Spatial Data Infrastructure:

NSDI concepts NSDI components SDI around the world



Kate Lance IGIS Americas July 29, 2003

A bit about me

U.S. Geological Survey EROS Data Center **Global Spatial Data Infrastructure Secretariat** U.S. Federal Geographic Data Committee E-INFORM (Africa) / SDI Africa Newsletter **PCIDEA** PROCIG







Central American Geographic Information Project (PROCIG)

27 participating institutions

Instituto Geográfico Nacional ^{*} SEGEPLAN

Dirección General de Estadística y Censos Ministerio de Agricultura y Ganadería Ministerio de Medio Ambiente y Recursos Naturales Viceministerio de Vivienda y Desarrollo Urbano Instituto Geográfico Nacional

> Instituto Nacional de Estadística y Censos Ministerio de Agricultura y Ganadería Ministerio de Ambiente y Energía Instituto Geográfico Nacional CATIE

http://www.procig.org

Land Information Center

Instituto Nacional de Estadística Secretaría de Agricultura y Ganadería Secretaría de Recursos Naturales y Ambiente Instituto Geografica Nacional

> Instituto Nacional de Estadística y Censos Ministerio Agropecuario y Forestal Ministerio de Ambiente y Rec. Naturales INETER

> > CIAT

Dirección de Estadística y Censos Autoridad Nacional de Ambiente Instituto Geográfico Nacional SENACYT

Significant increase in GIS use in the region

Scale 115

N LE STA ATA CONTRO DI P

lolous hard many





SAN FRANCISCO

JPQ(ESBQ56) nap

PUNTA PAITILL

Information Management Initiatives in Honduras (March 2001)

Initiative	Date of Initiation	Source of Funding	Orientation
SINIA AOT - SIGIT [SERNA]	August 1999	World Bank	National Environmental Information System & Land Administration System
Center for Geographic Information- CIGEO [UNITEC]	May 2000	USAID	Spatial data documentation and exchange
National Network for Permanent Capacity in Risk Management [COPECO]	June 2000	OFDA/USAID	Natural Disaster Network for disaster information exchange
National Forest Information System [COHDEFOR]	in development	World Bank	Information management for sustainable forestry
National Statistical Information System [INE]	January 2001	UNDP, ASDI	Census and statistics for development and democracy
National Systems for Evaluation and Management [Ministry of the President]	August 1999	IDB	Monitoring of policies, programs, projects and activities related to Modernization of the State

In Honduras, several projects promote better development and use of spatial data However, there is duplication

and little coordination between projects.

Donors are part of the problem

However...

THE BOOK OF @ BUSINESS

Acceleration of the operation beneficiary contracts, acceleration of another and acceleration of another and an another the acceleration and acceleration of the acceleration acceleration of the acceleration of a contract of the acceleration o

I provide the first and the second state of the state of the provides of the first provides of the first for provides of the first provides of the state of the provides of the first provides of the state of the provides of the state of the state of the provides of the state Nice facade. Bad infrastructure.



Nice facade. Bad infrastructure.

to make the postilions

Hered comparements with the region of approxy preserve that it is inclusively and pre-fillent excession that it is inclusively building endowman. In the preting the region of the region of the second second pre-many with a region of the region of the second preting and the second preting a second preting a second pre-second pre-toting a second preting a second A server of a Lightly Local approximation of the activation of the server of a transmission of the server of the s

annumer is from a control around annumer is being an Warman and annumer is being an Warman and annumer and annumer is being a subscription and being a subscription of a being and being and a subscription and being and a subscription and being and a subing being and a subscription of a subing being and a subscription of a subing being and a subscription of a subscription.

* LEGAL NOTE: IBM, the e-business logo and other marks designated ® or M are trademarks of International Business Machines Corporation in the United States

Source: The Economist



Capacida de Uso Original



Source of graphic: Alden Rivera, SERNA-Honduras







Justification for SDI

 Inconsistency in the production of geographic information (different coding and classification systems, different projections, lack of official digital base maps)

- Limited data documentation
- Duplication of efforts
- Institutional egos
- Insufficient value added to basic maps
- Minimal data exchange / sharing



What is a Spatial Data Infrastructure (SDI)?

"The SDI provides a basis for spatial data *discovery, evaluation, and application* for users and providers within all levels of government, the commercial sector, the non-profit sector, academia and by citizens in general."

--The SDI Cookbook

Components of NSDI

 Technology (hardware, software, networks, databases, technical implementation plans)

- Policies & Institutional Arrangements (governance, data privacy & security, data sharing, cost recovery)
- People (training, professional development, cooperation, outreach)

NSDI typically is not ...

a central repository of data
 (merely) a national geospatial database

Spatial Data Infrastructure:

NSDI concepts NSDI components SDI around the world



Kate Lance IGIS Americas July 29, 2003

Framework & Thematic Data...



Base Maps

Thematic Maps

Data provide the core

Framework Data







Thematic Data



Flood Zones Populated Places Land cover Water Lines Sewer Lines Soils Schools

Framework data...

provide a base on/from which to compile other themes





Development of Geodetic Control

Possible Consequences of Using Inconsistent Coordinate Systems

Source of graphic: Janice Sessing, NOAA

Metadata...

