

STUDY ON THE PREDICTION AND AMELIORATION OF SOCIO-ECONOMIC IMPACTS OF *EL NIÑO SOUTHERN OSCILLATION* (ENSO) IN LATIN AMERICA AND THE CARIBBEAN

(TC-97-12-38-3-RG)

EXECUTIVE SUMMARY

REQUESTER: Borrowing Member Countries.

EXECUTING AGENCY: World Meteorological Organization (WMO).

BENEFICIARIES: Climate Forecasting Agencies, Disaster Preparedness and Civil Defense Organizations in borrowing member countries.

FINANCING:

IDB (Japan Special Fund):	US\$ 998,000
NOAA:	US\$ 170,000
WMO:	US\$ 170,000
Local counterpart funding:	US\$ 200,000
Total:	US\$1,538,000

TERMS:

As of signature of agreement:

Execution period:	21 months
Disbursement period:	27 months

ENVIRONMENTAL / SOCIAL REVIEW: No environmental or social issues were raised during review of this operation.

OBJECTIVES: The general objective of this regional technical cooperation is to design a feasible regional early warning system to ameliorate the socio-economic impacts of ENSO. The feasibility will be analyzed in selected countries from the technical, economical, social, environmental, legal and institutional points of view.

DESCRIPTION: This technical cooperation comprises the following main components

1. Evaluation of existing institutional and technical capabilities: Envisioned within this component is an analysis of the existing institutional and technical capacity of the respective national weather and climate forecasting organizations.
2. Diagnostic analysis of socio-economic vulnerability: The diagnostic will comprise: (1) identification of the more vulnerable sectors and population groups; (2) preparation of four case

studies; (3) analysis of the institutional preparedness; and (4) simulations with macroeconomic models.

3. Preliminary system design and feasibility study: This will be done in parallel with component 2, and will define the requirements for the proposed early warning systems, based on the most crucial and relevant information and technical gaps identified in component 1 (observation and transmission network and data reception, computers, forecast models and software, human resources, institutional setting, and use of networks and systems). This component also includes a training session aimed at disseminating and explaining the value of climate forecasts, targeted for country representatives of relevant affected social and economic sectors.
4. Determination of the economic value of additional information: Based on the results of components 2 and 3 above, a cost-benefit analysis will be produced for one sector of the economy and within the country where macroeconomic simulation models were prepared (see component 2). The purpose of the cost-benefit analysis will be to analyze the economic value of additional information and better prevention mechanisms and programs by utilizing improved early warning systems and programs, as compared to the existing situation.
5. Policy Workshop: A workshop will be held toward the end of the analysis series, in order to inform as well as obtain inputs from policy makers and advisers of the countries involved.
6. Design of implementation plans and of project proposals: Project proposals and implementation plans for early warning and application systems, which are sustainable, will be prepared for interested countries or a group of countries in a sub-region, at least one proposal in each of the sub-regions of Meso-America, South America and the Caribbean.

BENEFITS:

Some countries may already have the capability of using ENSO forecasts to predict climate changes in their country-regions by applying statistical models or dynamic models or a combination of both. Nevertheless, the benefit for these countries will be the availability of profound analyses and focused implementation plans / projects to further improve

and modernize their methods and systems. Furthermore, this technical cooperation will give incentives for a closer collaboration and cooperation between national, regional and international climate forecast organizations and specialized institutions and thus contribute to the technical and institutional capacity building of relatively lesser developed organizations and institutions.

Countries whose climate forecast systems and related organizations and institutions do not have the capacity to predict long range forecasts covering a season or longer (seasonal forecast), as opposed to short and medium range weather forecasts, will benefit from this technical cooperation through the availability of a set of options ranging from training to recommendations for the modernization of existing systems and applicable instruments to relieve the impact of adverse weather conditions. The application of said options will further be encouraged by the analysis of the socio-economic vulnerability, as well as the cost-benefit analysis, identifying the economic value of additional information on adverse climate phenomena and of adequate prevention and relief mechanisms.

RISKS:

One major risk is that some countries may face difficulties in applying project recommendations and implementation plans to upgrade and modernize existing systems, institutions and prevention and relief instruments due to financial, technical or other restrictions. Nevertheless, through the involvement of various climate forecast and specialized institutions in this project, countries are able to establish closer links with these institutions in an effort to improve climate forecast systems and other prevention as well as relief instruments.

