Tel. +57 2 4450000. Email: [a.jarvis@cgiar.org](mailto:a.jarvis@cgiar.org)

Dr. Andy Jarvis is the Leader of the Decision and Policy Analysis Program in the International Centre for Tropical Agriculture (CIAT) and is a senior scientist for Bioversity International, and is based in Cali, Colombia. Dr. Jarvis has 10 years experience of cutting edge scientific research in developing countries to support the goals of alleviating poverty and protecting essential ecosystem services of importance to humanity. His research has focused on the use of spatial analysis and environmental modeling to address issues such as agricultural biodiversity conservation, adaptation to climate change, and maintenance of ecosystem services. Over the past ten years Dr. Jarvis has published over 50 articles, book chapters or books, with over 20 peer-reviewed articles published in international journals. Dr. Jarvis has also worked as a consultant to the Food and Agriculture Organisation (FAO) on developing climate change strategies to conserve agricultural biodiversity, and been a consultant on a variety of projects for the European Union, Global Environment Facility amongst others. In 2003 Dr. Jarvis won the Crop Science Society of America (CSSA) C-8 Genetic Resources award for best research paper stemming from his work on conservation prioritization research for wild peanuts in Latin America, and in 2009 received the prestigious Ebbe Nielsen award for innovative research in bioinformatics and biosystematics.

### EDUCATION

2001 – 2005: *Doctor of Philosophy*, Department of Geography, King's College London. Thesis entitled: "Terrain controls on the distribution of tree species diversity and structure in tropical lowland and tropical montane forest".

1996 – 1999: Undergraduate degree program at the Department of Geography, King's College London (part of University of London), receiving a *First Class BSc. Degree with Honours*.

### RESEARCH FOCUS

My research over the years has focused on how spatial analysis and environmental modeling can contribute to improved conservation and use of natural resources, specializing on agriculturally related plant species. This work has examined both infra-specific diversity and intra-specific diversity (morphological, molecular), and also how these resources can be used to improve livelihoods of the rural poor. The research highlights include advanced methods for assessing the conservation status of important gene pools (case studies in wild *Arachis* and *Vigna*), field validation of species distribution models for wild *Capsicum* and climate modeling examining the likely impacts of global climate change on agriculturally important species.

My current areas of focus are in assessment of environmental services and their relationship to poverty alleviation, specifically in Latin America. This work examines the status of environmental services, and evaluates different intervention mechanisms that effectively conserve and manage the ecosystem services, including payment schemes for services such as water. I am also engaged in climate change research, especially in evaluating the impacts on natural systems, and in evaluating and developing adaptation mechanisms that build resilience in natural and agricultural landscapes.

As a baseline necessity for much of the modeling work in natural resources, I have also focused on developing high quality global datasets of important environmental variables. I am author on three major global datasets on climate (WorldClim – <http://www.worldclim.org>), topography (SRTM – <http://csi.srtm.cgiar.org>) and water resources (Hydrosheds - <http://hydrosheds.cr.usgs.gov/>), and am currently developing detailed rainfall data derived from the TRMM satellite and vegetation data from MODIS.

Many of the methods developed are also integrated into user friendly software tools for use by biologists and conservationists. I am a co-author on DIVA-GIS ([www.diva-gis.org](http://www.diva-gis.org)), which is widely used by the conservation community. A number of training workshops have been held for this software in Latin America, Africa and Asia.

## APPOINTMENTS

Current – Decision and Policy Analysis Program Leader, International Centre for Tropical Agriculture (CIAT). Senior Scientist position with duties which include administering and leading the Decision and Policy Analysis Program of CIAT with 45 staff and an annual budget of US\$5.8m, leading a research agenda on spatial analysis of agrobiodiversity, supervising staff and students (undergrad, masters and PhD level), proposal development and fund raising.

Postdoctoral Research Fellow : 2004 – 2006 Joint-position between CIAT and Bioversity International, housed in the Land Use Project of CIAT.

## RECENT RELEVANT PUBLICATIONS

- Jarvis, A., Touval, J. L., Castro Schmitz, M., Sotomayor, L., Hyman, G. G. 2009. Assessment of threats to ecosystems in South America. *Journal for Nature Conservation*. doi:10.1016/j.jnc.2009.08.003.
- Jarvis, A., Lane A., Hijmans R., 2008, The effect of climate change on crop wild relatives, *Agriculture, Ecosystem and Environment*, Vol. 126, Issues 1-2, pp. 13-23.
- Lane, A; Jarvis, A. 2007. Changes in Climate will Modify the Geography of Crop Suitability: Agricultural Biodiversity can Help with Adaptation.. *Journal of the Semi-Arid Tropics*. Volume 4: Issue 1.
- Yeaman, S. and Jarvis, A. 2006. Regional heterogeneity and gene flow maintain variance in a quantitative trait within populations of lodgepole pine. *Proceedings of the Royal Society B: Biological Sciences*, 273, 1587-1593.
- Jarvis, A., Williams, K., Williams, D., Guarino, L., Caballero, P. & Mottram, G. (2005). Use of GIS for optimizing a collecting mission for a rare wild pepper (*Capsicum flexuosum* Sentn.) in Paraguay. *Genetic Resource and Crop Evolution*, 52, pp. 671-682.
- Jarvis, A., Yeaman, S., Guarino, L., Tohme, J. (2005). The role of geographic analysis in locating, understanding and using plant genetic diversity. In Zimmer E A.. and Roalson E.H. (eds), *Methods in Enzymology*, Vol. 395 *Molecular Evolution: Producing the Biochemical Evidence Part B*, Elsevier, New York, USA pp.279-298.
- Jarvis, A.; Ferguson, M.; Williams, D.; Guarino, L.; Jones, P.; Stalker, H.; Valls, J.; Pittman, R.; Simpson, C.; Bramel, P. 2003. Biogeography of Wild Arachis: Assessing Conservation Status and Setting Future Priorities. *Crop Science* 43, 1100-1108.
- Jarvis, A.; Guarino, L.; Williams, D.; Williams, K.; Hyman, G. 2002. Spatial analysis of wild peanut distributions and the implications for plant genetic resource conservation. *Plant Genetic Resources Newsletter* 131, 29-35.
- Hijmans, R.J., S. Cameron, J. Parra, P.G. Jones, A. Jarvis, 2005, WorldClim - very high resolution global terrestrial climate surfaces for monthly temperature and precipitation, *International Journal of Climatology* 25, pp. 1965-1978.

## AWARDS

The conservation prioritization research for wild peanuts in Latin America received an award from the Crop Science Society of America (CSSA) C-8 Genetic Resources department for best research paper in 2003.

Work on climate change impacts on biodiversity contributed to the 2009 Ebbe Nielsen award for innovative research on bioinformatics and biosystematics.