 Data about data -- describes existing data
 A standardized form of metadata was published in June 1994 by the FGDC; an international standard should be ready in 2003

 Metadata

 Base Maps
 Thematic Maps

An Operational View of Geospatial Data

Spatial/AttributionTemporal(Attributes,
Coding scheme)

Metadata

(Data Characteristics /Properties)

<u>"Metadata is a component of</u> <u>the data"</u>

What Good Are Metadata?

Organize and maintain an institution's internal investment in geospatial data.
 (Do you know what you've got?)
 Drovide information about an organization's data

Provide information about an organization's data to catalogues and clearinghouses.
 (Can you describe to someone else what you've got?) (Is it useful to advertise or promote what you have?)
 Provide information during a data transfer. (Can potential users figure out what you've done?)

Clearinghouse... Publication of metadata





Base Maps

Thematic Maps

Clearinghouse...

- Distributed service to locate geospatial data based on their characteristics expressed in metadata
- Clearinghouse allows someone to pose a query of all or a portion of the 'metadata network' in a single session
- Like a spatial Google/AltaVista



Discovery in Clearinghouse



Search Criteria

Geographic Coordinates

- place names
- bounding rectangle coordinates
- draw bounding box on interactive map

Time

- before, after and equal to
- Full / Field Text
 - full text
 - fielded search (14 metadata fields)

Data Sources

- all registered nodes
- selected nodes

Clearinghouse Nodes Around the World



Source: USGS/EROS Data Center, Sioux Falls

As of April 2001	
Argentina:	1
Barbados:	2
Brazil:	2
Canada:	42
Chile	1
Colombia:	2
Costa Rica:	3
Dominica:	1
Dominican Republic:	1
El Salvador:	1
Guatemala:	2
Honduras:	2
Jamaica:	1
Mexico:	2
Nicaragua:	1
Peru:	1
Trinidad & Tobago:	1
United States:	147
Uruguay:	2
Venezuela:	1

20 countries

Standards...

Standards allow NSDI to function, ensures compatibility/interoperability

Clearinghouse (catalog) + Services



Types of geospatial standards Data Classification e.g., Land Cover Classification Data Content e.g., Digital Geospatial Metadata, Data Schemas Data Symbology or Presentation e.g., Digital Geologic Map Symbolization Data Transfer e.g., ftp Data Services e.g. web mapping Data Usability e.g., Geospatial Positioning Accuracy July 2003

Codes for the Administrative Divisions



Unique identifier codes provides a means by which cross-reference attribute data (thematic data).



Chemical x 758 - 0.0 757 - 0.3 756 - 0.7 755 - 1.0

Number of Fish 758 - 60 757 - 100 756 - 200 755 - 400 International Organization for Standardization

Technical Committee 211

ISO/TC 271



Geographic Information / Geomatics

Communications Network...



Information Policy...



Data Pricing and Accessibility



(FREE)

Legal Framework...



Leadership and partnerships hold it all together

Inter-institutional Leadership/Partnership



Example NSDI Organigram



Inter-institutional Leadership/Partnership

The technical obstacles are minor compared to the institutional obstacles





Source of graphic: http://www.ahajokes.com/crt017.html

NSDI Components

'Institutional'

- Coordinating organization
- Enabling legislation
- Dedicated personnel for NSDI
- Legal aspects (copyright, liability, privacy)
- Access policies / restrictions / pricing
- Financing and monitoring of administrative costs
- Monitoring of data use
- Inter-institutional agreements

'Technical'

- Framework (core) data
- Standards
- Metadata (data documentation)
- distribution network)
- Websites
- Map servers / Map services
- Internet access

Education/Training

(Lance and Pedreros 2000)

Who is part of the solution?



Spatial Data Infrastructure:

NSDI concepts NSDI components SDI around the world



Kate Lance IGIS Americas July 29, 2003

A global network of geographic information custodians is growing

Global Spatial Data Infrastructure

"SPATIAL INFORMATION FOR THE GLOBAL COMMUNITY".

In the second secon

GSDI Conferences



- GSDI 1 Bonn Germany Sept 1996
- GSDI 2 Chapel Hill, USA Oct 1997
- GSDI 3 Canberra, Australia Nov 1998
- GSDI 4 Cape Town, South Africa Mar 2000
- GSDI 5 Cartagena, Colombia May 2001
- GSDI 6 Budapest, Hungary Sept 2002
- GSDI 7 Bangalore, India February 2004
- GSDI8 Cairo, Egypt May 2005

Permanent Committee of Spatial Data Infrastructure for the Americas



Permanent Committee of Spatial Data Infrastructure for the Americas

Principal Page

Statutes and Agreements

Reference Documents

Members

Working Groups

Links

PC IDEA

The aims of the Committee are to maximize the economic, social and environmental benefits of geographic information in accordance with Agenda 21 by providing a forum for nations from the Americas to:

Cooperate in the development of a regional geographic information infrastructure;

Contribute to the development of the global geographic information infrastructure;

 Share experiences and consult on matters of common interest; and

 Participate in any other form of activity such as education, training, and technology transfer.

Regional consensus has been achieved a forum for nations from the Americas to develop SDI





Pass the database

THANK YOU

Kate Lance klance@usgs.gov