**EXCEPTIONS TO
BANK PROCEDURES:**

It is proposed to hire the specialized agencies World Meteorological Organization (WMO), International Food Policy Research Institute (IFPRI) and the International Research Institute (IRI). The WMO is the world specialized agency in Climate and Meteorology and has rich experience in the coordination of this type of activity. Therefore, it is proposed that the WMO also acts as the Executing Agency for the technical cooperation and that the WMO subcontracts IRI and IFPRI which will provide their expertise, experience and their on-going involvement in actual ENSO forecasts and in the evaluation of socio-economic impacts. All other consultancies will be hired according to Bank procedures.

**THE PROJECTS ROLE
WITHIN THE BANK'S
STRATEGY:**

The Bank's Strategy for Integrated Water Resources Management states that "...the building of capacity to properly quantify and forecast hydrometeorological events such as floods and droughts caused by phenomena such as hurricanes and El Niño Southern Oscillation, are of importance...for disaster prevention and mitigation...". "The Bank will encourage the development of...programs...for natural disaster prevision and mitigation". Furthermore, the Bank's policy on natural disasters (OP-704) calls not only for measures during or after a disaster occurs, but also for structuring in advance the country's ability to prevent potential hazards. This project is in line with these recommendations.

**SPECIAL
CONTRACTUAL
CONDITIONS:**

The Executing Agency must comply to the Bank's satisfaction with the following conditions prior to first disbursement of the Bank's Contribution:

- (1) establish a separate or sub- Bank account;
- (2) establish Terms of Reference for the Project Technical Director as well as letters of agreement with all participating specialized agencies, including their Terms of Reference;
- (3) letters of agreement from at least three national focal points; and
- (4) select a Project Technical Director.

For disbursement purposes, the WMO will establish a separate Bank account which will function as revolving funds account. The Bank (COF/CCR) will disburse up to 30% of total IDB contribution (excluding contingencies) into the established revolving fund upon compliance with the conditions prior to first disbursement. The fund will be replenished upon request by the Executing Agency, request which must include the justification of the use of the Bank's previous disbursement(s). In case the executing agency should not fulfill said condition and in order to avoid payment disruptions to other specialized agencies that signed letters of agreement with the Executing Agency, the Bank may disburse directly to these specialized agencies upon COF/CCR and SDS/ENV review and approval of the output provided by said agencies.

I. BACKGROUND

- 1.1 Throughout the Americas, countries faced social and economic distress associated with the 1997/98 El Niño event in the tropical Pacific Ocean. In anticipation of El Niño's impact on key sectors such as agriculture, fisheries, hydro-energy generation, water management, human health and transportation, and the overall strength of their economies, the governments of Bolivia, Chile, Costa Rica, Ecuador, Panama and Peru declared states of emergency (or their equivalent) in affected areas, in order to cope with the expected drought, heavy rainfall and flooding. Other countries in Central America and the Caribbean, such as the Dominican Republic, Haiti, and Jamaica, also implemented measures to cope with these and other natural disasters.
- 1.2 The IDB has approved loans for Argentina, Ecuador, Paraguay and Peru (El Niño Emergency Programs 1118/OC/AR, 1057/OC/EC, 1104/OC-PR and 1058/OC/PE) and a technical cooperation was prepared for Central America by IDB, to mitigate the effects of the present El Niño and to provide necessary capacity building in disaster preparedness.
- 1.3 Previous El Niño events, as well as the converse La Niña events, have had devastating effects on the countries of Latin American and the Caribbean. The economic value of global losses due to floods, drought, forest fires, destruction of coral reefs, fishing industry, etc, associated with the El Niño event of 1982/83 was estimated to be 13 billion US dollars. Early warning could have reduced these losses considerably. Therefore, it is necessary to go beyond the present emergency relief status and establish a system which improves the quality of predictions and early warnings of the effects of both these phenomena, jointly referred to as El Niño Southern Oscillation (ENSO) events. Improved meteorological systems as well as the institutional setting, will allow these countries in the future to adopt pertinent measures in a timely and effective manner. The socio-economic benefits of providing accurate warnings and adopt targeted measures in advance are high. Estimates indicate that real economic returns on investments from improved seasonal to interannual climate forecasts have been in excess of 12 percent for the United States.
- 1.4 Besides actual warnings, it is of even equal importance to determine precise forecasts of El Niño's impacts on drought, streamflow, changing ocean and atmospheric temperature and their related impacts on crop yields, fishery resources, floods and emigration of families from flood prone areas, landslides, infrastructure, reef mortality, altered hurricane activity and budgetary demands for emergency relief actions and stockpiling of food, medicines and fuel in specific regions. Furthermore, it is necessary to assess the existing safety nets in the respective countries as to address the direct and indirect consequences of the El Niño phenomenon on income and consumption of poor households.

