



INTERNATIONAL COFFEE ORGANIZATION
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**Adaptation to climate change in three
PROMECAFÉ member countries
(Guatemala, Honduras and Costa Rica)**

Background

1. This document, submitted by PROMECAFE, contains the summary of a new project proposal designed to study the implications of climate change for coffee productivity and quality in Guatemala, Honduras and Costa Rica, as well as to provide some idea as to where high-quality coffee is likely to grow in the future and the extent to which the suitability of these areas is likely to have changed in a given period, for example in 2030 and 2050.
2. The proposal will be forwarded to the Virtual Screening Subcommittee (VSS) for a second evaluation and will be considered by the Projects Committee in September 2011.

Action

The Projects Committee is requested to consider this proposal as well as the recommendations of the VSS and, if appropriate, to recommend its approval by the Council.

**PROJECT PROPOSAL FOR SUBMISSION TO THE
COMMON FUND FOR COMMODITIES (CFC)**

Project summary

- 1. Project title:** Adaptation to climate change in three PROMECAFE member countries (Guatemala, Honduras and Costa Rica)
- 2. Duration:** 27 months
- 3. Location:** Guatemala, Honduras and Costa Rica
- 4. Nature of Project:** To carry out a study of the effects of climate change on coffee productivity and quality in the coffee producing regions of Guatemala, Honduras and Costa Rica, as well as to provide some idea as to where high-quality coffee is likely to grow in the future and the extent to which the suitability of these areas is likely to have changed in a given period.
- 5. Estimated total cost:** US\$310,000
- 6. Financing sought from the Fund:** US\$155,000 (50%)
- 7. Counterpart contributions:** US\$155,000
(Contributions in kind by the coffee institutions involved)
- 8. Project Executing Agency (PEA):** International Center for Tropical Agriculture (CIAT)
- 9. Supervisory body:** International Coffee Organization (ICO)
- 10. Estimated starting date:** Pending

Introduction

1. All climate models show that the climate is changing and will continue to change. The global circulation models used by scientists to make predictions on the nature and index of climate change indicate that temperatures will rise and that there will be radical changes in precipitation patterns. The implications for coffee growing communities in Central America are generally very serious.

2. Coffee growing is highly vulnerable to climate change and this change is likely to bring socio-economic and environmental challenges as a result of changes in crop adaptability. This means that it is essential to identify and develop adaptation strategies applicable from farm level to national level.

3. In order to develop these adaptation strategies it is important to understand the decisive factors involved in change. Climate change models predict that in the near future coffee growing will lose its adaptability due to factors related to lower precipitation and temperature increases.

4. For coffee production in general it is essential to have a clear understanding of probable impacts and to develop adaptation strategies that make it possible to understand the implications of climate change for coffee productivity and quality in coffee-producing regions as well as to provide some idea as to where high-quality coffee is likely to grow in the future and the extent to which the suitability of these areas is likely to have changed in a given period. Socio-economic information is very important for determining the degree of sensitivity at local level (communities) and the capacity for adaptation to climate change by producer groups and/or associations. Coffee institutions also need to know how soil use patterns are likely to change in order to plan their research and make suitable investments, ensuring that producers find sustainable and competitive options for the future. These recommendations are made at local level since they are specific to given areas. With these analyses, institutions can identify regions with significant negative impacts on coffee productivity and quality, using agricultural adaptability models to identify possible alternative crops, including other high-value crops like cocoa.

5. The subject of climate change will have growing importance in the institutional and political context. It is high on the Central American agenda and has been incorporated into the main regional policies and strategies.

6. The specific problem to be resolved consists in strengthening the capacity of national coffee institutions and local stakeholders (public and private) involved in developing coffee growing, specifically in relation to scientifically supported decision-making.

8.4 Participating institutions and responsibilities

- Anacafé, Guatemala
- IHCAFE, Honduras
- ICAFE, Costa Rica

7. The project target group is composed of public and private coffee institutions responsible for regional coffee development. Of these coffee institutions, we envisage active participation by Anacafé (Guatemala), IHCAFE (Honduras) and ICAFE (Costa Rica).

