PROJECT DOCUMENT

The Economics of Climate Change in Central America

Phases II, III and IV

UNITED NATIONS

ECLAC

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ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN

PROJECT DOCUMENT

THE ECONOMICS OF CLIMATE CHANGE IN CENTRAL AMERICA (PHASES II, III and IV)

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INTRODUCTION

It has been estimated that Central America produces less than 0.5% of the world's greenhouse gases (GHG) emissions, but at the same time it is one of the regions most vulnerable to the ravages of the climate change. Increases in the temperatures of the atmosphere and the sea, reductions and instabilities in rainfall patterns and the rise in sea level will all have an impact on production, infrastructure, and the livelihoods, health and security of the population. Furthermore, they will weaken the environment's capacity to provide vital services, and will lead to increased intensity of extreme meteorological phenomena, such as droughts and hurricanes.

Whereas the challenge and permanent solution at global level will require rapid and steep reductions in GHG emissions, the principle challenge for Central America is to address the high level of accumulated socioeconomic and environmental vulnerabilities, coupled with the new challenges of adapting to climate change, which is already becoming evident in the region.

These underlying vulnerabilities are linked to a long-term development pattern. Among its characteristics are the poverty in which approximately half of the Central American population live (reaching levels of about 70% in Nicaragua and Honduras), socioeconomic, ethnic and gender inequalities, limited access to food and drinking water, health services, education, social security and to capital and productive credit. This is compounded by the direct dependence of part of the poor population on natural resources for their livelihood and the dependence of the economy in general on a limited number of sectors, export products and countries of destination for those same products. In the political arena, although decades of armed conflict have been overcome and democratic electoral systems have been established, there is a continued need to deepen democracy including effective consultative dialogue among sectors of Central American societies.

This social vulnerability is interrelated with the biophysical vulnerability determined by the geo-climatic location of these societies, a narrow strip of land in the tropics between two oceans, the Pacific and the Caribbean, highly affected by cyclones and by the El Niño – Southern Oscillation (ENSO) phenomenon. Moreover, the interaction of the growing human population with its environment has weakened the latter's capacity to provide services, such as water, food, energy and protection against these same extreme natural phenomena. Socioeconomic conditions drive the poor to overexploit their ecosystems or to use fragile ecosystems. So both Central America's human population and environment are highly sensitive to the impact of climate change and have less resilience and capacity for adaptation.

In this context, it will not be possible to separate efforts to reduce these vulnerabilities from those of adaptation to climate change. In fact the already established goals of attaining more human, equitable and sustainable development, as laid down in the Millennium Development Objectives and in national poverty-reduction programmes, will continue to be highly relevant and will act as guidelines in discussions on action to be taken. The risks of climate change should be included in those goals and programmes.

The region can contribute to mitigating GHGs by preserving its natural systems, such as forests, by broadening its use of renewable energy sources with lower emission rates, by taking

measures to attain greater energy efficiency and in general make the transition towards a low-carbon economy. But these efforts should be developed as co-benefits of the main task of reducing socioeconomic vulnerabilities and adapting to the climate change.

Significant international developments have taken place over the past number of years, such as the issuing of Sir Nicholas Stern's Review on the Economics of Climate Change, commissioned by the Government of the United Kingdom, the publications of the Fourth Assessment Report (AR4), of the Intergovernmental Panel on Climate Change (IPCC), of the Global Environment Outlook GEO-4 by the United Nations Environment Programme (UNEP) and of the Human Development Report 2007–2008 Fighting climate change: solidarity in a divided world of the United Nations Development Programme (UNDP). A more recent report has been published by Sir Nicholas Stern on the key elements for a worldwide agreement on climate change. All these documents have contributed to raising the awareness of institutions, government and public opinion regarding the need to take more vigorous measures in the face of the possible magnitude of global warming.

This is the international context within which the project The Economics of Climate Change in Central America will be carried out with the joint efforts of the Ministries of Environment and Treasury and their Central American Commission on Environment and Development (CCAD) and the Subregional Headquarters of CEPAL in Mexico, with the support of the British Department for International Development (DFID) and with the invitation to other donors[1]. The objective of the now completed first phase was to establish the feasibility of making a study on the costs and benefits of taking action aimed at adapting to and mitigating climate change in Central America, compared with a scenario of following the current course of "business as usual". The Feasibility Study established the viability of carrying out the pertinent studies.[2]

The phases proposed by this feasibility study and herein developed in this Project Document aim to alert decision-makers and key stakeholders in Central America of the urgency of responding to the challenge of climate change by providing robust information on the nature of the threat and on policy options to promote national and regional decision-making and actions to cost-effectively reduce vulnerabilities and poverty, to adapt to climate change and to make the transition towards more sustainable and low-carbon economies. The project will carry out an economic assessment of the impact of climate change in Central America with different socioeconomic development scenarios and emission trajectories including the costs and benefits of inaction (known as business as usual), reduction of vulnerability, adaptation and the transition towards a sustainable, low-carbon economy. It will also promote a dialogue on options for national and regional policies and actions by which Central America can respond to the challenge of climate change. The proposed Phases II and III include the preparation of cost-benefit studies on adaptation and mitigation policies at the regional level, together with impact assessments in a selected sector at national level. Phase IV, involving the strengthening of institutional capacities, has been added at the request of the Environment Ministers.

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[1] To confirm a consortium of support for this initiative.

[2] ECLAC/DFID (2008), Feasibility Study on the Economics of Climate Change in Central America, Mexico City, May 2008.

I. BACKGROUND AND RATIONALE

1. Background

a) Predicted climate change impacts in Central America

According to the analyses made by Working Group I of the IPCC in 2007, the warming of the climate system is unequivocal, as evidenced by observations of the increases in the mean temperatures of the air and ocean, the increased melting of ice and snow, and rising average global sea levels.

Furthermore, greenhouse gases (GHG), measured by their warming impact in carbon dioxide equivalents, currently register a concentration of approximately 430 ppm CO_2e and increasing by 2ppm per year, in comparison to a pre-industrial era level of 290 ppm CO_2e. The growth in the atmospheric concentration of these gases since the pre-industrial era is due mainly to the burning of fossil fuels and to changes in soil use.

In recent years the Latin American region has experienced very variable climate and the increased occurrence of extreme events. Similarly, in the last decade significant changes have been observed in rainfall, as well as increases in temperature[3]. El Niño–Southern Oscillation (ENSO) is the dominant form of climate variability in Latin America and is the natural phenomenon with the greatest socioeconomic impacts. In the last three decades Latin America has faced the climatic impacts related to the increase in the occurrence of El Niño. Two extremely intense events of the El Niño phenomenon took place during this period (1982–1983 and 1997–1998) which contributed significantly to increasing the vulnerability of human systems to extreme natural events. It has been shown that the occurrence of these climate-related events increased 2.4 times between the periods 1970-1999 and 2000-2005, continuing with a tendency observed during the decade of the nineties.

For the Central American region in particular, a negative tendency has been observed in rainfall in the western part of the region, as well as temperature increases of about 1° C. Studies carried out in Central and South America show that the patterns of change in extreme events are consistent with a general warming, also evidenced by the greater occurrence of warm nights and negative tendencies in cold nights. Moreover, there is a positive tendency in the incidence of both days with extreme rainfall and consecutive dry days.

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[3] IPCC (2007), *Climate Change 2007: Impact, Adaptation and Vulnerability,* contribution of the Working Group II to the Fourth Assessment Report of the IPCC, chapter 13 (Latin America).

b) Climate projections and impacts

The results of Working Group I of the IPCC, 2007 include projections for temperature and precipitation in the Central American region for the A1B scenario. According to this scenario, mean annual temperature will increase between 1.8° C to 5.0° C for the period 1980 -1999 to 2080 - 2099. The average of regional models suggests a reduction in rainfall in most of Central America, where the anomaly of mean annual precipitation is expected to be –9% in accordance with the same scenario towards the end of the 21st century. The average of the multi-model reports significant regional variations within Central America. In both this average model for Central America and the majority of the models applied the projection is for a decrease in rainfall in all seasons of the year. The results of the models also indicate a probable increase in the frequency of meteorological and climatic extremes, as well as in the frequency and intensity of hurricanes in the Caribbean Basin.

Using seven general circulation models and the four main scenarios of the Special Report on Emissions Scenarios (SRES), the AR4 of IPCC projected the ranges corresponding to changes in temperature and precipitation for Central America for two "seasons" of the year (see Table 1). The higher increase in the rainy season would reach 6.6° C, whereas rainfall, also in the same season, could vary between a 30% reduction and an increase of 5% in the year 2080.

Table 1

PROJECTED TEMPERATURE AND PRECIPITATION FOR CENTRAL AMERICA
2020, 2050 y 2080

Season	Changes in temperature °C		
	2020	2050	2080
Dry	+0.4 a +1.1	+1.0 a +3.0	+1.0 a +5.0
Wet	+0.5 a +1.7	+1.0 a +4.0	+1.3 a +6.6
	Changes in precipitation (%)		
	2020	2050	2080
Dry	-7 a +7	-12 a + 5	-20 a +8
Wet	-10 a + 4	-15 a+ 3	-30 a +5

Source: IPCC (2007b), *Climate Change 2007: Impact, Adaptation and Vulnerability,* contribution of the Working Group II to the Fourth Assessment Report of the IPCC, chapter 13 (Latin America).

In 2001, the countries of Central America initiated the preparation of formal reports and capacity training for the generation of climate-change scenarios. Subsequent studies [4] made use of the scenarios proposed by the Third Assessment Report of IPCC, using the emission scenarios

[4] Mata, L. and C. Nobre (2006), *Impacts, vulnerability and adaptation to climate change in Latin America*, pp. 67; Paper commissioned by the secretariat of UNFCC.

of SRES and of the MAGICC/SCENGEN programme. [5] [6] This analysis suggests that temperature increases could vary between 0.9° C and 2.8° C by 2050 and 1.2° C and 4.1° C by 2080 in the region, depending on the trajectory of emissions. The same research with regard to precipitation shows that there could be increases in annual rainfall in certain areas, such as the southeast of the Isthmus, between 2% and 6% by 2050 and 3% and 9% by 2080 depending on the scenario. At the same time, the exercise suggested that in the rest of the Isthmus there could be substantial reductions in annual rainfall between 8% and 18% by 2050 and 8% and 27% by 2080.

Subsequently, the project Impacts and Adaptation to Climate Change and Extreme Events in Central America (AIACC, 2006)[7] [8], carried out by the Regional Committee on Hydraulic Resources (CRRH), suggested using the A2 and B2 emissions scenarios and built the possible scenarios for temperature and increase in sea level for two time horizons each (see Table 2), using five general circulation climate models. The analysis of projections of the temperature anomaly, both annual and seasonal, suggests significant differences as of the mid-21st century, with an increase of between 2.6° C and 3.6° C towards the end of the 21st century, which coincides with the results of the regional models and the average of the multi-model of AR4 WGI (2007). According to the studies carried out by the CRRH, the increase in average sea level in the Central American region is slow at the beginning of the 21st century and more accelerated in the middle of the latter, with between 37 cm. and 44 cm. projected for 2065, compared to the projections of WGI regional models.

The AIACC LA06 project also generated spatial distributions of expected changes in rainfall, using various methodologies, including down-scaling techniques. The results indicate that whereas rainfall tends to diminish over time north of Honduras, it tends to increase in the southwestern Caribbean, including parts of Panama and Costa Rica.

Another important contribution is the work performed within the framework of the project Stage II for the Promotion of Adaptation Capacities in the face of Climate Change in Central America, Mexico and Cuba, co-ordinated by CATHALAC and with the support of GEF. The technique of downscaling, using the Statistical Downscaling System Model (SDSM); (http://www.cics.uvic.ca/scenarios/), was applied to the results of various global models to generate specific scenarios referring to the pilot areas of the study, often involving priority watersheds. The exercise was completed by analyzing the changes projected by using the

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[5] Hulme, M., T.M.L. Wigley, E.M. Barrow, S.C.B. Raper, A. Centella, S.J. Smith, and A.C. Chipanshi (2000), "Using a Climate Scenario Generator for Vulnerability and Adaptation Assessments", *MAGICC and SCENGEN Version 2.4 Workbook*, Climatic Research Unit. Norwich, United Kingdom, pp. 52.