- 1.5 Being a global phenomenon, ENSO cannot be studied only locally. Initial efforts were conducted - such as the World Climate Research Program (WCRP) and the Tropical Ocean Global Atmosphere (TOGA) - by many countries and specialized organizations such as the World Meteorological Organization (WMO), National Oceanic and Atmospheric Administration (NOAA), the International Research Institute (IRI) and others active in the region, in order to better understand global climate incidents and develop models to improve forecasts. Furthermore, atmospheric and oceanographic data collection programs have been initiated.
- 1.6 In the case of El Niño, an ENSO Observation System is in place since 1994. Forecast information, though of varying degrees of confidence, is also currently available throughout Latin America, in part due to efforts of national research and meteorological institutions (e.g. IRI and NOAA). Some countries have been seriously impacted by this event and several governments have indeed taken action with varying degrees of success. This demonstrates the need and opportunity for an institutionalized and coordinated approach with respect to the provision of information and its practical application in the future. This necessarily has to be regional in nature, since countries cannot predict global phenomena based solely on their own capabilities and capacities. The application of preventive and other measures is local, but the prediction is based on a regional system. Proposals for improving forecast systems and for strengthening institutional capacities of the respective national and regional organizations involved will certainly contribute to initiate actions required for their modernization.
- 1.7 However, it is unlikely that countries of Latin America and the Caribbean will invest in such systems unless the benefits can be more clearly identified. Methods, similar to those used for the United States study should therefore be employed to estimate the value of providing improved forecasting and application capabilities in the countries concerned. This, along with the socio-economic studies to be undertaken should demonstrate the economic and social benefits of investing in systems that improve forecasts, as well as mechanisms / action plans to cope with adverse meteorological effects.
- 1.8 In summary, there is a need to: (1) analyze the technical and institutional capacities of national meteorological institutions / organizations; (2) analyze the extent of the socio-economic impact of ENSO events and, (3) formulate implementation plans for the improvement of early warning systems, interconnecting data generating (research institutions, meteorological services, etc) with data user organizations.

II. OBJECTIVES

- 2.1 The general objective of this regional technical cooperation is to design a feasible regional early warning system to ameliorate the socio-economic impacts of ENSO. The feasibility will be analyzed in selected countries from the technical, economical, social, environmental, legal and institutional points of view.
- 2.2 The specific objectives are: (i) to evaluate the existing institutional and technical forecasting capability in all countries of the region to anticipate and cope with El Niño's consequences; (ii) to identify on a geographical basis by groups of countries, the more vulnerable economic sectors and population groups; (iii) to analyze the economic value of improved early warning systems as compared to the existing situation; and (iv) to prepare project proposals for improved early warning systems in selected countries within the sub-regions of Meso-America, the Caribbean and South America, to ameliorate the socio-economic impacts of ENSO.

III. DESCRIPTION

A. Activities

Approach:

- 3.1 The effects of ENSO are not homogeneous in the region. Nor are the capabilities for prediction and amelioration of its effects. That is why the study will take a converging approach.
- 3.2 First, an assessment of existing technical and institutional capabilities will be made covering all the countries. This task will be accomplished by using the accumulated knowledge in the region and in the participating specialized agencies and concentrating on the most important information gaps. This information will include data needed for assessing the socio-economic vulnerability.
- 3.3 Four case studies on specific country/sector combinations will then be selected. Simulation analyses will be made in these combinations with macroeconomic models in order to analyze the impacts of ENSO events on the economy as a whole, particular country regions, economic sectors and population groups. The economy and population groups are affected in different ways in different countries (the effect on fisheries may be important in some Pacific-rim countries of South America, but not in Central America, for example; the converse might be true for agriculture, etc.). Accordingly, the selection criteria for the countries to be studied in this step include the following: (i) their geographical location; (ii) their degree of readiness to cope with ENSO effects; (iii) the direct and indirect consequences on poor households; (iv) the importance of the effects in various sectors (in some countries the effect on

agriculture may be most important; in others it will be the effect on water resources management, or fisheries, or health; the prevention of natural disasters may be a common denominator, etc.); and (v) the availability and readiness of data.

