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Subregional Headquarters for the Caribbean

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Understanding the Economic Impact of Climate Change in
Latin America and the Caribbean
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REPORT OF THE THIRD EXPERT GROUP MEETING OF THE PROJECT UNDERSTANDING THE POTENTIAL ECONOMIC IMPACT OF CLIMATE CHANGE IN LATIN AMERICA AND THE CARIBBEAN

That report had been reproduced without formal editing.

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A. DECISIONS AND RECOMMENDATIONS

1. Saint Lucia: (a) Rainwater harvesting should be a key adaptation strategy to address the water needs in the tourism and household sectors; (b) RECCC studies would be useful for private sector buy-in; (c) The costing of impacts to sectors would serve to justify the updating of the national climate change framework; (d) Quantitative results from RECCC would be critical to informing Caribbean participants in international negotiations and in defining both national and regional policy; (e) The importance of maintaining and improving disease surveillance activities in the health sector was stressed; (f) There was a need to implement a holistic water management plan which also took into account food storage facilities and early warning systems; (g) Eco-tourism should not be considered as an alternative to coastal and marine tourism in the RECCC analysis.

2. Guyana: (a) Provide a better understanding of future climate scenarios in line with Inter-Governmental Panel on Climate Change (IPCC) projections and assessing the costs; (b) Support ongoing adaptation planning and response by providing more data analysis through model scenarios; (c) Assist in implementing the low carbon development strategy and providing inputs into the preparation of a comprehensive priority adaptation plan; (d) Assist with Guyana's reporting under the United Nations Framework Convention on Climate Change (UNFCCC), particularly with providing inputs into current preparations for the second national report; (e) Build in-country capacity for future modelling; (f) Include crop vulnerability models into the agriculture study to enhance its applicability to policy; (g) Further explore the consequences of an intensive approach to development in Georgetown.

3. Jamaica: (a) The results of RECCC studies should be mainstreamed into the national disaster risk reduction strategy and the existing climate change strategy; (b) The importance of education in adapting to climate change should be addressed; (c) It would be crucial to implement early warning systems for diseases; (d) The results of the economic analyses should be used to inform the adaptation strategies, the implementation of which would require applying for financial assistance from multilateral agencies; (e) A study to determine the vulnerability of the tourism sector; (f) The new information from RECCC studies should be used to update the 2009 draft climate change action plan; (g) RECCC studies should be presented to the policymakers; (h) The data from RECCC studies should be used to justify climate change plan and strategies to the donor community.

4. Trinidad and Tobago: (a) RECCC assessments could be used to determine sectoral vulnerability to climate change; (b) The assessments for the energy and agriculture sectors need to be more clearly understood before they could be used for policy revision, however the adaptation measures proposed for the health sector might be used; (c) ECLAC should assist countries with the preparation of Nationally Appropriate Mitigation Actions (NAMAs). ECLAC support was also requested in identifying the socio-economic impacts of policy implications of climate change as those would also be necessary to inform the development of NAMAs.

B. ATTENDANCE AND ORGANIZATION OF WORK

1. Place and date

5. The expert group meeting under the initiative, Understanding the Potential Economic Impact of Climate Change in Latin America and the Caribbean, was convened by the Economic Commission for Latin America (ECLAC) Subregional Headquarters for the Caribbean on 30 June 2011 in Port of Spain.

2. Attendance

6. A number of experts in the field of sustainable development from member countries of the Caribbean Development and Cooperation Committee (CDCC) attended the meeting. In addition, representatives from regional and international organizations attended.

3. Agenda

1. Adoption of the agenda

2. Cost/benefit analysis of the economic impact of climate change on national policy in:

   (a) Saint Lucia
   (b) Guyana
   (c) Jamaica
   (d) Trinidad and Tobago

3. Strengthening of national climate change policies using results of economic assessments.

4. Recommendations and conclusions.

5. Other matters.

6. Closing remarks.

C. SUMMARY OF PROCEEDINGS

1. Opening of meeting

7. Welcome and opening remarks were made by Charmaine Gomes, Sustainable Development Officer, ECLAC Subregional Headquarters for the Caribbean. Ms. Gomes provided an insight into the Caribbean's position in negotiations for the new Kyoto Protocol within the context of the vulnerability of Caribbean Small Island Developing States (SIDS) and compared that with the position taken by developed countries. She traced the accomplishments achieved by the Caribbean in adaptation to climate change and recognized the leadership and support of the Caribbean Community Climate Change Centre (CCCCC) in supporting the subregion. She touched on the national economic sectoral assessments that were being completed on the impacts of climate change and related the results to the policy documents that have been prepared by Guyana, Jamaica, Saint Lucia and Trinidad and Tobago. She referred to the objectives of the meeting which were to examine the ways in which the results of those studies could be mainstreamed into the national policy documents. Finally, she apprised the meeting of the subsequent economic regional assessments that would be pursued with the support of the Australian Agency for

International Development (AusAID) and called for the continued cooperation of experts in implementation of that initiative.

