

**CONCEPT NOTE: Development and Coordination of a Technical, Operational and Legal Framework for the Management of Geographic Information in Central America**

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**Introduction**

Geographic information is essential for Central American nations to address national issues such as urban growth, forest management, land title administration, coastal zone management, natural hazard mitigation, and land use planning. While countries in the region develop their economies, attracting investment in their human and natural resources, geographic information, such as aerial photographs, road maps, population censuses, soil surveys, rainfall measurements, and forest inventories, become increasingly more important. At the same time, natural disasters such as Hurricane Mitch and the more recent earthquakes in El Salvador demonstrated the necessity for having up-to-date demographic and terrain data on hand to facilitate disaster relief and reconstruction. The proposed Mesoamerican Biological Corridor and tourism activities rely on spatial data as well for habitat characterization, priority setting and monitoring. Spatial data includes all data that is referenced to a location, and Geographic Information Systems (GIS) have greatly expanded opportunities for data integration and analysis, modeling, and map production. Typically, spatial data is the raw material upon which planning offices evaluate projects, universities structure research, and NGO's develop conservation plans. Private businesses, as well, are increasingly using spatial data to guide investment and marketing strategies.

Government agencies produce the majority of a nation's data; however, universities, private companies, non-governmental agencies, and donors also collect, process, and disseminate geographic information. Many of these datasets when fused or integrated are inconsistent, inaccurate, or inadequate for certain applications. The countries in Central America have yet to develop a comprehensive plan to coordinate data acquisition, production, integration and dissemination.

Several issues in particular limit the use of geographic information:

- (1) Data tend to be produced by many different institutions, in an uncoordinated way, and under inconsistent specifications. There is considerable duplication of effort, and different formats and standards prevent data integration.
- (2) The lack of documentation of spatial data [referred to as metadata] prevents users from finding out what data are available and evaluating the fitness of the data for an intended application.
- (3) The lack of policies on pricing and access to spatial data inhibits the use of data by obscuring the procedures for data acquisition.

**National Spatial Data Infrastructure**

National Spatial Data Infrastructure (NSDI) is a structured national system for managing geographic information. NSDI encompasses the policies, technologies, standards, laws, and institutional organization for facilitating the acquisition and use of and access to geo-referenced information. An indispensable component of NSDI is a national committee for the coordination of activities and the development of policies. At the same time, it is necessary to initiate inter-institutional working groups focused on specific themes. These working groups participate in the development of standards and other themes such as communication, education, metadata and clearinghouse, etc. The aim is to generate and provide information that facilitates decision-making by institutions.

Developing NSDI is a complex endeavor with diverse ramifications to many sectors of the government. Base data (maps covering political boundaries, roads, streams, etc.) and technology are at the core, but NSDI also requires institutional change and partnerships. In a simple schema, NSDI has both administrative and operational components (Table 1).

Table 1. General scheme for national geographic information management (Lance and Pedreros 2000).

Administrative Components	Operative/Technical Components
<ul style="list-style-type: none"> <li>- Legal framework (copyright, restrictions)</li> <li>- Coordinating body / Leadership</li> <li>- Access policies / Pricing / Restrictions</li> <li>- Monitoring of administrative costs</li> <li>- Monitoring of data users</li> <li>- Inter-institutional agreements</li> </ul>	<ul style="list-style-type: none"> <li>- Standards</li> <li>- Data accuracy</li> <li>- Metadata (data documentation)</li> <li>- Clearinghouse (network of distribution)</li> <li>- Internet access / Websites</li> <li>- Fundamental data (base maps)</li> </ul>

Public access to spatial data is increasingly being defined by the legal and economic factors of who controls and potentially profits from the data. It is important to recognize that these legal and economic factors need to be actively discussed and decided. If not, they will get decided on by default or in an ad hoc way. Without focusing attention on NSDI policies, benefits from government data may not be shared by all. In the absence of NSDI policies, a state of “policy chaos” ensues, which leads to confusion, waste, and misuse -- not just of spatial data, but of human and natural resources.