[6] Hulme, M., and N. Sheard (1999), Escenarios de Cambio Climático para Mesoamérica, Folleto WWF, UEA, UK. 6.

[7] AIACC-LA06 (Central America Integration System, SICA), (Regional Committee on Hydraulic Resources, CRRH), (University of Costa Rica, UCR), and (Geophysical Research Center) (2006), *Impacts and Adaptation to Climate Change and Extreme Events in Central America.*

[8] Fernández, W., J. Amador y M. Campos (2006), "Impacts and Adaptation to Climate Change and Extreme Events in Central America", *Final Report*. AIACC, TWAS, SICA (Sistema Integrado de Centro América), CRRH (Comité Regional de Recursos Hídricos), University of Costa Rica (UCR), Centro de Investigaciones de Recursos Geofísicos (CIGEFI/UCR), 125 pp.

PRECIS dynamic model forced laterally with the outputs of the Hadley CM3 model, under conditions of the SRES A2 for 2070–2099. [9]

Table 2

CHANGES IN TEMPERATURE AND SEA LEVEL ACCORDING TO A2 AND B2 SCENARIOS FOR THREE TIMES HORIZONS, 2050, 2065 Y 2100

Time Horizons	2050		2065		2100	
Emissions scenarios	A2	B2	A2	B2	A2	B2
Increase in temperature (°C)	1.5	1.5	--	--	3.6	2.6
Increase in sea level (cm)	18	18	37	44	--	--

Source: *Echeverría B.J., 2004.*

The possible impacts of climate change on agriculture, water resources, health and forests have been estimated in Central America for different scenarios. In Guatemala, Costa Rica and Panama mainly negative variations were projected for maize, beans and rice production. There are also studies in Guatemala, Costa Rica and Nicaragua in which the impacts of expected changes in temperature and precipitation on water runoff have been estimated. The impacts on health were studied in Guatemala using the Bultó index, developed in Cuba, to assess the future behavior of diseases closely related to climatic variables. In the forestry sector the results are varied, depending on the hypotheses used and the scenarios considered. Studies made in Guatemala and Costa Rica have been reported. [10]

2. Rationale

Climate Change represents a "contingent public liability" that will affect public finances for generations. With small open economies whose key economic sectors tend to be directly tied to the environment, such as agriculture and tourism, with important challenges to public finance income including reductions in import and export tariffs due to free trade agreements and low property or income tax revenue, especially in some cases, and with high levels of poverty and demand or needs for public investment and expenditure on the other hand, public finances are already under stress and require careful management. Climate change could seriously affect both public sector income and expenditure requirements. The different studies and research to be

[9] CATHALAC/UNDP/GEF (2007) (Water Center for the Humid Tropics of Latin America and the Caribbean), (United Nations Development Programme), (Global Environment Facility), *Regional Synthesis Capacity Building II Adaptation to Climate Change in Central America, México y Cuba*, Panama City.

[10] For further information on advances in the analysis of the impact of climate change in Central America please refer to ECLAC/DFID (2008).

carried out in the Project The Economics of Climate Change will have their impact on government, civil society and private initiative by providing the analysis required to define medium- and long-term strategies and public policies in adaptation to and mitigation of climate change.

The preparation of the Feasibility Study of the Project Economics of Climate Change, corresponding to Phase I, it was confirmed that the countries of the region have generated a significant data that could be useful to validate global models and establish climate change projections at the regional level. In addition, there are a considerable number of studies that analyze vulnerabilities and the adaptation and mitigation challenges of Central America.

It was likewise confirmed that the meteorological services of all the countries of Central America have meteorological and hydrometric stations with data in fairly extensive time series, although these are sometimes incomplete. This constraint can be overcome by access to public, good quality data bases, developed with the efforts of the countries' meteorological services, the IPCC and the World Meteorological Organization (WMO), among others. So Central America has sufficient climatic data bases to analyze regional climate, including the application of statistical downscaling methods.

With regard to the mitigation of climate change, 25 country studies and five regional ones were identified, most of them related to forestry, water resources, electric power generation and agriculture. As to vulnerability and adaptation, 48 country studies and eight regional ones were documented, the majority concerning the expected impacts of climate change on agriculture, water resources and health, and ways to reduce its impact.

In addition to the countries' own efforts, the Subregional headquarters of ECLAC in Mexico possesses wide-ranging statistical information on the Central American countries as a result of over 50 years of technical co-operation with this region. Similarly, a significant number of studies on the energy, natural disaster and agricultural sectors have been prepared in relation to the Climate Change. Along these lines, the Inter-American Development Bank and the World Bank have also made a considerable number of studies.

There are institutional aspects linked to the management of Climate Change which are similar in all the countries of Central America. First of all, Climate Change is mainly addressed by the ministries of the environment (or their equivalents) and the meteorological services. The participation of institutions such as central banks and ministries of economy and finance has been scarce so far. In operational terms all the countries have set up climate change offices or units, often with financing by GEF. The work of these official institutions is complemented by research centers, universities and non-governmental organizations.

At the regional level, climate change is on the political agenda and there has been major progress in defining a common strategy. These efforts stem from the process of regional integration, coordinated by the Central American Integration System (SICA) and from the mandate given to the regional and national institutions by the Presidents of these countries to develop a regional strategy for climate change. In this context, special emphasis should be placed on the momentum shown by the Central American Commission on Environment and Development (CCAD), made up of the Environment Ministers of the region. Furthermore, the

CRRH, the intergovernmental technical agency of SICA, specialized in the areas of meteorology and climate, hydrology and water and hydraulic resources, has developed a network of institutional capacities in the region. In addition, there are a series of SICA agencies that have prepared initiatives in their sectors, relative to climate change.

Based on all the available information, Phases II and III of the Project The Economics of Climate Change in Central America seek to make an assessment of the main economic consequences for the countries of the region, as well as the related costs for different socioeconomic sectors. It also includes a study of the impacts and possible actions in adaptation and reduction of vulnerability, as well as in mitigation, relative to a scenario of inaction. Thus the costs of adaptation, reduction of vulnerability and mitigation will be estimated.

An important additional component of the Project is that related to strengthening national capacities in the topics linked to the study, which was expressly requested by Central America's Environment Ministers. The aim is for the studies of the Project to be made with the participation of national specialists.

According to the information compiled, the technical data to carry out analyses of the regional climate are available, including the application of downscaling models, although in some cases this information could be insufficient to make assessments with high levels of reliability. However, in regard to economic data, the situation is more difficult, for no sectoral reports with information on costs have been reported (except for impact assessments of extreme natural events). Certain important capacities and skills have been developed in the region in most of the topics necessary for carrying out the Project's studies. This capacity, however, has been generated mainly in environmental analysis, not necessarily in economic analysis.

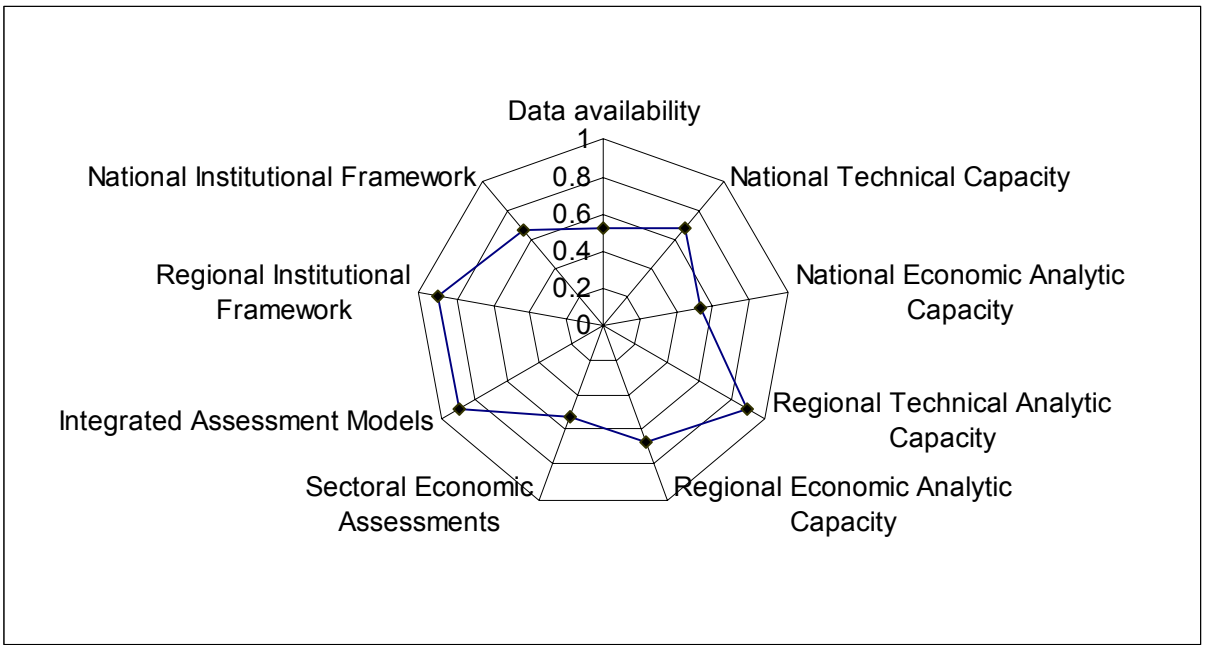
With regard to the institutional aspects, the Environment Ministers who make up the CCAD are providing support at regional level. The Declaration of San Pedro Sula, signed by the Heads of State of SICA, expressed their support for the implementation of the next Phases of the Project. Thus, at this level, the execution of the above-mentioned studies has the necessary political backing. At the national level, there is the support of the Environment Ministers and their express will to involve the Ministries of Finance or Treasury in carrying out Phases II and III.

The Feasibility Study for this project assessed various components of feasibility and the result of assessing the nine criteria used, considered that the probability of having the expected results for the Project is always higher than 50%. Furthermore, in three of the cases it would be higher than 66%, and in another three, higher than 90%. It can therefore be stated that it is viable to carry out the studies of the Project The Economics of Climate Change in Central America, bearing in mind the limitations mentioned, as well as the adjustments that have to be made (see Chart 1). [11]

[11] For the full analysis please refer to ECLAC/DFID (2008)

Chart 1

OVERALL ASSESSMENT OF FEASIBILITY



3. Poverty and climate change in Central America

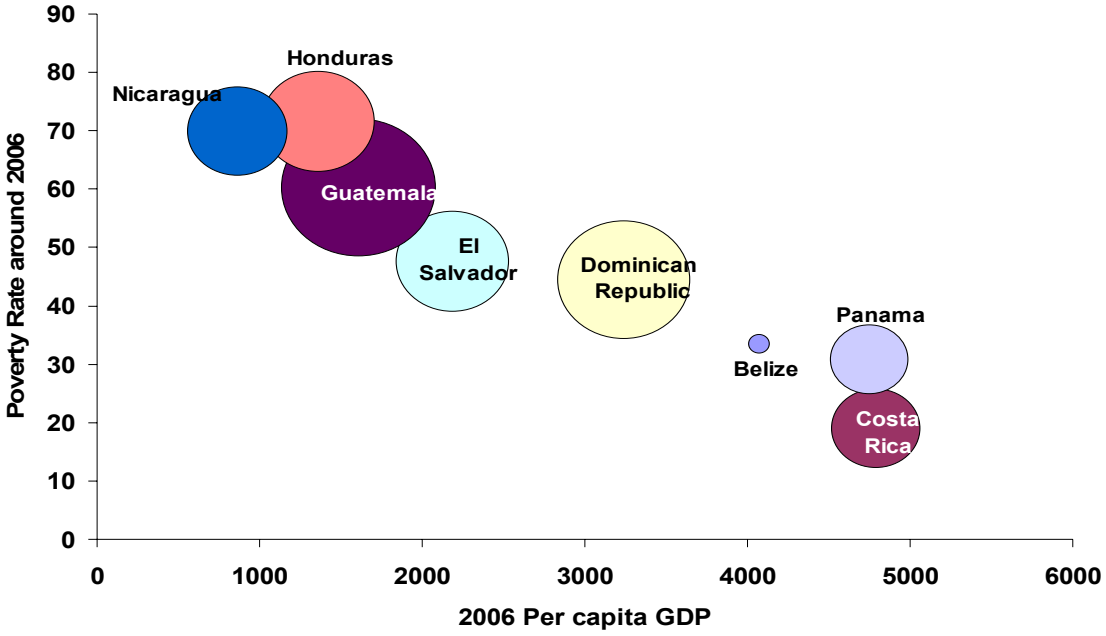
Although climate change has the potential to affect all socio-economic groups, its impacts will be magnified by other vulnerability factors for populations living in poverty. The Central American population suffers from high levels of socioeconomic inequity and geo-climatic vulnerability. Roughly half the population lives in poverty and about a third in extreme poverty. Although there is a certain diversity of situations at the national level, per capita GDP by country in the region did not exceed US$5,000 in 2006 and four countries had levels of less than half that figure (dollars at constant 2000 prices). The national poverty rates vary from between 19% in Costa Rica in 2006 to 71% in Honduras in the same year, compared with an average for Latin America of 36% (see Chart 2). There is a high level of socioeconomic, ethnic and gender inequality, evidenced by differentiated rates for child and maternal mortality and disease, malnutrition, access to food and drinking water, health services, education, social security and to capital and productive credit.