2. Adoption of the agenda

8. The provisional agenda was adopted.

3. Cost/benefit analysis of the economic impact of climate change on national policy in: (a) Saint Lucia, (b) Guyana, (c) Jamaica, (d) Trinidad and Tobago

9. The first presentation provided an outline of the climate change policy regime in Saint Lucia. The policy is designed to guide the national process of addressing the effects of climate change to ensure that quality of life and opportunities for sustainable development were not compromised. Based on 14 principles and targeting action at eight sectors, the main objectives were to foster the development of: strategies and approaches, appropriate legal and institutional systems and management mechanisms, and economic incentives to encourage adaptation measures. The new Climate Change Adaptation Policy Framework (2011-2021) which allows for appropriate alignment of future climate change impacts and provides an opportunity to develop appropriate policy changes and adaptation actions was also outlined. The presentation concluded by linking the usefulness of RECCC studies to the development and implementation of climate change policies in Saint Lucia, namely, the costing of climate change impacts to sectors in monetary terms for policymakers.

10. The second presentation focused on the impact of climate change on the agriculture, health and tourism sectors in Saint Lucia. With respect to the tourism sector, the total cost of climate change for the tourism industry, in relation to damages to coral reefs and sea level rise, was projected to be US$12.1 billion (12 times 2009 GDP) under the A2 scenario and US$7.9 billion for the B2 scenario (8 times 2009 GDP). In relation to adaptation strategies, the highest cost-benefit ratios were attained for enhanced reef monitoring systems to provide early warning alerts of bleaching events, artificial reef or fish aggregating devices and to increase recommended design wind speeds for new tourism-related structures. In the health sector, the diseases considered were malaria, dengue fever, gastroenteritis, schistosomiasis and leptospirosis, among others. The key adaptation options were to maintain and improve surveillance activities and to identify the range of treatment costs for the impacts identified. Banana crops, along with 24 other crops were explored for the agriculture sector. The projections for banana exports under BAU, A2 and B2 scenarios up to 2050 indicated increasing decline. The present value of cumulative banana export losses relative to the baseline on the assumption of three discount rates showed a similar result. The same conclusion was obtained for other crops. Eleven adaptation strategies were reported that were related to: holistic water management plans, the establishment of systems of food storage and early warning systems.

11. The discussion focused on clarifying the methodologies used in the assessments. There was a query as to whether or not the tourism analysis in the RECCC study set out to only explore the impact on marine resources. It was noted that the adaptation measures presented were coral reef and fisheries related and that there was no mention of the impact on biodiversity and ecosystems. The impact on other aspects of the tourism sector, such as eco-tourism, was also neglected. There was also no mention of what the expected changes in climate in Saint Lucia were. The presenter explained that a number of other adaptation strategies, including eco-tourism, were explored as alternative attractions. They were listed and ranked, but the cost-benefit ratios implied that they were perhaps not worth exploring, and that was covered in the reports. The presenter also mentioned that less rainfall was expected in Saint Lucia with subsequent implications for water management and its use in the agriculture and tourism sectors and on sanitation. The holistic water plan, which had the highest cost-benefit ratio, was a critical plan which

would allow for the effective allocation of water especially as the tourism sector had the highest demand for water.

12. An interest in the climate index used in the studies was expressed. One participant asked whether other factors affecting tourism, such as a longer hurricane season and warmer climates in countries where tourists originated, had been taken into account. He also asked if the cost benefit analysis in agriculture considered the development of tolerant crop varieties and whether or not the impact of increased levels of CO_2 in the atmosphere on the growth of crops had been explored, taking into account the positive feedback.

13. A question was posed on the adaptation measure related to water storage facilities. It was noted that the cost-benefit ratio for water storage tanks in the tourism sector was higher than that for the agriculture sector.

