USAID/GUATEMALA – CENTRAL AMERICAN PROGRAM MITCH SPECIAL OBJECTIVE: IMPROVED REGIONAL CAPACITY TO MITIGATE TRANSNATIONAL EFFECTS OF DISASTERS

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I. Introduction

On October 25, Hurricane Mitch, the fourth most intense Atlantic Ocean hurricane on record, slammed into the Central American coastline. At its height on October 26 and 27, the hurricane had sustained winds of 180 mph and triggered 4 days of heavy incessant rains. The devastation wrought across a broad portion of Central America, especially in Honduras and Nicaragua, was unprecedented. Throughout the region, more than 9,000 people were reported killed, an equal number were reported missing. In addition to the immediate human tragedy, Hurricane Mitch inflicted severe damage to the region's economy and infrastructure. Total damages, direct and indirect have been estimated in the range of $7.5 to $8.5 billion for the region. This short-lived

extreme event set back economic development in the most affected countries by perhaps more than a decade.

Hurricane Mitch's incursion into Central America is not an anomaly. Extreme events are a common feature of Central America's climate. On average the Caribbean Basin experiences ten "named" tropical storms per year, of which six are classified as hurricanes. Intense dry seasons, associated with the El Niño Southern Oscillation Phenomenon (ENSO) such as the one that affected the region in 1998, have impacted the region sixteen times this century.

Recent trends and future climate change scenarios suggest that the frequency and severity of extreme climate events will increase. For example, three of the last four Atlantic Basin hurricane seasons were exceptionally active. In the past four years, there were a total of 32 hurricane-force tropical storms. This amounts to an average of eight per year; which is two above the long-term average of six storms a year. On September 25, 1998, for the first time this century, four concurrent hurricane-force storms, George, Ivan, Jeanne, and Karl were in progress on the same day in the Caribbean Basin. Conversely during the protracted 1998 dry season, roughly 42,286 forest fires occurred throughout the isthmus burning over 2.5 million hectares, an area larger than the country of El Salvador. Ironically, the Central American Presidents' Summit scheduled for November 16, 1998, in which vulnerability to extreme climatic events was one of the principal agenda items, had to be postponed due to Hurricane Mitch.

The likelihood that Central America will experience extreme climate phenomena with increasing frequency poses a heightened risk for a region that also is prone to unpredictable disastrous seismic events. To reconstruct Central America's infrastructure, and rehabilitate its economy without taking into account this reality would be futile. Central America must begin now to incorporate the increasing likelihood of climate change-induced catastrophic events in its sustainable development strategy.

II. Problem Statement

In spite of its strength, duration, and unpredictable trajectory, Hurricane Mitch cannot be singularly blamed for the devastation it triggered. Instead, the disaster emerged largely from development patterns and institutional weaknesses that tend to increase Central America's vulnerability to extreme climatic events.[1] According to a recent USAID-Department of Energy report, *"The effects of the natural disaster were aggravated by man-made factors including: poorly developed and maintained infrastructure; population pressures that have resulted in large scale deforestation; and an historic lack of soil conservation that left communities vulnerable to deadly floods and mud slides. Flooding was aggravated by poor watershed management."*[2]

Three systemic weaknesses that exacerbate Central America's vulnerability to disasters are: 1) poor watershed management and unsustainable use of natural resources; 2) inappropriate infrastructure development and maintenance; and, 3) insufficient institutional capacity to assess vulnerability and influence land-use planning.

To address these and other weaknesses, the countries affected by Hurricane Mitch propose to carry out a series of national reconstruction activities in public health (water and sanitation, repair, reconstruction and re-equipping of health clinics, and disease surveillance), economic reactivation (soil conservation, assistance to small farmers, micro-enterprise lending, and repair and reconstruction of housing, schools, and farm-to-market roads), and environmental management/disaster mitigation (through better land-use planning and watershed management, reforestation and flood control). However, there is a clear need to address regional level deficiencies in the capacity to mitigate transnational effects of disasters and reduce regional vulnerability. Individual countries, hard-pressed to deal with their reconstruction needs, may be unable to focus on or leave unattended cross-border implications and opportunities for disaster mitigation.