Thus far no studies have been identified that link the possible impacts of climate change to poverty levels or income in poor sectors in Central America. The analyses made to date have logically concentrated on estimates of physical impacts, first in temperature, rainfall and sea level, and second on the physical implications of these changes in the diverse sectors. For example, on agricultural yields, water stress, disease patterns, changes in forests and biodiversity.

These results provide indications on some of the channels of impact on the livelihoods and quality of life of poor populations and lay the foundations for an important and necessary analysis on the impact of climate change on poverty.

Chart 2

POVERTY, PER CAPITA GDP AND POPULATION SIZE, 2006 [a]
(*Constant 2000 dollars*)



Source: Source: ECLAC CEPALSTAT Online database.
a/ Poverty measured as household per capita income in year 2006 or nearest year. Bubble size is population size.

An important part of the population living in poverty depends directly on the environment for access to basic goods, such as water, food, energy –including firewood– and medicines, among others. In many cases the lack of capital and alternative livelihoods lead this population to overexploit their environment. This, combined with, the general development pattern and the weaknesses in risk management, has produced a vicious circle of human impoverishment and weakening of environmental sustainability in the region. This scenario of environmental stress in the presence of the poor population will become increasingly complicated with climate change and with the envisaged increase in population, which will rise from approximately 45 million in 2005 to a maximum of approximately 73 million by 2075, according to Latin American Demographic Center (CELADE) for seven countries of Central America.

Other parts of the poor population, such as those who live in marginal urban areas and/or depend on the informal economy, will also be at serious disadvantages in facing the impact of

climate change. Since this population accesses most of its basic needs through the income it earns in economic activities, climate changes that negatively affect the sectors of the economy in which they earn income or affects their purchasing power will increase its impoverishment, for example, through a reduction in supply of and/or a rise in the price of basic foods. Moreover, the impacts of climate change in rural areas could increase the migration flow of the poor population towards urban areas.

Another important channel of direct impact on the population in poverty is through extreme natural events whose intensity, frequency and cumulative effect have not only weakened these countries' development paths, but in particular have affected poor populations, reducing their incomes and their limited and hard earned assets. The studies on socioeconomic and environmental impact of extreme natural events carried out in the countries of the region by ECLAC with national and international partners also reveal the differentiated impact of these events on women.

Currently, access to social security and productive insurance in Central America is limited for the poor population of the region, and therefore they cannot avail themselves of this tool for cushioning the economic discontinuities that could arise. The low levels of per capita social spending –although higher in Panama and Costa Rica– also limit resilience and the ability to adapt.

As an example of a probable impact on poverty, studies already made suggest reductions in future production of basic grains, such as rice, maize and beans. Depending on the country, an important part of the production of these commodities is carried out by small farmers with limited access to irrigation systems, and in the last few decades, little technical support and scarce access to credit, crop storage and marketing systems. The impact of climate change on the production of basic grains suggests that this population will suffer a significant decline in their food security and incomes, which could give rise to higher levels of rural migration and greater problems of basic food supply to the poor urban population.

In another example, the studies carried out foresee increases and changes in the seasonal and territorial distribution of the incidence of diseases such as dengue, malaria, acute respiratory infections and acute diarrheic illnesses. Although these risks will be experienced by all of the population, limitations in the coverage and quality of health services for the poor population and probable reductions in their already limited access to water, food and income could create a very serious weakening of their state of health in regions negatively affected by the climate change.

In the political field, even though democratic electoral systems have been established, further steps need to be take to ensure effective participation in consultative and decision-making processes for poor populations, women and indigenous and afro-descendant populations.

Climate change will require greater efforts than those made so far in order to attain many of the Millennium Development Goals (MDGs) in Central America (IPCC, 2007b), [12] such as those related to hunger and poverty reduction, lower mortality rates (due to infectious epidemics, high temperatures, etc.), the development of an open and equitable financial and commercial

[12] The IPCC indicates that climate change may not make it possible for the MDGs to be attained in the next 50 years.

system for all and sustainable development. Climate change could also negatively affect other goals related to peace, migration and good government, since it could put further stress on social cohesion and vulnerable democracies. In this region, as in many others, the populations most affected by the challenges related to the MDGs will also be the ones most affected by climate change. This point to the urgency of uniting efforts to attain the MDGs with those aiming to address climate change.

II. LOGICAL FRAMEWORK OF THE PROJECT

The Project consists of preparing an economic analysis of the impact of climate change in the region, and of adaptation and mitigation options, with reference to the guidelines of the methodology of the Stern Report or similar methodologies, as well as carrying out selected impact assessments at national level (Phases II and III). The project needs to take the economic, social and environmental characteristics of the region into consideration so as to make the pertinent modifications to potential methodologies. These characteristics include the high level of poverty and vulnerability to occurrence of extreme natural events, among others.

It should be added that the study is an economic appraisal, which will be based on the science of climate change, taking social and environmental aspects into consideration. Hence, first of all the study will consider the scientific evidence related to climate change, especially to the expected impacts in the Central American region.

An important activity will be the creation of baseline scenario into the future (also known as "business as usual" or "BAU") for economic, population, social and environmental variables of the sectors considered without climate change. This will allow for a comparison with the potential impacts of climate change and to estimate the costs of these impacts in terms of GDP, GDP per capita and poverty. To estimate the different baselines there are diverse methodologies, which should be evaluated to consider a good range of options and identify the most appropriate ones for this study.

The economic analysis will generate useful information for evaluation and administration of the risk related to the climate change. The Study is essentially a risk analysis that will explore how much should be invested from now on, mainly in adaptation and mitigation, to cost-effectively reduce future vulnerability to the climate change.

The Feasibility Study considered the original proposal of carrying out the project with a Phase II of a regional study and a Phase III of national studies, executed in a parallel manner. Owing to the availability of data and the existence of important regional integration authorities, it is deemed advisable to use an approach of developing regional studies which evidence as much as possible national characteristics. Moreover, by express request of the Ministers of Environment, the strengthening of capacities in the methodology to be used in the project will be fostered through the participation of national technicians in the studies, as well as a training component. This part will fall under Phase IV of the Project.

The logical Framework, in table format, is in Annex I. Three more columns (Means of Verification, Sources and Suppositions) have been added to those elements presented in the following text.

1. General Aim of the Project

To alert decision-makers and key stakeholders in Central America of the urgency of responding to the challenge of climate change by providing robust information on the nature of the threat. To promote national and regional decision-making and actions to cost-effectively reduce vulnerabilities and poverty, to adapt to climate change and to make the transition towards more sustainable and low-carbon economies.

2. Specific Aims

a) To carry out an economic assessment of the impact of climate change in Central America with different socioeconomic development scenarios and emission trajectories including the costs and benefits of inaction (known as business as usual), reduction of vulnerability, adaptation and the transition towards a sustainable, low-carbon economy.

b) To promote a dialogue on options for national and regional policies and actions by which Central America can respond to the challenge of climate change.

Impact indicators:
Ultimately the impact of this project will be an increase in the cost effective adaptation and mitigation activities carried out by these countries, based on providing the decision-makers and key stakeholders with an improved knowledge base of the risks and opportunities of different actions. These impacts will not necessarily occur within the time framework of the project, but in the period following the Phases II, III and IV. However, it is highly probable that the institutions that are the main partners in the project will continue to collaborate in this field beyond the completion of the project, and thus will follow up on its impact. Even so, it should be taken into account that it will not always be possible to separate the net impact of the project from that of other activities at global, regional and national levels, independent of this project, which will contribute to achieving the aim put forward here. Even so, it would be expected to identify impacts through the partners involved in the project, such as the ones listed below:

- Strengthening and greater precision of national and sectoral climate-change strategies and of the Regional Climate Change Strategy currently under development, by applying the results and findings of the project.
- Incorporation of the results of the Project into National Development Plans and/or Poverty Reduction Plans.
- Increase in annual public budgets allocated to adaptation activities, reduction of vulnerabilities in the face of climate change and mitigation or transition to a low-carbon economy.
- Proposals for changes in public regulations to stimulate the reduction of vulnerabilities and adaptation to climate change and/or the transition towards a low carbon economy.
- Technical strengthening of the countries' positions in negotiations on the post-Kyoto framework, including finance flows for the reduction of poverty and vulnerabilities, for adaptation and strengthening of actions aimed at attaining the Millennium Development

Goals, and for access to technologies and support for the development of local technologies for adaptation and transition to low-carbon economies.

- Increase in private-sector initiatives, including small and micro-enterprises, and non-governmental and community organizations of civil society directed to adaptation and reduction of vulnerabilities and to the transition towards a low-carbon economy.
- Increase in initiatives for dissemination of information on the challenges of the climate change and the need for poor communities in the seven Central American countries to take action, with special communication activities.

3. Expected Results

Result 1: The governments of Central America, in particular their Ministers of Environment and Treasury/Finance, **have received** an economic assessment of the impact of the climate change with different socioeconomic development scenarios and emission trajectories including with the costs and benefits of potential inaction (known as business as usual), reduction of vulnerability, adaptation and the transition towards sustainable, low-carbon economies.

Process indicators:

- Completion of activities 1 to 19.
- Participation by the Ministries of Public Finance/Treasury and/or Economy. The Project should rely from the beginning on the commitment and determined participation of these institutions, or their equivalents, to have access to information and relevant knowledge during the making of the studies and to be one of the main users of the results of the project
- Follow-up meetings of the Steering Committee, the Regional Technical Committee and the Regional Thematic Groups, with minutes as an instrument of verification of the progress of the project and the parties' participation in the process.

Indicators of effects:

- Approval of the study by the Regional Technical Committee and the Steering Committee.

Activities: 1 to 19, summarized in Activity Report 17.

Result 2: The governments of Central America, in particular their Ministries of Environment and Treasury/Finance, their inter-ministerial or inter-sectoral Climate Change committees and the pertinent agencies of SICA have discussed the results of the study and the political options and actions with regard to this challenge at a national and regional level.

Process indicators:

- Number of activities in which the results of the study have been presented and discussed with these key partners.
- Number of countries, institutions and participants in these activities.

Effects indicators:

- Conclusions, agreements, instructions, declarations made with regard to these discussions.
- Participants' appraisal of the effect of the discussion activities organized by the project (exit assessment).
- Number of press articles published on these activities and their results.

Activities: Activity Report 17

Result 3: The results of the study have been disseminated among decision-makers and key stakeholders in the Central American societies, both public-sector and private-sector, and discussed at different events.

Process indicators:

- Establishment of a web portal for the project.
- The results are available in a technical version and a version for the general public to facilitate wide dissemination.
- Number of press releases and other prepared dissemination material.
- Number of dissemination and discussion activities carried out directly by the project.

Effects indicators:

- Number of press articles published on the project and its results.
- Number of visits to and downloads from the web portal.
- Number of countries, institutions and participants in the activities carried out by the project and its institutional partners (press conferences, meetings, workshops, seminars).
- Participants' appraisal of the effect of the dissemination and discussion activities organized by the project (exit assessment).
- Number of other dissemination and discussion activities organized by partner institutions or by the media.