14. In response, the presenter confirmed that CO_2 levels had not been included as a specific variable, largely because CO_2 concentrations were already included in the A2 and B2 scenarios and to include them again would be double counting. It was also confirmed that new crop varieties, such as salt and drought-resistant strains, had been explored as an adaptation strategy, but when ranked they did not appear in the top 10 so that option was not pursued in the analysis. She stated that the reason for the discrepancy in the water storage assessments was most likely due to the different assumptions made in the studies. The calculations made for the water storage facility in the agriculture sector were based on the assumption that the facility would serve for farm use (rain water harvesting) and, therefore, required specific materials and specific size tanks. Those requirements would be very different and most likely cost more for the tourism sector. For agriculture, the cost benefit analysis would be in terms of yield, whereas for tourism it would be in terms of tourism expenditure.

15. The representative of ECLAC added that water storage facilities in a hotel required a higher standard of quality control, pressure and technology for the harvesting and purification of rainwater, which was a more costly endeavor than the simple collection of rainwater which could be used without treatment for agricultural purposes. She also highlighted that plants had an optimal level of CO_2 use and thus increased levels of CO_2 would only have an impact to a certain extent. Building on the query made by the representative of Grenada, ECLAC asked whether any information existed on the contribution of the coastal/marine environments to the tourism sector's contribution to GDP to which the response was negative.

16. The issue of sea level rise had not been reflected in the presentation and, given its implications for the marine/coastal environment, it was important that it be taken into account in the analyses. It was questioned why the proxy used in the health sector was taken from the United States of America and not from Europe and whether an adjustment factor had been adopted in its application. In response, it was stated that there was not enough local epidemiological data available to create a historical time series and, hence, a proxy had to be used. One could argue it was not a perfect result but it was the best approach that could be used in the absence of data. It was further explained that Saint Lucia had carried out extensive work on Geographic Information System (GIS) mapping of coastal resources and flood prone areas and had baseline information to work with. Those maps were now used to monitor the changes and subsequent impacts of sea level rise on the coastal zone. Setback areas in relation to natural beach erosion were being identified and would provide guidance as per the distance where coastal development should not take place.

17. One participant enquired if the financial services sector was considered in the climate change policy for Saint Lucia. In response, it was highlighted that the financial services sector did not feature in the initial climate change policy, but that special consideration needed to be given to that sector in the

policy as it was evident that it was unable to meet the demands of the other sectors in responding to climate change. Coastal zone management was considered a big issue for Saint Lucia and currently the country was in the process of finalizing and implementing building codes for structures near the coast. The Pilot Project for Climate Resilience (PPCR), which accompanied the policy framework, considered not only water storage facilities for hotels but also for private dwellings. Currently the largest contribution to GDP came from the traditional tourist sector of sun, sea and sand and not from the nascent markets, such as eco-tourism.

18. It was acknowledged that scientific studies proved human anthropogenic activities contributed to increasing temperatures, having implications for increased intensity and frequency in extreme events and ecosystem functioning. While these facts were evident, countries did not universally agree on one policy approach, but there were a cadre of options proposed including emissions-trading programmes, emission taxes, performance standards and technology promoting programmes. As climate change economics focused on diagnosing the economic underpinnings of climate change, it offered positive and normative analyses of policies to address the issues.

19. The first presentation gave a brief background with regards to the current status of climate change. It was noted that through the Reducing Emissions from Degradation and Deforestation (REDD) initiative, although most countries agreed to keep global warming to a two degree increase, the Caribbean's position was to maintain no more than a 1.5 degree increase. The initiative made compensation for keeping forests alive and, in that regard, Guyana had signed an agreement with Norway to be remunerated for maintaining its forest cover.

20. The second presentation discussed the economic assessment of the agriculture, coastal and human settlements and health sectors. The agriculture sector was broken down into three major sections: (a) Section 1 - General impacts of climate change on agriculture, (b) Section 2 – Agriculture and climate change in Guyana, and (c) Section 3 – Policy implications for adaptation and mitigation.

21. In the ensuing discussions, a request was made for clarification on what would be the loss or gains in human livelihood with reference to additions in the health sector and climate change. It was explained that if temperatures increased there would be a decrease in the occurrence of gastroenteritis, but if there was an increase in flooding then there would be an increase in leptospirosis. Moreover, if improvements were made to water and sanitation facilities, there would be a 30% decrease in water-borne diseases. With regard to the specifics on the water and sanitation programmes, utilizing bed nets and fogging methods, an inquiry was made as to whether those adaptation strategies included the provision of chlorine tablets to the population.

22. The meeting continued with the debate on conflicting results presented for the agriculture sector under the A2 and B2 scenarios. It was suggested that the study implicitly stated that those scenarios were downscaled for the region, however, concerns were raised regarding the increased yields shown under the B2 scenario. It was believed that those results should be verified as that would indicate to governments that climate change was a desirable situation. A question was posed regarding the long term consequences of the changes in rice production under the A2 and B2 scenarios.