- 3.4 Based on the above, a preliminary design proposal of early warning systems will be made for a country or group of countries in each of the sub-regions of Meso-America, the Caribbean and South America, that will try to capture economies of scale and regional/sub-regional sharing of data. In order not to over-design the systems, it is important to assess the economic feasibility of such incremental improvements. This will be made on the basis of one of the sector/country combinations previously selected and analyzed and, which has the most suitable data for this purpose.
- 3.5 To discuss the findings of the analysis and the proposed projects, a policy workshop will be held in order to inform as well as obtain inputs from policy makers and advisers of all the countries. This will allow them to formulate final decisions with respect to the preliminary project proposals and implementation plans designed for installing or upgrading and modernizing early warning and applications systems. The three final demand-driven proposals will be finished on that basis at the feasibility level. In addition, the study would have also established a methodology that could be applied to satisfy any demand for additional feasibility studies.

Components:

- 3.6 This technical cooperation therefore comprises the following main components :
 1. *Evaluation of existing institutional and technical capabilities in all countries of the region (estimated total costs: US\$240,000, of which IDB: US\$80,000).* It will cover: (1) the capacity of the national organizations to analyze and apply data ; (2) human resources requirements; and (3) institutional capacity building needs, including the relationship with users of forecast data.
 2. *Diagnostic analysis of socio-economic vulnerability in four selected sector/country combinations (estimated total costs: US\$280,000, of which IDB: US\$250,000):* The diagnostic will comprise: (1) identification of the more vulnerable sectors and population groups; (2) preparation of four case studies; (3) analysis of the institutional preparedness; and (4) simulations with macroeconomic models.
 3. *Preliminary system design and feasibility study; one each for Meso-America, the Caribbean and South America (estimated total costs: US\$285,000, of which IDB: US\$160,000):* This will be done in parallel with component 2, and will define the requirements for the proposed early warning systems, based on the most crucial and relevant information and technical gaps

identified in component 1 (observation and transmission network and data reception, computers, forecast models and software, human resources, institutional setting, and use of networks and systems). This component also includes a training session aimed at disseminating and explaining the value of climate forecasts, targeted for country representatives of relevant affected social and economic sectors.

4. *Determination of the economic value of additional information (estimated total costs: US\$95,000, of which IDB: US\$65,000):* Based on the results of components 2 and 3 above, a cost-benefit analysis will be produced for one sector of the economy and within the country were macroeconomic simulation models were prepared (see component 2).
5. *Policy Workshop (estimated total costs: US\$50,000, of which IDB: US\$30,000):* A workshop will be held toward the end of the analysis series, in order to inform as well as obtain inputs from policy makers and advisers of the countries involved. The main objective of this workshop is to provide information regarding the findings of the analyses to date (results of the evaluation of existing capabilities, the diagnostic analysis of socio-economic impacts, the preliminary feasibility study and the cost-benefit analysis), allowing participating countries to formulate final decisions with respect to the preliminary project proposals and implementation plans designed for installing or upgrading and modernizing early warning and applications systems.
6. *Design of three implementation plans and of project proposals (estimated total costs: US\$150,000, of which IDB: US\$65,000):* To be prepared for interested countries or a group of countries in a sub-region, at least one proposal in each of the sub-regions of Meso-America, South America and the Caribbean.

B. Organization and implementation

- 3.7 The WMO as a world-wide specialized agency for climatology and meteorology will be the Executing Agency for the technical cooperation and will be responsible to the Bank for overall activities.
- 3.8 The WMO will be assisted by the following organizations/institutions (specialized agencies): IFPRI, IRI, and NOAA (for additional information about these agencies see *Annex I*). The WMO will sign letters of agreement with them for the purposes of this study, detailing their Terms of Reference and (if applicable) counterpart financing (please also see paragraph 3.16, giving a brief justification for the selection of these specialized agencies, and *Annex I*). Indicative Terms of Reference for the participation of the Specialized Agencies and for the individual consultants are included in *Annex V* (SDS/ENV technical files).

- 3.9 As executing agency, the WMO will use its sub-regional office in San José, Costa Rica for the implementation of this regional technical cooperation 1/. As such, the WMO will be responsible, among others, for (1) process the requests for funds to the Bank, (2) sign letters of agreement with IFPRI, IRI and NOAA for the execution of this technical cooperation, (3) process the requests for proposals for consultancy services from the participating organizations, (4) contracting the consultants in coordination with the organizations involved; (5) identifying and establishing letters of agreement with the respective national focal points that will be involved in this study and (4) overseeing overall project activities.
- 3.10 The WMO will hire a consultant to act as Project Technical Director (to be financed by Bank funds). His overall functions include: (1) manage, supervise and coordinate project activities, (2) mobilization of government specialists, consultants and the various stakeholders, and (3) participation in the preparation of the deliverables stated in the terms of reference (see *Annex V* in technical files of SDS/ENV). Detailed Terms of Reference will have to be presented by the WMO to the Bank (COF/CCR and SDS/ENV) for approval. In addition, WMO will provide office space, support personnel and general support services at its sub-regional office in San José (in kind contribution).
- 3.11 The WMO will also be directly involved as specialized agency on the evaluation of the existing institutional and technical capabilities (component 1), the policy workshop (component 5) and the project proposals (component 6). Within each project component, the assistance to be received by WMO from the specialized agencies and to be specified in the respective letters of agreement (sub-contracts) to be signed, is as follows:
- (a) IFPRI: will carry out the socio-economic vulnerability analysis (component 2);
 - (b) IRI: will develop the preliminary system design and feasibility study including the organization of the training course (component 3);
 - (c) NOAA: will support the WMO within all components but mainly doing the analysis of the economic value of additional information (component 4);