Activity: 18

Result 4: The development of the different methodologies used in carrying out the various studies has been documented and shared in an initial manner.

Process indicator:

- Prepared methodological documents
- Number of initial training activities carried out directly by the project with the number of countries, institutions and participants.

Effects indicator:

- The economic assessment includes analyses on poverty and equity, adaptation and vulnerability, and biodiversity.
- Assessment of the participants on the importance of initial training to strengthen their capacities in these fields (exit assessment).

Activity: 20

4. Project Activities

The proposed activities are divided into the following phases: Phase II: Regional Studies, Phase III: National Studies on impacts in selected sectors and Phase IV: Strengthening of Institutional Capacities. It should be mentioned that the first of these phases includes all the actions related to the project's administration, co-ordination and planning.

The selection of the sectors for the regional impact and costing studies in Group 3 of Phase II were the subject of in depth discussions with the Climate Change Focal Points of each Environmental Ministry and consulted within these Ministries. Although other sectors were considered, these sectors were chosen as those common to all countries and of the highest priority at the regional level. Other sectors that may have priority in specific countries could be covered through the national impact studies proposed for Phase III. The existence of other studies, including the Second National Communications, which will update emissions inventories for different sectors, and being completed in these countries during this period, was also taken into consideration in the decisions made.

In Phase III, each country will be able to carry out a study on the impact on either one sector not included in the regional studies or develop a more detailed analysis on one of these sectors which are particularly important for that country. These studies will focus on strengthening analysis of impacts and will not necessarily include costing.

PHASE II

GROUP 1: CO-ORDINATION AND PLANNING

1. Co-ordination mechanisms for implementation of the project
1.1 Establishment of the Steering Committee, the Regional Technical Committee, the Regional Thematic Groups and the Project Co-ordination Unit (PCU)
1.2. Planning of activities
1.3. Meetings of the Regional Technical Committee
1.4. Meetings of the Regional Thematic Groups
1.5. Support for the implementation of the Project
1.6. Support for the Project's Web Page

GROUP 2: METHODOLOGICAL ASPECTS AND GLOBAL STUDIES

2. Methodological aspects
2.1. Analysis of previous studies in Central America
2.2. Analysis of the different available methodological approaches, in particular the study on climate change in Mexico
2.3. Determination of the scope of the studies required

3. Preparation of climate change scenarios in Central America
3.1. Current conditions and tendencies observed in climatic variables

3.2. Physical impacts observed
3.3. Selection and justification of SRES scenarios (of IPCC) to be used and possible emission trajectories, stabilization points that will be used in the study
3.4. Selection and justification of global climate models that will be used to generate regional climate change scenarios
3.5. Creation of scenarios in keeping with the needs of the rest of the priority components and taking into consideration current modeling capacity. Definition of spatial and temporal resolution, as well as of the relevant variables for the studies
3.6. Creation of probabilistic climate change scenarios and management of uncertainty

4. Analysis of Extreme Events
4.1. Estimates of costs of the impacts of extreme events in the region and their effects on development
4.2. Analysis of types of extreme events, frequency and impacts (including ENSO)
4.3. Analysis and estimates of possible changes in the frequency and intensity of extreme events in the region
4.4. Analysis of factors (climatic and non-climatic) that increase the vulnerability of the sectors and their possible future evolution according to the scenarios developed in the previous point
4.5. Assessment of adaptation actions that have been adopted and possible adaptation strategies in the prioritized sectors. Estimate of costs and benefits of adaptation and prevention

5. Preparation of macroeconomic scenarios for Central America to 2100
5.1. Analysis of current macroeconomic situations by country
- Trends and cycles
- Economic growth and environment
- Insertion in the world economy and effect of free trade agreements Central American Free Trade Agreement (CAFTA, EU,)

5.2. Analysis of regional development implied by SRES
5.3. Baselines and long-term macroeconomic projections (with fan chart) without climate change according to global scenarios
5.4. Creation of future scenarios with relevant variables (GDP, population, poverty if possible, technologies, among others)

6. Analysis of the international context
6.1. Analysis of policies and international agreements for the mitigation of greenhouse gases. Implications and scenarios for the region
6.2. Analysis of the options and mechanisms for trade in certificates of reductions of emissions and possible options and mechanisms of interest to the region for future negotiations (new international agreement in 2012). Estimate of possible benefits and risks for different scenarios
6.3. Analysis of the implications for the region of the changes produced by climate change in the global economy and that of the different regions. Implications for productive sectors in the region. Estimate of possible cost/benefits and risks for different scenarios

6.4. Analysis of possible positions in international negotiations as regards the financing of adaptation and mitigation costs for the region

7. Analysis and prospects of the relationships between climate change, social conditions and poverty
7.1. Creation of baseline and projections of poverty and inequality without and with climate change
7.2. Identification of impacts of climate change on poverty and inequality, in terms of macroeconomic and sectoral analysis and additional studies on women and girls, as well as vulnerable populations (for instance small farmers) and their livelihoods
7.3. Analysis of data broken down by gender (where available) and of current costs or opportunities lost by poverty and inequality and generation of estimated values for climate change impact scenarios
7.4. Assessment of actions aimed at poverty and inequality reduction that have been adopted and possible future strategies in relation to projected sectoral and macroeconomic impacts and response scenarios
7.5. Estimate of costs and benefits of these future strategies (reduction of vulnerabilities/adaptation and mitigation)
7.6. Analysis of the interrelations with other sectors and areas of analysis

8. Reformulated activity, originally involving Integrated Assessment Models

GROUP 3: REGIONAL SECTORAL STUDIES

9. Analysis of the water resources sector
9.1. Estimation of current water availability, consumption by uses, and unmet demand. Creation of baseline
9.2 Estimate of runoff and future water availability related to the different climatic and socioeconomic scenarios generated in previous priority activities
9.3. Identification of the main risk factors and possible potential benefits
9.4. Analysis of factors (climatic and non-climatic) that increase the sector's vulnerability and its possible future evolution in keeping with the scenarios developed in the previous point
9.5. Economic appraisal of the climatic impact (costs) where possible, including use of estimations of other countries or regions
9.6. Assessment of adaptation actions adopted and possible future adaptation strategies. Economic appraisal of costs and benefits of adaptation. Identification of possible joint benefits in mitigation of climate change, including reduction of emissions and opportunities in carbon markets

10. Analysis of agricultural and forestry sectors
10.1. Analysis of current conditions in the sector. Socioeconomic importance. Creation of baseline
10.2. Selection of representative crops and analysis of the main vulnerabilities and possible current adaptation strategies
10.3. Construction of potential impact scenarios in the sector, based on the climate change and socioeconomic scenarios prepared in the previous points

10.4. Estimate the sector's potential for the development of Clean Development Mechanism (CDM) projects and other carbon market mechanisms
10.5. Identification of the main risk factors and of possible potential benefits
10.6. Analysis of factors (climatic and non-climatic) that increase the vulnerability of the sector and its possible future evolution in line with the scenarios developed in the preceding point
10.7. Economic appraisal of the climatic impact (costs) where possible, including use of estimations of other countries or regions
10.8. Analysis of current conditions in the forestry sector. Creation of baseline
10.9. Construction of scenarios of potential impacts in the forestry sector, based on the climate-change and socioeconomic scenarios set forth in the preceding points. Analyze preferably in conjunction with the activities of ecosystems and biodiversity, agriculture and water resources
10.10. Estimate the sector's potential for the development of CDM projects (afforestation, reforestation and deforestation and avoided degradation) and other carbon market mechanisms (including potential evolved forms of the CDM)
10.11. Identification of the main risk factors and of potential co-benefits
10.12. Analysis of factors (climatic and non-climatic) that increase the sector's vulnerability and its possible future evolution in keeping with the scenarios developed in the previous point
10.13. Economic appraisal of climatic impact (costs) where possible, including use of estimations of other countries or regions
10.14. Assessment of the actions for adaptation that have been adopted and possible future adaptation strategies for agriculture. Economic appraisal of costs and benefits of adaptation. Identification of possible joint benefits in mitigation of the climate change, including reduction of emissions and opportunities in carbon markets
10.15. Assessment of the actions for adaptation that have been adopted and possible future adaptation strategies for the forests. Economic appraisal of costs and benefits of adaptation. Identification of possible joint benefits in mitigation of the climate change, including reduction of emissions and opportunities in carbon markets

11. Analysis of the human health sector
11.1. Analysis of the sector's current conditions. Creation of baseline
11.2. Selection of diseases related to weather and climate that are most important for the region and analysis of costs and current policies
11.3. Building of potential impact scenarios in the sector, based on the climate-change and socioeconomic scenarios prepared in the preceding points
11.4. Identification of the main risk factors and possible potential benefits
11.5. Analysis of factors (climatic and non-climatic) that increase the sector's vulnerability and its possible future evolution in line with the scenarios developed in the preceding point
11.6. Economic appraisal of the climatic impact (costs) where possible, including use of estimations of other countries or regions
11.7. Evaluation of adaptation actions carried out to date and possible future adaptation strategies. Economic appraisal of costs and benefits of adaptation

12. Analysis of the energy sector
12.1. Analysis of sources, composition and current situation. Creation of baseline

12.2. Projections of supply and demand for energy with different technologies (renewable sources, cogeneration, rational use of energy, etc.)
12.3. Analysis of alternative energies and technological changes for the region. Cost-benefit analysis
12.4. Analysis and prospects of the land transport sector
12.5. Estimation of the sector's mitigation potential (and its costs) and of its potential in participating in Clean Development Mechanism (CDM) projects
12.6. Estimation of the potential impacts of climate change on the sector, both on the supply and the demand sides
12.7. Identification of the main risk factors and possible potential benefits
12.8. Analysis of factors (climatic and non-climatic) that increase the sector's vulnerability and its possible future evolution in keeping with the scenarios developed in the preceding point
12.9. Economic appraisal of the climatic impact (costs) where possible, including use of estimations of other countries or regions
12.10. Assessment of adaptation actions adopted and possible future adaptation strategies. Economic appraisal of costs and benefits of adaptation. Identification of possible joint benefits in mitigation of climate change, including reduction of emissions and carbon market opportunities

13. Analysis of ecosystems and biodiversity
13.1. Current conditions and tendencies observed. Identification of hotspots in biodiversity and most vulnerable species. Creation of baseline
13.2. Construction of scenarios of potential impacts and estimation of biodiversity losses for the different climate change scenarios, including the impacts caused by alterations in forests, water resources and agricultural sector
13.3. Identification of the main risk factors and possible potential benefits
13.4. Analysis of factors (climatic and non-climatic) that increase the sector's vulnerability and its possible future evolution in accordance with the scenarios developed in the preceding point
13.5. Economic appraisal of the climate impact (costs) where possible, including use of estimations of other countries or regions
13.6. Assessment of adaptation actions adopted and possible future adaptation strategies. Economic appraisal of costs and benefits of adaptation. Identification of possible joint benefits in mitigation of climate change, including reduction of emissions and carbon market opportunities

14. Analysis of marine-coastal areas
14.1. Current conditions and tendencies observed
14.2. Generation of scenarios of increase in sea level
14.3. Potential impacts on low coastal areas, infrastructure and tourism, coastal morphology and mangroves and availability of drinking water. Estimation of related costs
14.4. Identification of main risk factors and possible potential benefits
14.5. Analysis of factors (climatic and non-climatic) that increase the sector's vulnerability and its possible future evolution in keeping with the scenarios developed in the preceding point

14.6. Assessment of adaptation actions adopted and possible adaptation strategies. Estimation of costs and benefits of adaptation

GROUP 4: GLOBAL ECONOMIC ASSESSMENT

15. Economic assessment of impact of climate change on macroeconomic scenarios until 2100
15.1. Selection of economic data to be used (discount rate, costs, etc.)
15.2. Analysis of the different scenarios to be considered, by means of the model
15.3. Assessment of results
15.4. Comparison of macroeconomic scenario results with sectoral analyses

16. Development of recommended public-policy options

17. Drafting of the report

GROUP 5: DISSEMINATION OF PROJECT RESULTS

18. Implementation of the dissemination strategy
18.1. Regular publication of press features, studies, results, etc.
18.2. Initial training activities in the seven countries of the region ¨road tour¨

PHASE III

GROUP 6: NATIONAL STUDIES ON IMPACTS IN A SELECTED SECTOR

19. Studies on national impacts in selected sectors
19.1. Study selected by Belize
19.2. Study selected by Costa Rica
19.3. Study selected by El Salvador
19.4. Study selected by Guatemala
19.5. Study selected by Honduras
19.6. Study selected by Nicaragua
19.7. Study selected by Panama

PHASE IV

GROUP 7: STRENGTHENING OF INSTITUTIONAL CAPACITY

20. Activities for strengthening institutional capacity

20.1. Drafting of a methodological document of the Project, with information from all the studies carried out

20.2. Holding training Course on the methodological approaches used during the execution of the studies, as well as the results achieved, intended for the technical levels of each country (government, universities, chambers of private sectors, NGOs, consultants, etc.)