There are four disaster mitigation problem areas that the Secretariat for Central American Integration (SICA) and national governments agree require a regional approach. These areas are: (1) inadequate resource management practices in transnational watersheds that increase vulnerability; (2) insufficient regional coordination on road network planning and design; (3) deficient regional vulnerability assessment capacity; and (4) inadequate coordination on regional energy system vulnerability. USAID/G-CAP's regional program is well positioned to offer assistance in transnational watersheds and road network planning and design because of its existing programs with regional institutions and field resources.

III. Rationale for a Regional Approach

Seven Central American nations occupy 525,000 Km^2, which is an area equivalent to three-fourths the size of Texas. Nicaragua, the region's largest country, is only one fourth the size of California. This relatively large number of countries squeezed in the narrow Central American isthmus translates into an inordinate extension of shared international boundaries and cross border effects.

The superimposition of Central America's political boundaries onto a topographically complex landscape has important ecological, economic, and social ramifications. For example, natural units, such as watersheds and important coastal zone ecosystems do not respect international boundaries. Thirty six percent of Central America's surface is contained in shared watersheds, and 26% of the total annual runoff flows between countries. Furthermore, the ecological health and resilience of key coastal ecosystems are linked to watersheds that drain two or more countries (e.g. Gulf of Honduras, Gulf of Fonseca). National level actions separated from regional considerations can not solve Central America's natural resources management problems; this is a deficiency that renders the region more vulnerable to extreme climate events.

This ecological intertwining also has economic and social dimensions. For example, intra-regional trade accounts for 16% of the region's international trade, and 7% of the region's GDP. During Hurricane Mitch, severed transportation routes had important trade and disaster response implications. Energy generated in El Salvador is used to meet peak demand needs in Guatemala.

Central American countries have long recognized the need for regional coordination. Efforts at regional integration date back to 1962 with the establishment of the Organization of Central American States. Today, the close relationship between regional and national development is explicitly recognized in the Central American Alliance for Sustainable Development (ALIDES), a regional pact signed in 1994 by the Central American heads of state outlining a regional agenda for collaboration. The implementation of ALIDES is presided over by the Central American System for Integration (SICA), an umbrella secretariat that incorporates sectoral institutions such as the Central American Commission for Environment and Development (CCAD), the Central American Economic Integration Secretariat (SIECA), the Regional Committee on Hydrologic Resources (CRRH), and the Regional Center for Prevention of Natural Disasters in Central America (CEPREDENAC). This institutional matrix has given rise to a number of regional legal instruments, such as the Regional Agreement on Climate Change, and the Regional Agreement on Forests. Thus, from a legal and institutional perspective, Central America, perhaps more than any other region in the developing world, lends itself to a regional approach for development assistance. The United States in the CONCAUSA declaration, a joint statement outlining an action plan in support of ALIDES, formally embraces the collaboration between Central America and the United States. The close ecological, sociological, economic, legal and institutional integration of Central America creates several windows of opportunities for a regional approach to reduce the transnational effects of disasters.

- A regional program working through regional institutions can bring countries together to address cross-border dimensions of disaster mitigation such as the management of transnational resources and the development of a sound regional road network.
- Because of similarities among countries, lessons learned in one country may be shared across the region.
- A regional approach may reduce institutional and infrastructure redundancy. Thus, a few well-placed national environmental data management centers, with clear regional data distribution functions, may provide disaster mitigation-related information services to the entire region.
- Capacity building events from a regional platform catering to common training needs is probably more effective than training programs carried out individually in every country.
- A regional approach could streamline disaster related information exchange between US institutions and Central America. Hence, a standing agreement for real-time information exchange between a US agency and a counterpart in Central America, with a similar agreement with national level institutions would simplify and clarify information exchange channels and responsibilities.

This strategy is designed to cash-in on clear opportunities created by a regional approach to disaster mitigation.

Regional SpO Principles

The proposed regional Special Objective adheres to the following specific principles:

- a USAID regional program should not duplicate national-level bilateral efforts, but support and complement them;
- the regional program must not expand into themes that are more effectively handled by other agencies and USAID operational units; and
- the program should also work in areas and address problems that regional bodies, such as SICA, have identified with the national governments as appropriate for regional intervention.