23. The A2 scenario suggested there was a decrease in precipitation, while under the BAU scenario there was an increase in rainfall. As such, different types of rice species that might adapt more easily to the increased precipitation should be examined as alternatives. It was proposed that further assumptions should be considered in the study to present a different perspective and the agriculture study should explore the option of using similar studies as a point of departure, which was the approach used for the health study. Although yields might be realized by up to 10% with increasing temperature, it would decrease under the A2 scenario as temperature continued to increase. It was stated that, according to

projections conducted by the Institute of Meteorology in Cuba, the southern Caribbean was predicted to be wetter than the northern Caribbean, hence the increased productivity for some crops. However, the importance of assuring that the science meshed with the econometric modelling results was emphasized.

24. The discussion shifted towards addressing issues raised in the coastal and human settlements study. A concern was expressed pointing to the exclusion of two fundamental issues affecting Guyana, namely drainage and irrigation. It was acknowledged that those factors should be included in the study but other factors were considered under the model for the coastal and human settlements. The discussions mentioned the sensitive issue of population resettlement, especially considering the cost implications. However, it was agreed that despite the cost implications it was not impossible to relocate large cities. Jamaica and Belize served as examples of where that had already taken place. The fundamental issue of population size was not addressed, and it was noted that such national nuances must be considered in developing possible policy recommendations. The feasibility of implementing the proposed recommendations was something that consultants needed to appreciate.

25. There was agreement with Guyana's low carbon strategy policy approach, but there were reservations raised regarding the emphasis on Reducing Emissions from Deforestation and Degradation (REDD). Those were mainly based on future development that might threaten forests. The natural resource wealth of Guyana and the utilization of sugarcane as a source of biofuels, as well as the tremendous potential for hydroelectric power, were highlighted as also playing an important role in the climate change strategy. Previous studies had been conducted on the use of sugarcane and rice crops to generate energy, as well as initiatives in the area of pharmaceuticals and the hydroelectric project based at Amaila Falls. It was remarked that even though biofuels played a big role in countries such as Brazil, it was important to remember the conflict between the use of the crop as a food source and as biofuel. Although Guyana had tremendous potential to generate biofuels, that strategy should be approached with caution.

26. The chair noted that the first presentation was clear on the country's position with respect to greening Guyana, but that it was hard to get a sense of the cost involved in the transition process. He noted that the Caribbean had learnt a great deal from the RECC project experience but, in addressing all the concerns of climate change, it was imperative to deal with a more capital-intensive approach, which was where the RECCC cost benefit analysis would be useful. However, because the region's economies were labour intensive, there would be consequences in transitioning to a more capital-oriented process. In light of that, there were suggestions made for the exploration of new technologies that could encourage regional governments to address climate change differently.

27. The first presentation on Jamaica focused on the outline of the current draft of the National Climate Change Policy. The background for the development of the policy document and its general structure were explained. Some of the trends highlighted in the predictions for Jamaica included increased temperatures of 1.5^0C by 2050, drier June – August months, increased sea level rise by 0.35 metres and tropical cyclones. It highlighted the challenges in addressing climate change in the short, medium and long term, among them, poverty, limited financial resources and limited legislative and regulatory support. Some of the future threats and potential impacts were coastal and marine resources, water resources, agriculture tourism and human health. The document also proposed mitigation and adaptation strategies.

28. The second presentation reviewed the findings of the agriculture, health and tourism sectors of Jamaica and how climate change would impact them. In the agriculture sector model estimated for sugar, yam and escallion, the consultant presented a comparative costing of adaptation versus no adaptation for each crop. A matrix of the costs benefits and the return on the investment was completed. In the model used for health, the four cost components that were explored included the treatment cost

morbidity estimates, mortality estimates productivity loss and the no option cost. Those components were all reviewed and the total cost for treating a patient for each disease. Finally, the section on tourism costed temperature and precipitation, extreme events and sea level rise. Upon reviewing all the costs, a table was presented to capture the net cost benefits ratios.

29. In the ensuing discussion, it was agreed that the assessment studies on the agriculture, health and tourism sectors provided a useful contribution to the finalization of Jamaica's climate change policy document. The inclusion of the cost of adaptation strategies was viewed as a possible improvement of the overall document before the final draft was presented to the decision makers.

30. Jamaica had a medium term socio-economic plan called "Vision 2030" which would also benefit from the incorporation of the cost benefit results from RECCC studies. Such costings would provide evidence to support funding applications. The high utility of the reports were endorsed, especially for tourism.