1/ Through its coordination of the World Climate Program and its participation in a wide range of climate related activities, the WMO has a rich technical and coordination expertise in climatological activities. Furthermore, participating countries are also members of WMO, which also facilitates the regional coordination. Also, through the Climate Information and Prediction Services (CLIPS) project that is being implemented by the WMO on a world-wide basis, this operation can build upon the expertise and progress being achieved in other regions with respect to the provision of climate information and their effective use and application for predictions.

(d) IFPRI, IRI and NOAA will also support the WMO in components 1, 5 and 6, but specially in the design of implementation plans and project proposals (component 6).

(e) IFPRI, IRI and NOAA will designate a technical coordinator for the project within their institution.

Summary of technical responsibilities (*)

COMPONENT/TASK	MAIN TECHNICAL RESPONSIBILITY	ASSISTED BY
1. Evaluation of existing capabilities	WMO	NOAA, IFPRI, IRI
2. Analysis of socio-economic vulnerability	IFPRI	WMO, NOAA
3. Preliminary system design and feasibility; training course	IRI	WMO
4. Analysis of economic value of additional information	NOAA	WMO, IFPRI
5. Policy workshop	WMO	NOAA, IFPRI, IRI
6. Project proposals	WMO	NOAA, IFPRI, IRI

(*) The Executing Agency will be the WMO

3.12 Due to the nature of the study and the participating specialized agencies and in order to ensure a well coordinated implementation of the project, a Coordinating Committee will be established, which will be chaired by the executing agency. The Committee comprises the Bank (SDS/ENV and SDS/POV), representatives from the focal points and from the participating specialized agencies and regional/sub-regional organizations. The main functions of the Committee will be the following: (1) advise the executing agency on potential candidates and requirements for the individual consultancy services (see terms of reference in Annex V); (2) identify existing and/or potential short-comings in the execution of the study and recommend measures to overcome them; and (3) perform periodic progress reviews during the execution of this technical cooperation and recommend adjustments for the pending work, if necessary. The Committee will meet at least twice during the project's implementation period, and at the end of the project for the purpose of evaluation. Prior to every meeting, the respective reports (IRR, see paragraphs 3.22 - 3.24) will have to be distributed by the WMO.

3.13 Project activities will be executed according to the following implementation sequence:

- Phase 1: Fourty five days; hiring of PTD, initial planning meeting, ending with the detailed **working plan**;
Three months, for **hiring of other consultants**;
- Phase 2: Seven months, ending with the **diagnostics report** on existing capabilities, including **results of surveys** of climate data, climate and ENSO forecasting and disaster preparedness institutions as well as a **training course** for potential users;
- Phase 3: Five months, finalizing the **report of case studies** and **diagnostic report on socioeconomic vulnerability**, as well as preliminary report on **alternative forecasting schemes** (with respective design, including required equipment, personnel, telecommunications infrastructure and institutional arrangements), plus details of which alternative(s) was selected and why, and preliminary reports on the macro-economic modelling and the cost benefit analysis for the selected countries.
- Phase 4: Workshop in the 17th month, presenting the **results of the analyses to date**, including the results of the macroeconomic model analysis and cost benefit analysis, and the results of the **preliminary system design**;
- Phase 5: Four months, ending with the **final report**, including the final report on the socioeconomic vulnerability, the cost benefit analysis and project implementation plans and project proposals.

3.14 A detailed schedule of activities is given in *Annex II*.

3.15 Project execution period for this technical cooperation is expected to be 21 months as of signature of the Agreement by the Executing Agency.