8. The project aims to strengthen the institutional capacity of coffee institutions in the Central American region to improve their performance in coping with the implications of climate change and the adaptation of coffee growing to new scenarios through a knowledge management system which will permit the exchange of production experiences and successful organizational and institutional arrangements, as well as good practices for coffee development.

9. During the implementation, national institutions will monitor the project to ensure a highly participatory focus. Future sustainability will be assured through the training of national technicians (see Component 2) in the field of climate change, the generation and management of projected climate data, the management of tools and methodologies developed in the last few years to predict the behaviour of coffee growing and alternative crops, the design of adaptation strategies and the main socio-economic implications of climate change for each country involved. In this way, technical personnel of national institutions will be able to carry out their own information analyses to support decision-making.

International Center for Tropical Agriculture (*Centro Internacional de Agricultura Tropical – CIAT*)

10. CIAT has a long history of processing global climate databases and developing models and algorithms for generating worldwide coverage of climate and topographical data. CIAT is also developing models to predict suitable environments for the production of specific crops and has been developing these models in recent years, taking into account progressive climate change. CIAT is regarded as a leader in Latin America in terms of

environmental/climate modelling for specific crops. Given its experience in the field and its institutional presence in collaborating countries, CIAT is the most suitable organizational participant for this project.

11. CIAT will implement the project under the supervision and with the support of PROMECAFE. Coffee institutions and producer organizations in each country will assist in data compilation and interpretation. In addition, these organizations will designate the technical personnel to be trained in order to create local capacity in data management and interpretation and ensure future continuity of the project.

12. The estimated cost is US\$310,000. CIAT and national institutions will contribute 50% of this cost in kind, including payment of personnel to carry out training activities and technical personnel involved in training, the costs of training installations, purchase of vehicles to be used in field work, etc. The financing requested from the CFC is US\$155,000, representing 50% of the total. This financing will be used to cover CIAT operational costs.

8.5 Objectives and rationale

13. Many of the data needed for these analyses are already available in coffee-producing organizations and were used in projects on Designation of Origin and Identification of Environmental Niches for high-quality coffee. CIAT was able to use existing data to carry out spatial analyses and simulate prediction models to design climate change adaptation strategies. The specific data needed are geographical coordinates (georeferencing) of coffee farms, cupping data (sensory attributes) defining the cup quality of the coffee, the final cupping score, environmental and terrain databases, socio-economic databases or surveys of coffee producers.

8.5.1 Project specific objectives

14. On the basis of short- and long-term climate data predictions generated through Global Climate Models (GCM) under different scenarios for greenhouse gas emissions, we can estimate the future adaptability of coffee growing and the impacts of climate change on coffee production and quality. This prediction will be accompanied by the training of producers and technical personnel from national institutions and/or organizations in management of tools and national databases and equipment to create local decision-making capacity across the country. Alternative crops or suitable management strategies for coping with likely climate change will be identified and the socio-economic impacts will be evaluated to determine the vulnerability of producer livelihoods and their adaptability or resilience of production systems. Strategies will be designed on a participatory basis,

developing financing mechanisms for adaptation and planning under different scenarios. At the same time an on-line IT platform will be designed to improve decision-making for adaptation strategies and measures and to ensure the maintenance of productivity.

Project objectives

15. To examine the implications of climate change for coffee productivity and quality in the coffee producing regions of Central America and the Caribbean, as well as to predict where high-quality coffee is likely to grow in the future, and the extent to which this suitability of these areas is likely to have changed by 2030 and 2050.

Expected results

- Climate change data generated by each country.
- Technical personnel of national organizations trained in databases and the use of Geographic Information System (GIS) tools for coffee and alternative crops.
- Predictions of current and future adaptability of coffee-producing regions.
- High-quality coffee environmental niches identified.
- Interactions of sensory attributes of coffee and climatic variables determined.
- Alternative crops identified and production systems adapted to current and future climate change conditions.
- Socio-economic impacts of climate change quantified in regions with contrasting conditions.
- Adaptation strategies designed for specific locations.
- On-line information for coffee farms to obtain feedback on climate change strategies.