31. The representative of Saint Vincent and the Grenadines reported the existence of a national action plan with a climate change adaptation policy.

32. It was expressed that when a policy was formulated in a particular sector (tourism or agriculture), even though linkages to various agencies in other sectors existed, there was still a lack of coordination as the policies tended to be housed under one agency. As such, links failed and strategies related to a number of agencies were never implemented. It was suggested that ECLAC studies be implemented in an integrated manner.

33. Jamaica was reported to be the lead in the region with regards to the collection and use of data for policymaking. Over the years, Jamaica's data sets had been easier to collect than those of other countries in the region. However, it was noted that Jamaica was confronted with gaps in climate change data, as well as costs in assigning values to environmental resources.

34. At that time Jamaica had a project which focused on ecosystem valuation with a training component to inform better decision-making. Although there were hydro infrastructures, there were constraints to the level of implementation which was determined by the availability of funds. Fortunately, the country benefited from piggy-backing on other projects through other ministries. But, Jamaica needed to improve its facilities to increase collection of real time data. There was endorsement of automatic stations, intended to run in tandem with an archiving system, which would be directed to the office continuously. That platform would allow information to be available on the website for all to access by the end of 2011.

35. It was stated that there was generally a challenge of accessing data in Jamaica. Despite the existence of an imposed fee for regular data there were provisions for government to government exchange through T21.

36. The adaptation options for climate change would take some time, and in cases where different stakeholders were not taking ownership, a mechanism should be devised to ensure accountability. It was essential to create that medium to articulate policy to the society to encourage ownership.

37. It was explained that there were instances where values generated in the region could be applied to other countries in other regions, but some countries expressed their dissatisfaction with the use of proxies, therefore, specific or special considerations had to be explored.

38. The first presentation on Trinidad and Tobago addressed the draft climate change policy. The implementation of that policy sought to fulfil the commitments of Trinidad and Tobago to the United Nations Framework Convention on Climate Change and the Kyoto Protocol. The policy would be implemented via different sectors and/or industries in the twin-island economy and the government should engage with all relevant stakeholders, including academia, research institutions, the public and private sectors, non-governmental organizations, community-based organizations, business and industry organizations and the citizenry at large in developing strategies and approaches to addressing climate change, both from a mitigation and adaptation perspective. Therefore, to implement the policy effectively under the national self assessment project, a national focal point in every government entity would be identified to liaise with the industry. It was expected that that would further create a network of stakeholders to show what would be done, what could be done and what should be done.

39. It was suggested that ECLAC and CARICOM should continue to explore ways of assisting countries with the implementation policy plan in looking at economic projections as part of developing the methodology for constructing ways so that the government can make informed decisions.

40. Several queries were made with respect to the improvement of the draft implementation policy, the extent to which it reflected the national strategic policy of Trinidad and Tobago and whether it could be extended to Jamaica and Barbados. Participants enquired whether the implementation policy met the thresholds in the Caribbean, in comparison with the European system, which was the only system that had been implemented and sustained. It was stated that any implementation plan in a country would have to conform to what was done at a national level. The plan to be implemented must be consistent with the national circumstances and must be feasible. Regional application would be explored and addressed in the future.

41. The second presentation was on the economic impact assessment of climate change on the agriculture, energy and health sectors in Trinidad and Tobago. Despite the small contribution of the agriculture sector to the country's GDP, the sector's value added was substantial to the economy. The energy sector, however, contributed the largest share of GDP. The assessment showed a 40-year forecast of energy demand in Trinidad and Tobago which detailed an increase of 0.03% in 2011-2010 to 0.05% in 2040-2050. In the health sector, the government spent 4-5% of total health expenditure as a percentage of GDP. The mitigation strategies outlined included an increase in the use of renewable energy, increased energy efficiency in commercial and residential buildings, increase in the use of alternative fuels and fuel switching in the transportation sector, and an increase in the use of cleaner technology in all green house gas emitting sectors

42. The discussion initially focused on the high projected incidence of gastroenteritis (1.4 million cases during the period 2011-2050) and the link to sanitation conditions. The implication of the increased cost of improving sanitation was highlighted. The impacts of the high incidence of diseases were expected to impact employment in Trinidad and Tobago and so careful consideration was needed in the mechanism of policy implementation with respect to the health sector.