Benefits deriving from the participation of other organizations

3.16 The support and participation of other organizations, such as NOAA, IFPRI and IRI will be important to the project in providing collaborative support, expertise and experience and due to their involvement in actual forecasts. The participation of the NOAA's chief economist and the Office for Global Program is particularly beneficial since they have already embarked on several programs which will contribute to this project. Among these programs are: (1) the development of a Pan-American Climate Information System (PACIS), (2) review of the climate outlook for a methodology, (3) pilot project on forecast availability in reducing climate impact costs and (4) pilot projects in Latin America and the Caribbean on the use of forecast information. Furthermore, benefits will derive from the use of information, training and workshops that will be conducted by these organizations independently and complementary to project activities. The involvement of IFPRI is especially

significant since the participation of social scientist consultants working in the field of forecast applications will be crucial. The involvement of IRI is essential since they conduct research and training in climate forecasting and produce climate prediction information that can be employed by countries with trained personnel. (See also Annex I for more information on each specialized agency).

C. Cost and financing

- 3.17 Total project costs are estimated at US\$1,538,000. The Bank will contribute US\$998,000 from the Japan Special Fund (JF). Bank funds will cover financing for consultancy services (individual consultants and firms/specialized agencies), as well as general support and publications. Furthermore NOAA and WMO will each provide in-kind contributions in the equivalent of US\$170,000 and the participating countries a total in-kind contribution in the equivalent of US\$200,000. A summary of costs is given in the following table (see detailed budget in Annex III).

Budget summary
(US\$)

Components / Categories	IDB	NOAA (in kind)	WMO (in kind)	LOCAL (in kind)	Total
I. Evaluation institutional and technical capabilities: Individual consultancy services, travel & per diem, and general Support	80,000		30,000	130,000	240,000
II. Diagnostic socio-economic vulnerability Consultancy Specialized Agencies, and general support	250,000			30,000	280,000
III. System design / feasibility study / trainig session Consultancy Specialized Agencies, travel & per diem and general support	160,000	105,000	20,000		285,000
IV. Economic value additional information Consultancy Specialized Agencies, individual consultancy services, travel & per diem, and general support	65,000	30,000			95,000
V. Policy Workshop Travel & per diem and general support	30,000		10,000	10,000	50,000

VI. Implementation Plans / project proposals Consultancy Specialized Agencies, individual consultants, general support	65,000	35,000	20,000	30,000	150,000
VII. Publications	15,000				15,000
VIII. Project Technical Guidance / Administration Consultancy Specialized Agencies, individual consultancy services, travel & per diem.	310,000		90,000		400,000
IX. Contingencies	23,000				23,000
TOTAL	998,000	170,000	170,000	200,000	1,538,000

- 3.18 For disbursement purposes, the WMO will establish a separate Bank account which will function as revolving funds account. The Bank (COF/CCR) will disburse up to 30% of total IDB contribution (excluding contingencies) into the established revolving fund upon compliance with the conditions prior to first disbursement. The fund will be replenished upon request by the Executing Agency, request which must include the justification of the use of the Bank's previous disbursement(s). In case the executing agency should not fulfill said condition and in order to avoid payment disruptions to other specialized agencies that signed letters of agreement with the Executing Agency, the Bank may disburse directly to these specialized agencies upon COF/CCR and SDS/ENV review and approval of the output provided by said agencies. The remaining 10% IDB contribution will be disbursed upon the Bank's approval of the final report. As executing agency, the WMO will hire a consultant to assist with the additional activities resulting from the execution of the technical cooperation and will also receive 2% of the Bank's contribution as financial management costs.
- 3.19 Conditions prior to first disbursement. The WMO must comply with the following conditions prior to first disbursement: (1) establish a separate or sub- Bank account; (2) establish Terms of Reference for the Project Technical Director and individual consultants as well as letters of agreement with all participating specialized agencies, including their Terms of Reference (to be approved by SDS/ENV and SDS/POV); (3) letters of agreement from at least three national focal points; and (4) select a Project Technical Director. At completion of the envisioned activities, the WMO will present for the Bank's approval (COF/CCR) an audited consolidated and detailed financial report.

D. Reports and monitoring

Reports

- 3.20 The executing agency will submit all respective reports (hard copy plus their electronic files on 3.5" or higher capacity diskettes in Word or WordPerfect to the IDB (COF/CCR, SDS/ENV and SDS/POV) and the Coordinating Committee. The reports will be produced by the Project Technical Director based on the reports prepared by the respective consultants and participating specialized agencies.

Detailed working plan

- 3.21 The detailed working plan shall be submitted within forty five days as of project initiation. It shall include a detailed schedule of activities, outlining tasks, visits, reports to be produced, etc. for each of the participating specialized agencies, consultants or group of consultants in the project team. Furthermore, the plan must include a projected disbursement schedule.