## Personal Information

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**First name** Daniel-Augusto  
**Last name** Amariles-García

**Office address** International Center for Tropical Agriculture (CIAT)  
Kilometro 17 recta Cali-Palmira  
Cali – Valle del Cauca  
Colombia

**Fix phone number** +57 (2) 439 6816  
**Office phone number** +57 (2) 445 0100 ext. 3369  
**Cell phone number** +57 315 539 3839

**E-Mail** daniel.amariles88@gmail.com

**Date of birth** March 14th 1988  
**Nationality** Colombian

## Career Objectives and research area

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I have experience developing Java applications, database management, data analysis and technical support. Interested to work in software design, database design, Java application development and Web application development areas.

Currently working in the development of Java based applications for filtering and correction of spatial and environmental data stored in MySQL database, important for the analysis of the impacts of climate change in plant species at the global level.

## Core skills

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### Databases

- Excellent knowledge MySQL, Microsoft SQL Server, Oracle database, PostgreSQL

### Programming languages

- Excellent knowledge Java, C#
- Excellent knowledge JSP, ASP.NET, JavaScript

### Other

- Operating systems: Windows 98/2000/XP/Vista/7, Linux Fedora 9, Linux Ubuntu 8.04, Linux RedHat E5
- Development Environments: Eclipse IDE 3.5, Visual Studio 2008, Oracle Developer Suite 11g
- UML

## Career History

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<b>July 2009 – Present</b>	<b>International Center for Tropical Agriculture</b> <i>Student Intern</i>	<b>Colombia</b>
<b>Aug 2008 – June 2009</b>	<b>Universidad Icesi</b> <i>Juridical Office Advisor</i>	<b>Colombia</b>
<b>Dec 2006 – July 2007</b>	<b>Tierra, pastos y ganado</b> <i>Administration assistant</i>	<b>Colombia</b>
<b>Jun 2006 – Dec 2006</b>	<b>Ralfa.Bioenergía</b> <i>Software Developer</i>	<b>Colombia</b>

## Education

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<b>2009</b>	<b>Bachelor's Thesis</b> <i>Windows Workflow Foundatios for Software Engeneering Projects.</i>  Directors: Guillermo Londoño, MSc (Universidad Icesi, Cali, Colombia)	<b>Colombia</b>
<b>2004 – Present</b>	<b>Universidad Icesi</b> <i>X semester Computer Science</i> <i>X semestre Ingeniería de Sistemas</i>	<b>Colombia</b>
<b>1993 – 2004</b>	<b>Primary and Secondary schools</b>	<b>Colombia</b>

## Languages

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<b>Spanish</b>	Excellent written, reading and oral skills (mother tongue)
<b>English</b>	Good written, reading and oral skills



## Personal Information

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**First name** Héctor-Fabio  
**Last name** Tobón-Rincón

**Office address** International Center for Tropical Agriculture (CIAT)  
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**Office phone number** +57 (2) 445 0100 ext. 3369  
**Cell phone number** +57 310 359 6037

**E-Mail** htobon@gmail.com

**Date of birth** August 23th 1985  
**Nationality** Colombian

## Career Objectives and research area

---

I have experience developing Java applications, creation and management web forums, data analysis, technical support and database management. Interested to work in java application development, software design, database design and web applications development.

Currently working in development of Java based applications for filtering and correction of spatial and environmental data stored in MySQL database, important for the analysis of the impacts of climate change in plant species the global level.

## Core skills

---

### Databases

- Excellent knowledge MySQL, Microsoft SQL Server, PostgreSQL, Oracle Database.

### Programming languages

- Excellent knowledge Java Language.
- Excellent knowledge C# .NET Language.
- Excellent knowledge JSP Language.
- Medium knowledge PHP Language.

### Other

- Operating systems: Windows 98/2000/XP/Vista, Linux RedHat E5
- Development Environments: Eclipse IDE 3.5, Visual Studio 2008, Oracle Developer Suite 11g.
- UML

## Career History

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Feb 2005 – Present	<b>Universidad Icesi</b> <i>Advisor on Algorithms for Students</i>	<b>Colombia</b>
Feb 2008 – Nov 2008	<b>Universidad Icesi</b> <i>Psychoanalysis Advisor</i>	<b>Colombia</b>
July 2009 – Present	<b>International Center for Tropical Agriculture</b> <i>Student Intern</i>	<b>Colombia</b>

## Education

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Present	<b>Bachelor's Thesis</b> <i>Técnicas de Modelado, Visualización e Interacción de grafos en 3D</i> <i>Modeling, Visualization and Interaction Techniques in 3D Graph</i>  Directors: Juan Diego Urán (Universidad Icesi, Cali, Colombia).	<b>Colombia</b>
2003 – Present	<b>Universidad Icesi</b> <i>X semester Computer Science</i> <i>X semester Ingeniería de Sistemas</i>	<b>Colombia</b>
1991 – 2003	<b>Primary and Secondary schools</b>	<b>Colombia</b>

## Languages

---

<b>Spanish</b>	Excellent written, reading and oral skills (mother tongue)
<b>English</b>	Good written, reading and oral skills

## Personal Information

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**First name** Julián  
**Last name** Ramírez-Villegas

**Office address** International Center for Tropical Agriculture (CIAT)  
Kilometro 17 recta Cali-Palmira  
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Colombia

**Fix phone number** +57 (2) 513 4290  
**Office phone number** +57 (2) 445 0100 ext. 3455

**E-Mail** j.r.villegas@cgiar.org

**Date of birth** November 1st 1985  
**Nationality** Colombian

## Career Objectives and research area

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I have been involved in climate, crop modeling as well as biodiversity conservation especially in the context of climate change, making use of statistics and geographic information systems (GIS) to produce new knowledge at different levels of agricultural production systems and environmental services in tropical regions.

My current research area is focused mainly in spatial analysis towards the analysis of relationships between environmental factors, and geographical distributions of plant species. I am currently engaged in two major projects: (1) the evaluation of completeness of the CGIAR system germplasm collections, and (2) comprehensive assessment of the impacts of climate change in crop biodiversity and definition of plant genetic resources *in situ* and *ex situ* conservation strategies in the 21<sup>st</sup> century. There are other projects and publications in which I'm currently involved, mainly focused on climate change, environmental and ecological modeling.