The development of the different research components should include:

a) Analyzing previous studies that have been prepared for the region and carrying out the necessary studies to complete the information required to make the envisaged economic assessment.

b) Analyzing the interactions among sectors (water, agriculture, forests, ecosystems and biodiversity and energy) that could increase or diminish the region's vulnerability to the climate change where feasible.

c) All the products and results obtained for each priority sector should provide estimations of uncertainty and be accompanied by proposals for handling uncertainty in decision-making

d) Providing quantitative and/or qualitative estimates of impact for each of the priority sectors and for the region's economic growth and development. Carrying out estimates of costs/benefits of adaptation and the potential benefits of mitigation and trade in emission-reduction certificates where feasible.

e) Documenting the methodologies used (adapted, created etc.) in carrying out the different global and sectoral studies.

III. INSTITUTIONAL PARTNERS

1. Regional and national institutions

In keeping with the experience during the first phase of the Project The Economics of Climate Change in Central America, the Ministries of Environment with their Ministers and Focal Points on Climate Change will continue to participate in the execution of the following phases. However, active participation by the Ministries of Finance or Treasury of the seven Central American countries is also expected, in view of the economic approach to be taken by the upcoming studies. The regional coordinating bodies of these ministries will also participate in the project; their respective agencies in the Central American Integration System (SICA) are the CCAD and the Council of Ministers of Finance and Treasury (COSEFIN). In addition, the Presidential Declaration of San Pedro Sula was the basis for the inclusion of SIECA in the project.

The other specialized agencies of SICA will likewise be involved, including the CRRH, the intergovernmental technical agency of SICA specializing in the fields of meteorology and climate, hydrology and water and hydraulic resources, and which has developed a network of institutional capacities in the region. Among the other specialized agencies to be invited to contribute to the research will be the Co-ordination Centre for the Prevention of Natural Disasters in Central America (CEPREDENAC), which has the mandate of promoting risk reduction with regard to disasters related to extreme natural events; in addition it promotes and co-ordinates international co-operation and exchange of experiences and technical and scientific advisory assistance, and systematizes and registers information pertinent to this topic.

In the energy sector there are two important technical agencies. The Co-operation Committee on Hydrocarbons of Central America (CCHAC) is made up of those responsible for the hydrocarbons subsector of the six Central American countries with the aim of improving hydrocarbon supply management. The Electrification Council of Central America (CEAC) has as its members the principal public electric power companies of the Central American countries, the purpose of which is to improve development of energy resources in the processes of generation, transmission and distribution of electric power. At the political level, the Ministers of Energy have their Council of Ministers within the framework of SICA.

The other sectoral councils of Ministers that function within SICA are highly important for the work envisaged to develop the study. These include the Ministers of Economy (Council of Ministers of Economic Integration, (COMIECO/SIECA), of Agriculture (Central American Agricultural Council, CAC) and of Health Council of Ministers of Health of Central America, (COMISCA).

The Council of Ministers of CCAD has worked with its counterparts in the agriculture and health sectors (CAC and COMISCA) to develop the Regional Agro-environmental and Health Strategy (ERAS) recently approved jointly by these councils and the Presidents of Central America. Furthermore, CCAD has held various meetings with the Ministers responsible for the

Energy sector, since this sector is of vital importance in the challenge posed by climate change and the transition to a low carbon economy.

A most important event was the Central American Presidential Summit on Climate Change, held in San Pedro Sula, Honduras, on 28 May 2008, where the Heads of State and Government of the member countries of the Central American Integration System (SICA), aware of the serious effects of the climate change on their region, signed the Declaration of San Pedro Sula. In this declaration, the chief executives decided to begin a process of broad-based participation by all sectors of society in order to build a common strategy to face the impacts of climate change, and pledged to incorporate it into national development plans. They express the urgent need to have baseline data to make it possible to monitor the evolution of the Climate Change. They also gave their final approval to the Guidelines for the formulation of a Regional Strategy for Climate Change.

The Declaration welcomes the feasibility study co-ordinated by ECLAC with the financial support of the British Government and aims to obtain additional support from IDB for the following phases. At the CCAD ministerial meeting, held at the same Summit, ECLAC confirmed the feasibility of carrying out the study, the Ministers gave their approval to continuing with the project and the British Government announced its offer of financing for the second and third phases. In the guidelines for the Regional Strategy, reference is made to the shortage of studies related to the costs of the climate change and to the study being carried out by ECLAC and CCAD with British support, and the Presidents instruct CCAD and the National Environmental Authorities to follow up on the efforts under way to carry out the study, take the appropriate steps to obtain the necessary resources for its execution and co-ordinate this work with SIECA and the Ministers of Economy and Finance. In addition, they instruct the ministers of public finances that, in conjunction with the appropriate national and regional entities, they assess the necessary investments for adaptation to climate change and take measures to assure the resources required to finance these investments, giving priority to the poorest and most vulnerable sectors of the population.

The implementation of the following phases of the Project will also benefit from active participation by different national institutions in addition to the Ministries of Environment and Finances/Treasury, mentioned earlier. These include the National Meteorological Services, the Ministries of Agriculture, Health, Energy, and those responsible for natural resources, such as forests, water resources and others.

2. Subregional Headquarters of ECLAC in Mexico

The Subregional headquarters of ECLAC in Mexico have a long history of work with the authorities of the Central American countries and their integration institutions. This work has been aimed at strengthening the capacity for analysis and for formulation of social and economic development policies, particularly in relation to poverty reduction and inequality, social protection, macroeconomics and trade, as well as energy, agriculture, industry and the services sectors. In view of the region's high vulnerability to extreme events, this office has played a leading role in developing a comprehensive methodology for assessment of the economic, social and environmental impacts of such events.

For many years the Subregional headquarters has been integrating the concept of sustainable development into its research and technical assistance, including projects with the countries in new and renewable sources, energy efficiency and energy sector externalities, clean production, and environmental co-operation, among others. ECLAC has also worked with the Central Banks of Central America to strengthen their capacity to use macroeconomic and general equilibrium models to assess the impact of free trade agreements, macroeconomic policies, external shocks and social protection programmes.

In 2007, the Subregional headquarters strategic planning process established the need to place priority on supporting the Central American societies in addressing the effects of climate change. This resulted in a decision to commit the office's own resources, and develop joint projects with national and regional partners, other agencies of the United Nations system and donors.

ECLAC has collaborated with CCAD in the past in issues related to trade and environmental problems and participated as a member of its Reference Group of donors and international partners, which was organized to support to the preparatory work for the Summit of Heads of State of SICA on Climate Change. Likewise, ECLAC is providing technical support to Mexico's Ministry of Environment and Natural Resources and to the Ministries of Environment of Central America in their process of establishing an agenda for south– south co-operation the Mesoamerican Sustainable Environment Strategy. Furthermore, the office has worked closely with the Ministers and General Directors of the energy sector, carrying out various technical studies and providing advisory services. In recent years this work has focused on bio-fuels and the preparation of energy development scenarios as the basis for the Sustainable Energy Strategy of Central America 2020 approved at the level of ministers and Heads of State in 2007. Also, the Subregional headquarters has worked closely with CEPREDENAC and national agencies for disasters in carrying out impact assessments for extreme natural events and disseminating the methodology developed for such purposes.

With this background of collaboration, its multisectoral and multidisciplinary approach and its role as a bridge between knowledge creation centres and public and private institutions and the organizations of civil society that formulate and execute policies and initiatives at national level, the Subregional headquarters of ECLAC in Mexico is well placed to provide significant co-operation to the Central American countries' efforts in strengthening their capacities to face the effects of Climate Change.

IV. PROJECT STRATEGY

1. Organization of the Project

Based on previous experiences of ECLAC in projects of this nature and scope, as well as the structure adopted in Mexico's project on The Economics of Climate Change, currently being executed, the following organizational mechanisms for the project are proposed.

a) Regional level

The governing organization of the Project The Economics of Climate Change in Central America would be made up of the following bodies: a Steering Committee, a Regional Technical Committee, Regional Thematic Groups, National Technical Groups, and a Project Co-ordination Unit (PCU), according to the organization chart shown in Chart 3.

At the political level, the Steering Committee would be the Project's highest decision-making body. It would define the general policies of the study and adopt the necessary decisions for a good outcome. For practical reasons, it is proposed that this political level should take advantage of the regular meetings of the CCAD Environment Ministers, as well as those of the Finance/Treasury Ministers. Likewise, the possibility of joint meetings with the said ministers, promoted by the Secretariat of CCAD and SIECA, with the support of ECLAC, should be fostered.

It has been proposed that the Regional Technical Committee should be composed of two delegates from each country, the Focal Point for Climate Change [13] and one delegate from the Ministry of Finance or Treasury. An ex-officio seat on this body would be given to the Executive Secretariats of CCAD and SIECA, which would act as Secretariat for the above-mentioned Committee. A representative of the British Government, would also have a seat on this Committee, with the same characteristics. (The same would apply to other major donors). It should be mentioned that in Phase I, the representative of the British government also supported the project in dissemination activities with different decision-makers and socioeconomic sectors of the region and this support is expected to continue in the following phases.

The main function of this Regional Technical Committee is setting the technical direction of the project, based on the decisions agreed on at the ministerial level. Among its main tasks is the definition of the scope and terms of reference of all the Project's overall and sectoral studies. The rules of procedure of this committee should be established prior to the start of the Project, in order to ensure governance and its execution in the established times.

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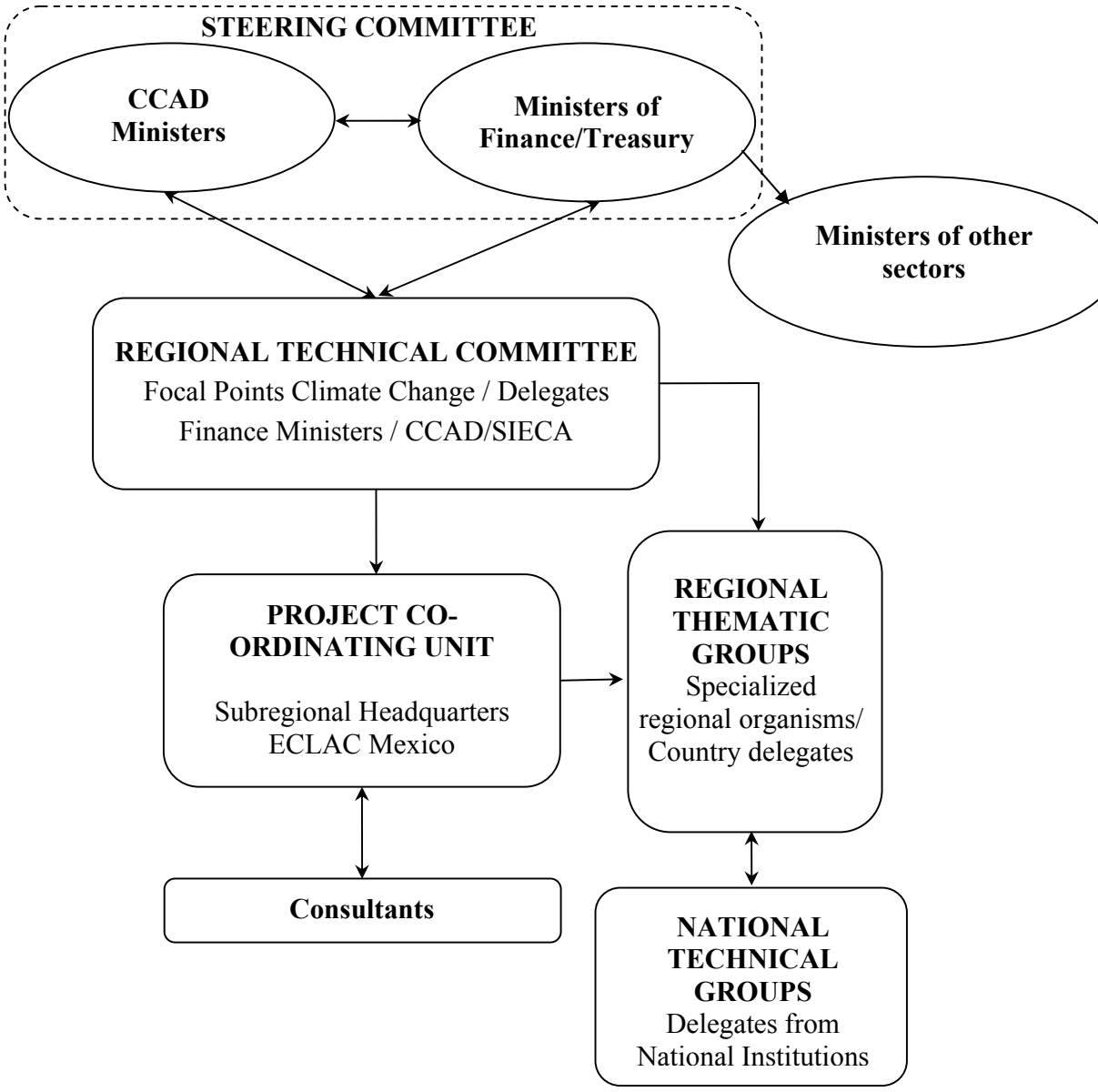
[13] For Costa Rica this position would be filled by the Focal Point for Climate Change ascribed to the CCAD.