16. Likely impact: With this information all stakeholders in the coffee supply chain will be able to develop suitable mitigation and adaptation strategies for specific locations, both over the short and long term, in order to guarantee coffee supply on the one hand and to improve the livelihoods of rural communities on the other.

8.6 Related projects and previous work

17. CIAT is part of the Consultative Group on International Agricultural Research (CGIAR), comprising a consortium of countries, regional and international organizations and private foundations, which support a world network of research centres. In its work, CIAT collaborates with many entities including farmer organizations, indigenous communities, grassroots organizations, national agricultural research systems, non-governmental organizations, universities, private sector bodies and development projects.

18. CIAT's Decision and Policy Analysis (DAPA) Programme focuses on the presentation of research results on policies in four subject areas which are of great demand in Latin America. These areas are: ecosystem services and benefits for poor people; climate change and development of resilient agricultural systems; equitable design of supply chains for poor people to achieve a dynamic world; and the impact of orientation, facilitation and evaluation. Although these subject areas are very varied, the research processes used in research programmes are very similar, namely spatial and economic analyses. The programme firmly believes in the power of information to improve decision-making in investment of agricultural and natural resources from farm level to the worldwide level. Through alliances with the main stakeholders, the dissemination of information and policy recommendations on these subject areas can contribute to achieving results both in research and development that will improve the means of livelihood and the management of natural resources in agro-ecosystems.

19. Over the last six years, the DAPA Programme has been developing methodology to implement Designation of Origin and Geographical Indication for coffee. A project commissioned by the National Federation of Coffee Growers (*Federación Nacional de Cafeteros – FNC*), which ended in 2008 aimed to generate scientific support for the implementation of sub-denominations in Colombia. A project was also carried out for the Nicaraguan Association of Small Producer Cooperatives (CAFENICA) in Nicaragua to identify niches for high-quality coffee.

20. For more than twenty years, DAPA has been developing GIS applications for the agricultural sector. During the last two years, training activities have been carried out and a number of methodological workshops have been held on subjects relating to the coffee chain in Central America, including analysis of coffee chains, coffee quality management in the coffee chain, and analysis of climate change impact in the coffee chain.

21. CIAT participates in a project for predicting the socio-economic impacts of climate change on producer livelihoods in Guatemala and El Salvador. Many of the data and results obtained in the region with the active participation of national coffee producer organizations will be used to complement this new research initiative.

Project components

Brief description of component:

Component 1: Generate short- and long-term climate change data and different scenarios for greenhouse gas emissions.

Objective

22. To generate climatic data predicted under different scenarios for each decade from 2020 to 2050 for each country (Guatemala, Honduras and Costa Rica).

Results

- Climate change data generated for each country. It is proposed to use the 18 most representative models from the evaluation report of the Intergovernmental Panel on Climate Change (IPCC) held in 2007, using a process of downscaling the GCM to resolutions of 0.5 arco-minutes (approximately 1km) for each decade to 2050, and monthly WorldClim variables (precipitation, average, minimum and maximum temperatures) and scenario A2a ('business as usual') as the base line.

Activities

- (a) Climate change data generated by mathematical models of the general circulation of a planetary atmosphere or ocean, on the basis of equations used to carry out complex calculations in computer programmes commonly used for weather forecasting, understanding the climate and projecting climate change.
- (b) Evaluation of similitude levels of different models and variation coefficient between the models. The data generated can be used by institutions for their research work and projects.
- (c) Standardization of data for each country.

Resources

- Expert climate data processing personnel (three experts for nine months).
- Specialized hardware and software.
- Back-up material and dissemination of the information generated.