## Core skills

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### Statistics and GIS

- Excellent knowledge of spatial analysis with Arc/Info workstation
- Excellent knowledge of the different GIS software (Arc/Info workstation, ArcView GIS 3.x, ArcGIS 9.x, ERDAS Imagine)
- Excellent knowledge of statistical analyses used for quantitative and qualitative data analysis in agriculture using mainly SAS (Statistical Analysis System)
- Good knowledge of other statistical packages: R 2.8.x, Minitab 14, STATA, SPSS

### Programming languages

- Excellent knowledge Arc/Info Macro Language (AML)
- Good knowledge of Visual Basic

## Other

- Operating systems: Unix Solaris 9.1, Windows 98/2000/XP/Vista, Linux OpenSUSE 11.1, Linux Kubuntu, Linux RedHat E5
- Good knowledge of Access

## Career History

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July 2008 – Present	<b>International Center for Tropical Agriculture</b> <i>Agroecosystems resilience research assistant</i>	<b>Colombia</b>
Nov 2007 – June 2008	<b>CIAT – Bioversity International</b> <i>Thesis student</i>	<b>Colombia</b>
Apr – Nov 2007	<b>CIAT - Bioversity International</b> <i>Student Intern</i>	<b>Colombia</b>

## Education

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2008	<b>Bachelor's Thesis</b> <i>Black leaf streak disease pressure spatial variability and potential productivity of different Musa cultivars using multi-site trial data.</i>  Directors: Andy Jarvis, PhD (CIAT, Cali, Colombia) – Inge Van den Bergh, PhD (Bioversity International, Montpellier, France), Edgar Madero, PhD (Univesidad Nacional de Colombia sede Palmira, Palmira, Colombia)	<b>Colombia</b>
2003 – 2008	<b>Universidad Nacional de Colombia sede Palmira</b> <i>Bachelor degree in agricultural engineering (with honours)</i> <i>Grado como ingeniero agrícola (con honores)</i>	<b>Colombia</b>
1991 – 2002	<b>Primary and Secondary schools</b>	<b>Colombia</b>

## Languages

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<b>Spanish</b>	Excellent written, reading and oral skills (mother tongue)
<b>English</b>	Very good written, reading and oral skills

## Publications and international presentations

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**Ramirez, J.**, Jarvis, A. and Salazar-Villegas, M. 2009. A way forward on adaptation to climate change in Colombian agriculture: Perspectives towards 2050. *In preparation.*

Jarvis, A., **Ramirez, J.**, Anderson, B., Leibing, C., and Aggarwal, P. K. 2009. Chapter 2: Scenarios of climate change within the context of agriculture. *In: Reynolds, M. 2009. Climate Change and Crop Production. CABI publishing. In press.*

Schroth, G., Laderach, P., Depenwolf, J. Philpott, S., Hagggar, J., Eakin, H., Castillejos, T., Garcia-Moreno, J., Soto-Pinto, L., Hernandez, R., Eitzinger, A., and **Ramirez-Villegas, J.**

2009. Towards a climate change adaptation strategy for coffee growing communities and ecosystems in the Sierra Madre de Chiapas, Mexico. *Mitigation and Adaptation Strategies for Global Change*. DOI: 10.1007/s11027-009-9186-5.

Laderach, P., Lundy, M., Jarvis, A., **Ramirez, J.**, Perez-Portilla, E., and Schepp, K. 2009. Predicted impact of climate change on coffee-supply chains. *In: Climate 2009*, 2-6 November, Online Conference.

Jarvis, A; King, N; Gaiji, S; **Ramirez, J**; Zapata, E; Guevara, E; Laderach, P. 2009. GBIF: Infrastructure, standards and access to data and tools to forecast changes in agricultural production. Climate change: global risks, challenges and decisions, University of Copenhagen. Copenhagen (Denmark), 10-12 March, 2009.

Jarvis, A; King, N; Gaiji, S; **Ramirez, J**; van Zonneveld, M. 2009. GBIF: Infrastructure, standards and access to data and tools to forecast climate change impacts on forest ecosystems. Climate change: global risks, challenges and decisions, University of Copenhagen. Copenhagen (Denmark), 10-12 March, 2009.

**Ramírez, J**; Jarvis, A. 2009. Geographic Information Systems to Assess the Impact of Climate Change on Crop Biodiversity. Proceedings of the 4<sup>th</sup> World Congress on Conservation Agriculture. New Delhi (India), 4-7, Feb 2009.

**Ramírez, J**; Jarvis, A.; Van den Bergh, I. 2008. Presión de la Sigatoka Negra y Distribución Espacial; de Genotipos de Banano y Plátano: Resultados de 19 Años de Pruebas con Musáceas. 18 International Meeting ACORBAT, Guayaquil (Ecuador), 10-14, Nov 2008. 8 p.

Jarvis, A.; **Ramírez, J.**; Guevara, E.; Zapata, E. 2008. Global impacts and implications of climate change on banana production systems. 18 International Meeting ACORBAT, Guayaquil (Ecuador), 10-14, Nov 2008. 18 p.

**Ramírez, J.**; Jarvis, A.; Guevara, E. D. 2008. Are Crop Wild Relatives a Useful Source of Genetic Traits Related to Abiotic Resistance in the Context of Climate Change?. *Plant Genetic Resources Newsletter*. Submitted.

**Ramírez, J**; Jarvis, A; Van den Bergh, I. 2008. Mapping global black leaf streak (*Mycosphaerella fijiensis* Morelet) disease pressure through analysis of environmental drivers. *Crop science*. Submitted.

Laderach, P.; Jarvis, A.; **Ramírez, J.**; Fisher, M.J. 2008. Predictions of land use changes under progressive climate change in coffee growing regions of the AdapCC project: Final report. Cali, Colombia: October 2008[on line]. Centro Internacional de Agricultura Tropical (CIAT), Cali, CO. 65 p.

## Personal Information

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**First name** Louis  
**Last name** Reymondin

**Address** Carrera 24c #6oeste-150 Apt. 102A  
Edificio Altavista  
Cali - Valle del Cauca  
Colombia

**Phone number** (0057 2) 514 61 49  
**E-Mail** louis.reymondin@heig-vd.ch

**Date of birth** July 27 1984  
**Nationality** Swiss

## Objectives

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Work with bio inspired technologies  
Use my knowledge for environment conservation and durable development

## Core skills

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### Languages

- Excellent knowledge of Java SE
- Good knowledge of PHP
- Good knowledge of C/C++
- Good knowledge of Visual Basic

### Notions

- Excellent knowledge of object oriented programming
- Good knowledge of concurrent and distributed programming
- Good knowledge of network programming

### Database

- Conception of database
- Good knowledge of Oracle, PostgreSQL, Access, MySql

## Career History

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<b>Mar 2008 – Present</b>	<b>International Center for Tropical Agriculture</b> <i>Visiting researcher in the land use department as Development Engineer</i>	<b>Colombia</b>
<b>Jan – Apr 2004</b>	<b>Ecole de commerce de Nyon (EPCN)</b> <i>Stage in the IT department, helpdesk, maintenance</i>	<b>Switzerland</b>
<b>Apr – Dec 2003</b>	<b>Radio Suisse Romande (RSR)</b> <i>Stage in the IT department, helpdesk, maintenance</i>	<b>Switzerland</b>

## Education

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2007	<b>Diploma's theses</b> <i>Analysis of satellite image data for environmental applications</i>	<b>Colombia</b>
2004 – 2007	<b>Haute Ecole d'Ingénierie et de Gestion du Canton de Vaud</b> <i>Engineer diploma in Software development</i>	<b>Switzerland</b>
2001 – 2004	<b>Centre Professionnel du Nord Vaudois</b> <i>Professional Degree in computer science</i> <i>Professional Baccalaureate MPT</i>	<b>Switzerland</b>
1991 – 2001	<b>Primary and Secondary school</b>	<b>Switzerland</b>