This regional strategy focuses on geographic and thematic areas that are more conducive to a regional approach, and in which USAID/G-CAP has a comparative advantage. On-the-ground activities will be confined to transnational natural units such as watersheds and associated coastal areas, or regional level mapping and data management efforts. The strategy will concentrate on strengthening international linkages, particularly as it relates to information exchange. In order to avoid overlap with USAID's Office of Foreign Disaster Assistance (OFDA) and other disaster response units, this strategy does not include actions to address disaster response and management.

IV. Description of the Special Objective and Results Framework

The regional SpO is "Improved Regional Capacity to Mitigate Transnational Effects of Disasters." To achieve this SpO, USAID/G-CAP's regional program will pursue two intermediate results: 1) framework established for sound transnational watershed management; and 2) regional guidelines and standards developed to reduce road network vulnerability to natural disasters.

USAID/G-CAP will be collaborating and coordinating with the Nicaragua, El Salvador, Guatemala, and Honduras Missions, USAID/Washington, as well as with USG agencies on regional Mitch reconstruction efforts.

IR1: Framework Established for Sound Transnational Watershed Management

Rationale

There are fifteen transnational watersheds in Central America; however, there is no existing supra-national mechanism or agreement to coordinate the management of these hydrological units. People and institutions in different countries work independently with little concern for transnational watershed management. Often, upstream actions by one nation have detrimental downstream consequences in another nation. The vulnerability of infrastructure (e.g., power plants, and bridges), populations centers, and agriculture in a downstream country may be increased by poor land-use practices in a neighboring upstream country. This situation has a bearing not only on disaster mitigation but also on international relations. Hence, the need for an improved framework for transnational watershed management that galvanizes efforts in different countries around a common set of watershed management objectives has been identified.

Activities under this IR will be centered on one or two watersheds for which pilot multinational watershed management and monitoring action plans will be developed. This may serve to guide the development of transnational watershed management agreements, treaties, protocols and action plans. Currently, Central America lacks a regional policy and legal instrument to regulate or direct the management of transnational watersheds. [3]

Several U.S. agencies have proposed watershed centered activities related to post-Mitch environmental reconstruction in Central America. For example, the U.S. Department of Agriculture (USDA) proposes to work with producers to reduce the impact of inappropriate natural resources management practices on watersheds. This work will focus on Nicaragua and Honduras where Hurricane Mitch's impacts were most pronounced. The United States Geological Survey **(**USGS) proposes to re-establish and improve the stream and river monitoring network in selected watersheds, some of which could be transnational, and to develop a watershed management project.

Watershed-level management planning and capacity building activities such as those proposed by U.S. partner agencies are essential for sound watershed management and disaster mitigation. However, the management of transnational watersheds require collaboration among countries, a goal USAID/G-CAP is well placed to achieve because of its relationship with regional institutions (CCAD and CRRH), field presence, contacts with key watershed management entities and individuals, and thorough knowledge of cross border issues.

IR1 - Framework Established for Sound Transnational Watershed Management - will be met by establishing a coordinating mechanism and determining criteria and action plans for the sound management of natural resources in key transnational watersheds. This will entail the adoption of a joint watershed management plan by the watershed countries and the establishment of an effective institutional arrangement for its implementation. These actions should lead to improved watershed management, better natural resource management, improved disaster avoidance capacity, and overall greater regional capacity to respond to extreme events. In the pursuit of this result USAID/G-CAP will tap complementary efforts proposed by the other U.S. agencies and USAID bilateral missions.

Illustrative Approach

This IR will be achieved through a *quasi*-chronological sequence of activities that begin with the compilation and organization of natural resources and socio-economic data into a geo-referenced database. The geo-referenced database will be developed in collaboration with USGS and NASA. Collaboration with the latter will be conducted under the Memorandum of Understanding between that agency and the Central American Commission for Environment and Development (CCAD). The creation of the database will be used as a training medium to increase the capacity of Central American disaster-related institutions to process geo-referenced data.