Implementation Review Reports (IRR)

- 3.22 The first report shall be submitted within eleven months as of project initiation (end of phase 2; see paragraph 3.13 and Annex II). This report will synthesize the results of the initial technical visits to the countries concerned, and include a diagnosis of the existing capabilities and results of the surveys on climate data, climate and ENSO forecasting and disaster preparedness (as a result of component 1) and results of the training course.
- 3.23 The second report shall be submitted within sixteen months as of project initiation (end of phase 3). This report should include: (1) a draft of the case studies, as well as of the diagnostic paper on socio-economic vulnerability, including an array of applicable macro-economic models (as a result of component 2); (2) summary of the findings on alternative and feasible forecasting systems (as a result of component 3), and (3) summary of preliminary conclusions from the cost-benefit analysis (as a result of component 4). Furthermore, this report will include a draft agenda of the topics to be discussed at the policy workshop (see component 5).

Final report

- 3.24 A draft final report will be submitted by the WMO for comments within nineteen months as of project initiation. This report will comprise a synthesis of all the respective analyses by project components. Furthermore, it will include a chapter evaluating issues related to overall project implementation, lessons learned and future actions. The report will have to be distributed with the respective annexes, i.e. the final papers that were prepared within

each project component. All participating specialized agencies and IDB will present their comments to the WMO within 30 days.

- 3.25 The final report will be submitted for approval by the WMO to the Bank (COF/CCR, SDS/ENV and SDS/POV) at the end of the implementation phase of this technical cooperation.

Monitoring

- 3.26 The operation will be monitored by the Coordinating Committee. In order to fulfill its tasks, the Committee will receive all pertinent information (reports) through the Project Technical Director. If members of the Committee should have any concerns about the reports or related to aspects of project implementation, they should be addressed as agreed by the Committee. The Committee should meet three times during execution of the study, unless specific circumstances require additional ad hoc meetings. The Project Technical Director will prepare and distribute the respective minutes of these meetings to all Committee members.

IV. BENEFITS AND RISKS

Benefits

- 4.1 Some countries may already have the capability of using ENSO forecasts to predict climate changes in their country-regions by applying statistical models or dynamic models or a combination of both. Nevertheless, the benefit for these countries will be the availability of profound analysis and focused implementation plans / projects to further improve and modernize their methods and systems. Furthermore, this technical cooperation will give incentives for a closer collaboration and cooperation between national, regional and international climate forecast organizations and specialized institutions and thus contribute to the technical and institutional capacity building of relatively lesser developed organizations and institutions 2/.
- 4.2 Countries whose climate forecast systems and related organizations and institutions do not have the capacity to predict long range forecasts covering a season or longer (seasonal forecast), as opposed to short and medium range weather forecasts, will benefit from this technical cooperation through the availability of a set of options ranging from training to recommendations for the modernization of existing systems and applicable instruments to

2/ A great deal of data relating to ENSO is available on the Internet. Deficiencies in access to the Internet should be defined. Also, other sources of data, such as the Caribbean Meteorological Institute, should be identified.

relieve the impact of adverse climate conditions. The application of said options will further be encouraged by the analysis of the socio-economic vulnerability, as well as the cost-benefit analysis, identifying the economic value of additional information on adverse weather phenomena and of adequate prevention and relief mechanisms.

Risks

- 4.3 One major risk is that some countries may face difficulties in applying project recommendations and implementation plans to upgrade and modernize existing systems, institutions and prevention and relief instruments due to financial, technical or other restrictions. Nevertheless, through the involvement of various climate forecast and specialized institutions in this project, countries are able to establish closer links with these institutions in an effort to improve climate forecast systems and other prevention as well as relief instruments.

V. EVALUATION

- 5.1 At the end of project implementation, the WMO will issue a final report including an evaluation of the activities accomplished. This evaluation will include an assessment of the respective consultancy services, and an overall assessment of the study as a whole. The report will detail the difficulties encountered and the solutions found during project implementation.