## Languages

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<b>French</b>	Excellent written and oral skill
<b>English</b>	Good written and oral skill
<b>Spanish</b>	Good written and oral skill
<b>German</b>	Basic written and oral skill

November 5, 2009

**Dr. Luisa Fernanda Neira**  
Department of Sustainable Development  
Organization of American States  
1889 F. St., N.W., Suite 773-C  
Washington, D.C. 20006  
Telephone: +202-458-6097  
Fax: +202-458-3560  
E-mail: [lneira@oas.org](mailto:lneira@oas.org)

Dear Dr. Neira,

It gives me great pleasure to present the attached proposal entitled: *"Providing means for a better understanding of biodiversity: improving primary data and using it for threat assessment and in situ conservation planning in South America"*. The lead scientist of the proposal is Dr. Andy Jarvis, a high profile, experienced and highly qualified scientist, leader of the Decision and Policy Analysis program of the International Centre for Tropical Agriculture (CIAT).

The International Centre for Tropical Agriculture (CIAT), a member-centre of the Consultative Group of International Agricultural Research (CGIAR), is a not-for-profit research organization with headquarters in Cali, Colombia. The mission of CIAT is to alleviate poverty and conserve natural resources in the tropics. We believe that well targeted use of spatial data and its interoperability as well as its interactive sharing within a network is a key issue in need of being addressed, in order to improve regional decision making processes. We hope and trust that this proposal is of interest to IABIN. The proposal validity stands up to December 1, 2009.

We are very pleased with this approach and believe this will prove to be a fruitful undertaking.

Please do not hesitate to contact us should you require any further information regarding our participation in the proposal.

Sincerely yours,



 Ruben Echeverría  
Director General

c.c. Dr. Richard M. Huber (IABIN), Dr. Andrew Jarvis (CIAT)

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REPUBLICA DE COLOMBIA

# DIARIO OFICIAL

FUNDADO EL 30 DE ABRIL DE 1864

IVAN SUAREZ CAMACHO  
Director Imprenta Nacional

Bogotá, D. E., martes 22 de marzo de 1988  
Año CXXIV No. 38.264—Edición de 16 páginas

MINISTERIO DE GOBIERNO  
Bogotá 15-OCT-1997 de 197  
Certifico que es autógrafo el presente  
ejemplar del diario oficial.

MELLYDA QUINTERO ALCANTARA  
Directora Delegada Diario Oficial  
Tarifa Apostal No. 58  
DIRECCION: MINISTRO DE GOBIERNO

## Poder Público—Rama Legislativa Nacional

### LEY 29 DE 1988 (marzo 18)

por medio de la cual se aprueba el convenio entre el Gobierno de la República de Colombia, y el Centro Internacional de la Agricultura Tropical, CIAT, suscrito en Bogotá el 5 de mayo de 1987.

El Congreso de Colombia

DECRETA:

Artículo primero. Apruébase el Convenio entre el Gobierno de la República de Colombia y el Centro Internacional de la Agricultura Tropical, CIAT, suscrito en Bogotá el 5 de mayo de 1987, cuyo texto es:

«CONVENIO ENTRE EL GOBIERNO DE LA REPUBLICA DE COLOMBIA Y EL CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL, CIAT.

El Gobierno de la República de Colombia y el Centro Internacional de Agricultura Tropical, CIAT,

CONSIDERANDO:

1. Que el Grupo Consultivo sobre Investigaciones Agrícolas Internacionales (GCIAT) es una agrupación de gobiernos nacionales, organismos de ayuda multilateral, fundaciones privadas y otras personas jurídicas que han contribuido al establecimiento de un sistema de centros internacionales de investigaciones agrícolas y prestan apoyo a dicho sistema con el propósito de aumentar la producción agropecuaria en todo el mundo en desarrollo.

2. Que los tres copatrocinadores del GCIAT son el Banco Internacional para la Reconstrucción y Fomento (BIRF), la Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO) y el programa de las Naciones Unidas para el Desarrollo (PNUD).

3. Que el Centro Internacional de Agricultura Tropical, CIAT, está establecido en Colombia por acuerdo celebrado entre la Fundación Rockefeller y el Gobierno de Colombia el 10 de noviembre de 1967 y tanto el CIAT como su personal técnico y científico internacional ha gozado de los privilegios, prerrogativas y exenciones concedidos mediante Decreto 301 de marzo 7 de 1968.

4. Que el Centro Internacional de Agricultura Tropical, CIAT, es una corporación de derecho privado sin fines de lucro en virtud de la Escritura Pública número 4717 del 18 de octubre de 1967 de la Notaría Tercera de Bogotá y reconocido como persona jurídica en virtud de la Resolución número 4939 del 4 de diciembre de 1967 del Ministerio de Justicia.

5. Que el CIAT funciona como un centro internacional de investigaciones agrícolas dentro del sistema del GCIAT con el mandato de llevar a cabo investigaciones sobre los problemas de la agricultura tropical, para beneficio de Colombia y de otros países en desarrollo.

6. Que el Gobierno de Colombia y los copatrocinadores, en memorando que se firmó el 12 de octubre de 1983 con motivo del décimo aniversario de la inauguración de la sede permanente del CIAT, manifestaron especial interés en que el CIAT continúe desempeñando satisfactoriamente sus actividades y la creencia de que es esencial que el CIAT tenga la condición y las características apropiadas a su mandato internacional, a sus fuentes internacionales de financiamiento y a la índole internacional de su personal.

7. Que el Banco Internacional para la Reconstrucción y Fomento y el programa de las Naciones Unidas para el Desarrollo, por acuerdo firmado el 28 de mayo de 1986 en Washington (Estados Unidos) fundaron el Centro Internacional de Agricultura Tropical, CIAT, con personería legal y status internacional con la intención de que el CIAT a que se refiere el considerando tres del presente Convenio continúe

su existencia y operaciones, con sede en Colombia, bajo los términos del recientemente fundado CIAT, con su personería legal y su status internacional.

8. Que en el Acta de Fundación del CIAT, firmado por el BIRF y el PNUD se estipula que el CIAT debe llegar a un acuerdo con el Gobierno de Colombia que regule su existencia en Colombia con su nueva personería legal y con el reconocimiento de su status internacional.