The geo-referenced database will provide the basis for the undertaking of a watershed vulnerability analysis to be conducted in close coordination with the USGS. The vulnerability analysis will identify disaster-prone areas such as unstable steep terrain, fire and flood prone

areas, vulnerable populations, and vulnerable infrastructure. Ideally, it will incorporate models that link the magnitude and nature of extreme events with the spatial distribution of risk. For example, decision making tools using the GIS database could be used to estimate the likelihood of fire outbreaks in specific areas of the watershed based on a combination of vegetation characteristics, population, land-use practices, and weather trends.

A vulnerability analysis and a geo-referenced database will guide the installation of an effective hydrologic monitoring system. USAID/G-CAP in coordination with NOAA and the USGS will develop a monitoring system consisting of a network of gauging stations linked by satellite to a receiving station. The location of the receiving station will be determined through informed discussions. NOAA is planning to install a receiving station in Central America; USGS and NOAA will collaborate with USAID and regional partners to set up the hardware and software components necessary for this to take place. USAID\G-CAP also could support the development of real-time data exchange protocols between watershed management entities and satellite data management centers. Training in flood forecasting and other aspects of early warning will be conducted in close coordination with NOAA.

Armed with a solid watershed database and information system, natural resources management planners from the countries involved will be in a better position to develop a transnational watershed management plan. One more element key to achieving IR1 is the establishment of an effective institutional arrangement for transnational watershed management. The nature of this institutional arrangement is to be defined through discussions among stakeholders facilitated by CCAD. USAID/G-CAP does not envision the creation of a new multinational watershed entity, but rather a clear definition of roles and assignment of responsibilities to existing national level institutions and individuals for the joint management of the watershed. The activities of these institutions and individuals could be coordinated by existing regional structures such as the Regional Committee on Hydrologic Resources (CRRH).

Selection of Key Watersheds

Key watersheds will be selected in collaboration with regional partners. Selection criteria will be based on the following: (1) degree of vulnerability of populations, infrastructure and natural resources within the watershed; (2) economic importance of the watershed to the relevant countries; (3) willingness of the countries to support the activity; (4) availability of data; and (5) demands placed on the watershed's water resources.

Based on the above criteria, it is probable that the watershed will be situated in the Pacific side of the continental divide. This segment of the Central American isthmus accounts for 30% of surface water resources and 66% of the Central American population resides here.[4] This imbalance creates significant pressure on watershed resources. The Rio Lempa watershed, shared among El Salvador, Guatemala, and Honduras emerges as a likely Pacific selection site. The Rio Lempa provides water to El Salvador's three hydroelectric dams. Guatemala and El Salvador share energy generated within its watershed. NASA is planning to collect high-resolution radar data in portions of the watershed. Other possible watershed sites include the Rio Goascoran (Honduras-El Salvador). This river drains into the Gulf of Fonseca (El Salvador, Honduras and

Nicaragua), which is a key coastal ecosystem. Additionally, PROARCA/Costas has activities in the Gulf of Fonseca and the area is one of NASA's intensive data sampling sites.

Illustrative Indicator

- Effective transnational watershed management plan adopted

An index measure will be used to reflect the different steps required to adopt a watershed management plan. The following benchmarks will be measured: 1) watershed management plan developed; 2) institutional arrangement for transnational watershed management in place; 3) watershed management adopted; and 4) joint watershed conservation or monitoring actions implemented.

IR2: Regional Guidelines and Standards Developed to Reduce Road Network Vulnerability to Natural Disasters

Rationale

There are no standard design and construction guidelines for the present regional road network. Each country uses its own standards for their section of the regional road network. The Pan American road system, financed by the United States, initially adhered to a standard set of construction and design guidelines. However, over time as countries repaired sections of the road, the standard construction regulations were replaced with country specific regulations. Moreover, many of the guidelines governing the Pan American road system are now obsolete and do not take into account the potential effects of severe natural disasters. Inadequate and obsolete specifications constitute a serious condition of vulnerability for the region's road network.

The destruction of Central American's roads infrastructure due to Hurricane Mitch provided concrete evidence of the vulnerability of the road network to natural disasters. Central American countries have now decided that vulnerability planning is a critical component of the overall road plan. The Central American Roads Network Program, as defined by the Ministers of Transportation Council (COMITRAN), includes the roads systems through the Central American region, links to neighboring regions, and selected spurs to major urban centers and strategic points such as ports and airports. COMITRAN will take the lead role in preparing a vulnerability analysis for incorporation in future assessments and decisions regarding the Central American road corridor. USAID's regional SpO will assist COMITRAN in this effort.