LOGICAL FRAMEWORK

OBJECTIVES	INDICATORS	VERIFICATION METHODS	HYPOTHESIS
<p><u>OUTCOME:</u></p> <p>A feasible project or projects to establish a regional system or systems which will produce: (a) improved early warnings based on actual predictions of ENSO, and (b) utilization of these warnings to ameliorate the socio-economic impacts of ENSO</p>	<p>The Climatologic forecasting organizations of participating countries will be able to make better long-term predictions tailored to the user's needs</p> <p>The disaster preparedness organizations will be able to make better use of forecast information</p>	<p>Feasibility of increased capacity for regional climatic predictions</p> <p>Feasibility of useful predictions from the point of view of disaster preparedness organizations</p>	<p>The feasibility of the investment projects is demonstrated. Continued priority and commitment of Governments for the execution of the investment projects, once the design and feasibility study is finished</p>

<p><u>PURPOSE:</u></p> <p>(i) design feasible implementation plans/projects to improve and utilize early warning forecasts of impending danger, so that interested countries can submit them to international or regional lending institutions</p> <p>(ii) analyze the technical, environmental, socioeconomic, legal and institutional feasibility of the project proposals and implementation plans.</p>	<p>The designed implementation plans / projects are adequately structured and tailored to the needs and capabilities of the participating countries and follow internationally accepted standards</p> <p>All possible negative environmental impacts are analyzed and adequate mitigation measures are included, if needed</p> <p>All economic indicators at a level acceptable to the Bank are evaluated and beneficiaries are identified</p> <p>The proposed execution scheme is within possible boundaries as determined by the capabilities, legal framework and political objectives of the countries, both, at the national and international level.</p>	<p>A Coordinating Committee will be formed with representatives from all participating specialized agencies, the Executing Agency and the focal points. The Committee will approve activities prior to first disbursement, will review and approve the reports produced by the Executing Agency and will meet periodically to agree on measures necessary to ensure that the objectives of the study are met.</p>	<p>That Executing Agency, other specialized agencies and focal points demonstrate capacity to carry out the various activities on a timely manner.</p>
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<p>COMPONENTS / ACTIVITIES:</p> <ol style="list-style-type: none"> 1. Evaluation of existing institutional and technical capabilities: consultants / specialized agencies will analyse: (1) the institutional capacity of national climate forecast organizations, including their capacity building needs and, (2) their human resource requirements. 2. Diagnostic analysis of socio-economic vulnerability: consultancy services / specialized agencies will identify vulnerable sectors and population groups affected by adverse weather phenomena; prepare targeted case studies; macroeconomic simulation models and, analyse the respective institutional preparedness. 3. Preliminary system design and feasibility study: based on the results of the activities mentioned above, this component will define the requirements for early warning systems. Furthermore, training sessions will be offered. 4. Determination of the economic value of additional information: preparation of a cost-benefit analysis, based on macroeconomic simulation models, in order to determine the value of additional weather forecast information. 5. Policy workshop: organization of a policy workshop in order to discuss the proposed implementation plans for identified early warning systems. 6. Design of implementation plans and of project proposals: final preparation of implementation plans according to the countries' needs and request. 	<p>A Project Technical Director and an assistant will be hired by the Executing Agency.</p> <p>The Executing Agency will also hire all the necessary individual consulting services called for in the TC Plan of Operations, following the requirements and procedures of the Bank and will secure all necessary arrangements and formal agreements with the participating specialized agencies NOAA, IFPRI and IRI, and the participating national and/or subregional focal points</p> <p>The Executing Agency will coordinate all work and inputs from the various participants and produce the following reports: (i) detailed workplan 30 days after initiation; (ii) diagnostic report eleven months after initiation; (iii) preliminary report sixteen months after initiation; (iv) draft final report nineteen months after initiation; and (v) final report twenty-one months after initiation of studies.</p>	<p>Information sources for verification will be the original draft reports and technical memoirs of the specialized agencies and consultants, as well as the information that can be provided by the focal points in the participating countries.</p> <p>Also information provided by the IADB Representations and the meetings of the Coordinating Committee</p>	<p>That the different specialized agencies, consultants and focal points provide the required inputs on a timely basis</p>
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PROPOSED RESOLUTION

REGIONAL. NONREIMBURSABLE TECHNICAL COOPERATION FOR A STUDY ON THE PREDICTION
AND AMELIORATION OF SOCIO-ECONOMIC IMPACTS OF EL NIÑO SOUTHERN
OSCILLATION (ENSO) IN LATIN AMERICA AND THE CARIBBEAN

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, as Administrator of the Special Fund of Japan, to enter into such agreements as may be necessary with the World Meteorological Organization, and to take such measures as may be pertinent for the execution of the plan of operations referred to in Document AT-_____ with respect to a nonreimbursable technical cooperation for a study on the prediction and amelioration of socio-economic impacts of El Niño Southern Oscillation (ENSO) in Latin America and the Caribbean.

2. That up to the sum of US\$998,000 is authorized for the purposes of this resolution, chargeable to the resources of the Special Fund of Japan.

3. That the above-mentioned sum is to be provided on a nonreimbursable basis.