Por lo tanto:  
El Gobierno de la República de Colombia y el Centro Internacional de Agricultura Tropical, CIAT, acuerdan lo siguiente:

ARTICULO UNO

a) Por medio del presente Convenio el Gobierno de Colombia otorga sede permanente en su territorio al Centro Internacional de Agricultura Tropical, CIAT, y como contribución al logro de sus objetivos fundamentales, garantiza la continuidad de las facilidades y privilegios que en el presente Convenio se establecen.

b) El Gobierno de Colombia reconoce al Centro Internacional de Agricultura Tropical, CIAT, como un organismo independiente de carácter internacional, con personería legal sin ánimo de lucro, con fuentes internacionales de financiación.

c) En este Convenio, la expresión "personal contratado internacionalmente" significa personal científico, técnico y administrativo de nivel superior que, en virtud de las normas del CIAT, sea contratado en el plano internacional.

ARTICULO DOS

El CIAT difundirá en Colombia, por los medios que considere más apropiados, la tecnología generada por sus científicos. El Ministerio de Agricultura y las instituciones especializadas dedicadas a la investigación y desarrollo agrícola, tales como el Instituto Colombiano Agropecuario, ICA; la Federación de Arroceros, Fedearroz; la Federación de Cafeteros, etc., tendrán acceso a la tecnología generada por el CIAT en las áreas de su interés. El CIAT concederá cupos a profesionales colombianos en sus programas de capacitación. Para los efectos anteriores, el CIAT podrá establecer convenios o contratos con entidades colombianas.

ARTICULO TRES

De conformidad con lo establecido en el Acuerdo firmado entre el BIRF y el PNUD (Artículo siete, parágrafo 1º) que el país anfitrión de CIAT deberá tener representantes en la Junta Directiva de CIAT, escogidos por el país anfitrión y el CIAT; el Gobierno de Colombia y CIAT consideraran conveniente continuar el actual arreglo por medio del cual los siguientes ciudadanos de Colombia serán miembros ex officio de la Junta Directiva del CIAT: el Sr. (a) Ministro de Agricultura, el Sr. (a) Gerente General del Instituto Colombiano Agropecuario, ICA, y el Sr. (a) Rector de la Universidad Nacional de Colombia. Un cuarto miembro colombiano será elegido libremente por la Junta Directiva.

ARTICULO CUATRO

El Gobierno de Colombia concede al CIAT los siguientes privilegios e inmunidades dentro del territorio de Colombia:

1. Locales

Los locales donde tiene la sede principal el CIAT, en el Municipio de Palmira y la residencia del Director General en Cali serán inviolables. Por este motivo el CIAT presentará al Ministerio de Relaciones Exteriores la documentación requerida.

2. Archivos

Los archivos del CIAT serán inviolables. El término "archivos" incluirá, entre otras cosas, todos los registros financieros y de otra índole, correspondencia, documentos, manuscritos, fotografías, películas y grabaciones que pertenezcan al CIAT o estén en su poder, en los locales a que se refiere el numeral 1 del presente artículo.

3. Inmunities

a) Dentro de los límites de sus actividades oficiales, el CIAT tendrá inmunidad de jurisdicción y competencia, excepto:

1) En la medida en que el CIAT haya renunciado expresamente a tal inmunidad en un caso determinado;

2) Con respecto a una acción civil de terceros por daños resultantes de un accidente causado por un vehículo automotor perteneciente al CIAT o conducido en su nombre, o con respecto a una infracción de tránsito en que tal vehículo se vea involucrado, y

3) En el caso de embargo, por decisión de las autoridades judiciales, de los sueldos o emolumentos que el CIAT deba a un miembro de su personal.

b) Salvo en lo previsto en el párrafo a) 3) anterior, las propiedades y demás pertenencias del CIAT serán inmunes a cualquier forma de requisa, confiscación, expropiación y secuestro. Serán también inmunes a cualquier forma de retención administrativa o judicial provisional, excepto en la medida en que tal medida sea temporalmente necesario en relación con la prevención e investigación de accidentes en que se vean involucrados vehículos automotores pertenecientes al CIAT o conducidos en su nombre.

4. Impuestos

a) El CIAT como persona jurídica, sus bienes, sus ingresos y egresos y todas las operaciones y transacciones en desarrollo de sus objetivos cumpla y ejecute estarán exentos de toda clase de impuestos, directos o indirectos, tasas, tributos, aportes, derechos, timbres, emolumentos, contribuciones y gravámenes sobre las personas, las cosas o las actividades, bien sean de la Nación, de los departamentos, de los municipios, o institutos descentralizados y cualquiera que sea la finalidad o destino de los mismos. Lo antedicho no es aplicable a los cargos por concepto de servicios públicos.

b) Para implementar lo anterior, numeral 4, aparte a, el Gobierno hará todas las gestiones pertinentes para que se reembolsen al CIAT los impuestos que puedan haberse incluido en el precio de compra de los bienes o servicios adquiridos por el CIAT, en desarrollo de sus objetivos.

5. Importaciones y exportaciones

a) El CIAT, además de lo dispuesto en el numeral anterior, estará exento de derechos de importaciones en los términos del Decreto 3311 de noviembre 14 de 1965 y las normas que lo complementen o modifiquen; y de prohibiciones y restricciones sobre importaciones y exportaciones de artículos importados y exportados por el CIAT en desarrollo de sus operaciones.

b) El CIAT podrá importar libre de derechos de aduana los vehículos que necesite para uso oficial, o de sus funcionarios internacionales. Todos los vehículos se deberán importar y registrar a nombre del CIAT. El número de vehículos de su flota será igual al que a la firma del presente Convenio se encuentre registrado a nombre del CIAT en la Dirección General del Protocolo del Ministerio de Relaciones Exteriores. En adelante todo vehículo adicional deberá ser justificado mediante memorando peticionario dirigido a la Dirección General del Protocolo.

c) El régimen para la importación y venta de los vehículos de propiedad del CIAT, así como para la matrícula y asignación de placas, será el mismo establecido para los vehículos de Misión Técnica en el Decreto 232 de 1967 y otras disposiciones concordantes.

d) Sin que ello suponga restricción de la generalidad de lo antedicho, el CIAT estará autorizado para importar y exportar los materiales biológicos necesarios para sus investigaciones científicas, con sujeción a las leyes y los reglamentos de Colombia sobre cuarentena e inspección de esos materiales para evitar la introducción al país o la exportación desde éste de enfermedades y plagas graves; el Gobierno de Colombia asegurará la pronta y expedita inspección de todos los materiales. Al aceptar lo que antecede, el Ministerio de Agricultura de Colombia instruirá a las autoridades sanitarias y aduaneras colombianas para que permitan el libre movimiento de semillas y material genético de propiedad del CIAT dentro del territorio colombiano. Para sus exportaciones el CIAT presentará ante las correspondientes autoridades únicamente el conocimiento de embarque. El CIAT estará exento del requisito de registro de exportación.

d) La Dirección General de Aduanas de Colombia facilitará la nacionalización de los vehículos y bienes destinados al CIAT; así como los menajes domésticos de sus funcionarios internacionales.

Igualmente, para facilitar las importaciones a que este Convenio se refiere, no se requerirá licencia previa, bastando la presentación del conocimiento de embarque como único documento necesario para presentar a las autoridades de Aduana al llegar las mercancías a puerto colombiano, para que sea permitida su pronta nacionalización. Los vehículos automotores se registrarán por lo dispuesto en el numeral 5b) del presente artículo.