Timetable

23. Activities related to generation of climate data will have a duration of nine months from the start of the project.

Costs

24. The estimated cost of the first component is US\$33,000. CIAT can contribute 50% of this cost in kind, including use of high capacity servers (hardware) and payment of qualified personnel to carry out data generation processes.

Component 2: Training and equipment for project sustainability.

Objective

25. To strengthen local capacity in national institutions, enabling producers and technicians to make use of the information, to interpret the data generated and information management so as to fill gaps in individual and institutional knowledge and ensure project sustainability.

Results

- Technical personnel of national organizations trained in use of databases and GIS tools for coffee and alternative crops.

Activities

- (a) Preparation of work plans for training. Work plans can vary from country to country since progress made will probably differ.
- (b) Revision of infrastructure (hardware and software).
- (c) Analysis of existing human capacities.
- (d) Preparation of training manuals.
- (e) Organization of training workshops in the region.
- (f) Dissemination of technologies, methodologies and tools which prove successful for the region.

Resources

- Two GIS experts with experience in training, coffee and climate change.
- One expert in design of adaptation strategies.
- Equipment: one computer per country with software and cartographic databases.

Timetable

26. Duration of activities for training of technical personnel will be two semesters divided into two stages.

27. The first stage will undertake training in database management and GIS applied to climate data. The second stage will undertake design of adaptation strategies.

Costs

28. The estimated cost of this component is US\$72,000. CIAT in collaboration with national institutions can contribute 50% in kind to cover payment of qualified personnel carrying out training activities and technical personnel involved in this training.

Component 3: Predicting future adaptability in coffee producing areas.

Objective

29. To estimate future distribution on the basis of predicted changes in climatic parameters.

Results

- Predictions of current and future adaptability in coffee producing areas.

Activities

- (a) Georeferencing of coffee farms in each country.
- (b) Modelling of distribution and evaluation of environmental niches for coffee farms in Central America. The results of Global Climate Models will be used to predict the areas likely to be adversely affected by climate change in a given period and under different greenhouse gas (GHG) emissions scenarios.

- (c) Maximum entropy data will be used to determine the adaptability of the coffee crop to current and future environmental conditions. MaxEnt and CaNaSTA software will be used for this purpose.

Resources

- Two climate change and coffee quality experts.
- Two coffee cupping experts for each country.

Timetable

30. These activities will be carried out during the first six months of the project; this provision includes compilation of information on coffee quality.

Costs

31. The estimated cost of this component is US\$29,000. CIAT in collaboration with national institutions can contribute 50% in kind, including payment of qualified personnel to carry out georeferencing of coffee farms. In addition CIAT will contribute software and tools to predict the future behaviour of coffee in terms of production, response to coffee crop pests and diseases.

Component 4: Evaluate climate change impacts on coffee quality and production.

Objective

32. To estimate the influence of climatic parameters on coffee quality and production.

Results

- Environmental niches for high-quality coffee identified.
- Interactions between sensory attributes of coffee and climate variables determined.

Activities

- (a) Annual compilation of data on coffee productivity and quality of participating coffee farmers.
- (b) Understanding the relationship between coffee productivity and quality and climatic factors.
- (c) Simulating the impact of future climate change on coffee productivity and quality.

Resources

- Two climate change and coffee quality experts.
- Two coffee cupping experts for each country.

Timetable

33. Distribution and evaluation models of environmental niches will be prepared in six months together with the evaluation of the impact of future climate change on coffee productivity and quality.

Costs

34. The estimated cost of this component is US\$36,000. CIAT in collaboration with national institutions can contribute 50% in kind, including provision of qualified personnel to carry out cupping activities. In addition, CIAT will contribute software and tools for predicting the future behaviour of coffee production and quality in relation to climate.

Component 5: Identify alternative crops under different predicted climate change scenarios.

Objective

35. To predict changes in the adaptability of the most valuable commodity crops under different progressive climate change scenarios.

Results

- Alternative crops identified and production systems adapted to current and future climate change conditions.