The same way there is a need to coordinate the development of geographic data within a country, it is necessary to do so between countries in a region. This concept note thus far has summarized the status of geographic data management in the region and explained how NSDI provides a beneficial and viable alternative. The remaining text outlines a project to bring together government representatives from Central America, along with experts from other countries, to establish spatial data infrastructure as a backbone to sustainable development, as a regional vision for information policy, and to support national agencies in managing data resources.

**Regional Project**

Each country in Central America, individually, has begun taking steps in the development of their national spatial data infrastructures. The countries would further benefit from cooperation and exchange of NSDI models already put into practice elsewhere (e.g., from the United States, Canada, Mexico, and Colombia). Plus, cooperation and exchange would ensure the transnational compatibility of data.

This concept note summarizes a project to bring together government representatives from Central America, along with experts from other countries, to stimulate NSDI dialogue. The proposed project will be a combination of a technical capacity building and institutional strengthening – linking in with national planning programs for sustainable development, environmental protection, modernization of the state, science and technology innovation, and access to information.

The project will host two regional conferences that will clarify the requirements and constraints characterizing spatial data dissemination. The project will also promote spatial data policies, as they affect spatial data description, compatibility, and access at the regional level. Policy makers ultimately will speak a common language and be able to make informed decisions about their information resources.

The project also will include a series of national workshops and meetings, which will facilitate the cooperation of participating institutions in the development of data standards, data access mechanisms, data policies, and the development of fundamental data. Communication between the National Geographic Institutes, the National Statistics Institutes, and the Ministries of Environment will increase. Generally, each has been working in separate spheres, and this has had a negative impact on geographic information development and use. Throughout the process, the project will have an active dissemination program, including preparation of briefing papers and public awareness materials. The project will take advantage of electronic networking to encourage the broadest possible discussion of issues. By the end of the project, each participating country will have draft documentation and an implementation plan for their individual NSDI programs, as well a regional implementation plan.

The implementation plans will take into account that the full vision of NSDI can only be achieved over time and with the leadership of national mapping organizations. It is essential that the National Geographic Institutes of Central America, as the chief geographic data producers and authorities in the region, provide the necessary leadership to achieve this goal. The Directors of the National Geographic Institutes (IGNs) have recently formed a Regional Committee for Spatial Data Infrastructure, and a formal international agreement for cooperation was signed. Much progress has already been made in clearinghouse development through support from the Inter-American Development Bank (IADB) and Pan-American Institute for Geography and History (PAIGH). The EROS Data Center (EDC) and the International Center for Tropical Agriculture (CIAT) have had supporting roles in the region from past and on-going activities, and they are prepared to provide technical support to the National Geographic Institutes in their efforts to develop national and regional data infrastructure.

NSDI activities in each country will center on the development of four linked, core components:

- *Institutional framework*, which defines the policy and administrative arrangements for building, maintaining, accessing data;
- Work plans for *Fundamental Data* (primary data sources – base maps);
- *Technical Standards and Protocols*, which define the technical characteristics of the fundamental data and other thematic datasets, and
- *Clearinghouse Network*, which is the means by which metadata are made accessible to the community.

The project would produce the following outputs:

- ❖ Increased leadership of IGN's for implementing NSDI.
- ❖ Formulation of NSDI Steering Committees and standards working groups.
- ❖ (Draft) law/executive order for the legal authority of the NSDI Steering Committees.
- ❖ National NSDI implementation plans and a regional SDI implementation plan.
- ❖ NSDI awareness-raising within government agencies and the public.
- ❖ Institutional mechanisms/clearinghouses for data discovery.
- ❖ Standards for fundamental data development.
- ❖ Assessment report of copyright law/database protection.
- ❖ Procedures/performance indicators in place to monitor NSDI development.

More interaction between Central America and the U.S., Canada, Mexico, Colombia should have many positive effects. This interaction is particularly timely given the trans-national scope of many environmental concerns (biodiversity conservation, disaster management, migration, etc.) A greater awareness is needed of the interdependence of government institutions involved in spatial data management, since coordination is needed for establishing standards, formats, database protection, and co-financing.