Para facilitar la importación y despacho para consumo de las mercancías importadas por el Centro Internacional de Agricultura Tropical, CIAT, este mantendrá un Depósito Aduanero habilitado dentro de sus instalaciones en Palmira. Igualmente las autoridades aduaneras autorizarán el rápido traslado al Depósito del CIAT de las mercancías que lleguen a cualquiera de las Aduanas del País, con este destino. El Centro Internacional de Agricultura Tropical será responsable de ese traslado.

6. Fondos y bienes

a) Sin ninguna restricción por controles financieros, reglamentarios o moratorios de cualquier clase, el CIAT podrá:

1) Recibir y mantener sus fondos en cualquier moneda, en efectivo o valores de cualquier naturaleza, y administrar sus cuentas en cualquier moneda, y

2) Transferir libremente tales fondos y convertirlos a cualquier clase de moneda cuando lo considere conveniente.

b) A solicitud del CIAT, el Gobierno de Colombia ayudará al CIAT a obtener las condiciones más favorables en sus transacciones de cambio de moneda extranjera por moneda colombiana y viceversa.

c) El Centro Internacional de Agricultura Tropical, CIAT, podrá recibir donaciones de entidades y personas colombianas con el carácter de descuento tributario y beneficios para quienes las hagan en las condiciones reglamentadas por las disposiciones legales que rijan al momento de la donación; pudiendo para ello el CIAT expedir los correspondientes certificados de donación válidos para efectos tributarios.

d) Recibir y adquirir por donación, cesión, permuta, comodato, legado, traspaso, compra o arriendo, ya sea en propiedad o en depósito, contribuciones de propiedad mueble o inmueble, de cualquier persona, firma o entidad, incluyendo fondos y efectos de valor, que puedan ser necesarios para llevar a cabo los fines y objetivos del CIAT, y poseer, operar, usar y disponer de las mismas propiedades y bienes en cualquier forma.

7. Comunicaciones

Para sus comunicaciones y publicaciones oficiales el CIAT gozará de tratamiento no menos favorable que el acordado por el Gobierno de Colombia a otras organizaciones internacionales.

8. Publicaciones

El CIAT tendrá libertad para publicar y difundir los resultados de sus investigaciones y cualquier otro material informativo, propio de su actividad, sin restricción alguna. Las publicaciones del CIAT disfrutarán dentro del territorio de Colombia de tarifas postales iguales a las concedidas a otras publicaciones de la misma índole.

9. Políticas de empleo

a) El CIAT tendrá libertad para adoptar respecto de su personal contratado internacionalmente las políticas y condiciones de empleo que sean apropiadas para poder contratar y retener a dicho personal con criterio internacional, sin discriminación alguna por motivos de nacionalidad u origen y sin más consideración que sus calificaciones y experiencia. Los derechos y obligaciones del personal así contratado y acreditado ante el Ministerio de Relaciones Exteriores, de conformidad con lo establecido en el artículo cuatro, sección 13, párrafo a), se registrarán exclusivamente por los términos y condiciones establecidos por el CIAT.

b) Los empleados y trabajadores del CIAT, distintos del personal contratado internacionalmente a que se hace referencia en el párrafo a) anterior, estarán sometidos a las leyes laborales colombianas. Respecto de este personal, el CIAT cumplirá la legislación colombiana relativa a salario mínimo, recargo por trabajo nocturno, descansos dominicales y festivos, retención en la fuente por concepto de impuesto a la renta, e inscribirá a dicho personal en el Instituto de Seguro Social Colombiano. Se da por entendido que el CIAT no cotizará al Servicio Nacional de Aprendizaje (SENA), por tratarse de un impuesto del que el CIAT está exento de conformidad con el artículo cuatro, sección 4 de este Convenio.

El CIAT organismo internacional asume todas las obligaciones que se deriven de los contratos de trabajo vigentes a cargo del CIAT corporación colombiana de que habla el considerando tres del presente Convenio.

## 10. Junta Directiva

a) Los miembros de la Junta Directiva que no sean de nacionalidad colombiana gozarán de las inmunidades y privilegios a que se refieren los apartes a (1), a (2), b (1) y b (2) del numeral 13 de este artículo.

## 11. Director General

a) El Director General del CIAT, en el evento de no ser ciudadano colombiano, tendrá condición de Jefe de Misión Técnica Internacional y de Representante de un Organismo Internacional y, por lo tanto, disfrutará de los privilegios e inmunidades, consignados en el artículo 8 a) del Decreto número 3135 de 1956 y en el Decreto número 232 de 1967 del Gobierno de Colombia.

b) El Presidente de la Junta Directiva del CIAT comunicará en cada caso al Ministerio de Relaciones Exteriores el nombre de la persona designada para ocupar el citado cargo.

c) El Director General del CIAT deberá comunicar oportunamente al Ministerio de Relaciones Exteriores el nombre de la persona o personas que lo sustituyan en el desempeño de su cargo en caso de ausencia temporal.

d) El Director General registrará su firma y las del personal directivo que él autorice para firmar documentos de rutina, visas, expedición de documentos de identidad, licencias para manejar, etc.

## 12. Visas

Las solicitudes de visa para el personal técnico y científico destinado al servicio del CIAT, miembros extranjeros de su Junta Directiva y técnicos y científicas que asistan a programas de capacitación seminarios o conferencias deberán ser presentadas ante la División de Visas del Ministerio de Relaciones Exteriores por el Director del Centro o quien haga sus veces, sin necesidad del Formulario Especial del Fondo Rotatorio, acompañadas de la hoja de vida del solicitante y de una explicación relativa a las labores que va a desarrollar en el país y el término de duración de su estadía.

El Ministerio de Relaciones Exteriores otorgará las visas, cuando proceda, libres de impuestos y brindará las mayores facilidades para la entrada al país de los funcionarios del Centro, su cónyuge e hijos. Al personal extranjero contratado en forma permanente lo mismo que a su cónyuge e hijos, se les concederá visas de servicios válidas por un (1) año, prorrogables por períodos iguales hasta el término de la misión. A los profesionales que vengan a colaborar en investigaciones científicas, a participar en programas de capacitación o en calidad de investigadores visitantes por un período superior a los tres (3) meses, se les concederá visa de servicio hasta por un plazo de diez (10) meses prorrogables, sin derecho a privilegios de importación personal. Igual visa y por el mismo término se dará a su cónyuge e hijos.

Para investigadores científicos y estudiantes, miembros extranjeros de la Junta Directiva del CIAT, participantes en conferencias internacionales o visitantes distinguidos que vengan por períodos hasta de tres (3) meses se les otorgará Visa de Cortesía, por el mismo término de su estadía, prorrogables hasta por un (1) mes adicional únicamente, previa solicitud del Director del Centro.