43. The forum was asked to consider the significant reduction that would be expected in the cases of gastroenteritis between 2011 and 2050, if Millennium Development Goal 6 were achieved. One participant enquired whether modelling diseases associated with air pollution were considered in the assessments and it was revealed that that factor had not been considered owing to the significant gaps in data series that precluded their inclusion. Another participant commented that there was inconsistency with the assumptions and the general projections of the various scenarios underlying the analysis, as well as the inputs in the modelling. It was explained that inconsistency was due to gaps in data collection and the need to encourage countries to have a consistent data collection was reinforced.

44. It was indicated that the adaptation options presented for the energy study were essentially mitigation actions and clarification was needed between the two. Enquires were also made about the assumptions in determining the increasing energy demand and in trying to meet the demand gap. The issue of adverse impact of climate change on energy demand was raised, but the relationship with respect to the impact of identified adaption options was not clear. It was further noted that Trinidad and Tobago had a "Green Fund" which was to be used for community-based adaptation activities linked to the climate change policy. In addition, the National Capacity Self Assessment Project hoped to establish national focal points between ministries and community organizations to address climate change issues across Trinidad and Tobago.

45. Participants asked to what extent RECCC studies reflected the national strategic policy of Trinidad and Tobago. It was indicated that any plans that result from the assessments must conform to what was happening locally in order to maintain consistency and should also take into account the social impacts of climate change (i.e. employment). It was further stated that one response to mitigating the impact of climate change involved 'cap and trade' and the feasibility of that mechanism was still being explored. A related issue concerned the increased costs associated with the implementation of the recommendations of the report. It was also reiterated that there were opportunities that might arise from climate change in terms of the creation of jobs from the use of green technologies (although expensive), but the success was dependent on how policies were crafted, created and implemented. However, the beneficiaries of such opportunities needed to be defined.

46. It was stated that the outputs from the agriculture study seemed unrealistic with increased productivity being projected under the A2 scenario. The meeting agreed that uncertainty existed in making projections and that those were made using the available data sets which, by and large, were incomplete. It was also mentioned that in the case of green vegetables and root crops, a decline in productivity might occur. With respect to the energy sector, a detailed summary of adaptation strategies should be carried out to get a true understanding of energy mitigation. There was a query on whether an adaptation mitigation policy would have an impact on GDP in Trinidad and Tobago, and it was indicated that a study to investigate that was currently being conducted.

47. It was stated that a more explicit link should be made with regard to climate change and energy, so that climate change objectives could be linked to energy policies. It was further indicated that the energy policy was complementary to, and not exclusive of, the national climate change policy.

4. Strengthening of national climate change policies using the results of economic assessments

48. The presentation outlined the importance of climate change economics in the formulation of adaptation and mitigation policy, followed by an overview of the predicted global impacts of climate change including sources of greenhouse gas emissions and growth forecasts, projected changes in temperature, water availability, and current and future emissions by country. It indicated that climate change stabilization would require a reduction of CO_2 emissions to 550ppm and developing countries would also be required to take action. A case study of global agriculture was explored which showed the predicted changes on crop yields under different climate change scenarios and the subsequent impact of policy action versus inaction informed by economic studies. In the final part, the CARICOM secretariat approach to the development of planning and policy frameworks was presented and involved a: summary of the CARICOM programme of adaptation (1997-2011), the Liliendaal Declaration (2009) in which a set of commitments and actionable recommendations were bound, an overview of CARICOM institutions involved in climate change, the Regional Framework for Achieving Development Resilient to Climate Change (2011), and the Regional Strategic Programme. As such, results from economic assessments could be used to ensure the further effectiveness of such policy frameworks.

49. In the discussion, it was mentioned that the Regional Framework for Building Climate Resilience was reviewed in Jamaica by a thematic working group which included public and private sectors, civil society and international development partners, and that substantive comment had been sent to CARICOM. It was agreed that it was important to take those comments into account and incorporate them into the strategy.

50. There was agreement on the value of having an implementation plan, but concern was expressed with respect to the absence of national climate change negotiators at consultation workshops. It was accepted that negotiators had very hectic schedules, but it was noted that consultation workshops always took place when the negotiators were not available. Therefore, it was important that consideration be given to the availability of negotiators when scheduling future workshops.

5. Conclusions and recommendations

51. ECLAC was pleased to reiterate an earlier statement by the representative of CARICOM that the region was progressing, which was received as a positive reflection of the advancement made in the climate change arena with the undertaking of RECCC studies in the region.