Illustrative Approach

An assessment of the road network vulnerability will be carried out with the active participation of all appropriate stakeholders in the public and private sectors. Recommendations from the road assessment will be disseminated, as appropriate. It is anticipated that the recommendations will allow for a more informed decision-making process at the national and regional levels. SIECA, with technical assistance provided by USAID/G-CAP, will facilitate the development of a regional action plan that lays out the required measures to upgrade, over the short term, the regional road network and reduce vulnerability to natural disasters.

Illustrative Indicators

- Assessment of the road network vulnerability completed including recommendations, standards applied and a completed action plan
- Application of regional standards and other specifications in the construction and maintenance of the regional road network

V. Linkages to Key Regional Programs and Policies

Relationship to CONCAUSA

Several of the CONCAUSA commitments specifically address the environmental area of focus of the proposed USAID/G-CAP Special Objective. These include:

- support the active participation of Central American scientists and natural resource managers in data sharing, training and information exchange for watershed planning;
- provide support for improvement and coordination of geographical information systems;
- support the systematic monitoring of changes in: the advance of the agricultural-deforestation frontier, forest composition, coastal zones, land-use, marine currents, and climate; and,
- provide technical training in the analysis of satellite information and support for the establishment of satellite imagery networks among U.S. and Central American centers.

Relationship to NASA-CCAD Memorandum of Understanding

The NASA-CCAD five-year program, as outlined in their MOU, has considerable relevance and application to the SpO, through the compilation, dissemination and utilization of information important to vulnerability reduction. Of relevance to the SpO, under the MOU signed in 1998, the parties will:

- cooperate in the use of satellite and aerial photography data to develop land cover classification maps for the entire isthmus;
- develop CCAD´s environmental data and information systems through the provision of optical, radar and topographical remote-sensing data;
- build capacity among Central American researchers in remote-sensing analysis and utilization;
- facilitate U.S.-Central American connections in space and earth science, research and applications.

Some of the major products that will emerge from the program are the following: (1) mosaic map of the entire region; (2) digital elevation maps developed from radar aerial photography; (3) land-cover maps; (4) forest fragmentation information; (5) GIS data base; and (6) intensive study site analyses.

Relationship to SIECA

The Secretariat for Central American Economic Integration (SIECA) serves as an executive secretariat to the Ministers of Transport Council (COMITRAN) on issues related to regional road networks and the regional logistical corridor. SIECA has a mandate to harmonize trade policies including customs procedures and other elements to encourage increased regional trade.

VI. Implementation Plan

A. Illustrative Approaches

IR1

USAID/G-CAP's principal partner for IR1 will be CCAD under the direction of SICA. CCAD's participation is crucial to the coordination of the watershed management plan development, facilitating the development of an effective information management and sharing system, and putting in place an effective institutional arrangement for watershed management. CCAD will operationalize aspects of the NASA MOU that are relevant to the achievement of the IR1 such as providing training on the use of the GIS database for watershed management decision-making. USAID resources will facilitate collaboration between NASA and CCAD through the regional and national working groups created by CCAD to support the MOU. CCAD, through the Environmental Directorate's Watershed and Hydrological Resources Unit, will coordinate with regional organizations on issues related to the undertaking of a vulnerability analysis. CCAD will be instrumental in the coordination of transborder activities such as conducting watershed management and disaster mitigation workshops for national and regional organizations.

Given the nature of the activities and results proposed under this SpO, USAID/G-CAP proposes to enter into a new grant agreement with CCAD, as the principal regional partner to implement actions specific to this SpO. The activities to be implemented under IR1 are new and different from those results anticipated in our current agreement with CCAD.

Interagency agreements will be signed with NOAA and USGS. NOAA will provide training and technical assistance for a local-level flood warning network and telemetry installation. Additionally, NOAA will assist with improving the hydrometeorological data collection network and ensuring that a watershed-level flood forecasting system is in place. USGS will provide technical assistance and training for the installation of stream gauging stations, and will develop flood inundation and landslide susceptibility maps.