El régimen de visas establecido en este Convenio podrá ser modificado por acuerdos complementarios suscritos entre el Gobierno de Colombia y el CIAT.

## 13. Personal contratado internacionalmente

a) Todos los miembros del personal del CIAT contratados internacionalmente deberán acreditarse ante el Ministerio de Relaciones Exteriores y gozarán de los siguientes privilegios:

1) Inmunidad de jurisdicción respecto de todas las palabras dichas, escritas y todos los actos realizados por ellos en su condición oficial y dentro de los límites de su autoridad;

2) Inviolabilidad de todos sus documentos oficiales;

3) Exención del pago de impuestos, tributos o gravámenes sobre el valor de los pasajes nacionales e internacionales que utilicen en el ejercicio de sus funciones y de cualquier otro impuesto por la entrada a Colombia o la salida del territorio colombiano; y

4) Utilización de vehículos oficiales para uso personal.

b) Los miembros del personal del CIAT contratados internacionalmente que no sean de nacionalidad colombiana gozarán además de los siguientes privilegios e inmunidades:

1) Inmunidad de arresto personal y detención;

2) Exención de impuesto a la renta y complementarios sobre los honorarios, salarios y emolumentos que el CIAT les pague;

3) Exoneración de todo servicio personal de carácter civil;

4) Exoneración de la inscripción como extranjeros y de restricciones de inmigración para ellos y los familiares a su cargo;

5) Libertad para mantener sus cuentas personales en moneda extranjera, para cambiar, por intermedio de entidades autorizadas, moneda extranjera a moneda nacional colombiana y para retirar los saldos en moneda extranjera de sus cuentas durante y al término de su servicio al CIAT;

6) Las mismas facilidades para repatriación y los mismos derechos de protección por las autoridades colombianas, para ellos y los familiares a su cargo, de que gozan los miembros de las Misiones Diplomáticas de países extranjeros en períodos de tensión internacional u hostilidades internas o internacionales;

7) Libertad para importar, sin derechos de aduana, enseres de uso doméstico y pertenencias personales a su llegada a Colombia y para exportar dichos artículos al término de su misión en Colombia, dentro del plazo de los seis meses siguientes a su llegada a territorio colombiano o a su salida del mismo;

8) Cuando un miembro del personal contratado internacionalmente haya prestado sus servicios al CIAT por cuatro años consecutivos y el Director General considere que su contrato continuará por un período indefinido, el Director General, podrá solicitar al Ministerio de Relaciones Exteriores, para dicho funcionario la renovación de sus enseres personales de uso doméstico mediante importación libre de derechos consulares, aduaneros y otros gravámenes;

9) A discreción del Ministerio de Relaciones Exteriores, y previa petición del Director General, el CIAT podrá introducir a Colombia, para su uso oficial y el de su personal contratado internacionalmente, libres de derechos de aduana y otros gravámenes, ciertos artículos para su exclusivo uso oficial o consumo particular, tales como medicamentos, bebidas alcohólicas, medicinas, etc., y

10) Una visa apropiada, una licencia para conducir vehículos para el técnico y sus familiares, expedida por el Ministerio de Relaciones Exteriores y un carné o tarjeta de identidad que acredite su vinculación al CIAT, a los fines de aplicar los privilegios e inmunidades reconocidos en este Convenio.

El carné de identidad expedido por el Ministerio de Relaciones Exteriores para el personal contratado internacionalmente y sus familiares, no colombianos, tendrá efectos de plena identificación ante cualquier autoridad colombiana.

## 14. Cumplimiento

a) Con el objeto de otorgar a cada miembro del personal del CIAT contratado internacionalmente, los privilegios e inmunidades declarados en este Convenio, el Director General del CIAT o su representante suministrarán al Ministerio de Relaciones Exteriores una solicitud individual exponiendo el nombre del funcionario y de los familiares a su cargo, una breve descripción de sus calificaciones y experiencia y de las tareas que vaya a desarrollar, y la duración prevista del empleo del funcionario.

b) Con el objeto de cubrir los privilegios e inmunidades descritos anteriormente a los miembros de la Junta Directiva del CIAT, el Director General o su representante suministrarán al Ministerio de Relaciones Exteriores una lista de los miembros colombianos y no colombianos de la Junta, y actualizará dicha lista de año en año.

c) Igual gestión realizarán el Director General del CIAT o su representante ante el Ministerio de Relaciones Exteriores para obtener las respectivas visas, exenciones de impuestos de inmigración y salida y demás facilidades para entrar al país cuando se trate de becarios, consultores temporales, conferencistas, familiares inmediatos de los miembros no colombianos de la Junta Directiva que acompañen a éstos y visitantes de carácter oficial.

## 15. Renuncia de inmunidad

El Director General del CIAT podrá y deberá renunciar a la inmunidad de cualquier miembro del personal contratado internacionalmente en cualquier caso en que, según su criterio, la inmunidad impida el curso de la justicia y la renuncia pueda hacerse sin perjuicio para los intereses del CIAT.

## ARTICULO CINCO

Las disposiciones de este Convenio se pondrán en práctica en virtud de medidas pertinentes del Gobierno de Colombia. Las partes en este Convenio reconocen que la puesta en práctica y la aplicación de estas disposiciones requerirán que el Gobierno de Colombia y el CIAT celebren consultas directamente con regularidad, y acuerdan que los problemas que surjan en relación con la interpretación o aplicación de los privilegios e inmunidades mencionados en este Convenio serán considerados, negociados o dirimidos, según sea apropiado, por el Gobierno de Colombia y el CIAT.

## ARTICULO SEIS

El CIAT como entidad con personería legal y status internacional será independiente de las organizaciones que la establecieron. Por lo tanto, ni el BIRF o el PNUD, ni ningún otro miembro del GCIAI será responsable por cualquier obligación contraída por CIAT.

## ARTICULO SIETE

Al entrar en vigor el presente Convenio, el CIAT con Personería Jurídica 4939, del 4 de diciembre de 1967, expedida por el Ministerio de Justicia de Colombia, deberá disolverse y todos sus activos, pasivos y obligaciones serán traspasadas al recientemente creado CIAT con carácter internacional.

ARTICULO OCHO

1. Este Convenio entrará en vigor treinta días después de la fecha en que el Gobierno de Colombia notifique a CIAT que dicho Convenio ha recibido la aprobación del Congreso Colombiano.

2. Este Convenio permanecerá en vigor hasta la fecha, de las dos siguientes, que ocurra primero:

a) Un año después de que el Gobierno de Colombia o el CIAT haya notificado a la otra parte de su deseo de terminar el Convenio, o

b) La fecha que se indique en la resolución de disolución del CIAT, de conformidad con sus Estatutos.