52. The recommendations and conclusions borne from the national policies and RECCC reports were then delivered following the structure of the agenda:

Saint Lucia

1. Ten years had elapsed since the initial climate change action policy for Saint Lucia had been drafted and that a new policy would guide action in the period 2011-2021. It was also noted that for agriculture a reduction in yield output was forecasted to be greater under the A2 scenario relative to the B2 scenario. Although the loss of agricultural land from sea level rise was not expected, there was an anticipated 5% increase in the intensity of tropical storms, which would have implications for additional agriculture loss. It was further emphasized that coastal and marine tourism provided a greater contribution to GDP than eco-tourism. Also emphasized was the fact that the shift in the tourism feature due to climate change could cost Saint Lucia about 5 times 2009 GDP, where the total cost of climate change for the tourism industry was projected to be US$12.1 billion (12 times 2009 GDP) under the A2 scenario and US$7.9 billion for the B2 scenario (8 times 2009 GDP),

2. For the agriculture sector, projections for banana exports under the BAU, A2 and B2 resulting from the impact of increased temperature to 2050 indicated increasing decline. The present value of cumulative banana export losses in Saint Lucia relative to the baseline on the assumption of three discount rates showed a similar result.

Guyana

1. RECCC studies concluded that sea level rise could create a catastrophe for major human settlements and that people would only be able to create the required settlement areas by making use of new sites where natural hazard exposure might be high. For both A2 and B2 scenarios, there was an expected increase in population density, which had implications for human settlements particularly in the coastal areas. With respect to health, the analysis suggested that an increase in temperature might reduce gastroenteritis, while an increase in rainfall might increase the prevalence of leptospirosis. Concern was also expressed on the

over emphasis given to REDD in the national climate change policy, as forests might be lost due to other factors.

Jamaica

1. Discussions concluded that The Vision 2030 policy document would incorporate the results of RECCC and that it would also be useful for the development of fiscal programmes. The results for the agriculture sector indicated that for sugar (1% discount rate) and yam (all discount rates), the cost of adaptation was less than taking no action. For escallion, the cost of adaptation was twice (all discount rates) than that of taking no action. In the health sector, the costs of treating dengue fever, gastroenteritis and leptospirosis would be higher under both the A2 and B2 scenarios as compared to the BAU,

2. Jamaica was confronted with gaps in climate change data as well as costs in assigning values to environmental resources.

Trinidad and Tobago

1. It was agreed that the climate change policy paper would be updated based on the new scientific information. RECCC in-country workshops were also noted for having built the capacity of government-level technical experts, and the need for free exchange of information and data among ministries was highlighted. In terms of adaptation strategies, water management systems were identified for the agriculture sector, energy efficiency and renewable energy technologies for the energy sector, and improved access to water and sanitation and lifestyle changes in relation to use of water resources for the health sector,

2. Overall, it was agreed that the research and development agenda in the economics of climate change had progressed, which should inform national policies, especially in the agricultural sector, where very little of that research had been used. The importance of public education and awareness of climate change was further emphasized.

53. Key recommendations included:

Saint Lucia

1. (a) Rainwater harvesting as a key adaptation strategy to address the water needs in the tourism and household sectors; (b) RECCC studies would be useful for private sector buy-in; (c) The costing of impacts to sectors would serve to justify the updating of the national climate change framework; (d) Quantitative results from RECCC would be critical to informing Caribbean participants in international negotiations and in defining both national and regional policy; (e) The importance of maintaining and improving disease surveillance activities in health; (f) The need to implement a holistic water management plan which also took into account food storage facilities and early warning systems; (g) Eco-tourism should not be considered as an alternative to coastal and marine tourism in the RECCC analysis;

2. Enhanced reef monitoring systems to provide early warning alerts of bleaching events, artificial reef or fish aggregating devices and increase recommended design wind speeds for new tourism-related structures were identified as the most cost effective adaptation strategies.

3. The key adaptation options in the health sector were to maintain and improve surveillance activities and to identify the range of treatment costs for the impacts identified;

4. In the agriculture sector, holistic water management plans, the establishment of systems of food storage and early warning systems were identified as the most cost-effective adaptation strategies. The highest net benefits were the use of drip irrigation, mainstreaming climate change issues into agricultural management and food storage;

Guyana

1. It was recommended that RECCC studies would: (a) provide a better understanding of future climate scenarios in line with IPCC projections and assessing the costs; (b) support ongoing adaptation planning and response by providing more data analysis through model scenarios; (c) assist in implementing the low carbon development strategy and providing inputs into the preparation of a comprehensive priority adaptation plan; (d) assist with Guyana's reporting under UNFCCC, particularly with providing inputs into current preparations for the second national report; (e) build in-country capacity for future modelling; (f) include crop vulnerability models into the agriculture study which would enhance its applicability to policy; (g) further explore the consequences of an intensive approach to development in Georgetown; (h) give consideration to relocation of coastal settlements in Guyana, given that the capitals of Jamaica and Belize were successfully relocated.