Chart 3

ORGANIZATION CHART

PROJECT ECONOMICS OF CLIMATE CHANGE IN CENTRAL AMERICA



In order to ensure active participation by national specialists in the execution of the Project, the creation of a maximum of up to ten Regional Thematic Groups (one for each main topic to be evaluated) has been envisaged. Each Group would be made up of two delegates from each country, the representative of the SICA regional agency related to the topic being studied

(for instance the representative of CRRH in the Regional Thematic Group on water resources), a delegate of the Project Co-ordination Unit and the consultants. At the initial meeting, based on the scope previously defined by the Regional Technical Committee, the Regional Thematic Group would address the following issues (at least): methodological approaches to be used, responsibilities of national counterparts, execution schedule, etc. One of the consultants of each study will have defined, in his/her terms of reference, the drafting of a document on the methodological approach used. Upon completion of the work of the consultants and the Project Co-ordinating Unit (PCU), a final meeting of the Regional Thematic Groups is programmed to be held for the most important topics, with the aim of discussing and reviewing the results of the respective research projects.

The Regional Technical Committee will have three meetings during the period of execution of the project. A total of 17 meetings are scheduled for the Regional Thematic Groups, during the same period.

The implementation of the Project would be coordinated by the Subregional Headquarters of ECLAC in Mexico, as Project Co-ordinating Unit (PCU). ECLAC would appoint an official to carry out the leadership functions of this Unit, as well as the officials who will participate in the implementation of the Project's activities. One communications official would be included in the PCU team in order to ensure dissemination of the Project's Activities. As an agency of the United Nations system, ECLAC must comply with the regulations established by the General Assembly of the UN in the execution of projects. Nevertheless, the Project's strategic decisions are defined by the Steering Committee, the highest body for governance of the Project.

As a means of communication between the different entities involved in the Study, a Web page will be available as one result of the Feasibility Phase. This Web page will have a section accessible by the general public as well as a private section, with access only for the participants in the Study, by means of a password, in order to ensure fluid communication for the development of the project. This private part includes a section with the reports of the consultants in their different versions (preliminary and final), and the reports of the PCU.

b) National level

The organizational structure at national level would be composed of a National Technical Group of the Economics of Climate Change Project (see chart 3), co-ordinated by the two national members of the Regional Technical Committee (the Focal Point of Climate Change and the delegate from the Ministry of Finance/Treasury). This National Group could establish National Thematic Groups to incorporate the participation of different national agencies into a specific area of analysis. The existence of national/inter-sectoral/inter-ministerial climate change committees in the countries that have them would be an excellent point of reference and support for the National Group of the Climate Change Project.

c) Global level

It is worth noting the working relationship of the ECLAC team with the Study on Economics of Climate Change for Mexico, which is scheduled to finish in the last quarter of 2008. Thus, when the Central America Project began, the former was in its final phase. So advantage has been taken of the debates and discussions that took place during the course of the Mexican project, particularly with highly important topics such as the definition of the ¨Business as usual¨ scenario (BAU), sectoral analyses, the discussion on discount rates, cost estimates, the report on technological innovation and transport technologies, among others.

Similar studies are also being carried out in Brazil, the Caribbean, the Andean Community, Southeast Asia and China, with different time-lags. An informal network of groups responsible for Regional Studies on Economics of Climate Change has been formed with the support of different authorities of the United Kingdom, both from government and universities and from the team of specialists of the Stern Report. This network will make it possible to maintain methodological discussions and share experiences related to the manner of solving specific problems in each region.

2. Dissemination strategy

The purpose of dissemination of the Project, during the course of the research work and when the analyses are completed, will be to keep public and private agencies informed of its progress and to give broad dissemination of the results.

This will be achieved by publishing the different studies, as soon as they are approved by the Steering Committee, in the project's Web page, with free access, and announced by means of a Press Article from PCU. A Directory with the addresses of the main national partners, both in the public sector and in universities, private research centres, ONGs, newspapers, chambers of private initiative, among others, will make it possible to directly disseminate information and announce the reports on the Project's Web page.

Furthermore, the final meetings of the Regional Thematic Groups could conclude with a press article by PCU and, where possible, a press conference given by the members of the Thematic Group.

Upon conclusion of the Project, the Steering Committee would prepare a special programme to disseminate the results, with several possible components. First of all, the final Report of the Project could have three versions, one for the Ministers and Focal Points of Climate Change, one for experts and organizations of civil society, and another for the general public. The first version would be the most complete, reference document from which the other two versions would be prepared.

By means of the extensive contacts with the press available at the Ministries and other national institutions involved, as well of ECLAC, the results of the diverse studies, the three versions of the final report and of key activities will be disseminated by means of press

conferences, interviews in the media and the distribution of a series of press articles and other dissemination materials. The aim would be to co-ordinate this activity with other United Nations agencies such as UNEP and UNDP.

Another component would be the programming of a first series of seminars or road tour through the seven countries to present the results in each of the capital cities. This tour would be of one or two days per country, which would make it possible to make one or several presentations for different audiences. The presenters would be members of the PCU, or consultants, with a minimum of three people, complemented by government experts or national consultants who have taken part in the different activities of the Project. The Ministries of Environment, in co-ordination with the Ministries of Finance or Treasury, would organize the event in each country. Where possible, the organization would include representatives of the British Ministry of Foreign Affairs and the Department for International Development.

Finally, the Steering Committee, with the support of PCU and the project's donors, will identify national, regional and international priority events in which it would be useful to disseminate the results of the project.

3. Users of the Project

The principal users of the Project will be:

- Governments and other Decision-Makers, especially the entities in charge of public finances, economic and sectoral development of the countries, as well as the Ministries of the Environment. The information that will be generated by the Project The Economics of Climate Change would call attention to and provide new and very much required technical analysis on the expected economic impacts in a scenario of no response (BAU), and the costs and benefits of potential responses, both in terms of adaptation and mitigation to the climate change. It is hoped that these users will then be more willing to incorporate the issue of climate change into their decisions and will have key technical estimations to do the same.

- Private sector and organizations of civil society, in all their breadth and diversity, will be key users of the results of this study, since it considers not only the exposure to the impacts of climate change, but also the need for initiatives and the opportunities to invest in reducing its vulnerability and advance in adaptation. Moreover the study could identify business opportunities, both in the supply of clean technologies, and in market niches that value a lower carbon intensity. Some economic actors are particularly vulnerable to changes in climate. Among these are the agricultural sector in general, particularly small farmers which contribute an important percentage of GDP, exports and employment, and other sectors such as the production of hydroelectric power and tourism. On the other hand, non-governmental and community organizations will be able to take advantage of more precise information on the impacts of climate change on poverty and inequality.

- International development agencies, multilateral and bilateral organizations, for whom it would be important to count on economic studies that make it possible to advance with the integration of climate change into the poverty reduction and sustainable development agendas and prioritize and adapt their programmes, investments and limited resources to activities in which the greatest benefit is obtained in terms of the needs for adaptation and development of the region.

- The operators and institutions related to the carbon markets (CDM-type), for which this Project could provide guidelines on baselines and on the region's potential for participating in this type of market, and the necessary mechanisms to make the most of the same. The study will allow the development of a joint strategy to offer standardized products that have not only benefits of an environmental nature but also components of poverty relief and human development.

From the point of view of the project it is important to be clear about this diversity of users, in order not only to take them into account from the start in the process of implementation of the project, but also at the time of designing its specific products.

4. Budget for the Project

In order to quantify the budget for each of the phases, a series of criteria were established with regard to consultants' salaries, consultants' missions, PCU missions, expenses of missions of delegates of the countries to participate in project meetings, support for the execution of the project, dissemination strategy, miscellaneous and contingencies. Administrative support for ECLAC (13%) is also set out. These criteria conform to the United Nations administrative rules and regulations.

In view of the amount needed to cover the participation of the delegates of the countries in the project's different meetings (Regional Technical Committee and Regional Thematic Groups), and bearing budget limitations in mind, the original total amount of the budget line for mission expenses has adjusted by a factor of the historical experience of levels of attendance by the countries at this type of events (80%). This will make it possible to have a budget more in line with recent reality. On the other hand, a line for support for the execution of the project at the national level has been incorporated, allocating 6 person months of technical support for each Focal Point for Climate Change, with the aim of assuring the compiling of the pertinent information and attention to the consultants contracted for the different thematic groups in the different government institutions involved.

The estimated budget for Phase II is 2,016,000 dollars, divided into 1,511,000 dollars provided by the Co-operation Agency and 505,000 dollars equivalent as contribution in kind (45.4 months of specialized human resources) from the Subregional Headquarters of ECLAC in Mexico (see Tables 3 and 4). Phase III has a total budget of 263,000 dollars divided into 225,000 dollars provided by the Co-operation Agency and 38,000 dollars as counterpart support from ECLAC (see Tables 5 and 6). Finally, Phase IV has a total budget of 185 000 dollars, broken down into 143,000 dollars and 42,000 dollars, respectively (see Tables 7 and 8). Thus the total budget for the project is 2,464,000 dollars (see Table 9). These calculations do not yet include the

countries' counterpart expenses involved in assigning personnel from the different ministries for the leadership and execution of Project activities.

It should be noted that ECLAC's contribution for the execution of the Project corresponds to approximately 30% of the total cost and is a higher level than normally dedicated. This was due to the high priority given to this initiative and due to the need to start the project without complete funding of the budget so that additional time was used of ECLAC experts to advance the studies despite this limitation. In recognition of this situation, ECLAC is proposing to create a Project Coordinator position with donor funding to support institutional technical coordination an project management for 12 months. The budget broken down by part and activity is shown in the Annex II, for each of the Phases.