Activities

- (a) Compile databases of national and local institutions on both basic food crops and export crops, area planted and geographical location of crop production systems, pressure from pests and diseases.
- (b) Review determining factors (limiting and ideal factors) for producing at least ten selected crops.
- (c) Generate these factors for progressive climate change, taking into account Global Climate Models and emissions scenarios.

- (d) Compare, evaluate and adapt different models for predicting crop adaptability based on algorithms such as EcoCrop and Maximum Entropy (MaxEnt).
- (e) Predict crop adaptability with progressive climate change for each year until 2050.

Resources

- Two experts in climate change and alternative crops.

Timetable

36. Activities under the component for identification of alternative crops will be carried out over 12 months, distributed between months 9 and 20.

Costs

37. The estimated cost of this component is US\$29,000. CIAT in collaboration with national institutions can contribute 50% in kind, including provision of qualified personnel to carry out surveys and compile information from national censuses and public institutions. In addition, CIAT will contribute software and tools to predict future crop behaviour.

Component 6: Evaluate the implications of climate change in terms of socio-economic parameters.

Objective

38. To evaluate the socio-economic impact of climate change on producer livelihoods and the vulnerability level of production systems.

Results

- Socio-economic impacts of climate change quantified in regions having contrasting conditions.

Activities

- (a) Identify regions with different anticipated impacts and contrasting and complementary socio-cultural conditions.
- (b) Characterize communities on the basis of social and economic conditions by carrying out field surveys.

- (c) Identify social dimensions of global change in communities using qualitative analysis of socio-economic data.
- (d) Analyse the vulnerability of livelihoods in coffee farms.

Resources

- One expert in climate change and livelihood vulnerability (socio-economic analysis).

Timetable

39. This component will have a duration of six months.

Costs

40. The estimated cost of this component is US\$36,000. CIAT in collaboration with national institutions can contribute 50% in kind, including provision of qualified personnel to carry out surveys and conduct workshops with producers from contrasting regions.

Component 7: Design adaptation strategies for the coffee sector.

Objective

41. To develop specific adaptation strategies for the most significant crops.

Results

- Adaptation strategies designed for specific locations.

Activities

- (a) Assist producer organizations and national institutions to design suitable adaptation scenarios.
- (b) Develop coordinated workshops in each country for the dissemination of climate change information and data, distribution of instruments to support decision-making and participatory design of adaptation strategies.
- (c) Analysis of possible scenarios with other stakeholders in the supply chain to determine possible impacts on the overall supply chain and to support participatory design of adaptation strategies along the entire chain.

Resources

- Two experts in climate change and adaptation strategies.

Timetable

42. This component will have a duration of six months.

Costs

43. The estimated cost of this component is US\$36,000. CIAT in collaboration with national institutions can contribute 50% in kind, including provision of qualified personnel to carry out surveys and conduct workshops with technicians and producers.

Component 8: On-line platform for improving decision-making.

Objective

44. To promote access to information that will permit structured and secure exchange between producers and other stakeholders in the supply chain.

Results

- On-line information for coffee farms to obtain feedback on climate change strategies.

Activities

- (a) Compilation of data: Global Positioning System (GPS) and cupping data, information on coffee farms, varieties, products, yields, farm management, infrastructure.
- (b) Database pruning.
- (c) Placing information on line.
- (d) Workshops for training technical personnel from the organizations involved.
- (e) Information feedback.

Resources

- One expert in Information and Communications Technology (ICT).

Timetable

45. This component will have a duration of 15 months from month 12.

Costs

46. The estimated cost of this component is US\$39,000. CIAT in collaboration with national institutions will contribute 50% in kind, including provision of qualified personnel for compilation of data and placing information on-line.