Jamaica

1. It was recommended that: (a) the results of RECCC studies be mainstreamed into the national disaster risk reduction strategy and the existing climate change strategy; (b) the importance of education in adapting to climate change should be addressed; (c) it would be crucial to implement early warning systems for diseases; (d) the results of the economic analyses should be used to inform the adaptation strategies, the implementation of which would require applying for financial assistance from multilateral agencies; (e) a study should be carried out to determine the vulnerability of the tourism sector; (f) the new information borne from RECCC studies should be used to update the 2009 draft climate change action plan; (g) RECCC studies should be presented to the policymakers; (h) the data from RECCC studies should be used to justify climate change plans and strategies to the donor community,

2. Implementation of adaptation options for climate change would take some time, but if different stakeholders were not taking ownership a mechanism should be devised to ensure accountability. It was essential to create that medium to articulate policy to the society to encourage ownership.

Trinidad and Tobago

1. Three key recommendations emerged: (a) RECCC assessments could be used to determine sectoral vulnerability to climate change; (b) the assessments for the energy and agriculture sectors needed to be more clearly understood before they could be used for policy revision, however, the adaptation measures proposed for the health sector might be used; (c) ECLAC should assist countries with the preparation of NAMAs. ECLAC support was also requested in identification of the socio-economic impacts of policy implications of climate change as these would also be necessary to inform the development of NAMAs;

2. With respect to the health sector, recommended adaptation options included enhancement of water sources, improvement in sanitation and changes in attitude, behaviour and lifestyles in relation to the use of water sources;

3. Mitigation strategies against the impacts of climate change included an increase in the use of renewable sources of energy, improved energy efficiency and the use of cleaner energy technologies in all greenhouse gas emitting sectors;

4. There was a need to organize a data collection process to ensure availability of robust time series of data that would inform future economic assessments.

6. Other matters

54. The representative of CARICOM explained that the organization had participated in a climate change meeting that addressed the establishment of the mechanism agreed upon at Cancun and that there was good regional representation. At that meeting, a number of Central American countries pointed out that, according to the latest World Bank economic assessments, they were more vulnerable to climate change than the Caribbean islands. It was important that the Caribbean be aware of that statement.

55. The representative of CARICOM, in agreeing with other participants, expressed the wish that ECLAC continue to be involved in the dissemination of information on the potential economic impacts of climate change in Latin America and the Caribbean.

56. The representative of ECLAC explained that in-country workshops had been held to provide exposure to the studies and present methodologies to policymakers. In doing so, countries had been left with some measure of expertise to conduct those assessments. As ECLAC continued that work, they looked forward to receiving support from Caribbean States in the implementation of regional studies, including energy, tourism, health, water and agriculture. It was also anticipated that the social aspects of climate change would be explored as well. The plan was to recruit a national focal point in each CARIFORUM country that would be able to work with a consultant for three months and help them access the necessary data.

7. Closing remarks

57. The representative of ECLAC thanked all experts for participating in the meeting and stated that ECLAC remained supportive of the Caribbean subregion in facilitating the conduct of economic assessments. She mentioned that, with support from AusAID, additional economic assessments into the impact of climate change would be conducted at the regional level in CARIFORUM countries inclusive of Cuba. She stated that ECLAC looked forward to continued cooperation from the regional community as the subregion accelerated its strategies in addressing the impacts of climate change.

Annex I

List of participants

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Annex II

List of background documents

1. The economic impact of climate change on the agriculture sector in Guyana.
2. The economic impact of climate change on the agriculture sector in Jamaica.
3. The economic impact of climate change on the agriculture sector in Saint Lucia.
4. The economic impact of climate change on the agriculture sector in Trinidad and Tobago.
5. The economic impact of climate change on the energy sector in Trinidad and Tobago.
6. The economic impact of climate change on the coastal and human settlements sector in Guyana
7. The economic impact of climate change on the health sector in Guyana
8. The economic impact of climate change on the health sector in Jamaica
9. The economic impact of climate change on the health sector in Saint Lucia
10. The economic impact of climate change on the health sector in Trinidad and Tobago
11. The economic impact of climate change on the tourism sector in Jamaica
12. The economic impact of climate change on the tourism sector in Saint Lucia
13. Climate change policy for Trinidad and Tobago
14. Climate change policy for Saint Lucia
15. Climate Strategy and Action Plan for Jamaica
16. The Low Carbon Development Strategy for Guyana.