Table 3

ESTIMATED BUDGET PHASE II
(Dollars)

Description	Amount
Countries' participation in Project activities	310 000
Consultants	514 000
Project Coordinator (12 months)	138 000
Consultants' missions	132 000
PCU missions	46 000
Support for Project execution and Web page expert	75 000
Dissemination and advocacy strategy	70 000
Miscellaneous	9 000
Contingency	43 000
Subtotal	1 337 000
Administrative support (13%)	174 000
Total	1 511 000

Table 4

ESTIMATED CONTRIBUTION OF ECLAC PHASE II
(Dollars)

Description	Amount
Supervision and co-ordination (4.4 m/p)	54 800
Senior Specialists (20,3m/p)	252 400
Specialists (16,8 m/p)	165 500
Junior Specialists (4 m/p)	32 000
Total (45,4 m/p)	504 700

Table 5

ESTIMATED BUDGET PHASE III
(Dollars)

Description	Amount
Consultants	158 000
Consultants' missions	34 000
Miscellaneous	4 000
Contingency	3 000
Subtotal	199 000
Administrative support (13%)	26 000
Total	225 000

Table 6

ESTIMATED CONTRIBUTION OF ECLAC PHASE III
(Dollars)

Description	Amount
Supervision and co-ordination (0.5 m/p)	6 000
Senior Specialists (0.5m/p)	6 000
Specialists (2.5 m/p)	26 000
Total (3.5 m/p)	38 000

Table 7

ESTIMATED BUDGET PHASE IV [14]
(Dollars)

Description	Amount
Salary Consultants (12m/p)	60 000
Consultants' Missions	46 000
PCU Missions	15 000
Miscellaneous and contingency	5 000
Subtotal	126 000
Administrative support (13%)	16 380
Total	142 380

Table 8

ECLAC CONTRIBUTION TRAINING PHASE (IV)
(Dollars)

Description	Amount
Senior Specialist (2.25 m/p)	28 800
Specialist (1.35 m/p)	12 800
Total	41 600

Table 9

ESTIMATED TOTAL BUDGET FOR THE PROJECT
(Dollars)

	Co-operation agency	ECLAC counterpart	Total
PHASE II	1 511 000	505 000	2 016 000
PHASE III	225 000	38 000	263 000
PHASE IV	143 000	42 000	185 000
Total	1 879 000	585 000	2 464 000

5. List of possible donor agencies

The Subregional Headquarters of ECLAC in Mexico, DFID and the *Pro tempore* President and Executive Secretariat of CCAD have been in contact with multilateral co-operation agencies and banks, including UNDP, UNEP, cooperation agencies of the governments of Germany, Norway, Sweden, Finland and Denmark, the Inter-American Development Bank (IDB) and the Central American Bank for Economic Integration (CABEI).

6. Schedule and funding

Phase I of the Project was extended to October 2008 to permit bridging activities and Phase II began in 1 January 2009. In view of the scope of the Project's three upcoming Phases, the high level of commitment to participate assumed by the different ministries, the prior and parallel commitments of the Focal Points for Climate Change with other regional initiatives, it was proposed that the duration of the Project should be 18 to 24 months (see Chart 4). A series of activities for dissemination of the results of the Project would be approved by the Ministers of Environment and the Ministers of Finance of Central America towards the middle of 2010.

DFID made an initial offer of funding during the Climate Change Summit in San Pedro Sula, Honduras, for the execution of Phase II. Added to this was ECLAC's willingness to assign its human resources as soon as they were required. With these financial and technical resources the activities of the Project began as soon as DFID made the first disbursement, although not all the Phase II budget was committed.

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Chart 4

SCHEDULE

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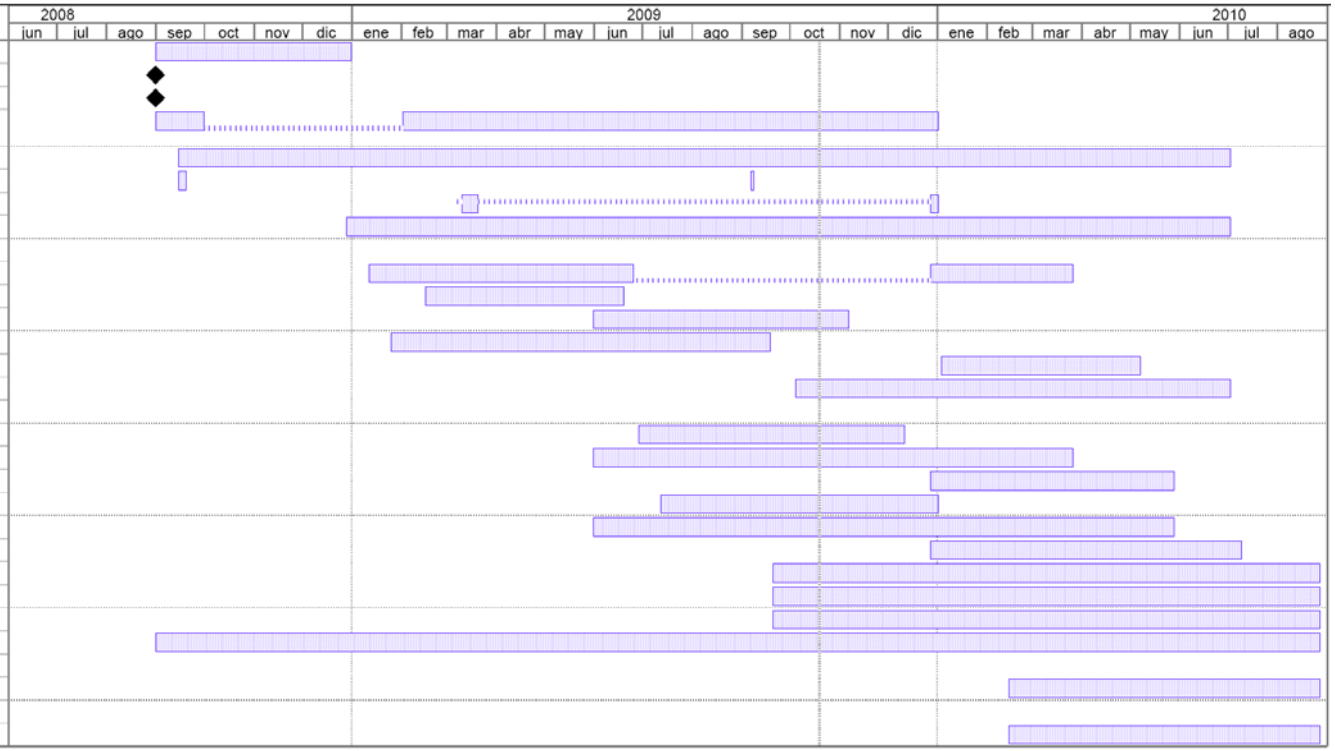
Id	Nombre de tarea
1	**TRANSITION PHASE**
2	**PHASE II**
3	1 Co-ordination mechanism for implementation of the project
4	1.1 Establishment of the Steering Committee, Regional Technical Committee, Regional Thematic Groups and Project Co-ordination
5	1.2 Planning and coordination of project activities
6	1.3 Meetings of the Regional Technical Committee
10	1.4 Meetings of the Regional Thematic Groups
11	1.5 Support for the implementation of the project
12	1.6 Support for the project's Web Page
13	2. Methodological Aspects
14	3. Preparation for CC scenarios in CA
15	4. Analysis of extreme events
16	5. Preparation of macroeconomic scenarios in CA
17	6. Analysis of the international context
18	7. Analysis of the relationship between cc, social conditions and poverty
19	8. Reformulated activity
20	9. Analysis of the water resources sector
21	10. Analysis of the agricultural/forestry sector
22	11. Analysis of the human health sector
23	12. Analysis of the energy sector
24	13. Analysis of ecosistems and biodiversity
25	14. Analysis of the marine- coastal areas
26	15. Economic assessment of impact of climate change
27	16. Development of recommended public-policy options
28	17. Drafting of final versions
29	18. Implementation of the advocacy and dissemination strategy
30	**PHASE III**
31	19. National studies on impacts of selected sector
32	**PHASE IV**
33	20. Activities for strenghthening institutional capacity



V. RISKS FOR THE EXECUTION OF THE PROJECT

The execution of any project entails risks inherent to its nature. Once the most important of these risks have been identified, procedures or methods to try to reduce or eliminate their probability or impact should be implemented.

The most obvious risk for this project would be insufficient participation by the countries' diverse key institutions due to a low level of interest in the Project, which could result from different factors such as, for example, apathy on the part of ministers of finance or treasury towards the Study, or the existence of conflictive relations between the authorities of the ministries of environment and treasury, or between their delegates. Another risk would be that national specialists with experience in the topics to be considered within the Project would not be available due to their workload or being assigned other priorities. In view of the limited professional capacity that exists in the region, this subject of specialists' availability is crucial to the Project's efficient execution.

Another risk is the difficulty of succeeding in concluding the project in due time and manner given its complexity, and the necessary participation of the different ministries of the countries. Another aspect would be having used sound methods that stand up to academic scrutiny and comparison with the other studies being carried out.

Failure to secure the necessary funds to carry out all the studies and research of the proposed phases, with the required timing, could give rise to significant lags, with effects on both the calendar of delivery of the results, and the interactions envisaged between the different activities. Finally, there is a risk that key institutions of the governments of some countries may not feel "comfortable" with the results and may not give due consideration to the analysis. This could also be the case if one of the countries considers it could lose a competitive advantage on the issue by being included in a "regional" study, despite its national elements, and by not doing an exclusively national one.

The study's environmental impact is limited, owing to the type of activities programmed. No procedure is included to offset the carbon emissions resulting from participants' meetings and trips.

All these risks are considered manageable, especially as a result of the favourable participation of national environment authorities and the high priority the topic is gaining on the political agenda of the region, so that a priori they would not represent a danger to the project The Economics of Climate Change in Central America.

ABREVIATIONS AND ACRONYMS

ACP	Autoridad del Canal de Panamá/ Panama Canal Authority
ADD	Acute Diarrheic Diseases
AGCM	Atmospheric General Circulation Models
AIACC	Assessment of Impact and Adaptation to Climate Change in Multiple Regions and Sectors
ANAM	Autoridad Nacional del Ambiente, Panamá/ National Environment Authority, Panama
AR4	Fourth Assessment Report of the Intergubermental Pannel on Climate Change
ARI	Acute Respiratory Infection
AOGCM	Atmospheric-Ocean General Circulation Model
BAU	Business As Usual
CABEI	Central Amercia Bank of Economic Integration
CAC	Central American Agricultural Council/Consejo Agropecuario Centroamericano
CAFTA	Central America Free Trade Ageement
CATHALAC	Water Center for the Humid Tropic for Latin America and the Caribbean/ Centro del Agua del Trópico para América Latina y el Caribe
CATIE	Agronomic Tropical Center for Research and Teaching/ Centro Agronómico Tropical de Investigación y Enseñanza
CCAD	Central American Environment and Development Commission/ Comisión Centroamericana de Ambiente y Desarrollo
CCCCC	Caribbean Community Climate Change Centre, Belice
CCHAC	Comité de Cooperación de Hidrocarburos de América Central /Co-operation Comité on Hydrocarbosns of Central America
CDM	Clean Development Mechanism
CEAC	Council of Electrification of Central America/ Consejo de Electrificación de América Central
CELADE	Latin America and the Caribbean Demographic Center /Centro Latinoamericano y Caribeño de Demografía
	Comisión Económica para América Latina y el Caribe
CEPALSTAT	CEPAL, Base de Datos y Publicaciones Estadísticas/ECLAC Data Bases, Publications and Statistics
CEPREDENAC	Centro de Coordinación para la Prevención de los Desastres Naturales en América Central/ Coordination Center for the Prevention of Natural Disasters in Central Amercia
CINPE	Centro Internacional de Política Económica para el Desarrollo Sostenible/ International Center of Economic Politics for Development
CLIRUN	Climate Runoff Model