**Adaptation to climate change in three PROMECAFE member countries
(Guatemala, Honduras and Costa Rica)**

Logical Framework

Objectives	Activities	Results expected	Data required	Time	Approximate Budget
1. To generate short- and long-term climate change data and different scenarios for greenhouse gas emissions.	Processing and generation of data using Global Climate Models for 2020 and 2050.	Climate change data generated for each country.	Worldclim climate data.	9 months	33,000
2. Training and equipment for project sustainability.	Training workshops. Investment in equipment.	Personnel trained in management of tools and databases for decision-making.	Worldclim climate data. GPS data. Cupping data.	12 months in two stages	72,000
3. Predicting future adaptability in coffee producing areas.	Georeferencing of coffee farms in each country. Modelling of distribution and evaluation of environmental niches for coffee farms in Central America.	Environmental niches for high-quality coffee identified.	GPS data. Cupping data.	6 months	29,000
4. Evaluate climate change impacts on coffee quality and production.	Annual compilation of data on coffee productivity and quality of participating coffee farmers. Understanding the relationship between coffee productivity and quality and climatic factors. Simulating the impact of future climate change on coffee productivity and quality.	Prediction of current and future adaptability of coffee areas. Interactions between sensory attributes of coffee and climate variables determined.	GPS data. Cupping data. Data on coffee crop requirements. Climate change data generated for each country.	6 months	36,000
5. Identify alternative crops under different predicted climate change scenarios.	Identifying regions with significant negative impacts on coffee productivity and quality. Identifying possible alternative crops using agricultural adaptability models.	Alternative crops identified and production systems adapted to current and future climate change conditions.	GPS data. Cupping data. Data on alternative crop requirements. Climate change data generated for each country	12 months	29,000

Objectives	Activities	Results expected	Data required	Time	Approximate Budget
6. Evaluate the implications of climate change in terms of socio-economic parameters.	Identify regions with different anticipated impacts and contrasting and complementary socio-cultural conditions. Characterize communities on the basis of social and economic conditions by carrying out field surveys. Identify social dimensions of global change in communities using qualitative analysis of socio-economic data.	Socio-economic impacts of climate change quantified in regions with contrasting conditions. Adaptation strategies designed for specific locations.	Socio-economic surveys.	6 months	36,000
7. Design adaptation strategies for the coffee sector.	Annual coordinated workshops in each country for the dissemination of climate change information and data, distribution of instruments to support decision-making and participative design of adaptation strategies. Analysis of possible scenarios with other stakeholders in the supply chain to determine possible impacts on the overall supply chain and to support participatory design of adaptation strategies along the entire chain. Link to high-quality market niches, developing financing mechanisms for adapting and planning scenarios.	Sustainable subsistence strategies proposed. High-quality environmental niches linked with high value markets.		6 months	36,000
8. On-line platform for improving decision-making.	Compilation of data: GPS and cupping data, information on coffee farms, varieties, products, yields, farm management, infrastructure. Database pruning. Placing information on line. Workshops for training technical personnel from the organizations involved. Information feedback.	On-line information on coffee farms and crops.	GPS data. Cupping data. Farm production data.	15 months	39,000

Countries:

GT = Guatemala; HN = Honduras; CR = Costa Rica

8.8 Benefits and beneficiaries

47. Climate change will have a drastic impact on the adaptability of coffee, directly affecting crop development, the production system and costs. In the Central American region more than 70% of coffee farmers are small-scale producers for whom coffee is a significant source of economic earnings. This is why it is important to determine the impact of future climate change in reducing the area planted to coffee (Laderach, 2008), directly affecting production (as a consequence of variations in rainfall and temperatures) and changes in production costs, prices, profitability and labour. The competitiveness of Central American coffee in the market will depend on measures taken by the national coffee authorities, producer organizations and, above all, the farmers themselves. Variables that will come into play include the technological level, the financial resources available, labour, inputs, accessibility (access roads) and appropriate farm management.

8.9 Environmental aspects

48. In Central America coffee is grown mainly under shade so that coffee farming has protected watersheds, regulating surface runoff and making a positive contribution to the replenishment of underground aquifers. Other environmental benefits of coffee growing include wildlife refuges, soil conservation, carbon sequestration, scenic landscape value, connectivity or contribution of biological corridors between protected areas, etc.