A la terminación del presente Convenio y adoptada estatutariamente la resolución de disolución, el CIAT hará la liquidación, y pagadas todas las deudas, los activos que queden en Colombia serán transferidos a otra institución colombiana sin ánimo de lucro, dedicada a la investigación, educación o extensión que el CIAT y el Ministerio de Agricultura consideren más apropiada.

En testimonio de lo cual, las partes en este Convenio, actuando a través de sus legítimos representantes debidamente autorizados, firman este Convenio en sus nombres respectivos.

Hecho en Bogotá, a los cinco días del mes de mayo de mil novecientos ochenta y siete (1987), en dos ejemplares igualmente válidos.

Por el Gobierno de Colombia,

(Fdo.) Julio Londoño Paredes  
Ministro de Relaciones Exteriores.

Por el CIAT,

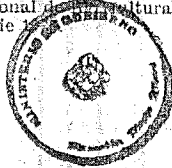
(Fdo.) John L. Nickel  
Director General

MINISTERIO DE RELACIONES EXTERIORES  
DIVISION DE ASUNTOS JURIDICOS

Es fiel copia del original que reposa en los archivos de la Sección de Tratados de la División de Asuntos Jurídicos.

(Fdo.) José Joaquín Gori Cabrera  
Jefe División de Tratados (E)

Convenio entre el Gobierno de la República de Colombia y el Centro Internacional de Agricultura Tropical, CIAT, suscrito en Bogotá el 5 de mayo de 1987.



RAMA EJECUTIVA DEL PODER PUBLICO  
PRESIDENCIA DE LA REPUBLICA

Bogotá, D. E., 29 de julio de 1987.

APROBADO. Semétese a consideración y aprobación del honorable Congreso Nacional para los efectos constitucionales.

(Fdo.) VIRGILIO BARCO VARGAS

El Ministro de Relaciones Exteriores,

(Fdo.) Julio Londoño Paredes.

MINISTERIO DE RELACIONES EXTERIORES  
DIVISION DE ASUNTOS JURIDICOS

Es fiel copia del original que reposa en los archivos de la Sección de Tratados de la División de Asuntos Jurídicos.

(Fdo.) Carmelita Ossa Henao  
Jefe División de Asuntos Jurídicos.

Artículo segundo. De conformidad con lo dispuesto en el artículo 1 de la Ley 7ª de 1944, el Convenio entre el Gobierno de la República de Colombia y el Centro Internacional de la Agricultura Tropical, CIAT, suscrito en Bogotá el 5 de mayo de 1987, que por el artículo primero de esta ley se aprueba, obligará al país a partir de la fecha en que se perfeccione el vínculo internacional.

Artículo tercero. La presente Ley rige a partir de la fecha de su publicación.

Hecho en Bogotá, D. E., a los ... días del mes de ... de ...

El Presidente del honorable Senado de la República,

PEDRO MARTIN LEYES HERNANDEZ

El Presidente de la honorable Cámara de Representantes,

CESAR PEREZ GARCIA

El Secretario General del honorable Senado de la República,

Crispín Villazón de Armas.

El Secretario General de la honorable Cámara de Representantes,

Luis Lorduy Lorduy.

República de Colombia -- Gobierno Nacional.

Publíquese y ejecútese.

Bogotá, D. E., 18 de marzo de 1988.

VIRGILIO BARCO

El Ministro de Relaciones Exteriores,

Julio Londoño Paredes.

LEY 30 DE 1988  
(marzo 18)

por la cual se modifican y adicionan las Leyes 135 de 1961, 1ª de 1968 y 4ª de 1973 y se otorgan unas facultades al Presidente de la República.

El Congreso de Colombia,

DECRETA:

Artículo 1º Los ordinales 29, 59 y 79 del artículo 1º de la Ley 135 de 1961, quedarán así:

Artículo 19 ...

29 Promover la adecuada explotación económica y la utilización social de las tierras rurales aptas para la explotación agropecuaria y de las incultas, ociosas o deficientemente utilizadas, mediante programas que provean su distribución ordenada, su incorporación al área de explotación económica agraria y su racional aprovechamiento.

59 Elevar el nivel de vida de la población campesina, generar empleo productivo en el campo y asegurar la colaboración y cooperación institucional de las diversas entidades del Estado para el desarrollo integral y coordinado de los programas de reforma agraria, tales como la dotación y mejoramiento de servicios públicos rurales, la prestación de asistencia técnica agropecuaria directa a pequeños productores, el suministro de crédito oportuno y de fácil acceso para la producción agropecuaria en áreas de etonomía campesina, el mejoramiento de las condiciones de vivienda, salud, educación y seguridad social de la población rural, la organización del mercado de productos, su almacenamiento y conservación, y el fomento de las cooperativas agropecuarias.

79 Promover, apoyar y coordinar las organizaciones que tengan por objeto el mejoramiento económico, social y cultural de la población rural y estimular la participación de las organizaciones campesinas en el proceso integral de reforma agraria, en lo relacionado con la redistribución de la propiedad de la tierra, la modernización de las formas de producción, y la dotación de infraestructura física y de servicios públicos a las áreas rurales.

Artículo 2º Adiciónase el artículo 1º de la Ley 135 de 1961 con el siguiente párrafo:

Artículo 19 ...

Parágrafo 2º Para la consecución de los fines de la presente Ley, y atendiendo a que el proceso de reforma agraria es función y responsabilidad integral del Estado y de sus organismos administrativos ejecutores, las entidades públicas del orden nacional, departamental y municipal deberán prestar, dentro de la esfera de su competencia, la colaboración necesaria al Instituto Colombiano de la Reforma Agraria, INCORA, para la ejecución coordinada de los programas de reforma social agraria, conforme a las reglamentaciones e instrucciones que al efecto expida o imparta el Gobierno Nacional. Los establecimientos públicos adscritos al Ministerio de Agricultura, deberán apropiarse anualmente con destino a la ejecución de programas de apoyo a la reforma agraria, dentro del área de su competencia, un porcentaje de su presupuesto conforme a los programas que el CONPES apruebe en los términos de que trata el artículo 58, numeral 1º de la presente Ley. La Junta Monetaria, determinará anualmente el porcentaje de recursos de crédito de fomento que deberá destinarse a campesinos beneficiarios o no de reforma agraria.

Artículo 3º Los literales c), e), f), g), h), j) y l) del artículo 3º de la Ley 135 de 1961, quedarán así:

Artículo 3º ...

c) Determinar, de conformidad con los procedimientos que la presente Ley establece, las zonas de reforma agraria en áreas precisas y delimitadas del territorio nacional donde deban adelantarse programas para el cumplimiento de los fines de la presente Ley, y ejecutar los respectivos programas, para lo cual realizará directamente o en colaboración con otras entidades públicas el estudio de las distintas regiones que pretenden afectarse.

e) Promover y ejecutar conjuntamente con otras entidades legalmente habilitadas, mediante mecanismos de cofinanciación, la construcción de vías necesarias para dar fácil acceso a las regiones de colonización, parcelación o concentraciones parcelarias, y la de caminos