COMIECO	Council of Ministres of Economic Integration/ Consejo de Ministros de la Integración Económica
COMISCA	/ Consejo de Ministros de Salud de Centroamérica /Council of Ministres of Health of Central America
COSEFIN	Consejo de Ministros de Finanzas y Hacienda/ Council of Ministries of Finance and Treasury
CRRH	Regional Commission of Hydraulic Resources/ Comité Regional de Recursos Hidráulicos
DFID	Department for International Development
DICE	Dynamic Integrated Model of Climate and the Economy
ECLAC	Economic Commission for Latin America and the Caribbean
ENSO	El Niño Southern Oscillation
EMIC	Emulators of Earth System Models of Intermediate Complexities/ Emuladores del Sistema Tierra de Complejidad Intermedia
EESC 2020	Estrategia Energética Sustentable Centroamericana 2020
ETESA	Empresa de Transmisión Eléctrica, S.A./ Electric Transmission Enterprise
ERAS	Regional Agro-Enviromental and Health Strategy
FCO	Foreign and Commonwealth Office
FUND	Climate Framework for Uncertainty, Negotiation and Distribution
GCCC	Grupo Consultivo de Cambio Climático, El Salvador/ El Salvador Consultative Grupo of climate change
GCOS	Global Climate Observation System
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEO-4	Perspectivas del Medio Ambiente-4
GHG	Green House Gas Emmissions
GPS	Global Positioning Systems
IADB	Inter-Amercian Development Bank
IAM	Integrated Assessment Models
ICE	Instituto Costarricense de Electricidad/ Costa Rican Institute of Electricity
IDRC	The International Development Research Center
INCAE	Instituto Centroamericano de Administración de Empresas/ Central American Institute of Business Administration
INSIVUMEH	Instituto Nacional de Sismología, Vulcanología, Meteorología e Hidrología, Guatemala
IPCC	Intergovernmental Panel of Climate Change
IRA	Infecciones respiratorias agudas
IUCN	International Union for Conservation of Nature
MAGICC	Model for the Assessment of Greenhouse Gas Induced Climate Change
MARENA	Ministerio del Ambiente y Recursos Naturales de Nicaragua/ Ministry of Environment and Natural Resources of Nicaragua
MARN	Ministerio de Ambiente y Recursos Naturales de El Salvador/

	Ministry of Environment and Natural Resources of El Salvador
MARN	Ministerio de Ambiente y Recursos Naturales de Guatemala/ Ministry of Environment and Natural Resources of Guatemala
MDL	Mecanismo de Desarrollo Limpio/ Clean Development Mechanism
MEI	Modelos de Evaluación Integrada/ Integrated Evaluation Models
MERGE	Model for Evaluating the Regional and Global Effects of GHG Reduction Policies
MDG	Millenium Development Goals
MINAET	Ministerio de Ambiente, Energía y Telecomunicaciones de Costa Rica/ Ministry of Environment, Energy and Telecommunications of Costa Rica
MMD	Multi Model Data
MNREI	Ministry of Natural Resources and the Environment of Belize
N	North
NAO	North Atlantic Oscillation
PAHO	Pan American Health Organization
PACA	Plan Ambiental de la Región Centroamericana/ Environment Plan of Central American Region
PACADIRH	Plan Centroamericano del Agua/ Centroamerican Water Plan
PAGE	Policy Analysis of the Greenhouse Effect Model
PCU	Project Coordinator Unit
PEER	Programa de Eficiencia Energética Regional/ Regional Energy Efficiency Programme/
PNUMA	Programa de Naciones Unidas para el Medio Ambiente
PRECIS	Providing Regional Climates for Impacts Studies
PRESANCA	Programa Regional de Seguridad Alimentaría y Nutricional para Centroamérica / Regional Food Security Programme for Central America
PREVDA	Programa Regional de Reducción de la Vulnerabilidad y Degradación Ambiental /Regional Programme for Reduction of Vulnerability and Environmental Degradation
RCM	Radiative Convenctive Models
RICE	Regional Dynamic Integrated Climate and the Economy Model
SANAA	/Servicio Autónomo Nacional de Acueductos y Alcantarillados, Honduras Autonompus / National Aqueducts and Sewage Service of Honduras
SCENGEN	Regional Climate Scenario Generator
SDSM	Statistical Downscaling System Model
SERNA	Secretaria de Recursos Naturales y Ambiente de Honduras/ Secretariat of Natural Resources and Environment of Honduras
SIECA	Secretaría de Integración Económica Centroamericana/ Secretariat for Central America Economic Integration
SNET	Servicio Nacional de Estudios Territoriales, El Salvador/ National Servcie of Territorial Studies, El Salvador
SRES	Special Report on Emissions Scenarios

SICA	Sistema de Integración Centroamericana / Central Amercian Integration System
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nationas Education, Scientific and Cultural Organization
UNFCC	United Nations Framework Convention on Climate Change
WB	World Bank
WG I	Working Group I of IPCC
WMO	World Metereological Organization

ANNEXES

ANNEX I

THE ECONOMY OF CLIMATE CHANGE IN CENTRAL AMERICA: LOGICAL FRAMEWORK

Narrative	Verifiable Indicators of Impact and Process	Means of Verification	Sources	Supositions
General Objective: To alert decision-makers and key stakeholders in Central America of the urgency of responding to the challenge of climate change by providing robust information on the nature of the threat. To promote national and regional decision-making and actions to cost-effectively reduce vulnerabilities and poverty, to adapt to climate change and to make the transition towards more sustainable and low-carbon economies.	Impact Indicators for Objectives: Strengthening and greater precision of national and sectoral climate-change strategies and of the Regional Climate Change Strategy currently under development, by applying the results and findings of the project.	National and regional Strategies and reports from partners	Ministeries of the Environment, CCAD and Intersectoral Committees	Continued high-level political commitment to mainstream climate change in national and regional development strategies.
Specific Objectives: a) a) To carry out an economic assessment of the impact of climate change in Central America with different socioeconomic development scenarios and emission trajectories including the costs and benefits of inaction (known as business as usual), reduction of vulnerability, adaptation and the transition towards a sustainable, low-carbon economy. b) To favour a dialogue on options for policies and national and regional actions so that Central America can respond to the challenge of climate change.	Incorporation of the results of the Project into National Development Plans and/or Poverty Reduction Plans.	National Development Plans and reports from partners	Ministries of the Environment and Finance and Intersectoral Committees	Good working relations within the Executive Group and the Regional Technical Group.
	Increase in annual public budgets allocated to adaptation activities, reduction of vulnerabilities in the face of climate change and mitigation or transition to a low-carbon economy.	National budgets	Ministries of Finance	Incorporation of the Ministries of Finance into the project and in the Executive and Regional Technical Groups.
	Proposals for changes in public regulations to stimulate the reduction of vulnerabilities and adaptation to climate change and/or the transition towards a low carbon economy.	Proposals for changes in regulations	Sectoral ministries according to sector (environment, health, energy, etc.)	Increased awareness of the implications of climate change for specific sectors among ministries.
	Technical strengthening of the countries' positions in negotiations on the post-Kyoto framework, including finance flows for the reduction of poverty and vulnerabilities, for adaptation and strengthening of actions aimed at attaining the Millennium Development Goals, and for access to technologies and support for the development of local technologies for adaptation and transition to low-carbon economies.	Consultations with negotiators	Ministries of the Environment	Member State negotiators have the time within their intense schedules to receive prepared information concerning the results.
	Increase in private-sector initiatives, including small and micro-enterprises, and non-governmental and community organizations of civil society directed to adaptation and reduction of vulnerabilities and to the transition towards a low-carbon economy.	Consultations with enterprises and reports in the press	Intersectoral committees, enterprises with contact with the project, Ministries of the Environment and the press	

Narrative	Verifiable Indicators of Impact and Process	Means of Verification	Sources	Supositions
	Increase in initiatives for dissemination of information on the challenges of the climate change and the need for poor communities in the seven Central American countries to take action, with special communication activities.	Consultations with organizations and reports in the press	Intersectoral committees, organizations with contact with the project, Ministries of the Environment and the press	
Expected Results: 1. The governments of Central America, in particular their Ministers of Environment and Treasury/Finance, have received an economic assessment of the impact of the climate change with different socioeconomic development scenarios and emission trajectories including with the costs and benefits of potential inaction (known as business as usual), reduction of vulnerability, adaptation and the transition towards sustainable, low-carbon economies.	Effects Indicator: Approval of the study by the Regional Technical Committee and the Steering Committee.	Minutes of the RTC y EC	Ministries of the Environment and Finance	Sufficient availability of regional and national specialists, technical staff of partner institutions and of ECLAC to participate in the specific studies and activities proposed in the project. High quality of study can be achieved despite the complexities of the diverse components and the short timeframe. Funds are available in a timely fashion and this flow does not adversely affect the tight calendar for production of the studies.
	Process Indicators: Compliance with the preparation of activities 1 to 19. Participation by the Ministries of Public Finance/Treasury and/or Economy. The Project should rely from the beginning on the commitment and determined participation of these agencies, or their equivalents, to have access to information and relevant knowledge during the making of the studies and be one of the main users of the results of the study as part of the project from the start. Follow-up meetings of the Steering Committee, the Regional Technical Committee and the Regional Thematic Groups, with minutes as an instrument of verification of the progress of the project and the parties' participation in the process.	Project reports Minutes of the RTC, EC Minutes of the RTC, EC and RTGs	RTC, EC and PCU RTC, EC and PCU RTC, EC, RTGs and PCU	
Linked to **Activities** 1 to 19				
2. The governments of Central America, in particular their Ministries of Environment and Treasury/Finance, their interministerial or inter-sectoral Climate Change agencies and the pertinent agencies of SICA have discussed the results of the study and the political options and actions with regard to this challenge at a national and regional level.	Effects Indicators: Conclusions, agreements, instructions, declarations made with regard to these discussions.	Minutes of the RTC, and minutes and declarations of the EC	RTC, EC and PCU	Continued high-level political commitment to discuss climate change in national and regional for and to draw up agreements, declarations and instructions regarding this challenge.

Narrative	Verifiable Indicators of Impact and Process	Means of Verification	Sources	Supositions
	Participants' appraisal of the effect of the discussion activities organized by the project (exit assessment).	Exit surveys of participants	PCU	
	Number of press articles published on these activities and their results.	Communications media	PCU	
	Process Indicators:			
	Number of activities in which the results of the study have been presented and discussed with these key partners.	Project reports	PCU	
Linked to **Activity** 17	Number of countries, institutions and participants in these activities.	Project reports	PCU	
3.The results of the study have been disseminated among decision-makers and key stakeholders in the Central American societies, both public-sector and private-sector, and discussed at different events.	Effects Indicators: Number of press articles published on the project and its results.	Web searchs and reports from ministries	Ministries of the Environment and Finance and PCU	Sufficient concern of the implications of climate change among key stakeholders to give them the necessary incentive to participate in the dissemination events of the project.
	Number of visits to and downloads from the web portal.	Web page counting system	PCU	The project website functions in a correct fashion.
	Number of countries, institutions and participants in the activities carried out by the project and its institutional partners (press conferences, meetings, workshops, seminars).	Project reports	PCU	High quality dissemination material is prepared.
	Participants' appraisal of the effect of the dissemination and discussion activities organized by the project (exit assessment).	Exit surveys of participants	PCU	
	Number of other dissemination and discussion activities organized by partner institutions or by the media.	Web searchs and reports from ministries and other partners	Ministries, other partners and PCU	
	Process Indicators: Establishment of a web portal for the project.	Internet checks	PCU	
	The results are available in a technical version and a version for the general public to facilitate wide dissemination.	Existence of versions on the Internet	PCU	
	Number of press releases and other prepared dissemination material.	Web searchs and reports from ministries and other partners	Ministries, other partners and PCU	
Linked to **Activity** 18	Number of dissemination and discussion activities carried out directly by the project.	Project reports	PCU	

Narrative	Verifiable Indicators of Impact and Process	Means of Verification	Sources	Supositions
4. The development of the different methodologies used in carrying out the various studies has been documented and shared in an initial manner.	Effects Indicators: The economic assessment includes analyses on poverty and equity, adaptation and vulnerability, and biodiversity.	Contents of the document	RTC, DC and PCU	Methodologies are documented despite the tight timeline for the production of the diverse studies.
	Assessment of the participants on the importance of initial training to strengthen their capacities in these fields (exit assessment).	Exit surveys of participants	PCU	
	Process Indicators: Prepared methodological documents	Existence of the methodological documents	RTC, EC and PCU	Funds are procured for the Phase IV.
Linked to **Activity** 20	Number of initial training activities carried out directly by the project with the number of countries, institutions and participants.	Project reports	RTC, EC and PCU	

BUDGET PHASE IV

No.	ACTIVITIES PHASE IV	Consultants	Consultants' missions	PCU missions	Miscellaneous. Contingency	Total
1	Methodological framework document	25000.00	0.00	0.00	5000.00	30000.00
2	National workshops (seven)	35000.00	46200.00	14742.00	0.00	95942.00
	Total	60000.00	46200.00	14742.00	5000.00	125942.00