49. The non-sustainability of coffee growing, with a consequent replacement by more degrading land use activities, would have very serious effects on this type of environmental service; resources like water are of vital importance, above all in the case of watersheds which supply water to major cities in Central America and the Caribbean. As an example, it is worth quoting the slogan used by the Dominican Coffee Council (Consejo Dominicano de Café - CODOCAFE), which emphasizes the environmental importance of coffee: *“Sin café en las alturas, no habría agua en las llanuras”* (“Without coffee in the highlands there would be no water in the lowlands”).

8.10 Intellectual property rights, publications

50. Parties involved in the project undertake to maintain confidentiality and not to disclose, except to their employees, any information related to the project that has been brought to their knowledge, or any form of intellectual property to which they have access and which is held to have the character of ‘confidential information’, unless the Party providing it has given prior consent in writing. The intellectual property of the Parties comprises any kind of information, techniques, technological knowledge, procedures or

processes, inventions, trademarks or patents, plant varieties covered by plant breeders' rights, software, copyright or authors' rights, and material resources containing such intellectual property (regardless of the form or medium in which that intellectual property was revealed or stored) which may have been known by any of the Parties before the project commenced and which the Parties might interchange in relation with the project.

51. All tangible and intangible results derived from this project shall be deemed to be international public property.

52. The results of the research project will be published in accordance with normal academic practice, and the Parties agree that researchers involved in the research project may make oral and written presentations of such results at symposia, congresses, seminars, events and national, regional or international meetings of a professional nature, and may publish them in scientific journals, or in graduate or doctoral theses. All material published must contain acknowledgements to CIAT and the authors.

Confidential information

53. CIAT and PROMECAFE member institutions undertake to hold as 'confidential' any information disclosed between both Parties which is designated or marked as such and not to disclose or communicate that information, except to their employees, and only in order to further or develop the aims of this project. Any employees to whom confidential information has been disclosed will be informed of its confidential nature and instructed to hold it as such in accordance with the provisions of this project. If any employee of the Party who receives the confidential information fails to treat it as stipulated herein, this action will constitute non-compliance on the part of the Party responsible for that employee.

8.11 Project costs and financing

Project component	Total cost	Contributions from CIAT and national institutions	Contribution from the Fund
1. Generate short- and long-term climate change data and different scenarios for greenhouse gas emissions.	US\$33,000	US\$16,500	US\$16,500
2. Training and equipment for project sustainability.	US\$72,000	US\$36,000	US\$36,000
3. Predicting future adaptability in coffee producing areas.	US\$29,000	US\$14,500	US\$14,500
4. Evaluate climate change impacts on coffee quality and production.	US\$36,000	US\$18,000	US\$18,000
5. Identify alternative crops under different predicted climate change scenarios.	US\$29,000	US\$14,500	US\$14,500
6. Evaluate the implications of climate change on socio-economic parameters.	US\$36,000	US\$18,000	US\$18,000
7. Design adaptation strategies for the coffee sector.	US\$36,000	US\$18,000	US\$18,000
8. On line platform for improving decision-making.	US\$39,000	US\$19,500	US\$19,500
Total	US\$310,000	US\$155,000	US\$155,000

8.12 Work plan

Activity	Quarters								
	1	2	3	4	5	6	7	8	9
Georeferencing.	x	x							
Generation of climate change data.	x	x	x						
Training of technicians.				x	x		x	x	
Distribution models (MaxEnt).				x	x				
Coffee quality data collection.	x	x	x						
Identification of environmental niches (CaNaSTA).			x	x					
Future climate change impact on coffee quality and productivity (CaNaSTA).				x	x				
Models to identify areas with greater negative impact using EcoCrop.				x	x				
Identify alternative crops.				x	x	x	x		
Analysis of livelihood vulnerability in coffee farms.					x	x	x		
Evaluate impact on production chain.							x	x	
Design adaptation strategies for specific locations.								x	x
On-line information and feedback.					x	x	x	x	x
Final report.									x

Total project duration: 27 months