IR2

The development of a sound regional road network has been fully endorsed by each of the Central American governments. Donor agencies supporting elements of this initiative include the Central American Bank of Economic Integration (CABEI) and the Inter-American Development Bank (IDB). Regional institutions participating in the initiative include the Central American Institute for Economics and Business (INCAE) and the Central American Economic Integration Secretariat (SIECA). SIECA has taken the lead

for the region on this initiative and is coordinating with donor agencies and national transportation ministries. It is anticipated that private investors will be involved in this initiative, possibly through a road construction and maintenance concession system.

USAID/G-CAP proposes to amend its current cooperative agreement with SIECA to include IR activities.

B. Monitoring and Evaluation

Within three months of SpO obligation, USAID/G-CAP will complete a performance-monitoring plan (PMP). The PMP will describe: the performance indicators, unit of measurement, data source, method/approach of data collection, a collection schedule, and party responsible for data collection and analysis. Quarterly reports will assess progress against indicator targets, to ensure activities are on track, and to make adjustments for the remainder of the program. These reviews will involve USAID, other USG agencies, and regional partner organizations. A final evaluation will be undertaken at the end of the two-year effort.

C. Audit Plan

USAID/G-CAP will ensure a high level of financial accountability for all funds provided to it under the supplemental. One consideration for determining implementers will be their ability to provide proper stewardship of USG funds. In this vein, USAID/G-CAP will work principally with known partners, both U.S. and non-American. Partners will likely include those with whom USAID/G-CAP has already worked to develop sound financial/administrative systems.

As part of its audit plan, USAID/G-CAP will employ concurrent audits, limited scope audits, USAID/G-CAP financial reviews, local coverage under A-133 audits of US partners and the regular Recipient Contract Audit Program for non-US partners. Financing for the audits and financial reviews will be factored into the SpO budget. RIG/ES, in collaboration with USAID/G-CAP, performed a risk assessment. Subsequently, RIG/ES issued its audit plan, which USAID/G-CAP is working with RIG/ES to implement.

VII. Environmental Compliance

An Initial Environmental Examination (IEE) has been prepared and approved by the LAC Bureau Environmental Officer. A Categorical Exclusion was issued to all activities involving education, technical assistance and other actions, such as the training and networking activities of IR1 which will not have an adverse impact on the natural or physical environment. A Negative Determination with conditions was issued to activities involving small-scale construction and the installation of stream monitoring devices. Implementation of these activities will adhere to environmental guidelines. The PROARCA Program Director and Regional Environmental Advisor, prior to activity implementation, must approve these environmental guidelines. A copy of environmental guidelines must be submitted to the LAC Bureau

Environmental Officer for his records. An Initial Environmental Examination (IEE) will be prepared prior to approval of activities. The IEE will follow the format established by the agency and will be submitted to the LAC Bureau Environmental Officer for review.

VIII. Resource Plan

A. Resource Requirements USAID/G-CAP has requested $4.5 million in supplemental resources to establish a framework for sound transnational watershed management and to develop regional guidelines and standards to reduce road network vulnerability to natural disasters.

B. Obligation Plan USAID/G-CAP plans to obligate the Regional Special Objective using various mechanisms (interagency 632B transfers, IQCs, cooperative agreements, etc.) as mentioned in the implementation section. One congressional notification will advise Congress of USAID's planned use of these funds.

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[1] Banco Interamericano de Desarollo. 1999. Lecciones aprendidas de los recientes desastres naturales en Centro America, e incorporación de la dimensión ambiental en los planes de reconstrucción nacional. Paper presented at a workshop: Gestión ambiental y disminución de Vulnerabilidad a Desastres Naturales, San Salvador March 3-5, 1999.

[2] USAID/DOE, Roadmap for Redevelopment of Central American Energy Infrastructure, 1999.

[3] Comité Regional de Recursos Hidraúlico (CRRH). Plan de Acción para la Gestión Integrada de los Recursos Hídricos del Istmo Centroamericano. Dirección Ambiental, Sistema Centroamericano de Integración, El Salvador, 1999

[4] CRRH. 1999.